

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

by

Kathryn Margaret Butterly

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ABSTRACT

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. Using

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).



Figure 1. TeamSTEPPS[®] 2.0 Logo.

Reprinted from www.ahrq.gov by AHRQ, 2013. Retrieved from: <http://www.ahrq.gov/teamsteps/images/tslogotxt.html>. Reprinted with permission

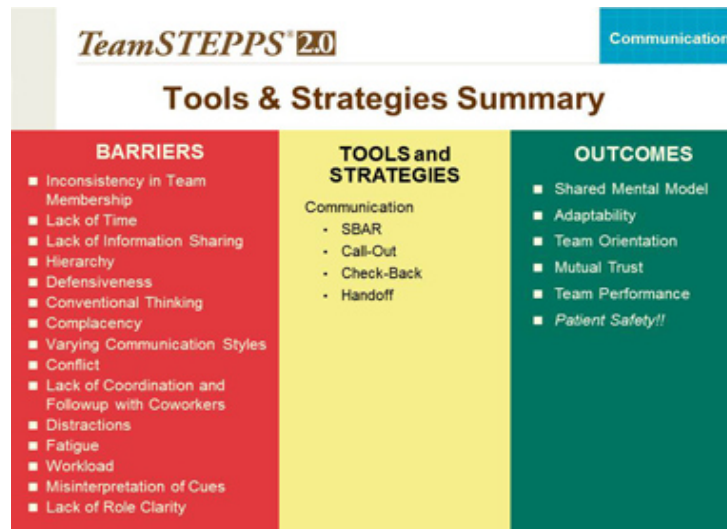


Figure 2. Tools & Strategies Summary. TeamSTEPPS[®] 2.0. Essentials Course
 Reprinted from www.ahrq.gov by AHRQ, 2013. Retrieved from: <https://www.ahrq.gov/teamsteps/instructor/essentials/igessentials.html> Reprinted with permission.

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[®] 2.0, 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[®] 2.0, 2017).

TeamSTEPPS [®] 2.0 Master Trainer	
Module 1	Introduction
Module 2	Team Structure
Module 3	Communication
Module 4	Leading Teams
Module 5	Situational Monitoring
Module 6	Mutual Support
Module 7	Summary-Putting it all together
Module 8	Change Management
Module 9	Coaching Workshop
Module 10	Measurement
Module 11	Implementation Workshop
Module 12	Practice Teaching Session

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).

Theoretical Framework

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).

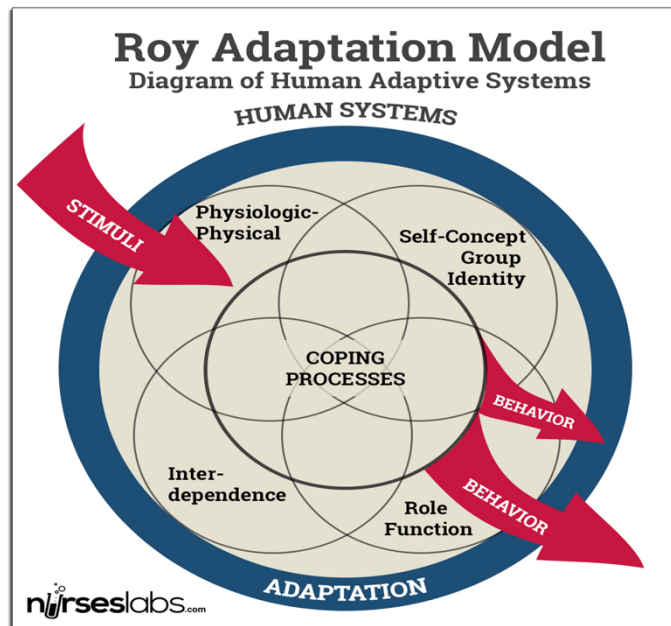


Figure 3. Roy Adaptation Model. Reprinted from nurseslabs.com by Nurse Labs 2018. Retrieved from: <https://nurseslabs.com/sister-callista-rov-adaptation-model/> Reprinted with

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 ($p < 0.01$). 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 ($p < .03$), 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).

TeamSTEPPS[®] 2.0

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).

Author	Title	Setting	Evaluation tool	Team Structure
Capella et al. (2010)	Teamwork training improves the clinical care of trauma patients.	Trauma	TTPOT	Surgical residents, faculty, and nurses
Colacchio, et al. (2012)	An approach to unit-based team training with simulation in a neonatal intensive care unit.	Neonatal ICU	Teamwork Attitudes Questionnaire (TAQ) TeamSTEPPS	Physicians, RNs, leadership, NPs, Pas, RTs, administrators
Deering et al. (2011)	On the front lines of patient safety: Implementation and evaluation of team training in Iraq.	Combat support hospital	Rates of communication-related errors, medication and transfusion errors, and needle stick incidents	All staff within the combat support hospital
Figueroa, et al. (2013)	Improving teamwork, confidence, and collaboration among members of a pediatric cardiovascular intensive care unit multidisciplinary team using simulation-based team training.	Pediatric Cardiovascular ICU	TeamSTEPPS	Multidisciplinary staff that work within the unit
Lisbon, et al. (2016)	Improved Knowledge, Attitudes, and Behaviors After Implementation of TeamSTEPPS Training in an Academic Emergency Department: A Pilot Report.	ED	TeamSTEPPS knowledge test	ED staff, physicians, and residents
Maxson et al. (2011)	Enhancing nurse and physician collaboration in clinical decision making through high-fidelity interdisciplinary simulation training.	Simulation education center	Collaboration Satisfaction About Care Decision Instrument	RNs and physicians
Mayer et al. (2011)	Continuing efforts to optimize TeamSTEPPS implementation in surgical and pediatric intensive care units.	Pediatric ICU Surgical ICU	TeamSTEPPS program	All PICU, SICU, and RT
Reed et al. (2017)	Simulation using TeamSTEPPS to promote interprofessional education and collaborative practice.	ED	TeamSTEPPS fundamentals tool. TTPOT	BSN nursing students 4 th year medical students (ED)
Rice, et al. (2016)	Implementation and Evaluation of a Team Simulation Training Program.	Trauma ICU	T-TAQ, TTPOT, T-TPQ, NLN satisfaction Survey	RNs
Riley et al. (2011)	Didactic and simulation non-technical skills team training to improve perinatal patient outcomes in a community Hospital.	Perinatal units within community hospitals	Weighted Adverse Outcomes Score (WAOS) and Safety Attitudes Questionnaire	All staff on perinatal unit

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 implement 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 ($p < .001$), and self-efficacy ($p < .001$). Rice et al. (2016) reported improved ($p < .000$) 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,

2016). 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,

n.d. a). 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).

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

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) (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 SSES with second- and third-year nursing students at a large university. The authors found the SSES to be a reliable psychometric evaluation of SBTT (Levett-Jones et al., 2011). The SSES 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 SSES 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.

