Fall 2015

Evaluation of the Impact of TeamSTEPPS Training on Perceptions of Teamwork and Resilience in the Intensive Care and Perioperative Units in a Tertiary Care Hospital

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Evaluation of the Impact of TeamSTEPPS Training on Perceptions of Teamwork and Resilience in the Intensive Care and Perioperative Units in a Tertiary Care Hospital

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In partial fulfillment of NR706C DNP

Regis University

August 2, 2015

Executive Summary

Evaluation of the Impact of TeamSTEPPS Training on Teamwork and Resilience in the Intensive Care Unit (ICU) and Perioperative Units in a Tertiary Care Hospital

Problem

The ICU and perioperative areas are stressful work environments. Nurses are a vulnerable population experiencing exposure to workplace stress, verbal and physical aggression, burn-out, moral distress, circadian rhythm disruption and depression. The stressful work environment leads to lower quality of patient care and nursing turnover.

Teamwork and collaboration prevents errors and promotes healthy work environments (HWE) (Zaccagnini & White, 2014). To achieve the goals of the Affordable Care Act, it will be essential for professionals to collaborate effectively as multi-disciplinary teams providing the highest quality of patient care at the lowest possible cost to create value.

Recent research indicates that resilience is not limited as an inherent personality characteristic, but is a process that can be developed by individuals through their environment and experiences (Chaboyer et al., 2007). It would be beneficial to improve the resilience of multi-disciplinary team members in order to more easily function and remain in the high stress environment of the ICU and perioperative units.

Purpose

The purpose of the capstone project was to determine if there is a relationship between TeamSTEPPS training on perceptions of teamwork and resilience.

Goals

The goal was to provide staff members in stressful work environments with evidence based tools to increase levels of teamwork and resilience.

Objectives

The short term objective was to analyze the effectiveness of TeamSTEPPS training on individual levels of teamwork and resilience. The long term objective was the creation of HWE's with increased levels of teamwork, high quality outcomes and retention of nursing staff.

Plan

The project involved participation of 144 ICU and perioperative staff members in a four hour TeamSTEPPS training program. A quantitative pre and post-test design was utilized to measure perceptions of teamwork and resilience.

Outcomes and Results

The T-TPQ analysis indicated an increase in the five constructs of teamwork with mutual support having a statistically significant increase in mean from 3.98 to 4.00, $p = .04$; $t = 2.067$, CI: -.178 to -.003. The Wagnild Resilience data analysis had a pre-survey composite score of 143.20 and post composite of 144.38 which was not statistically significant. $t = -.868$, $p = .387$, CI: -2.87 to 1.12. Implications for practice involve shifting the focus of teamwork impact from individual resilience to mutual support and relational resilience.

Acknowledgments

I would like to take this opportunity to thank the many individuals who have contributed to my success in completing this project. First, I would like to acknowledge the wisdom of my mother who exposed me to the field of nursing at a young age. This exposure has led to a satisfying life-long career for which I am very thankful. I would also like to thank my husband Frank. His love, positive affirmations and consistent support were instrumental in my ability to complete this course of study and project. I would also like to thank my children, Phillip and Alex, my daughter-in-law Amanda, my parents, Ed and Beverly Statter, as well as my extended family for their encouragement to pursue a terminal degree in nursing.

I would also like to acknowledge my many mentors and colleagues who supported and guided me throughout this process. Cris Finn, PhD, RN, FNP, MS, MA, FNE, my DNP capstone chair, advised and encouraged me on a regular basis. Cynthia Oster, PhD, MBA, RN, CNS-BC, ANP, Nurse Scientist, provided her research expertise and encouragement as my facility advisor and to Mary Seigrist, PhD for her assistance with statistical analysis. Many thanks to two additional mentors, Sharon Pappas, PhD, RN, NEA-BC, FAAN, and Karren Kowalski, PhD, RN, NEA-BC, ANEF, FAAN. Sharon and Karen have demonstrated the importance of nursing scholarship, elevation of nursing practice, and the critical significance of nursing involvement in health care policy. Their passion for excellence is a constant inspiration.

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Problem Recognition and Definition

In hospital environments teamwork is essential for patient safety, quality outcomes and staff satisfaction. Teamwork "depends on a willingness to cooperate, coordinate and communicate while remaining focused on a shared goal of achieving optimal outcomes for all patients" (King, Battles, Baker, Alonso, Salas, Webster, Toomey & Salisbury, 2008, p. 6). Many professional and governmental agencies have connected teamwork and inter-professional collaboration to patient safety. The Institute of Medicine (IOM) released a report called *To Err is Human: Building a Safer Health System* in 1999 and revealed the shocking statistic of 98,000 deaths annually as a result of medical error in the United States. The IOM further asserted that teamwork prevents errors. The Joint Commission for Accreditation of Hospital Organizations (JCAHO) issued a statement in 2008 that inter-professional collaboration prevents errors. The American Nurses Association (ANA) issued a similar statement in 2008, concluding that collaboration enhances patient safety. The American Colleges of Physicians (ACP) declared in 2009 that the future of healthcare is dependent on inter-professional teams (Zaccagnini & White, 2014). Ineffective communication has been identified by the Joint Commission for Accreditation of Hospital Organizations (JCAHO) as a root cause in nearly 66% of reported sentinel events between 1995 and 2005 (TeamSTEPPS curriculum 2.0, 2013). The IOM report was closely followed by the JCAHO National Patient Safety Goals (NPSG's) in 2003. One of the consistent NPSG's is to improve the communication among the heath care team (Zaccagnini & White, 2013).

A significant event was the passing of the Affordable Care Act (ACA) of 2010 that promoted quality of patient care and financial incentives for hospitals to comply. As a result, and rightly so, an environment currently exists where quality and safety are paramount. Hospitals and health

care providers are now being challenged by the ACA to provide the highest quality of patient care at the lowest possible cost, creating value.

At the center of the value equation is nursing. Registered Nurses (RN's) are the primary individuals providing the coordination of care in multiple health care environments with responsibilities for patient education, technical expertise, surveillance and prevention of patient harm. Nursing care is also integral to the patient experience with growing focus on patient and family satisfaction and re-imbursement pressures to deliver top level performance. As hospital systems focus on value, there is an effort to retain this valuable resource of nursing talent. Nursing turnover creates disruption to teams. This disruption may impact the quality of patient care, patient satisfaction, employee satisfaction, and is financially costly. National nursing turnover is 16.5% and the average cost to replace a vacancy is estimated to be $36,000 to $88,000 depending on the nursing specialty (Li & Jones, 2013).

The Intensive Care Unit (ICU) is a stressful work environment. ICU nurses frequently provide end of life care as well as skilled interventions and surveillance for a variety of critical illnesses. Perioperative nurses, working in the continuum of pre-op, operating room (OR) and post anesthesia care unit (PACU) are also exposed to stressful work environments as well as unique safety hazards including biological and chemical exposures (Sexton, Teasley, Cox & Carrol, 2007). Both teams adapt to rapid technological change and psychosocial concerns around healthy communication involving multi-disciplinary team members including peers, physicians and surgeons (Sexton, et al., 2007). The conditions leading to a stressful work environment include shift work that leads to sleepiness, safety and performance issues, social disruption and depression. Nurses are prone to musculoskeletal injuries, needle stick injuries,

chemical exposure to toxic medications and biohazards, and the mental health impact of incivility in the workplace (AFL-CIO Department of Professional Employees, 2012). Further evidence of the stressors in the nursing workplace was described by Trinkoff, Geiger-Brown, Caruso, Lipscomb, Johantgen, Nelson, Sattler & Selby (2015) including:

- 75% of nurses experience workplace stress
- 67% have been exposed to verbal aggression from a peer
- 26% have been assaulted by a patient or family member
- 40-49% of nurses experience burn out
- 15% of nurses leave nursing because of moral distress

Demonstration of teamwork behavior in the community tertiary care hospital was variable. Multiple staff members had expressed the need to improve teamwork behaviors such as answering call lights and volunteering to assist co-workers with patient care in the ICU. They had also shared that improvement in teamwork on the unit would increase their job satisfaction (personal communication, ICU Unit Based Council (UBC), April 7, 2014). The perioperative nurses asserted that hand-offs between the PACU and ICU need improvement (personal communication, ICU and perioperative services meeting July 11, 2014). The focus on hand-offs between the two areas was heightened in 2013 as patients in several surgical service lines began arriving to the ICU for recovery and bypassing the PACU. The average number of patients bypassing PACU averaged 60 per month. This new workflow created opportunities to coordinate patient care and better orchestrate hand-off communication between departments. Hand-off reporting is a critical time to ensure that important details about the patient and patient care are relayed to the next care team.

In response to the existing environments in our hospitals and the recommendations of professional organizations and governmental agencies, many medical team training curriculums have appeared on the market over the past decade. Most programs are based on Crew Resource Management (CRM) principles adapted from the airline industry. Examples of these programs include Anesthesia Crisis Resource Management (ACRM), Team Oriented Medical Simulation (TOMS), Dynamics Research Corporation's Med Teams, Medical Team Management (MTM), Dynamic Outcomes Management (DOM) also known as LifeWings, Geriatric Interdisciplinary Team Training (GITT) and TeamSTEPPS (Baker, Gustafson, Beaubien, Salas & Barach, 2005). TeamSTEPPS has the advantage of applicability to multiple hospital settings instead of specialization with one unit or population. It also has some permanence as it originated in a governmental agency instead of the private market and is widely known to be an evidence based practice program based on 20 years of research (TeamSTEPPS Curriculum 2.0, 2013). The original application of the TeamSTEPPS program was in military health care facilities. As successful outcomes were achieved, TeamSTEPPS trainers have extended the program to the private sector during the past decade.