Index	Role	Department	Years of Experience	Years at Hospital
P1	MD	ED	14	6
P2	MD	ED	9	4
P3	MD	ED	5	2
P4	MD	ED	6	5
P5	PA	ED	3	1
P6	RN	ED	17	9
P7	RN	ED	11	6
P8	RN	ED	11	7
P9	RN	ED	8	5
P10	RN	ED	7	4
P11	RN	ED	3	1
P12	RN	ED	3	2
P13	RN	Pediatrics	21	16
P14	RN	Pediatrics	9	4
P15	RN	Pediatrics	9	6
P16	RN	Pediatrics	7	3
P17	RN	Pediatrics	2	2
P18	RN	Pediatrics	2	1
P19	Paramedic	EMS	22	20
P20	Paramedic	EMS	7	3

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).

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

Table 5: T-TAQ 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 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.

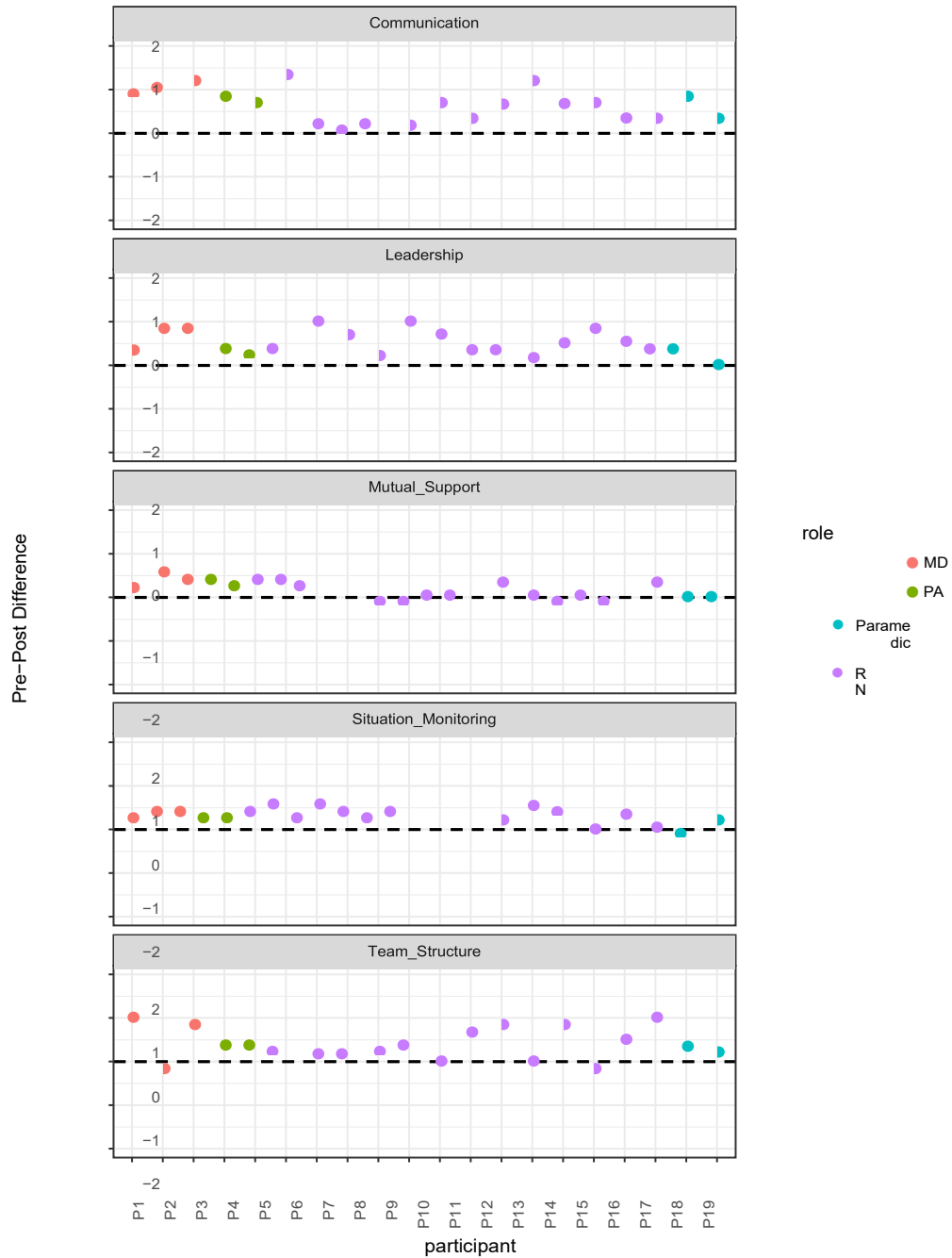


Figure 4: T-TAQ: Participant differences vs. participant for each construct. Reprinted from *EXAMINING EFFECTS OF TEAM TRAINING ON PERCEPTIONS AND ATTITUDES OF HOSPITAL STAFF* (15), by S.J. Walsh, 2017, Bozeman, MT, Statistical Consulting and Research Services: Montana State University. Copyright [2017] 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.)

T-TPQ								
Test	Construct	n	d	SD	SE	df	t	p -value
T-TPQ	Communication	20	1.1143	0.313	0.07	19	15.9217	$<$ 0.0001
T-TPQ	Leadership	20	0.1071	0.196	0.0438	19	2.4452	0.0122
T-TPQ	Mutual Support	20	0.4143	0.3557	0.0795	19	5.2086	$<$ 0.0001
T-TPQ	Situational Monitoring	20	0.2714	0.2119	0.0474	19	5.7287	$<$ 0.0001
T-TPQ	Team Structure	20	0.0286	0.1278	0.0286	19	1	0.1649