Resilience is defined as a dynamic process that results in adaptation in the context of adversity (Chaboyer, Gillespie & Wallis, 2007). Resilient individuals possess an internal locus of control, positive self-esteem, pursue personal goals, adapt to change and tend to have faith or purpose in life. These individuals also tend to have strong relationships, seek help when needed, look at stress as a way of becoming stronger and utilize past experience to problem solve current challenges. Humor, patience, tolerance and optimism are personal traits of resilient people (Connor, 2006).

Recent research indicates that resilience is not limited as an inherent personality characteristic, but is a process that can be developed by individuals through their environment and experiences (Chaboyer, et al., 2007). Garmezy (1991) developed a triadic model of resilience that describes the interactions between protective and risk factors on three levels; the individual, family and environment. Of key interest to this study are environmental factors that may enhance resilience such as work environments that have high levels of teamwork, provide resources, structure, high expectations, stability and opportunity. It would be beneficial to improve and cultivate the resilience of multi-disciplinary team members in order to more easily function in the high stress environment of the ICU and perioperative units.

Statement of Purpose

The purpose of this capstone project is to determine the impact of the TeamSTEPPS training program on teamwork and resilience of the staff members in the ICU and perioperative areas of a community tertiary care hospital. Outcome measures include the Teamwork Perceptions Questionnaire (T-TPQ; Appendix A) and the 25 question Wagnild Resilience Scale (Appendix B) that was developed by Wagnild and Young in 1993 (Wagnild, 2009). The research question is: What is the impact of a TeamSTEPPs training program on teamwork and resilience measured by the T-TPQ and the Wagnild Resilience Scale pre and post training?

Problem Statement

The problem statement is that while TeamSTEPPS training is considered to be evidence based practice, little is known about the impact of enhanced teamwork on resilience.

PICO Statement

Table 1. PICO Statement

Element	Identification
Population	Staff members in the ICU and perioperative areas at a tertiary care hospital
Intervention	TeamSTEPPS training program
Comparison	No teamwork training
Outcome	Increase in teamwork and resilience as measured by the T-TPQ and Wagnild Resilience Questionnaire to be measured pre- and post-training

Project Significance, Scope and Rationale

Theoretic Foundation

Four theoretical foundations were chosen as a framework of this Project. Koloroutis (2004) Relationship Based Care and Covell's Middle Range Theory of Nursing Intellectual Capital (2008) are taken from the discipline of nursing. Kotter's theory of change management (1995) was adapted from business. High Reliability Theory originated in industry and has the goal of zero defects in operations. High Reliability Organization (HRO) concepts are highlighted by the Institute of Healthcare Improvement (IHI). Application of these theories will result in a framework to effectively manage the variables to implement an effective TeamSTEPPS intervention.

Relationship Based Care (Koloroutis, 2004) is a model of care that is embedded in the community tertiary care hospital's Professional Practice Model (PPM). Relationship Based Care places the patient and family as the central focus of the model. There are six elements to the model that surround and touch the patient experience including leadership, teamwork, professional nursing, care delivery, resources and outcomes. Leadership embraces responsibility, authority and accountability and creates a culture of caring on the unit. Teamwork includes the important nurse-physician relationship as well as multidisciplinary team

members that have a "shared purpose" (Koloroutis, 2004, p. 16). Professional nursing practice contains the essential elements of caring and compassion as central elements. Patient care delivery is based on the ANCC's Forces of Magnetism and serves as a structure for nursing to organize their work, deploy resources and promote effective relationships. Resource driven practice includes delivering patient care value. This is achieved through collaboration between nursing and management with the goal of achieving outstanding outcomes. Outcomes are an essential element and may be utilized to motivate nursing leaders and practitioners to focus on continuous improvement. The six elements are enveloped by a healing and caring that sustains all of the individual elements. The skills that are deemed necessary for teamwork include effective communication, critical and creative thinking, personal leadership and interpersonal relationships (Koloroutis, 2004). These skills are part of TeamSTEPPS training.

The other nursing centric theory that applies to this PICO is Covell's Middle Range Theory of Nursing Intellectual Capital (2008). Covell's concepts of human capital, structural capital, relational capital and social capital and their relationship to enhancing outcomes are aligned with TeamSTEPPS training. Training will increase the human capital of the team, adding to the knowledge, skills and experience of the workgroup. According to Nerdrum & Erikson (2001), "Increasing the knowledge stocks within employees improves their productivity and enhances the organization's business performance outcomes" (Covell, 2008, p. 95). Building human capital also reduces nursing turnover, generating cost savings (Covell, 2008).

Kotter's Theory of Change Management (1995) is a theory that transitions well from the business world to nursing and is the primary theory that will be utilized. Kotter's steps of change management include creating urgency, forming coalitions, creating vision, effectively communication vision, removing barriers, gaining 'wins', continually assessing the effects of

change and reinforcing change (McEwen & Wills, 2011). Several of Kotter's steps will require transformational leadership to accomplish, most notably the leadership competencies of vision and communication. Reinforcing change will also be an important step in assisting to hard wire TeamSTEPPS interventions into the unit culture.

Another theory that applies to the PICO is High Reliability Theory that is highlighted through the Institute of Healthcare Improvement (IHI). The goals of High Reliability Organizations (HRO's) are to achieve failure free operations over time (Nolan, Resar, Haraden & Griffin, 2004). One of the tactics of implementation of high reliability is TeamSTEPPS, directly linking this theory to the PICO (Riley, 2009). The goals of High Reliability Theory also align with the Institute of Medicine's (IOM) goals that heath care should be safe, effective, patient centered, timely, efficient and equitable (Nolan, et al., 2004).

Literature Selection

A systematic review of the literature included 58 articles from which 32 were chosen for further study. The search included four databases: CINAHL, Academic Search Premier, Communication and Mass Media Complete and Medline with primary search words of TeamSTEPPS and resilience and secondary search words under the category of work environment. Position statements from expert committees such as the AACN and the IOM were also included in the review. Studies chosen included research that was quantitative, qualitative and systematic reviews of the literature. The selected articles ranged in time from 1999 to 2013, with the majority between 2005 and 2013. Four tiered levels of evidence were utilized as described by Houser and Oman; Ia, Ib, IIa, IIb, III and IV (Houser & Oman, 2011). Of the 32 articles chosen, six leveled as Ia, 2 as IIa, 12 as IIb, 3 as III and 9 as IV. An example of the systematic review is in Appendix C.

Review of the Evidence

TeamSTEPPS

The initial focus of the systematic review was on TeamSTEPPS. Multiple publications have documented improvement in pre- and post-test outcomes after TeamSTEPPS training as well as corresponding quality and safety outcomes (Castner, Ceravolo, Folz-Ramos & Swartz, 2012; Brock, Abu-Rish, Chia-Ru, Hammer, Wilson, Vorvick, Blondon, Schaad, Liner & Zierler, 2013; Thomas & Galla, 2013; Sheppard, Williams & Klein, 2013; Ferguson, 2008; Mayer, Cluff, Wei-Ting, Willis, Stafford, Williams, Saunders, Short, Lenfestey, Kane & Amoozegar, 2011). Brock, et al. (2013) reported that there were positive attitudinal shifts, increase in motivation to work as a team and a reduction in errors attributed to enhanced communication. Thomas and Galla (2012) found that there was an increased perception of staffing effectiveness reported by the team after completing training despite staffing levels remaining constant pre- and post- training. Other research had determined that post training scores were significantly higher for enhanced leadership from training (Castner, et al., 2012). In a large ten facility implementation of TeamSTEPPS there was marked improvement in four of the five focus areas of training including leadership, situation monitoring, mutual support and communication (Sheppard et al., 2013). Ferguson (2008) believes that the implementation of TeamSTEPPS training is responsible for the high level of teamwork and "unprecedented outcomes" in the Iraq war (p. 125). Mayer et al. (2011) published that post-implementation interviews reflected enhanced teamwork experiences after training, including role clarity, perceptions regarding team leadership, morale, trust and the ability to openly communicate concerns. The TeamSTEPPS curriculum is designed to improve communication and teamwork skills, therefore having a

positive impact on patient safety. The content focus is on four trainable team skills including leadership, communication, and situation monitoring and mutual support. Competency in these skills has positive outcomes in performance, knowledge and attitudes of professional care providers (). Brock, et al. (2013) examined the variable of attitude, including motivation and self-efficacy in inter-professional TeamSTEPPS training. They found that the TeamSTEPPS training had a positive effect on the individual's motivation to work on teams and that there was value in the training material and the application of the material to their work environment (Brock et al., 2013).

TeamSTEPPS identifies the barriers to effective teamwork as inconsistency in team membership, lack of time, lack of information sharing, hierarchical relationships, defensiveness, conventional thinking, complacency, varying communication styles, conflict, lack of coordination and follow-up, distractions, fatigue, workload, misinterpretation of cues and lack of role clarity. The tools and strategies TeamSTEPPS utilize include briefs, debriefs, huddles, cross monitoring, feedback, advocacy and assertion, collaboration, hand-off, the two challenge rule, call-out and check-back. The outcomes that may be achieved through the use of these tools include a shared mental model, adaptability, team orientation, mutual trust, higher team performance and higher levels of patient safety (TeamSTEPPS Curriculum 2.0, 2013).

There are three phases of implementation of TeamSTEPPS including site assessment, plan-train-implement and sustaining gains. The site assessment involves creating a change team of trainers, defining an opportunity to improve and setting measurable goals. The plan-train-implement stage involves gaining organizational commitment, administrative support and physician participation. Sustaining a TeamSTEPPS intervention involves practicing the skills,

leadership emphasis on skills learned, providing feedback and coaching to team members, celebrating wins, celebrating successes and updating and adjusting when needed (TeamSTEPPS Curriculum 2.0, 2013).

The review of the literature also indicates that there are a number of additional key variables in TeamSTEPPS implementations such as executive leadership oversight and participation, alignment of the program with organizational goals, early bedside staff involvement and trainer expertise, credibility and motivation of the trainers, and motivation and self-efficacy of the nursing staff. Patient safety, culture of safety, inter-professional communication, inter-professional education and hand-off's are frequently mentioned in TeamSTEPPS research. Concepts such as High Reliability Organizations (HRO's), Relationship Based Care and the AACN Healthy Work Environment were also explored and provide evidence to support teamwork as foundational to health care outcomes (Riley, 2009; Koloroutis, 2009; AACN, 2005).

Resilience

The concept of resilience has been explored by psychologists and psychiatrists over the past decades with the most common research centered on children that have had exposure to adverse family dynamics. Dr. Steven Wolin (1993) conducted 20 years of research on adult children of alcoholics and studied the factors that allowed them to rise above the adversity of their upbringing. Dr. Emmy Werner (1982) studied high risk children in homes with poverty, abuse and alcoholism in an attempt to determine the protective factors that facilitated their transition to healthy adulthood. Bernard (1995) also studied the concept and asserted that there are four

common attributes in resilient children; social competence, problem solving skills, autonomy and a sense of purpose and future.

There is recent application of resilience study to health care environments and the military. The Mayo Clinic provides resilience training through their website (Mayo Clinic, 2015) describing strategies to build skills to better endure hardship. Strategies include cultivating positive relationships, making every day meaningful, developing successful coping skills, remaining hopeful, self-care, planning in order to be pro-active and seeking professional advice assistance when needed (Mayo Clinic, 2015). The United States Army, under the direction of Brigadeer General Rhonda Cornum, identified an urgent need to address depression, Post-Traumatic Stress Disorder (PTSD) and trauma in the ranks. The resulting Comprehensive Soldier Fitness program includes tests for psychological fitness, self-improvement courses and Master Resiliency Training for drill sergeants. The resilience program is based on positive emotion, engagement, relationships, meaning and accomplishment (Seligman, 2011).

Resilience is a concept that repeatedly surfaced as an important attribute not only for individuals but for individuals working as team members (Gillespie, Chaboyer & Wallis, 2007; West, Patera & Carsten, 2009). Resilience is defined as positive adaptation to adversity and the components are self-efficacy, hope and coping (Gillespie et al., 2007). Team resilience provides teams with the ability to persevere through failure, setbacks, conflicts and any other adversity that teams may encounter (West et al., 2009). Gillespie et al., (2007) found in an extensive analysis that resilience is not a fixed trait, rather an attribute that could be developed over time based on experience and the environment. A gap in the literature exists in connecting teamwork training and any possible impact on levels of individual resilience (West et al., 2009).

The Work Environment

The literature commonly explores elements in hospital work environments and individual traits that impact stressful working conditions. Topics such as moral distress, futility, burn-out, critical reflective practice, emotional intelligence, empathy and compassion fatigue were included in the review. According to the ICU nursing staff, patients with End Stage Liver Disease (ESLD) are emotionally challenging to care for, particularly when a patient is told that they are no longer eligible for transplantation (personal communication, ICU UBC, April 7, 2014). Another challenging population includes patients that continue to receive life sustaining measures when recovery from the medical condition seems futile (personal communication, ICU UBC, April 7, 2014). Moral distress results when an "ethically appropriate course of action is known but is not taken" and is common in ICU nurses (Elpern, Covert & Klienpell, 2005, p. 523). Transplant associated distress is related to the experience of patients receiving liver transplantation while they are actively drinking alcohol, a scenario that has occurred in the ICU (Elpern, et al., 2005). Team effectiveness, quality of patient care and job satisfaction are achieved more readily when team members have a high level of emotional intelligence (McCallin & Bamford, 2007).

Uncivil work environments, including lateral and horizontal violence, bullying and social acts of disrespect were explored in the work of Ceravolo, Swartz, Folz-Ramos & Castner (2012). The results of lateral violence are socially demeaning and may involve verbal and emotional abuse (Ceravolo, 2012). Horizontal hostility and lateral violence are further defined as "a consistent pattern of behavior designed to control, diminish or devalue another peer that creates a risk to health and/or safety" (Barthalomew, 2013). Incivility is described as rude or disruptive behaviors that may result in physiological or psychological distress, and if left unaddressed may

progress into threatening situations, or result in temporary or permanent illness or injury (Clark & Carnasso, 2008). Reportedly, up to 90% of nurses experience lateral violence and up to 60% of new graduate nurses leave their first employment as a result of coworker conflict (Ceravolo, et al., 2012). An uncivil work environment can impact communication that is integral to providing quality care by medical teams (Center, 2010). This impact has been measured by the American Association of Critical Care Nurses (AACN), reporting that 60% of medication errors are caused by mistakes in interpersonal communication. Shortcuts that could be dangerous for patients have been witnessed by 84% of physicians who chose not to intervene. More than 50% of healthcare workers witness coworkers break the rules, make mistakes, fail to support, demonstrate incompetence, show poor teamwork, disrespect and micromanage others. Intent to leave a nursing unit is admitted by 23% of nurses because of these concerns. Inability or unwillingness to confront incompetent care is reported by 78% of nurses, some admit they have never been given the tools to confront professionally (AACN, 2005). Based on the work of Ceravolo et al. (2012), TeamSTEPPS incorporated conflict resolution in their curriculum in 2009.

Hierarchical barriers to communication were explored by Sheppard et al. (2013) in a TeamSTEPPS implementation in a North Texas hospital system including 10 facilities. Although this system made training available to physicians on a voluntary basis, Sheppard et al. (2013) conclude that their biggest hurdle with the implementation of TeamSTEPPS has been participation by their physician partners. The variable of management leadership is also underscored in this study. The two facilities that did not have improvement in TeamSTEPPS skills post implementation were undergoing significant leadership turnover during the rollout (Sheppard, et al., 2013). Regarding the hierarchical relationships as a variable, there is a

proposed relationship between hierarchical structures and the potential for horizontal and lateral violence discussed in the work of Ceravolo et al. (2012).

The work of Castner et al. (2012) and Thomas and Galla (2013) emphasize the importance of leadership support and involvement in healthy work environments. Leadership variables had a higher impact on patient safety correlation than teamwork, communication, handoffs, performance counseling or staffing ratios (Castner et al., 2012). The role of the manager is emphasized as well as charge nurses or Assistant Nurse Managers (ANM's) who ensure the shift to shift support of adequate staffing, resources and facilitation of communication (Castner et al., 2012).

Project Plan and Evaluation

Market/Risk Analysis

A macro analysis of health care assesses the forces that are beyond the control of the hospital in the areas of politics, economics, social factors and technology (Fortenberry, 2010).

Political forces include the ACA of 2010. Health care reform and value based purchasing will impact facilities and individual practitioners by increasing accountability, standardization of care and operationalizing evidence based practices. Attaining high reliability, quality and safety are all goals that will require a focus on individual accountability as well as accountability of the multidisciplinary team members. The political environment is also transitioning healthcare from managing episodes of care to managing the health of populations. This will cause a shift in resources from the inpatient to outpatient areas of care and will require collaboration between multiple disciplines to successfully operationalize the transition.

The economic forces facing hospitals include declining reimbursement and bundled payments for care. This is having current impact as hospitals attempt to control expenses through pay practice changes that may have the effect of decreasing staff morale such as limiting overtime, reducing shift differentials, increasing the use of unlicensed personnel and adjusting nurse-patient ratios. With bundled payments there is also pressure to decrease the hospital length of stay in order increase income on the cost per case. The aging population and decrease in nurses will stress available resources to provide care. In order to have skilled nursing staff, hospitals will need to train nurses and provide a working environment that retains their talent.

Multiple social forces impact the health care environment. Patients are now informed customers with publicly reported data. The public has high expectations for quality care and customer service from health care providers and all who touch the patient experience. Some members of the public also have expectations around sustaining life at all costs causing moral distress for our providers and nursing staff. Hierarchical healthcare dynamics are changing to valuing all members of the team and their contribution to patient care.

Technological forces include the transition to electronic medical records which some view as the computer coming between the nurse and the patient. The complexity of our technology has resulted in multiple alarms and alerts for our caregivers to manage leading to fatigue, tolerance and overstimulation.

There are a number of strengths identified in the analysis of nursing as stakeholders. The metro area of the community tertiary care hospital is experiencing a large amount of growth, attracting highly educated workers. The city is involved in urban planning and development to provide infrastructure including multiple housing alternatives that are close to mass transit. The

city has a pleasant climate and many recreational choices for outdoor activities in the sunshine. There are also many cultural and sports activity options. The job outlook is positive for nurses and the quality of care delivered in metro facilities is focused on quality and patient satisfaction. Organizations are implementing strategies to ensure an adequate number of nurses to care for an aging population and plan for the large number of impending nursing retirees.

While there are a number of strengths in the metro area, they are overshadowed by a number of weaknesses. Nurses may be considered a vulnerable population based on workplace stress, exposure to verbal aggression, physical assault, musculoskeletal injuries, exposure to biohazards and latex, and mental health concerns. Mental health and stress concerns are varied and include pressure to achieve high quality outcomes, the complexity of their patient conditions, an uncivil work environment, a continuous change management culture and workload around regulatory documentation requirements. These stressors are manifested in illness, turnover, high divorce rates among nurses and moral distress. The nursing population is aging in Denver and a shortage of nurses may result.