Table 6: T-TPQ 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

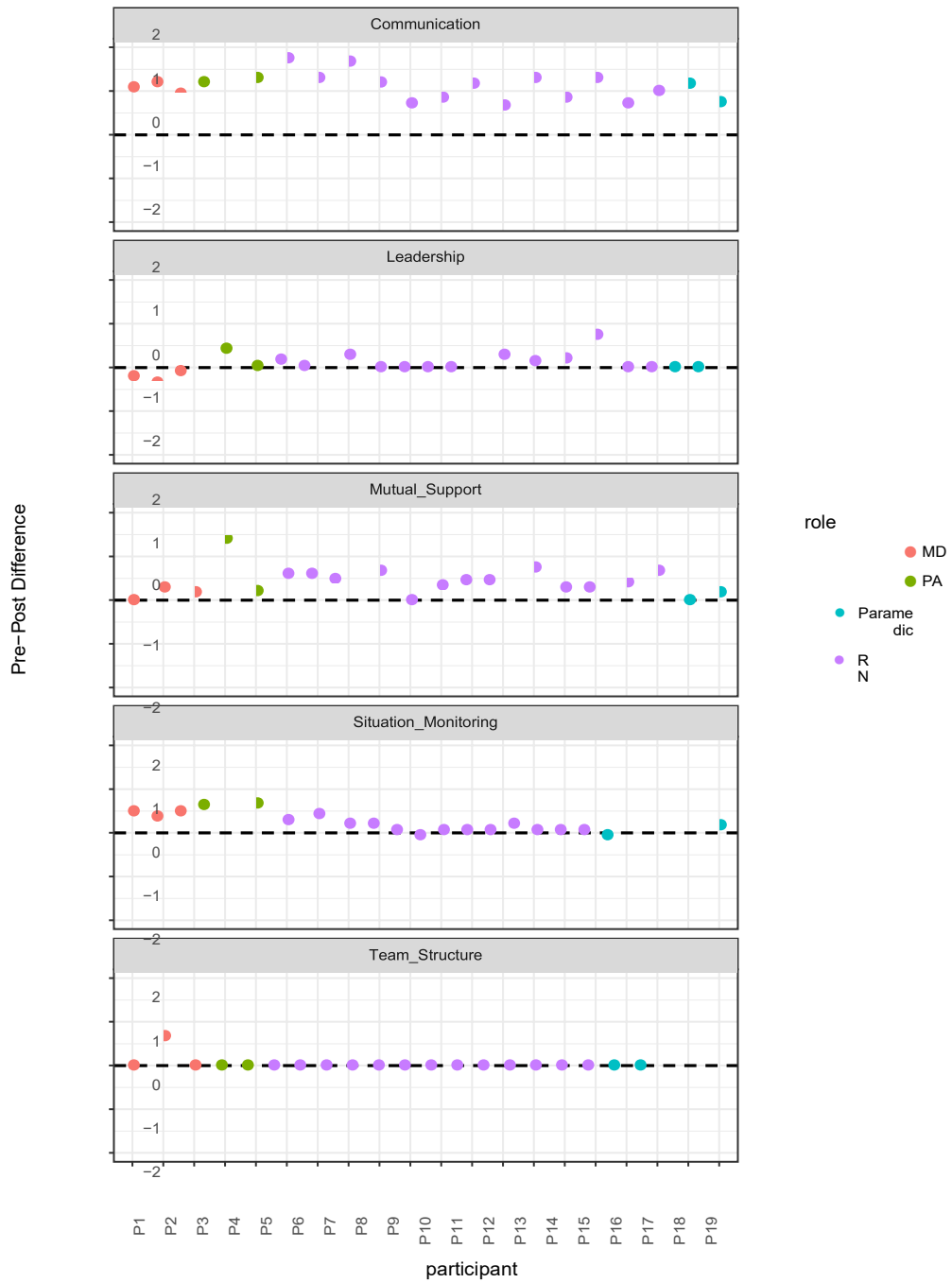


Figure 5: T-TPQ: Participant differences vs. participant for each construct. Reprinted from *EXAMINING EFFECTS OF TEAM TRAINING ON PERCEPTIONS AND ATTITUDES OF HOSPITAL STAFF* (15), by S.J. Walsh, 2017, Bozeman, MT, Statistical Consulting and Research Services: Montana State University. Copyright [2017] 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).

T-TPOT

Test	Construct	<i>n</i>	<i>d</i>	SD	SE	<i>df</i>	<i>t</i>	<i>p</i> -value
TPOT	Communication	4	5	1.633	0.8165	3	6.1237	0.0044
TPOT	Leadership	4	2.75	1.893	0.9465	3	2.9055	0.0311
TPOT	Mutual Support	4	5.5	1.291	0.6455	3	8.5206	0.0017
TPOT	Situational Monitoring	4	1.5	1.9149	0.9574	3	1.5667	0.1076
TPOT	Team Structure	4	2.25	2.0616	1.0308	3	2.1828	0.0585

Table 7: T-POT 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 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).

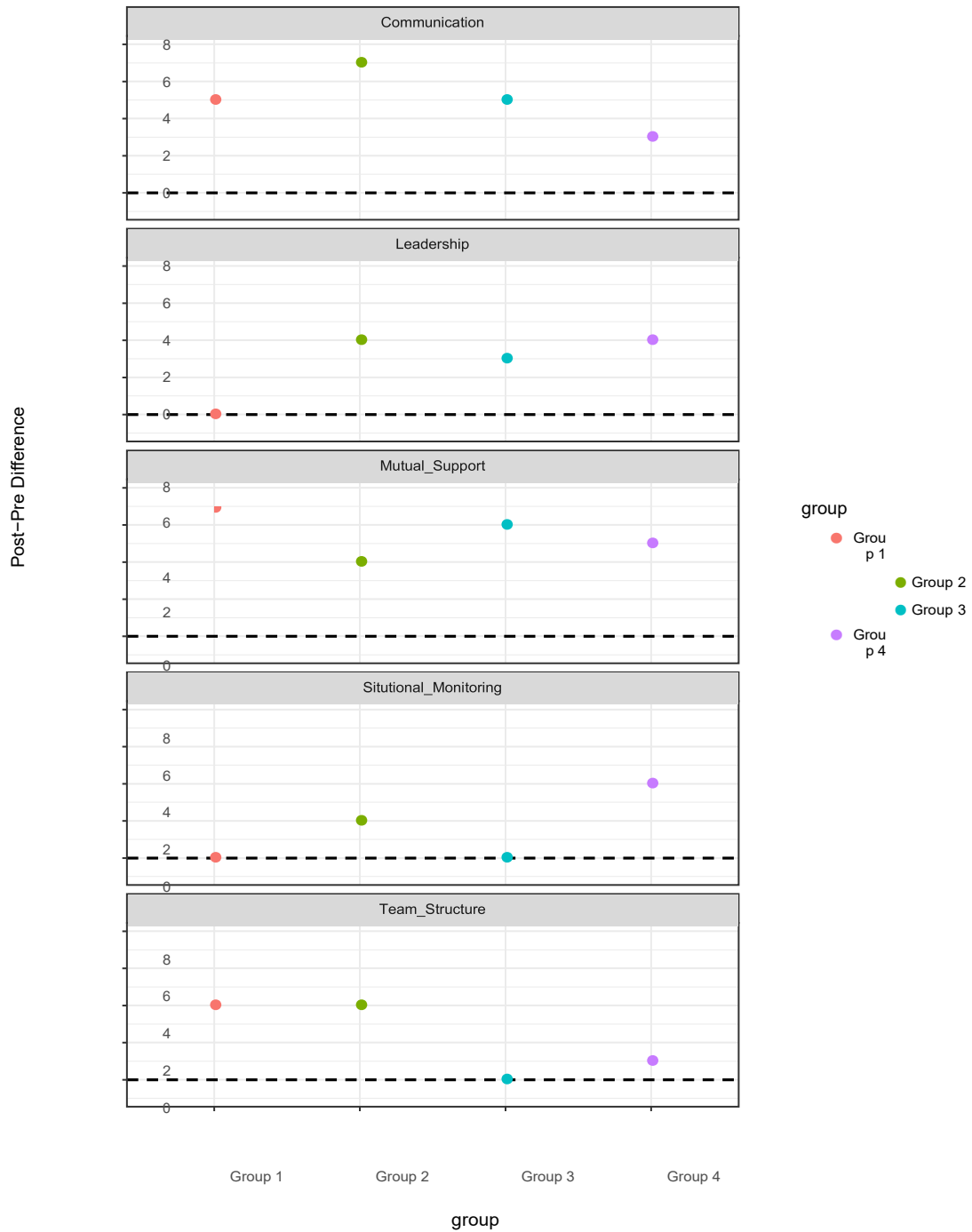


Figure 6: T-POT: Post-Pre Differences by Group. Reprinted from *EXAMINING EFFECTS OF TEAM TRAINING ON PERCEPTIONS AND ATTITUDES OF HOSPITAL STAFF* (15), by S.J. Walsh, 2017, Bozeman, MT, Statistical Consulting and Research Services: Montana State University. Copyright [2017] by S.J. Walsh. Reprinted with permission.

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).