Opportunities for health promotion exist. Workplace stressors for nurses could be impacted through implementation and enforcement of programs like the American Association of Critical Care Nurses (AACN) Zero Tolerance for Abuse position statement as well as Standards for Establishing and Sustaining Healthy Work Environments (AACN, 2012). Musculoskeletal injuries can be prevented with the use of lifting technology and lift teams. Risks from biohazards, needles and latex may be impacted through training to policies and procedures and the use of alternative products that are safer options. Work schedules can be changed and adapted for shorter shifts and use of weekend option to promote work-life balance. Stressful

nursing work environments may be impacted with shared governance and transformational leadership.

Project Strengths, Weaknesses, Opportunities and Threats

The community tertiary care facility has a stable executive leadership and management team. There is a high quality critical care physician group that provides consistent on site coverage for the ICU. The working relationships between the critical care physicians and the nursing staff are observed and reported to be very collegial. Specialized surgical teams exist for cardiovascular, orthopedic and transplant surgery in order to increase efficiency, teamwork and satisfaction for surgeons and associates. The ICU and perioperative areas have active shared governance councils, called Unit Based Councils (UBC's) that meet monthly and are regularly attended by staff members. The teams include many informal leaders who are dedicated to the unit, the unit outcomes and work environment. The ICU UBC has supported and assisted with the implementation of several evidence based practice changes over the past year including bedside report and elimination of visiting hours for family members. Also included in the ICU leadership structure are permanent charge nurses that provide shift accountability for leadership. The unit manager structure is two co-managers, an initiative that was implemented five years ago in an effort to stabilize significant manager turnover on the unit. For the first three years following the implementation of the co-manager leadership model, all clinical outcomes improved, as did associate satisfaction and resulting low staff turnover. Years four and five of the co-manager model maintained excellent clinical outcomes but an increase in turnover and decrease in associate satisfaction. The perioperative leadership structure has transitioned from charge nurses to Assistant Nurse Managers (ANM's) that have service line management

responsibilities. There is an OR manager and a PACU/Pre-op manager and a perioperative director who has provided stability to her units for over a decade.

The tertiary care facility is located in a large metropolitan area in western United States. The facility is licensed for 368 beds and is a full service hospital with specialization in joint replacement, spine surgery, organ transplant, behavioral health, cancer care and cardiology. The facility achieved Magnet status for nursing excellence in 2009 and was re-designated in 2013. The hospital was founded in 1930 and aligned with a larger faith based organization in 1996. The primary strength of the organization is the focus on excellence. Many of the items in the SWOT that are listed as strengths fall into the category of excellence including Magnet nursing designation, a 76% Bachelor of Science in Nursing (BSN) employment rate and 40% of nurses Have earned certification in their area of specialty. Excellence in outcomes are reflected in the low number of hospital acquired conditions including zero central line associated blood stream infections (CLABSI) for over two years. The organization has received multiple awards that recognize excellence in outcomes including the #2 hospital in Colorado by U.S. News and World Report in 2014 and 2015, ranked in top 100 orthopedic hospitals in the U.S. by U.S. News and World Report and achieving HealthCare Information and Management Systems Society (HIMSS) level 7 for electronic medical record integration (U.S. News and World Report, 2015). The hospital has an open heart surgery program, chest pain center accreditation, is a certified stroke center and level III trauma center. Healthgrades has awarded the organization five excellence awards including cardiac surgery, coronary intervention, cardiac valve surgery, interventional procedures and heart attack care (www.healthgrades.org). This journey towards excellence began in 2009 with the first Magnet hospital designation. This allowed the

organization to become excellent in one way and became greedy to achieve excellence in other areas (McBride, 2011).

Additional strengths are the not-for-profit culture and the faith based mission and vision. Corporate branding is also of benefit as well as the purchase of hospitals in strategic geographic areas in order to have channel more citizens into the centers of excellence. The growing population in the metro area is also of benefit.

The primary opportunity for the organization is to implement the recommendations from national organizations to implement team training in the facility. The IOM and the AHRQ recommend the implementation of TeamSTEPPS to increase interdisciplinary collaboration and improve outcomes (Freshman et al., 2010). TeamSTEPPS training may also mitigate the hierarchical physician and nursing relationships that is listed as a weakness (Freshman et al., 2010). The opportunity is available to all health care facilities and is free of charge. All of the items listed under threats could be listed under financial viability of the hospital during a time of decreasing re-imbursement. This would include competition with the neighboring facilities for commercially insured patients, controlling expenses to match reimbursement and decreasing the length of stay of dual diagnosis patients without safe discharge alternatives.

The threats for the community tertiary care hospital are the same threats that the competing hospitals have. Reasons for this are that all organizations are operating under the same public policy pressures, serve the same community and have the same financial pressures.

Figure 1. SWOT Analysis

Strengths	Weaknesses
• Hospital brand identity and vision • Growing population in metro area and growing market share • Magnet Hospital designation • 76% BSN and 40% Certified RN's • Focus on excellence, achieved stretch goal of zero CLABSI X 2 years • Stable and high quality leadership • Not for profit culture; faith based mission and vision • Named #2 hospital in Colorado by US News and World Report 2014 and 2015 • Top orthopedic (joint replacement) program; top 100 US News and World Report 2014 • Active recruitment of primary care base and specialists as employed physicians • Organization purchasing geographically strategic hospitals for outreach • All facilities connected by same EMR for ease of information sharing • HIMSS 7 recognition for achieving top 4 % of hospitals in EMR use • Recent purchase of new technology; beds, computers, IV pumps for nursing • 27 qualified TeamSTEPPS instructors in the facility; TeamSTEPPS EBP • All staff support environment for safety • Recent trauma designation resulting in increased volume and quality of care	• Some hierarchical mindset • Horizontal and lateral violence (limited but present) • Some deference in decision making to specialty physicians • Perception of staff that some patients are receiving non-beneficial care creating moral distress • Aging facility that needs modernization • Patient throughput inconsistent to inpatient units and very sluggish to psychiatric units with long ED length of stay • Inconsistent patient satisfaction scores
Opportunities	**Threats**
• IOM and AHRQ support interdisciplinary teamwork through TeamSTEPPS implementation to improve outcomes	• Competitive hospital environment in metro area • Patient population become more urban with increase in Medicaid dual diagnosis and pts with low resources and LOS due to inability to provide safe discharge • Management of difficult patients very challenging for nursing staff creating burn out and fatigue • Declining re-imbursement

Driving and Restraining Forces

The primary driving force is patient safety. The redesign of the work flow of patients going directly from the OR to the ICU and bypassing PACU was the initial impetus for the project. The hand-off and communication process for these high risk patients was of the upmost concern. Additional driving forces include associate satisfaction and nursing turnover at a level of 12% in 2015. This is the highest level of turnover for the tertiary care facility since Magnet designation in 2009. An additional driving force is the facility goal of achieving HRO, with team training as an established tactic (Riley, 2009).

Restraining forces include competing priorities, culture and cost. The tertiary care hospital has multiple initiatives and limited resources to coordinate efforts. Ongoing initiatives include technology advancement, new product implementation, service line growth efforts, patient satisfaction**,** personnel activities, quality improvement initiatives, regulatory compliance and productivity management. This is not an exhaustive list but is reflective of routine activities in hospital organizations. Existing culture is a common restraining force for any initiative, making change management theory valuable. Cost is a modest restraining force with training time and productivity as the primary barrier.

Need, Resources and Sustainability

The need for enhancing communication was identified by the perioperative and ICU staff members. As reported, critical airway patients began bypassing the PACU and arriving directly to the ICU from the OR. This created tension between the units and a recognized opportunity to improve communication in hand-offs for a critical patient population. The community tertiary care hospital is also experiencing turnover that is high for the facility at 12%.

Resources for the project include finances, personnel and training space. Financial backing was granted by the executive team at the facility. The development of a team of internal TeamSTEPPS trainers in the perioperative and ICU was accomplished over six months. The internal trainers utilized change management techniques to create the burning platform that collaboration between professionals improves patient care quality and safety and improves satisfaction with work environments. The internal trainers instructed all perioperative and ICU staff members the evidence based practice TeamSTEPPS program. Internal trainers were identified as a sustainment strategy because of their engagement in the program, ability to monitor use of tools and continue to re-educate when needed. By creating an enhanced teamwork practice environment, engaged and compassionate professionals will want to continue working at the tertiary care hospital.

Feasibility/Risks/Unintended Consequences

The implementation of a TeamSTEPPS initiative is feasible at the tertiary care hospital. The goal of enhancing teamwork and resilience of nursing staff aligns with organizational goals. Evidence based practice is embedded in the hospitals Professional Practice Model (PPM). Trainers volunteered to participate and provide training.

There are not risks involved in providing training to the organization. There are more risks associated with not providing TeamSTEPPS training. The impact of not implementing this program is loss of potential gains with regard to patient safety. Secondary missed opportunities may include poor workplace relationships within and between departments and a reduction in job satisfaction for nursing and ultimately turnover. There may also be a missed opportunity to impact patient satisfaction.

There are no known adverse unintended consequences for this project.

Stakeholders and Project Team

The primary stakeholders in the policy proposal include all Registered Nurses (RN's) in the perioperative units and the ICU of the tertiary care hospital. There were 77 RN's in the ICU and 76 RN's in the perioperative areas for a total combined pool of 153 RN's at the time of training. There were 27 staff members who had attended TeamSTEPPS train the trainer and of this group 16 were consistent presenters for the training. The training team consisted of formal and informal leaders including nurse managers, assistant nurse managers, charge nurses and a clinical coordinator.