CHAPTER FIVE – DISCUSSION

Discussion

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 (Fregley 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.

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APPENDICIES

APPENDIX A

EVIDENCE TABLE

APPENDIX A

Evidence Table

Author	Objectives	Level/Design	Intervention/Outcome Measured	Tool Used	Results	Limitations
Boling, et al. (2016)	Examine current research to answer the research question: "What is the effect of high-fidelity simulation on the knowledge, confidence, self-efficacy of critical care providers?"	Level I Integrative Review	What is the effect of HFS on knowledge and confidence of participants?	Systematic evaluation of evidence through electronic databases (CINAHL, Medline) in the past 10 years	Seventeen studies included. All 17 demonstrated improved knowledge. 13 evaluated confidence with improvement in the post simulation in all	English language only. Many studies did not specify HFS in title potentially excluding appropriate articles.
Capella, et al. (2010)	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?	Level III Pre/post test	Leadership, situation monitoring, mutual support, communication, time to: ct scan, endotracheal intubation, OR	TTPOT	Time from arrival to CT scan, ETT, and OR were decreased. No change in LOS-ICU or hospital, complication rate or mortality rate. Improved TTPOT scores	TTPOT was developed by the authors, not utilized previously.
Colacchio, et al. (2012)	Implement and evaluate teamwork training using simulation in situ in neonatal ICU	Level III Pre/Post test	Teamwork attitudes regarding team structure, leadership, situation monitoring, mutual support, communication	Teamwork Attitudes Questionnaire (TAQ) TeamSTEPPS	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	high patient census preventing sessions from being conducted in situ and scheduling conflicts preventing staff from participating
Deering et al. (2011)	Implementation and evaluation TeamSTEPPS in Iraq	Level III Mixed method	TeamSTEPPS training sessions and reinforcement on unit by leaders. Measurement of communication-related errors	Rates of communication-related errors, medication and transfusion errors, and needle stick incidents	Improved patient safety, improved communication	Clinical setting within combat zone with different variables than US hospital setting.
Falcone et al. (2008)	Evaluate the impact of SBTT on multidisciplinary group in pediatric trauma	Level III RCT	Monthly SBTT with video taping and debriefing	N/A	Improved team performance. Less errors	Comparison group makes up not defined

Figueroa, et al. (2013)	Determine whether participation in interdisciplinary SBTT in improving teamwork, confidence and communication in PPSC-CA	Level III Pre/post test	Didactic TeamSTEPPS principles. Interdisciplinary simulation. Participant evaluation their perceptions of confidence, skills, communication and collaboration. Rate themselves and team as a while during simulation on TeamSTEPPS principles	TeamSTEPPS	Course was useful, better prepared ($p < 0.05$) to participate and to lead, significant change in confidence ($p < 0.05$) and skill, significant increase ($p < 0.05$) in communication, use of debriefing, perception of mutual respect and sense of empowerment	Instructors worked with participants possibly creating bias. Insufficient data to assess impact on pt. outcomes or adverse events
Fung, et al. (2015)	Review the effectiveness of simulation-based CRM training for interprofessional and interdisciplinary teams compared to other instructional methods	Level I Systematic review	Effectiveness of simulation-based CRM training teams compared to other methods. Determine whether simulation-based CRM team training leads to modification of attitudes, skills/knowledge acquisition, changes in behaviors, and improved patient outcomes	Systematic evaluation of evidence through electronic databases (CINAHL, Medline, EMBASE, Cochrane, ERIC) Kirkpatrick Levels of effectiveness	Twelve studies included. Positive results in 10. Improved teamwork, attitudes, skills/knowledge acquisition, changes in behaviors, and improved patient outcomes with CRM. Generalizations cannot be reached due to a variety of learning interventions, methodologies and outcomes	Many studies had high risk of bias. Incomplete description of methods. Only English and French language studies included. No specific skill-related/interprofessional team training possibly missing inclusion of qualifying papers.
Frengley, et al. (2011)	Effectiveness of SBTT on performance of CCU teams	Level II RCT crossover study	The effects of SBTT on performance of CCU teams	Teamwork Behavioral Rater (TBR) tool	Significant improvement in overall teamwork, leadership and team coordination ($p < .002$) and in verbalizing situational information ($p < .02$), clinical management ($p < .003$)	Results only from one CCU.
Gillman et al. (2016)	STARTT program evacuation	Level IV post-intervention study	4 crisis simulations with post evaluation of ATLS performance and staff satisfaction	Ottawa global rating scale. ATLS checklist. Satisfaction survey	Satisfaction remained high. Improved CRM during course	Lack of evidence on clinical outcomes.
Gordon & Buckley 2009	Evaluate the effects of HFS on RN perceived abilities in emergencies	Level III Pre/post test	Confidence in ability to respond to emergencies with technical and nontechnical skills	Evaluator developed survey	Increased confidence in all aspects measured	Study tool never verified or utilized elsewhere.

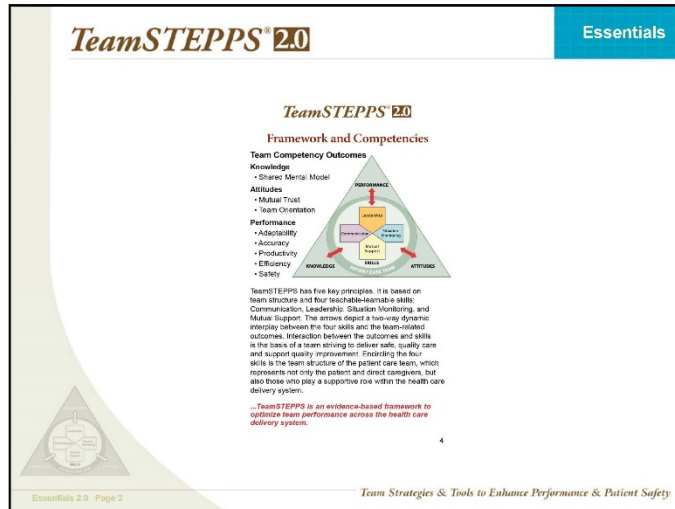
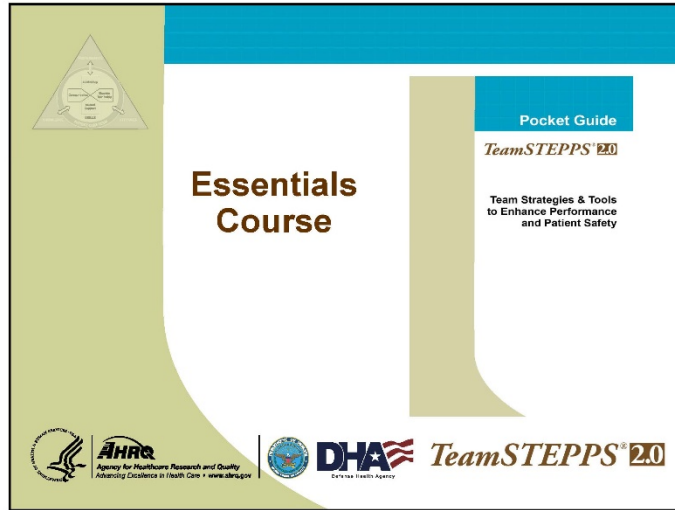
Laird-Fick et al. (2011)	To train medical residents and nurses to work together as a patient centered team and test its feasibility, nurses learning and patient outcomes	Level III Pre/post test	Patient satisfaction, learning by nurses of patient centered interview, team performance	Self-reported survey	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.
Lisbon, et al. (2016)	Describe the process and results from implementation of TeamSTEPPS in interprofessional team training in ED	Level V post-test Pilot study	4 hour didactic, video and small group discussion from TeamSTEPPS curriculum. Participant knowledge of TeamSTEPPS principles, attitudes and behaviors	TeamSTEPPS knowledge test. Self-developed observational tool	Knowledge and attitudes increased significantly (p<.05) and were sustained by day 90	Survey data not segregated by profession or trainee. No control group.
Maxson et al. (2011)	To evaluate for enhanced nurse/md collaboration post SBTT using TeamSTEPPS	Level III Pre/post test	Collaboration and satisfaction about care decisions	Collaboration Satisfaction About Care Decision Instrument	Significant improvement in satisfaction scores for both physician and RN. Improved perceived collaboration	No findings on patient clinical outcomes
Mayer et al. (2011)	Evaluate effectiveness/team performance improvement after implementation of TeamSTEPPS system	Level III Mixed method	Staff interviews, teamwork observation, staff surveys, clinical outcome data	TeamSTEPPS program	Improved experience of team work, improvement in staff perceptions of team work. Improved observed performance. Decrease infection rate	Participants only within 2 units of 1 hospital.
Merriel et al. (2016).	To evaluate if a short multidisciplinary training intervention and simulation can improve recognition of the deteriorating patient using EWS	Level III pre/post test	Hour long training on EWS, simulation and debriefing discussion. The EWS score, changes in safety and teamwork	EWS score. Teamwork and Safety Climate Survey	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
Murphy, et al. (2016)	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	Level I Integrative Review	Does multidisciplinary SBTT lead to improved team performance? 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?	Systematic evaluation of evidence through three electronic databases (CINAHL, Medline, EMBASE) and hand searching from 1980 - 2014	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	All studies reviewed were of low level evidence. Lack of comparative data across studies.