Cost-Benefit Analysis

The two day TeamSTEPPS train the trainer is provided free of charge by AHRQ. There are eight national training sites available including the New York North Shore-LIJ Health System, Duke in North Carolina, MetroHealth in Cleveland, Northwestern in Chicago, Tulane in New Orleans, University of Minnesota in Minneapolis, University of Washington in Seattle and University of California in Los Angeles. The majority of the trainers at the facility attended a two day training sponsored by a perioperative unit in a competing hospital.

Training cost estimates are based on an average nurse cost per hour of $33.00. Cost for 27 individuals to be trained as trainers in the two day curriculum was $14,256. The four hour training to the 153 members of the ICU and Perioperative teams was $21,978.

Table 2. Training cost estimates

Training costs for 153 RN participants	
AHRQ manuals ($2.50 each)	$382.50
Button "speak up for patient safety"	$80
RN cost (153)	$20,196
Instructor RN class time (10 classes)	$1,320
Potential total fixed cost for class training	$21,978
Train the Trainer Costs	
27 RN's	$14,256
Total	$36,234

A case may be made that this is a modest amount when one considers the cost of turnover for one RN is between $36,000 and $88,000 depending on specialty (Li & Jones, 2013).

Mission, Vision and Goals

This PICO is congruent with the researcher's personal vision and mission. Vision is one of the attributes of a leader that involves a future orientation, the ability to see the larger picture, to seek challenges and take risks (Chism, 2013). In our changing health care environment, vision is important in an attempt to predict the future, prepare for changes in regulatory requirements, reimbursement, technology developments, best practices and anticipating the needs of the population served (McBride, 2011). Increasing teamwork and resilience aligns with the personal vision statement of participating in the journey towards becoming a high reliability organization that provides consistent quality outcomes and a practice environment that attracts and retains engaged and compassionate professionals. It is also congruent with personal mission statement that supports the development of a resilient team of nursing professionals that provide patient care through the utilization of evidence-based-practices, demonstration of a Healthy Work Environment, Magnet nursing competencies and the core values of compassion, respect, integrity, spirituality, stewardship, imagination and excellence. Resilience is included in the

mission as it speaks to the synergy between individuals, the environment and personal experiences. Resilience is important to nursing as the components are self-efficacy, hope and coping (Gillespie et al., 2007).

The vision of the project team was to have a singular message that the participants would remember after training. The slogan, "Speak Up for Patient Safety' was chosen and lapel buttons were created with a stylized penguin and megaphone as a means of communicating the team's vision.

Figure 2. Speak Up For Patient Safety Slogan

Schematic Model

A schematic model for this project demonstrates the importance of theory for the overall structure. The importance of executive, manager, physician, charge RN and informal leader support is also highlighted. The mission and vision of achieving organizational goals and mitigation of lateral violence and uncivil behavior is noted as well as the significance of trainer expertise in the success of the initiative. Enhanced teamwork is the overarching goal.

Figure 3. Schematic Model

Process and Outcome Objectives

The primary outcomes objectives of this study are to increase the teamwork and resilience of team members in the ICU and perioperative units. The outcome measurements are the T-TPQ and Wagnild resilience questionnaire.

Table 3. Primary Outcome Objectives

Wagnild and Young Resilience Scale (1993)	Scores range from 25-175 Score >145 moderately high to high resilience Score 125-145 indicates moderate to moderately low resilience Score <120 indicates low resilience Goal to improve scores between pre and post training
TeamSTEPPS T-TPQ Questionnaire	Goal to improve scores between pre and post training

Larger scale objectives that are out of the scope of this project include achievement of excellence in outcomes. Outcomes that may be positively impacted by this project include job satisfaction as measured by Press Ganey, a decrease in patient falls and other Hospital Acquired Conditions (HAC's) as well as improvement in patient satisfaction scores to include nurse communication. Improved financial outcomes will result with consistent high quality, patient satisfaction, and retention of team members. The financial benefits of retaining personnel through increasing teamwork behaviors and individual staff member resilience would be reflected in decreased turnover. As reported by West, Patera and Carsten (2009) it stands to reason that employee job satisfaction may in part be a function of how satisfied employees are with the teams that they operate within. Desirable organizational outcomes including achieving High Reliability Organization status (HRO) with zero defects and Healthy Work Environment (HWE) as measured in the facility safety culture surveys are possible. If attained, these outcomes will demonstrate to the community that the tertiary community hospital is the provider of choice and strengthen market share of the organization.

Current comparison benchmarks and measures include:

Table 4: Outcome Objectives of Interest (Out of Scope)

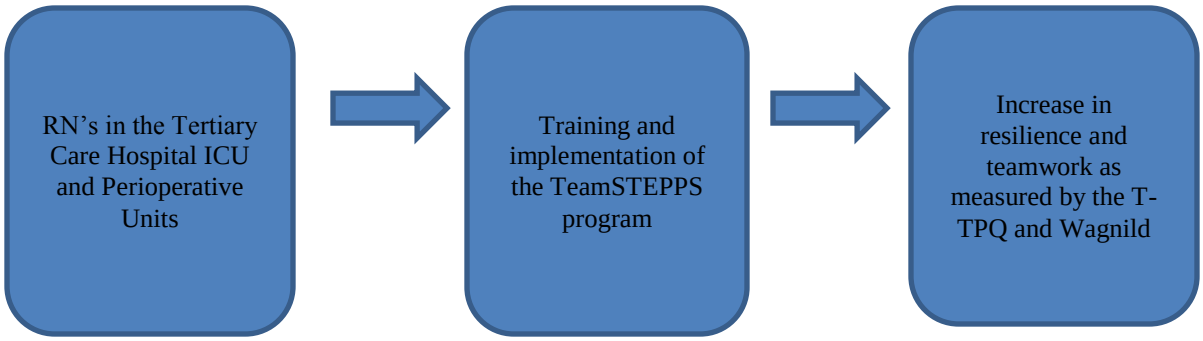
<table>
<tr><td>High Reliability Organization (HRO)</td><td>Goal zero defects
Last year ICU results:<table><tr><td>CLABSI</td><td>0</td></tr><tr><td>VAE</td><td>3</td></tr><tr><td>Fall with injury</td><td>0</td></tr><tr><td>CAUTI</td><td>0</td></tr></table>
Characteristics of a HRO
1. Safety is the hallmark of the organization
2. Work is accomplished by teams, not individuals
3. Communication is highly valued and regarded
4. Standards are set by interdisciplinary teams
5. Professionals learn through interdisciplinary education</td></tr>
<tr><td>Healthy Work Environment (HWE)</td><td>Characteristics of a HWE
1. Skilled communication
2. True collaboration
3. Effective decision making
4. Appropriate staffing
5. Meaningful recognition
6. Authentic leadership</td></tr>
<tr><td>Press Ganey Associate Satisfaction Survey</td><td>Unit goal for 60% of data base</td></tr>
<tr><td>HCAHPS Patient Satisfaction</td><td>Goal for facility is top quartile performance
Last quarter results:<table><tr><td>Nurse communication</td><td>77%</td></tr></table></td></tr>
<tr><td>Staff Turnover</td><td><table><tr><td>Organizational turnover average</td><td>12%</td></tr><tr><td>Current facility level is</td><td>12%</td></tr><tr><td>Facility lowest level</td><td>7%</td></tr></table></td></tr>
</table>

Logic Model

The capstone project researchable question is: Will the implementation of a TeamSTEPPS intervention increase teamwork and resilience of ICU team members as measured by the 35

question T-TPQ and the 25 question Wagnild Resilience Scale. The outcome measures will be the T-TPQ and the Wagnild Resilience scale measured pre and post training.

Figure 4. Simple Logic Model

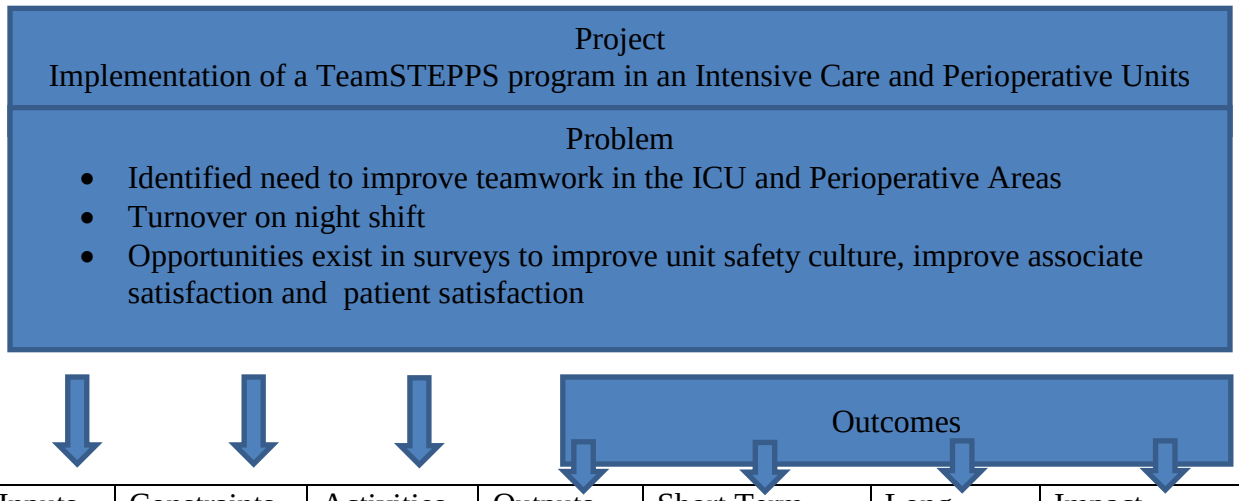


Zaccagnini & White Logic Model Simple (2014)

The complex logic model identifies the need to improve teamwork in the ICU and perioperative areas, that turnover of nursing staff has increased and that surveys of associate and patient satisfaction have opportunity for improvement. Inputs in the model include the personnel working in the two nursing departments comprised of nursing, unit secretaries, monitor technicians, respiratory therapists, physical and occupational therapists, contracted critical care physicians, surgeons, hospitalists and specialty physicians. Other inputs are TeamSTEPPS trainers, the finance department, facilities for training and patients. Constraints in the model are identified as the existing culture, buy in from staff members, scheduling logistics for training, physician and administrative participation, costs for training and efforts to sustain the tools and techniques. Outputs consist of the four hour training. The short term benefits are be the incorporation of the TeamSTEPPS tools from the AHRQ training guide into practice; SBAR, Call-Out, Check Back, Hand-off, Brief, Huddles, Debrief, Situational Awareness, Shared Mental Models, Cross Monitoring, Task Assistance, Feedback, Advocacy & Assertion, Two Challenge Rule, CUS and DESC (AHRQ, 2006). After training the short term benefits include

the outcomes of teamwork and resilience from the T-TPQ and Wagnild questionnaire and observation of consistent communication tools and teamwork behaviors among staff members. The impact out of the scope of this implementation may include decreased turnover, a decrease in HAC's, increase in patient satisfaction as measured through HealthStream, improved associate satisfaction as measured by Press Ganey, and enhanced teamwork as reflected in the safety culture survey. At the macro level these outcomes reflect a HWE and HRO.

Figure 5. Complex Logic Model



Inputs	Constraints	Activities	Outputs	Short Term	Long Term	Impact
	Existing Culture Buy in Scheduling Effort to sustain the initiative	Form team of trainers and teaching plan Managers, Charge, ANM's & Trainers to	Develop training plan 4 hour training sessions for all	Learn and utilize the content of the TeamSTEPPS curriculum: • SBAR • Call-Out • Check Back • HandOff • Brief • Huddles • DeBrief • Situational awareness	Hard-wire tools into work	Decrease turnover Retention of new staff members Recognition as a Healthy Work environment (HWE) & Civility

	Buy-in Existing culture Logistics of scheduling Participation optional Existing culture Participation optional Existing Culture	monitor & Sustain Require attendance Present plant to critical care committee Present to CMO and consider Medical Executive Committee	staff Consistent use of tools Gain buy-in and support Gain buy-in and support	• Shared mental model • Cross monitor • Task assistance • Feedback • Advocacy and assertion • Two Challenge Rule • CUS • DESC		Decrease HAI's High Reliability Organization (HRO) (Zero defects) Increase staff resilience and satisfaction Decrease moral distress Improved scores on patient safety survey
Finance	Cost of training for 153 @ avg salary 33.00/hr	Develop training plan that will not result in overtime	4 hr training 4hr cost= 22,978	Expense will be over two months	Gain efficiency with teamwork Decrease in hospital acquired conditions will provide cost avoidance Potential recovery of value based purchasing dollars Retention of staff will	Positive outcomes will outweigh costs

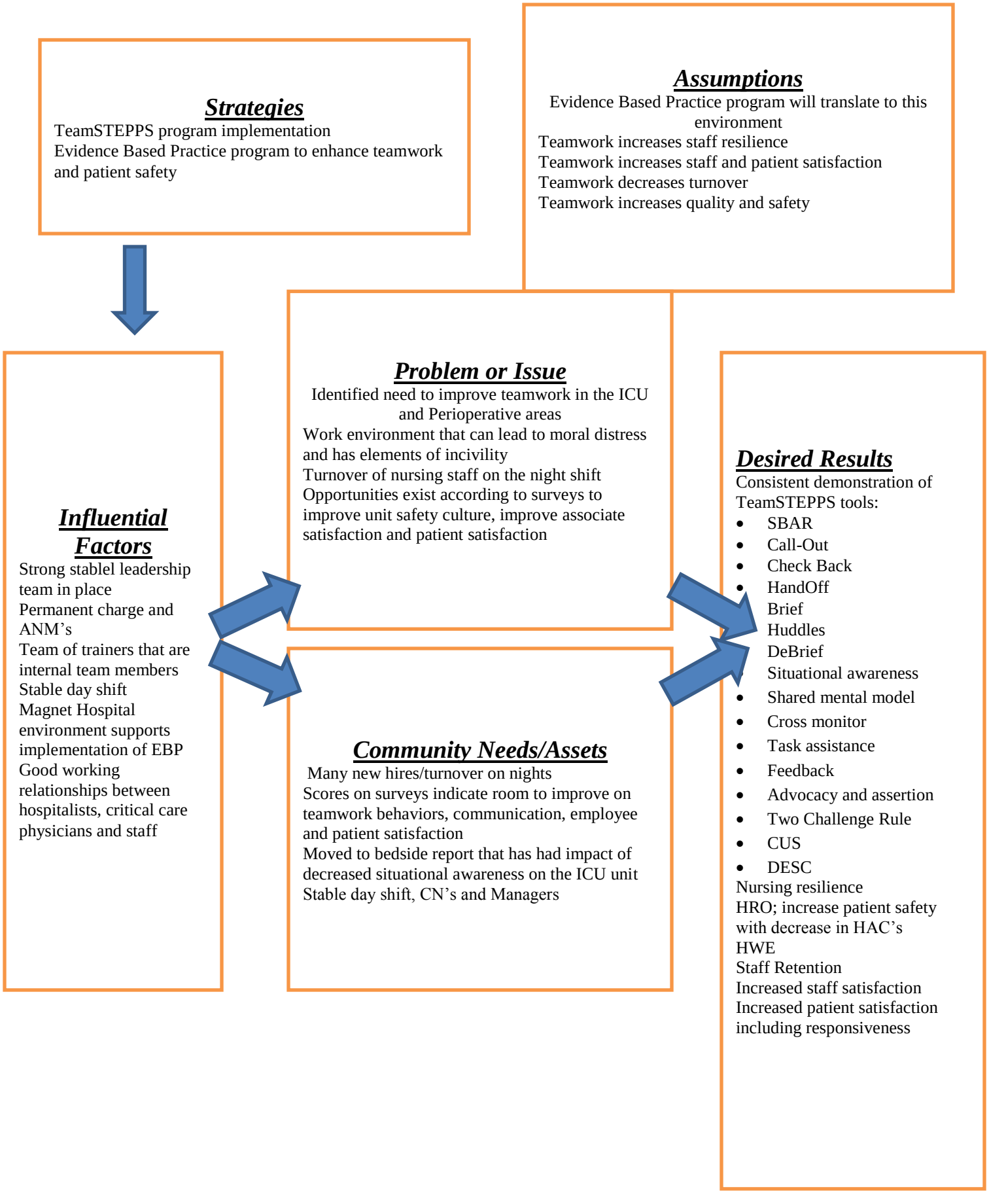
	Cost of training materials	Print in house to minimize cost	Purchase only pocket guides @ 2.50 ea	Minimal expense for training materials	provide cost savings from turnover	Pocket guides will provide sustainment
Facilities	No constraints	Book meeting rooms on campus	Training on campus			
Patient				Observe consistent communication tools and teamwork behaviors among staff		Benefit from outcomes of HWE HRO-decrease in HAC's Increased responsiveness of staff and overall patient satisfaction

Zaccagnini & White Logic Model Complex (2014)

An alternate representation of this capstone project employs the Kellogg Foundation Theory of Change template (W.K. Kellogg Foundation Logic Model Development Guide.pdf). The problem or issue is defined as the identified need to improve teamwork behaviors, the work environment may lead to moral distress, turnover on the night shift as well as opportunities to improve associate satisfaction, patient satisfaction and patient safety culture measured by corresponding surveys. The strategy for the problem is implementation of the TeamSTEPPS program. Assumptions include that the evidence based practice program will translate to our ICU and perioperative environments, that teamwork increases staff resilience, enhances staff and patient satisfaction, decreases turnover and improves quality outcomes and patient safety culture.

Community needs are that scores on patient and associate satisfaction surveys show opportunity for improvement, the move to bedside report may have decreased situational awareness on the unit and department silos exist. Influential factors include stable leadership, consistent directors and managers, eight long-term change nurses in ICU, an effective service line ANM structure in the OR, a day shift with low turnover, a magnet nursing environment that supports evidence based practice and good physician relationships with critical care physicians and hospitalists. Desired results are consistent demonstration of TeamSTEPPS tools, increased staff resilience, outcomes consistent with HRO and HWE, staff retention, increase in staff and patient satisfaction and improved patient safety survey scores.

Figure 6. Kellogg Theory of Change Template



Setting of the Evidence Based Project

The population that participated in the study is the nursing staff in the ICU and perioperative units at the community tertiary care hospital. All team members in the units were invited to attend and data analysis was limited to the nursing staff. The training team made the decision to make the TeamSTEPPS training mandatory for both units. The training was held at the facility in a conference room during March and April 2015. There were ten training times to choose from including a weekend session, early morning and late afternoon. The length of the training was four hours. Each class session involved a combination of fourteen different trainers from the two units teaching the five TeamSTEPPS modules; team structure, communication, leading teams, situation monitoring and mutual support. The class size was limited to 25 participants. Class times were loaded into the organizations computer software system, LEARN, for ease of class signup and tracking. Individuals on Family and Medical Leave (FMLA) were exempt from training. Training was made available to the critical care physicians and hospitalists and specialty surgeons on a voluntary basis.