					viewed non-technical skills of communication, leadership and decision making being important	
Reed et al. (2017)	Evaluate TeamSTEPPS effect on team performance, knowledge of TeamSTEPPS principles, self-efficacy	Level IV pre/post test quantitative descriptive 1-group	Assess TeamSTEPPS through simulation to determine impact on self-efficacy and team performance	TeamSTEPPS fundamentals tool.TTPOT	Significant improvement in all target measures	Internally developed evaluation tool
Reime, et al. (2016)	Experience of RN and medical students after SBTT course and impact on professional and patient safety practice	Level III Mixed method	Team performance was observed and scored. Focused interviews conducted to evaluate participants experience	Self-developed observational form	Team performance improved following video debriefing in sessions. Participants prefer this educational modality	The researchers were actively involved both as facilitators in the simulations and as moderators in the focus groups. Possible sample bias.
Rice, et al. (2016)	Implementation and evaluation of TeamSTEPPS SBTT in a trauma ICU 'boot camp	Level III Pre/post test	Teamwork attitudes regarding team structure, leadership, situation monitoring, mutual support, communication. Participants satisfaction with teaching modality	T-TAQ, TTPOT, T-TPQ, NLN satisfaction Survey	Significant satisfaction with course. Improved performance, attitudes and perceptions	Small sample size n=8
Riley et al. (2011)	Evaluate effectiveness of TeamSTEPPS training on perinatal outcomes	Level II RCT	Perinatal morbidity and mortality. One hospital was control group, TeamSTEPPS for one hospital One hospital used TeamSTEPPS and simulation training exercises	Weighted Adverse Outcomes Score (WAOS) and Safety Attitudes Questionnaire	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.
Roh et al. 2013	Efficacy and RN satisfaction with computer or HFS training	Level III post comparison	Self-reported self-efficacy and satisfaction post	Self-reported on 10-point Likert Scale	Significant improvement in satisfaction for usefulness, prioritization and protocol implementation	Further research needed to verify results
Siassako et al. (2010)	To determine whether team performance in a simulated emergency is related to generic teamwork skills and behaviors	Level II RCT Retrospective cohort observational study	Correlation of team performance and teamwork scores	Skills and behavior tool by Weller et al	Significant Positive correlation between clinical efficiency and teamwork scores	further research needed to know what aspect of team work is critical for performance

Strasser et al. (2008)	To test whether a team training intervention in stroke rehabilitation is associated with improved patient outcomes	Level II cluster RCT	Intervention group: 6 mos team training and feedback. Outcome: FIM instrument, community is charge and LOS	FIM instrument patient chart data on LOC and discharge location	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	None
Ten Eyck, et al. (2009)	Determine the effects of SB curriculum on fourth-year medical students test performance and satisfaction during ER training	Level II RCT crossover design	Students randomized into 2 groups for simulation, discussion and evaluation. Student performance and satisfaction evaluated	Multiple choice test performance. Likert satisfaction survey	Student performance on material presented in simulation vs discussion improved. Students prefer simulation format	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.
Wallin, et al. (2007)	Effects of team training on behavior and attitude of medical emergency team training	Level III Pre/post test	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)	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	Single site cohort.
Ziesmann et al. (2013).	STARTT program. Evaluate impact of CRM on emergency trauma management	Level III pre/post test	STARTT program. Outcome: Satisfaction	Satisfaction survey tool	Improved attitudes towards simulation, teamwork and safety but not stress recognition	Lack of evidence on clinical outcomes.

APPENDIX B

ESSENTIALS POWERPOINT TEAMSTEPPS 2.0



TeamSTEPPS[®] 2.0 Essentials

Key Principles

Team Structure Identification of the components of a multi-team system that must work together effectively to ensure patient safety
Communication Structured process by which information is clearly and accurately exchanged among team members
Leadership Ability to maximize the activities of team members by ensuring that team actions are understood, changes in information are shared, and team members have the necessary resources
Situation Monitoring Process of actively scanning and assessing situational elements to gain information or understanding, or to maintain awareness to support team functioning
Mutual Support Ability to anticipate and support team members' needs through accurate knowledge about their responsibilities and workload

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TeamSTEPPS[®] 2.0 Essentials

Multi-Team System For Patient Care

Safe and efficient care involves the coordinated activities of a multi-team system.

Team Structure

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TeamSTEPPS[®] 2.0 Essentials

SBAR


A technique for communicating critical information that requires immediate attention and action concerning a patient's condition


Situation – What is going on with the patient?
"I am calling about Mrs. Joseph in room 251. Chief complaint is shortness of breath of new onset."

Background – What is the clinical background or context?
"Patient is a 62-year-old female post-op day one from abdominal surgery. No prior history of cardiac or lung disease."

Assessment – What do I think the problem is?
"Breath sounds are decreased on the right side with acknowledgment of pain. Would like to rule out pneumothorax."

Recommendation and Request – What would I do to correct it?
"I feel strongly the patient should be assessed now. Can you come to room 251 now?"





Communication

Essentials 2.0 Page 5 Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS[®] 2.0 Essentials

Communication

Call-Out

Strategy used to communicate important or critical information

- Informs all team members simultaneously during emergent situations
- Helps team members anticipate next steps
- Important to direct responsibility to a specific individual responsible for carrying out the task

Example during an incoming trauma:

Leader: "Airway status?"
Resident: "Airway clear"
Leader: "Breath sounds?"
Resident: "Breath sounds decreased on right"
Leader: "Blood pressure?"
Nurse: "BP is 96/62"

Communication

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TeamSTEPPS[®] 2.0 Essentials

Check-Back


Using closed-loop communication to ensure that information conveyed by the sender is understood by the receiver as intended

The steps include the following:

1. Sender initiates the message
2. Receiver accepts the message and provides feedback
3. Sender double-checks to ensure that the message was received

Example:

Doctor: "Give 25 mg Benadryl IV push"
Nurse: "25 mg Benadryl IV push"
Doctor: "That's correct"



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Communication

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Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS[®] 2.0 Essentials

Handoff

The transfer of information (along with authority and responsibility) during transitions in care across the continuum. It includes an opportunity to ask questions, clarify, and confirm.

Examples of transitions in care include shift changes, transfer of responsibility between and among nursing assistants, nurses, nurse practitioners, physician assistants, and physicians, and patient transfers.



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Communication

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Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS[®] 2.0 **Essentials**

Handoff
Strategy designed to enhance information exchange during transitions in care.

"I PASS THE BATON"

I	Introduction	Introduce yourself and your team (include patient)
P	Patient	Name, identifiers, date, sex, location
A	Assessment	Present chief complaint, vital signs, symptoms, and diagnoses
S	Situation	Current status/requirements, including code status, level of alertness, recent changes, and response to treatment
S	Safety Concerns	Critical lab values/orders, open/closed orders, allergies, and other risks, location, etc.
THE		
B	Background	Current/line, previous medications, current medications, and family history
A	Actions	Explain what actions were taken or are required. Provide rationale.
T	Timing	Level of urgency and exact timing and prioritization of orders.
O	Ownership	Identify who is responsible for patient's ongoing patient safety needs
N	Next	What will happen next? Anticipate changes? What is the plan? Are there any ongoing plans?

Communication 13

Team Strategies & Tools to Enhance Performance & Patient Safety

Essentials 2.0 Page 9

TeamSTEPPS[®] 2.0 **Essentials**

Effective Team Leaders

The following are responsibilities of effective team leaders:

- Organize the team
- Identify and articulate clear goals (i.e., the plan)
- Assign tasks and responsibilities
- Monitor and modify the plan; communicate changes
- Review the team's performance; provide feedback when needed
- Manage and allocate resources
- Facilitate information sharing
- Encourage team members to assist one another
- Facilitate conflict resolution in a learning environment
- Model effective teamwork

Leadership 15

Team Strategies & Tools to Enhance Performance & Patient Safety

Essentials 2.0 Page 10

TeamSTEPPS[®] 2.0 Essentials

Leadership

Team Events

Sharing the Plan

- **Brief** - Short session prior to start to share the plan, discuss team formation, assign roles and responsibilities, establish expectations and climate, anticipate outcomes and likely contingencies

Monitoring and Modifying the Plan

- **Huddle** - Ad hoc meeting to re-establish situational awareness, reinforce plans already in place, and assess the need to adjust the plan

Reviewing the Team's Performance

- **Debrief** - Informal information exchange session designed to improve team performance and effectiveness through lessons learned and reinforcement of positive behaviors

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TeamSTEPPS[®] 2.0 Essentials

Brief Checklist

During the brief, the team should address the following questions:

- Who is on the team?
- Do all members understand and agree upon goals?
- Are roles and responsibilities understood?
- What is our plan of care?
- What is staff and provider's availability throughout the shift?
- How is workload shared among team members?
- What resources are available?



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Leadership

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TeamSTEPPS[®] 2.0 **Essentials**

Leadership

Debrief Checklist

The team should address the following questions during a debrief:

- Was communication clear?
- Were roles and responsibilities understood?
- Was situation awareness maintained?
- Was workload distribution equitable?
- Was task assistance requested or offered?
- Were errors made or avoided?
- Were resources available?
- What went well?
- What should improve?

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Essentials 2.0 Page 13 Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS[®] 2.0 **Essentials**

Situation Monitoring

Situation Monitoring Process

```
graph TD; A[Situation Monitoring (Individual Skill)] --> B[Situation Awareness (Individual Outcome)]; B --> C[Shared Mental Model (Team Outcome)]; C --> A;
```

Situation monitoring is the process of continually scanning and assessing a situation to gain and maintain an understanding of what's going on around you.

Situation awareness is the state of "knowing what's going on around you."

A **shared mental model** results from each team member maintaining situation awareness and ensures that all team members are "on the same page."

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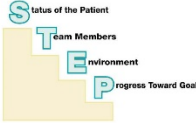
Essentials 2.0 Page 14 Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS[®] 2.0 **Essentials**

STEP
A tool for monitoring situations in the delivery of health care

Components of Situation Monitoring:

- S**tatus of the Patient
- T**eam Members
- E**nvironment
- P**rogress Toward Goal



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Situation Monitoring

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TeamSTEPPS[®] 2.0 **Essentials**

Situation Monitoring

STEP
Tool to help assess health care situations

Status of Patient

- Patient History
- Vital Signs
- Medications
- Physical Exam
- Plan of Care
- Psychosocial Issues

Team Members

- Fatigue
- Workload
- Task Performance
- Skill
- Stress

Environment

- Facility Information
- Administrative Information
- Human Resources
- Triage Acuity
- Equipment

Progress Toward Goal

- Status of Team's Patients?
- Established Goals of Team?
- Tasks/Actions of Team?
- Plan Still Appropriate?

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Essentials 2.0 Page 16 Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS[®] 2.0 **Essentials**

Cross-Monitoring

A harm error reduction strategy that involves:

- Monitoring actions of other team members
- Providing a safety net within the team
- Ensuring that mistakes or oversights are caught quickly and easily
- "Watching each other's back"

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Situation Monitoring

Essentials 2.0 Page 17 Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS[®] 2.0 **Essentials**

Situation Monitoring

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

TMSAFE Checklist

- I** = Illness
- M** = Medication
- S** = Stress
- A** = Alcohol and Drugs
- F** = Fatigue
- E** = Eating and Elimination

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Essentials 2.0 Page 18 Team Strategies & Tools to Enhance Performance & Patient Safety


TeamSTEPPS[®] 2.0 Essentials

Mutual Support

Task Assistance

Helping others with tasks builds a strong team. Key strategies include:

- Team members protect each other from work overload situations
- Effective teams place all offers and requests for assistance in the context of patient safety
- Team members foster a climate where it is expected that assistance will be actively sought and offered



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Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS[®] 2.0 Essentials


Feedback

Information provided to team members for the purpose of improving team performance

Feedback should be:

- **Timely** – given soon after the target behavior has occurred
- **Respectful** – focuses on behaviors, not personal attributes
- **Specific** – relates to a specific task or behavior that requires correction or improvement
- **Directed toward improvement** – provides directions for future improvement
- **Considerate** – considers a team member's feelings and delivers negative information with fairness and respect

Mutual Support



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Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS[®] 2.0 Essentials

Mutual Support

Advocacy and Assertion

Advocate for the patient

- Invoked when team members' viewpoints don't coincide with that of the decisionmaker