Design Methodology and Measurement

The capstone project is a quantitative study. Quantitative data consists of data in numerical form (Polit, 2010). The T-TPQ and Wagnild Resilience Scale tools have numerical values. The data from the T-TPQ and Wagnild Resilience Questionnaire are considered primary data as they were gathered by the researcher. While out of the scope of this project, secondary data of interest includes nursing turnover, HRO and HWE characteristics, associate and patient satisfaction.

The T-TPQ questionnaire may be found in appendix 1. The T-TPQ questionnaire is a continuous interval scale that contains 35 questions on a five point Likert rating system with the following options; 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree and 5 = strongly disagree. The tool measures the perceptions of team skills around the five core curriculum components in the TeamSTEPPS program; team structure, leadership, communication, mutual support and situation monitoring. There are seven questions for each of the core curriculum components. A mean score may be calculated between one and five for each construct pre and post training.

The Wagnild Resilience Scale may be found in appendix 2. It is a 25 question continuous interval scale. It measures the five dimensions that are central to resilience; perseverance, equanimity, meaningfulness, self- reliance and existential aloneness. It also includes a seven point Likert scale with the following values assigned; 7 = strongly agree, 6 = moderately agree, 5 = slightly agree, 4 = neutral, 3 = slightly disagree, 2 = moderately disagree and 1 = strongly disagree. The possible composite scores range from 25 to 175. Wagnild has identified that the following scores respond to levels of individual resilience (Wagnild, 2009).

Table 5. Wagnild Resilience Questionnaire Scoring

Score > 145	Moderately high to high resilience
Score 125-145	Moderate to moderately low resilience
Score < 120	Low resilience

Both the T-TPQ and Wagnild Resilience Questionnaire are condition specific as the concepts that they measure are the distinct concepts of teamwork and resilience. Both tools pass the test of sensibility and "enlightened common sense" (Kane & Radosevich, 2011, p. 62). There is no undue burden on staff as the tools are not extensive and can be taken over a short period of time.

Protection of Human Rights

This study received approval with an expedited review from the organization Joint International Review Board (IRB) in February 2015 as well as approval by the Regis University IRB in February 2015 (Attachment D, E). Collaborative Institutional Training Initiative (CITI) training was completed in June 2014. Elements of CITI training include ethical and regulatory principles of research, obtaining informed consent and protecting the privacy and confidentiality of the participants (Attachment F).

Instrument Reliability and Validity

The T-TPQ and Wagnild Resilience Questionnaire have been tested for reliability and validity. Reliability has been established through Cronbach's alpha coefficient. The following Cronbach's measures for the five core concepts in the T-TPQ are as follows:

Table 6. T-TPQ Cronbach's Alpha Measures

Team Structure	.89
Leadership	.95
Communication	.88
Mutual Support	.90
Situation Monitoring	.91

Cronbach's alpha coefficient for the Wagnild tool has an internal consistency between .85 and .94 reflecting robust reliability (Wagnild, 2009).

The primary threat to validity and reliability of this study is the quasi-experimental design itself. The one group pretest-posttest research design has flaws (Kane & Radosevich, 2011). The threats to validity of this design include:

- History-the possibility that an event outside of the study has influence over the outcome

- Maturation-the outcome is influenced by the subjects gaining knowledge with experience
- Testing-the study participants become familiar with the testing therefore influencing outcome
- Instrumentation-experience with the pretest and posttest appears as a floor/ceiling effect
- Generalizability (Kane & Radosevich, 2011).

Possible solutions to improve validity and reliability was to include a longitudinal testing element to the study, however, due to the timeline for the study this was not feasible. Another solution was to add a control group of another similar ICU and perioperative area in a neighboring hospital and enlist their participation in pretest and posttest with the T-TPQ and Wagnild Resilience Scale tools without the intervention of training (Kane & Radosevich, 2011). After consideration, a control group may not prove useful for this project as it would interject additional variables that would decrease validity of the data. It is possible that the control group consists of members that have had past team training.

Data Collection and Procedure

Folders were distributed at the beginning of training that contained two consents, one for the study and one for the staff member to keep (Appendix G). The consent was explained to participants as well as participation was voluntary and that there was no risk to employment for non-participation. The folder also contained two T-TPQ questionnaires and two Wagnild resilience questionnaires to be completed pre and post-training. The folders were de-identified and participants were cautioned not to put their names on the questionnaires.

After training concluded, the completed questionnaires and consents were kept in a locked file cabinet in a locked office. Only questionnaires that had a completed consent were utilized. Questionnaires that had missing data were not utilized, eliminating the need for a missing values strategy. Data analysis was conducted by a statistician and the researcher on a computer that was password protected. Questionnaires will be destroyed by December 31, 2015.

The ideal sample size using a paired *t*-Test (two-tailed) methodology with alpha of .05 and medium effect size will be 34 participants to achieve a power of .80, 44 participants to achieve a power of .90 and 54 participants to achieve a power of .95. After removing participants that did not consent to participate or complete both the pre- and post-survey the total number of T-TPQ participants was 123 and Wagnild participants were 121. The ICU had 77 RN's complete training and the perioperative units had 76 for a combined pool of 153 RN's at the time of training. The participation rate for the T-TPQ was 80% and the participation rate for the Wagnild questionnaire was 79% of possible participants.

Project Findings and Results

Key Elements/Instrumentation

The primary data tools being utilized are Likert scales in the T-TPQ and Wagnild questionnaires. Likert scales are ordinal level data, however, when numbers are assigned to Likert scales they may be interpreted as interval level data. Interval level data allows the calculation of mean or average scores that are helpful to compare pre- and post-survey data. A dependent group paired *t* test, also called a correlated groups *t* test, will be utilized for the statistical analysis.

Data analysis for the T-TPQ involved calculation of a mean score for each of the five constructs measured pre-training and post-training. Analysis of the Wagnild Resilience questionnaire involved calculating a composite mean score for both the pre-survey and the post-survey responses. The lowest possible composite score was 25 and the highest was 175. Statistical analysis was completed using (SPSS) statistical software that is widely used in academic settings and nursing research (Polit, 2010). The survey data was analyzed by a statistician.

Correlation analysis was conducted to determine the direction and magnitude of the relationship between the variables.

Table 7. Correlation of Variables

T-TPQ team structure pre-training mean	T-TPQ team structure post-training mean
T-TPQ leadership pre-training mean	T-TPQ leadership post-training mean
T-TPQ situation monitoring pre-training mean	T-TPQ situation monitoring post-training mean
T-TPQ mutual support pre-training mean	T-TPQ mutual support post-training mean
T-TPQ communication pre-training mean	T-TPQ communication post-training mean
Wagnild composite pre-training mean	Wagnild composite post-training mean

Descriptive statistics are utilized to describe, summarize, compare and characterize a relationship between variables. Examples of descriptive statistics include percentages and averages (Polit, 2010). Descriptive statistics utilized in this study include the central tendency measurement of the mean for pre and post survey data and standard deviation to measure the degree of variability from the mean scores. Standard deviation is the most commonly used variability index (Polit, 2010). Correlation was also measured using Pearson's r, a descriptive statistic that summarizes the magnitude and direction of a relationship between two variables. It is appropriate to use Pearson's r when variables are being measured on an interval or ratio level (Polit, 2010).

Inferential statistics use laws of probability to draw conclusions based on a population sample (Polit, 2010). This study utilized inferential statistics as a means of evaluating the relationship between variables, how strong the relationship is and how precise is the estimate about the existence and strength of the relationship between variables. Standard error of the mean (SEM) was calculated in addition to the standard deviation. The SEM is an estimation of the total amount of error for all possible sample means, therefore, an inferential statistic. A small SEM is a reflection of accuracy (Polit, 2010).

Reliability is a measure of how dependable or accurate an instrument is in measuring the attribute that it is designed to measure (Polit, 2010). Cronbach's alpha was used to measure internal consistency and reliability. Crohnbach's alpha focuses on variability between individual and composite scores with a resulting range of values between .00 and +1.0. A Cronbach's alpha of 0.0 is a reflection of randomness, coefficients from .70 to .75 are adequate and coefficients .80 or greater are desired as this is a reflection on the instrument quality (T-TPQ and Wagnild).

Table 8. Cronbach's Alpha Calculations

Construct	Cronbach's Alpha Literature	Cronbach's Alpha Sample
Overall T-TPQ	Not available	.95
Team Structure	.89	.83
Leadership	.95	.92
Situation Monitoring	.91	.87
Mutual Support	.90	.80
Communication	.88	.85
Wagnild Resilience Questionnaire	.85-.94	.87

Kaiser-Meyer-Olkin (KMO) measures the sampling adequacy by comparing the magnitudes of correlation coefficients to the sizes of partial correlation coefficients. A KMO score ranges from 0-1 and a KMO value greater than .80 is desired. (Polit, 2010). Kaiser-Meyer-Olkin (KMO) for the T-TPQ was .88, demonstrating sampling adequacy for further statistical analysis. The KMO for the Wagnild Resilience Questionnaire was .83, also demonstrating sampling adequacy to proceed with analysis.

The paired sample analysis includes mean, standard deviation, standard error of the mean and effect size.

Table 9. Paired Sample Statistics

Pair	Mean	N	SD	SEM	Effect Size
Team Structure (pre)	3.93	123	.61	.05	.0004
Team Structure (post)	3.95	123	.62	.05	
Leadership (pre)	3.64	123	.80	.07	.0002
Leadership (post)	3.65	123	.82	.07	
Situation Monitoring (pre)	3.77	123	.57	.05	.001
Situation Monitoring (post)	3.84	123	.61	.05	
Mutual Support (pre)	3.72	123	.58	.05	.002
Mutual Support (post)	3.81	123	.64	.05	
Communication (pre)	3.98	123	.70	.06	.0004
Communication (post)	4.00	123	.49	.04	
Wagnild Resilience (pre)	142.66	121	20.51	1.86	.07
Wagnild Resilience (post)	143.54	121	23.11	2.10	

Paired sample correlations were calculated using Pearson's r.