Assert a corrective action in a **firm** and **respectful** manner

- Make an opening
- State the concern
- State the problem (real or perceived)
- Offer a solution
- Reach agreement on next steps

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Essentials 2.0 Page 21 *Team Strategies & Tools to Enhance Performance & Patient Safety*

TeamSTEPPS[®] 2.0 Essentials

Two-Challenge Rule

Empowers all team members to "stop the line" if they sense or discover an essential safety breach

When an initial assertive statement is ignored:

- It is your responsibility to assertively voice concern at least **two times** to ensure that it has been heard
- The team member being challenged must acknowledge that concern has been heard
- If the safety issue still hasn't been addressed:
 - Take a stronger course of action
 - Utilize supervisor or chain of command

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Mutual Support

Essentials 2.0 Page 22 *Team Strategies & Tools to Enhance Performance & Patient Safety*

TeamSTEPPS[®] 2.0 Essentials

Mutual Support

CUS

Assertive statements:

I am **C**ONCERNED!
I am **U**NCOMFORTABLE!
This is a **S**AFETY ISSUE!
"Stop the Line"



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Essentials 2.0 Page 23 *Team Strategies & Tools to Enhance Performance & Patient Safety*


TeamSTEPPS[®] 2.0 Essentials

DESC Script

A constructive approach for managing and resolving conflict

- D** = Describe the specific situation or behavior; provide concrete data
- E** = Express how the situation makes you feel/what your concerns are
- S** = Suggest other alternatives and seek agreement
- C** = Consequences should be stated in terms of impact on established team goals; strive for consensus

Mutual Support



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Essentials 2.0 Page 24 *Team Strategies & Tools to Enhance Performance & Patient Safety*

TeamSTEPPS[®] 2.0
Essentials

Mutual Support

Team Performance Observation Tool

<p>Team Structure</p> <p>Assigns team members to specific roles and responsibilities</p> <p>Identifies team members' strengths</p> <p>Includes patients and families as part of the team</p>
<p>Communication</p> <p>Provides brief, clear, specific, and timely information</p> <p>Seeks information from all available sources</p> <p>Uses check-backs to verify information that is communicated</p> <p>Uses SBAR, call-backs, check-backs, and handoff techniques to communicate effectively with team members</p>
<p>Leadership</p> <p>Identifies team goals and roles</p> <p>Utilizes resources effectively to maximize team performance</p> <p>Delegates tasks and assignments, as appropriate</p> <p>Conducts check-backs, and debriefs</p> <p>Role models teamwork behaviors</p>
<p>Situation Monitoring</p> <p>Monitors the status of the patient</p> <p>Monitors fellow team members to ensure safety and prevent errors</p> <p>Monitors the environment for safety and availability of resources (e.g., equipment)</p> <p>Monitors progress toward the goal and identifies changes that could alter the care plan</p> <p>Provides constructive feedback to ensure a shared mental model</p>
<p>Mutual Support</p> <p>Provides task-related support and assistance</p> <p>Provides timely and constructive feedback to team members</p> <p>Effectively addresses for the patient using the Assertive Statement, Two-Challenge Rule, or CUS</p> <p>Uses the Two-Challenge Rule or DESC script to resolve conflict</p>

Essentials 2.0 Page 26
Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS[®] 2.0
Essentials

<p>BARRIERS</p> <ul style="list-style-type: none"> • Inconsistency in Team Membership • Lack of Time • Lack of Information Sharing • Hierarchy • Defensiveness • Conventional Thinking • Complacency • Varying Communication Styles • Conflict • Lack of Coordination and Follow-up With Coworkers • Distractions • Fatigue • Workload • Misinterpretation of Cues • Lack of Role Clarity 	<p>TOOLS and STRATEGIES</p> <p>Communication</p> <ul style="list-style-type: none"> • SBAR • Call-Out • Check-Back • Handoff <p>Leading Teams</p> <ul style="list-style-type: none"> • Brief • Huddle • Debrief <p>Situation Monitoring</p> <ul style="list-style-type: none"> • STEP • IM SAFE <p>Mutual Support</p> <ul style="list-style-type: none"> • Task Assistance • Feedback • Assertive Statement • Two-Challenge Rule • CUS • DESC Script 	<p>OUTCOMES</p> <ul style="list-style-type: none"> • Shared Mental Model • Adaptability • Team Orientation • Mutual Trust • Team Performance • Patient Safety
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Essentials 2.0 Page 26
Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS[®] 2.0 Essentials

Effective Use of TeamSTEPPS Tools and Strategies



Essentials 2.0 Page 27 *Team Strategies & Tools to Enhance Performance & Patient Safety*

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 (TPO) 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)
 - IO
 - Syringe pump
 - Infant warmer
 - OB Kit
 - Pediatric crash cart

3:30 – 3:45

- Break

3:45 – 4:15

- Pre TeamSTEPPS team simulation with Team Performance Observational Tool (TPO) (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

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 TeamSTEPPS™ 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 TPOT. 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 will 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



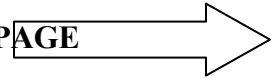
TeamSTEPPS Teamwork Attitudes Questionnaire (T-TAQ)

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.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Team Structure						
1.	It is important to ask patients and their families for feedback regarding patient care.					
2.	Patients are a critical component of the care team.					
3.	This facility's administration influences the success of direct care teams.					
4.	A team's mission is of greater value than the goals of individual team members.					
5.	Effective team members can anticipate the needs of other team members.					
6.	High performing teams in health care share common characteristics with high performing teams in other industries.					
Leadership						
7.	It is important for leaders to share information with team					

	members.					
8.	Leaders should create informal opportunities for team members to share information.					
9.	Effective leaders view honest mistakes as meaningful learning opportunities.					
10.	It is a leader's responsibility to model appropriate team behavior.					
11.	It is important for leaders to take time to discuss with their team members plans for each patient.					
12.	Team leaders should ensure that team members help each other out when necessary.					

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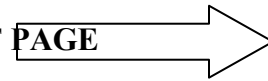


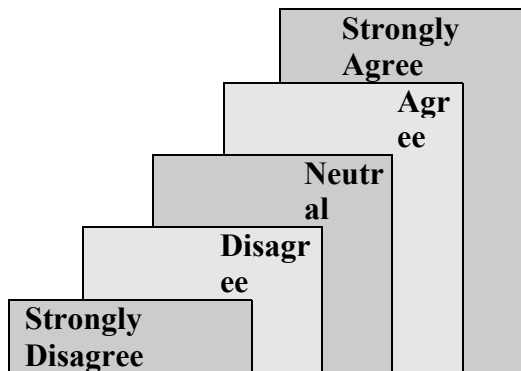
TeamSTEPPS® 2.0

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Situation Monitoring						
13	Individuals can be taught how to scan the environment for · important situational cues.					
14	Monitoring patients provides an important contribution to · effective team performance.					
15	Even individuals who are not part of the direct care team should be encouraged to scan for and · report changes in patient status.					
16	It is important to monitor the emotional and physical status · of other team members.					
17	It is appropriate for one team member to offer assistance to · another who may be too tired or stressed to perform a task.					
18	Team members who monitor their emotional and physical · status on the job are more effective.					
Mutual Support						
19	To be effective, team members should understand the work · of their fellow team members.					
20	Asking for assistance from a team member is a sign that an · individual does not know how to do his/her job effectively.					

21	Providing assistance to team members is a sign that an individual does not have enough work to do.					
22	Offering to help a fellow team member with his/her individual work tasks is an effective tool for improving team performance.					
23	It is appropriate to continue to assert a patient safety concern until you are certain that it has been heard.					
24	Personal conflicts between team members do not affect patient safety.					

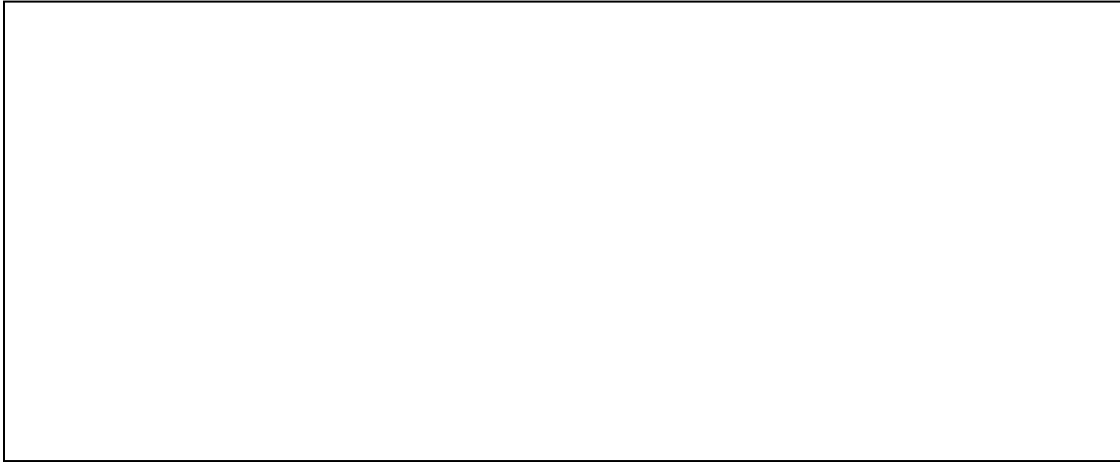
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Communication		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
25	Teams that do not communicate effectively significantly · increase their risk of committing errors.					
26	Poor communication is the most common cause of reported · errors.					
27	Adverse events may be reduced by maintaining an · information exchange with patients and their families.					
28	I prefer to work with team members who ask questions about · information I provide.					
29	It is important to have a standardized method for sharing · information when handing off patients.					
30	It is nearly impossible to train individuals how to be better · communicators.					

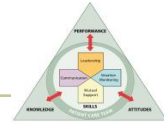
Please provide any additional comments in the space below.

A large, empty rectangular box with a thin black border, intended for the respondent to provide additional comments.

Thank you for your participation!

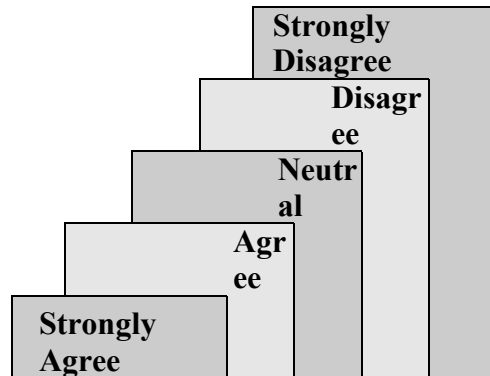
APPENDIX H

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.



Team Structure		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	The skills of staff overlap sufficiently so that work can be shared when necessary.					
2.	Staff are held accountable for their actions.					
3.	Staff within my unit share information that enables timely decision making by the direct patient care team.					
4.	My unit makes efficient use of resources (e.g., staff supplies, equipment, information).					
5.	Staff understand their roles and responsibilities.					
6.	My unit has clearly articulated goals.					
7.	My unit operates at a high level of efficiency.					
Leadership		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
8.	My supervisor/manager considers staff input when making decisions about patient care.					
9.	My supervisor/manager provides opportunities to discuss the unit's performance after an event.					
10.	My supervisor/manager takes time to meet with staff to					

	develop a plan for patient care.					
1 1.	My supervisor/manager ensures that adequate resources (e.g., staff, supplies, equipment, information) are available.					
1 2.	My supervisor/manager resolves conflicts successfully.					
1 3.	My supervisor/manager models appropriate team behavior.					
1 4.	My supervisor/manager ensures that staff are aware of any situations or changes that may affect patient care.					

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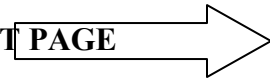


*Team***STEPPS**[®] **2.0**

		Strongly Disagree				
		Disagree				
		Neutral				
		Agree				
		Strongly Agree				
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					

	with that of a senior member of the unit.					
27.	When staff have a concern about patient safety, they challenge others until they are sure the concern has been heard.					
28.	Staff resolve their conflicts, even when the conflicts have become personal.					

PLEASE CONTINUE TO THE NEXT PAGE





		Strongly Disagree				
		Disagree			Neutral	
		Agree		Strongly Agree		
Communication						
29.	Information regarding patient care is explained to patients and their families in lay terms.					
30.	Staff relay relevant information in a timely manner.					
31.	When communicating with patients, staff allow enough time for questions.					
32.	Staff use common terminology when communicating with each other.					
33.	Staff verbally verify information that they receive from one another.					
34.	Staff follow a standardized method of sharing information when handing off patients.					
35.	Staff seek information from all available sources.					

APPENDIX I

TEAM PERFORMANCE OBSERVATION TOOL

TeamSTEPPS® 2.0



Team Performance Observation Tool

Date: _____

Unit/Department: _____

Team: _____

Shift: _____

Rating Scale Please comment if 1 or 2.

1 = Very Poor
 2 = Poor
 3 = Acceptable
 4 = Good
 5 = Excellent

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

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.

Debrief and reflection						
01	The facilitator provided constructive criticism during the debriefing	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
02	The facilitator summarized important issues during the debriefing	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
03	I had the opportunity to reflect on and discuss my performance during the debriefing	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
04	The debriefing provided an opportunity to ask questions	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
05	The facilitator provided feedback that helped me to develop my clinical reasoning skills	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
06	Reflecting on and discussing the simulation enhanced my learning	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
07	The facilitator's questions helped me to learn	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
08	I received feedback during the debriefing that helped me to learn	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
09	The facilitator made me feel comfortable and at ease during the debriefing	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
Clinical reasoning						
10	The simulation developed my clinical reasoning skills	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
11	The simulation developed my clinical decision making ability	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
12	The simulation enabled me to demonstrate my clinical reasoning skills	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
13	The simulation helped me to recognize patient deterioration early	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
14	This was a valuable learning experience	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
Clinical learning						
15	The simulation caused me to reflect on my clinical ability	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
16	The simulation tested my clinical ability	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
17	The simulation helped me to apply what I learned from the case study	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
18	The simulation helped me to recognize my clinical strengths and weaknesses	Strongly disagree	Disagree	Unsure	Agree	Strongly agree

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: Levett-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, bradypnea with ashen 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 developed, 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 developed, nourished and groomed.
 - Neuro: Pupils 4mm responsive
 - Resp: Absent lung sounds bilaterally.
 - CVS: 2+ radial bilaterally tachycardic

- 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
 - 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