Table 10. Paired Sample Correlations

Paired Samples	N	Correlation	Significance
Team Structure (pre) & Team Structure (post)	123	.78	.00
Leadership (pre) & Leadership (post)	123	.85	.00
Situation Monitoring (pre) & Situation Monitoring (post)	123	.68	.00
Mutual Support (pre) & Mutual Support (post)	123	.68	.00
Communication (pre) & Communication (post)	123	.52	.00
Wagnild Resilience (pre) & Wagnild Resilience (post)	121	.87	.00

The correlations between pre- and post-survey were statistically significant ($p<.0001$) and had a moderate to strong correlation ($r = .52$ to $.87$). This demonstrates that the paired t-test result may be considered accurate for the data analysis.

The paired *t*-Test analysis for the T-TPQ and Wagnild Resilience Questionnaire compared mean scores pre and post survey. Alpha for statistical significance was set at 0.05.

Table 11. SPSS Paired Samples Test Outcomes

Paired Samples Test

		Paired Differences					t	df	Sig
					95% Confidence Interval of the Difference				
		Mean	SD	SEM	Lower	Upper			
#1	Team Structure	-.023	.411	.037	-.096	.050	-.627	122	.532
#2	Leadership	-.011	.434	.039	-.088	.066	-.284	122	.777
#3	Situation Monitoring	-.075	.473	.042	-.159	.009	-1.760	122	.081
#4	Mutual Support	-.090	.488	.044	-.178	-.003	-2.067	122	.041
#5	Communication	-.016	.612	.055	-.126	.092	-.305	122	.761
#6	Resilience	-.876	11.10	1.00	-2.87	1.12	-.868	120	.387

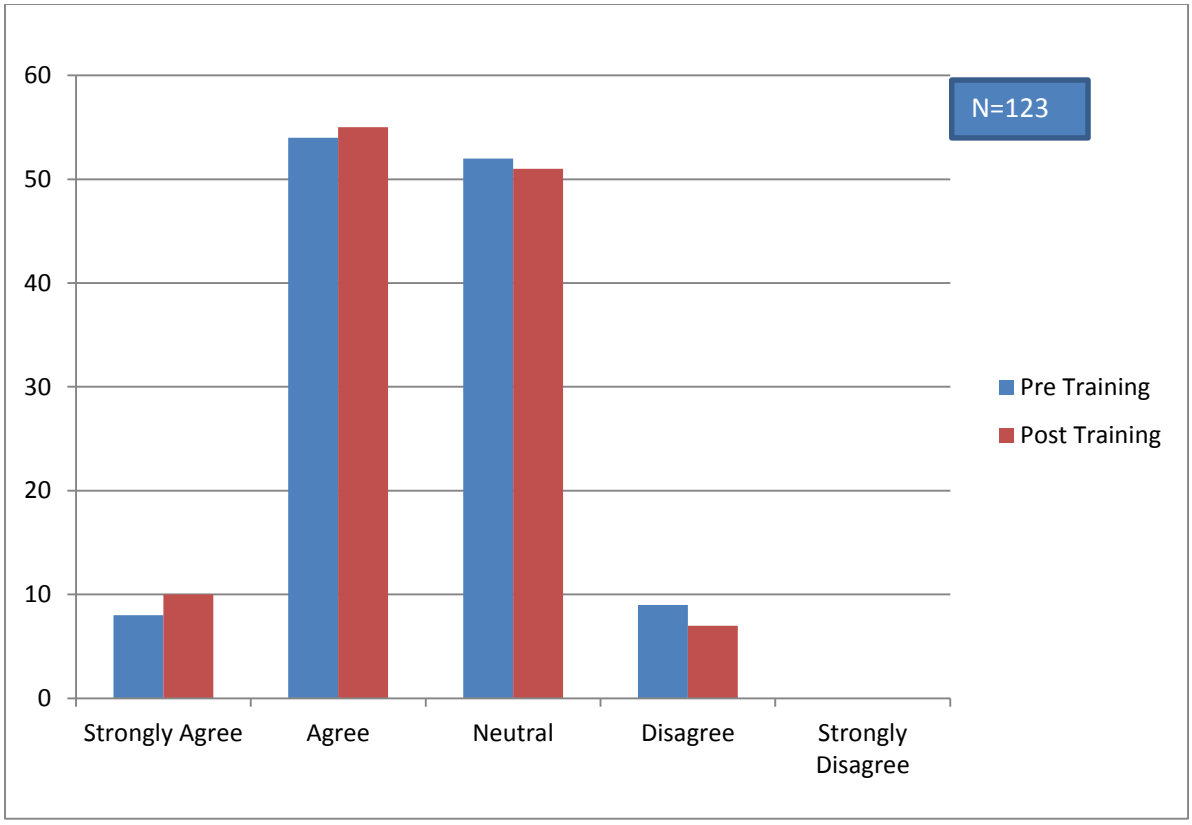
Team Structure

Null hypothesis: There is no difference between the pre and post survey responses in the Team Structure domain.

The Hypothesis decision: The team structure domain did not have a statistically significant difference in answers by participants from pre-to post-survey with a t = -.627, p = .532 and CI: -.096 to .050. The participant's survey mean increase was .023 with pre-survey 3.93 and post-survey 3.95. Pearson's r correlation is .78 indicating moderately strong magnitude and direction between mean scores.

Conclusion: The null hypothesis must be accepted for this construct.

Table 12. T-TPQ Pre and Post Survey Mean Scores: Team Structure



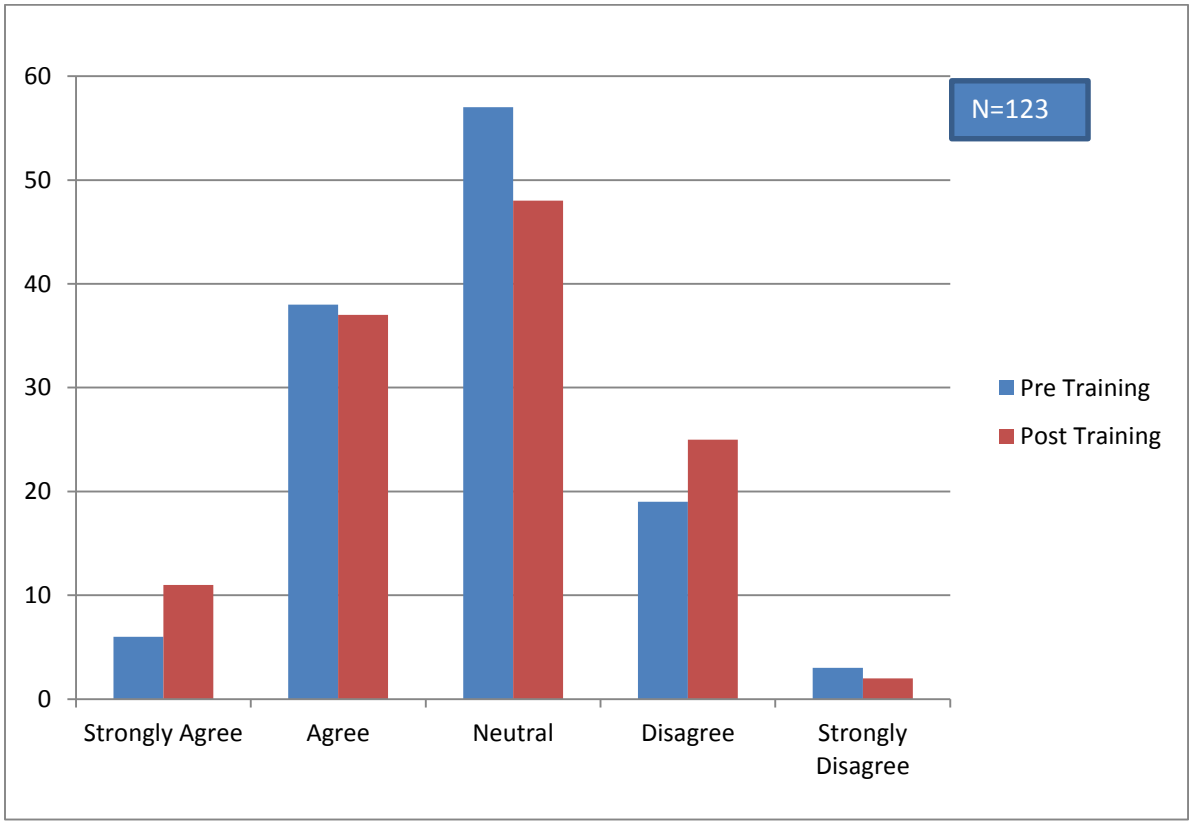
Leadership

Null hypothesis: There is no difference between the pre and post survey responses in the leadership domain.

The Hypothesis decision: The leadership domain did not have a statistically significant difference in answers by participant's from pre- to post-survey with a t = -.284, p = .777 and CI: -.088 to .066. The participant's survey mean for the leadership domain increased .011 with pre-survey 3.64 and post-survey 3.65. The Pearson's r is .85 indicating a strong magnitude and direction between mean scores.

Conclusion: The null hypothesis must be accepted for this construct.

Table 13. T-TPQ Pre and Post Survey Mean Scores: Leadership



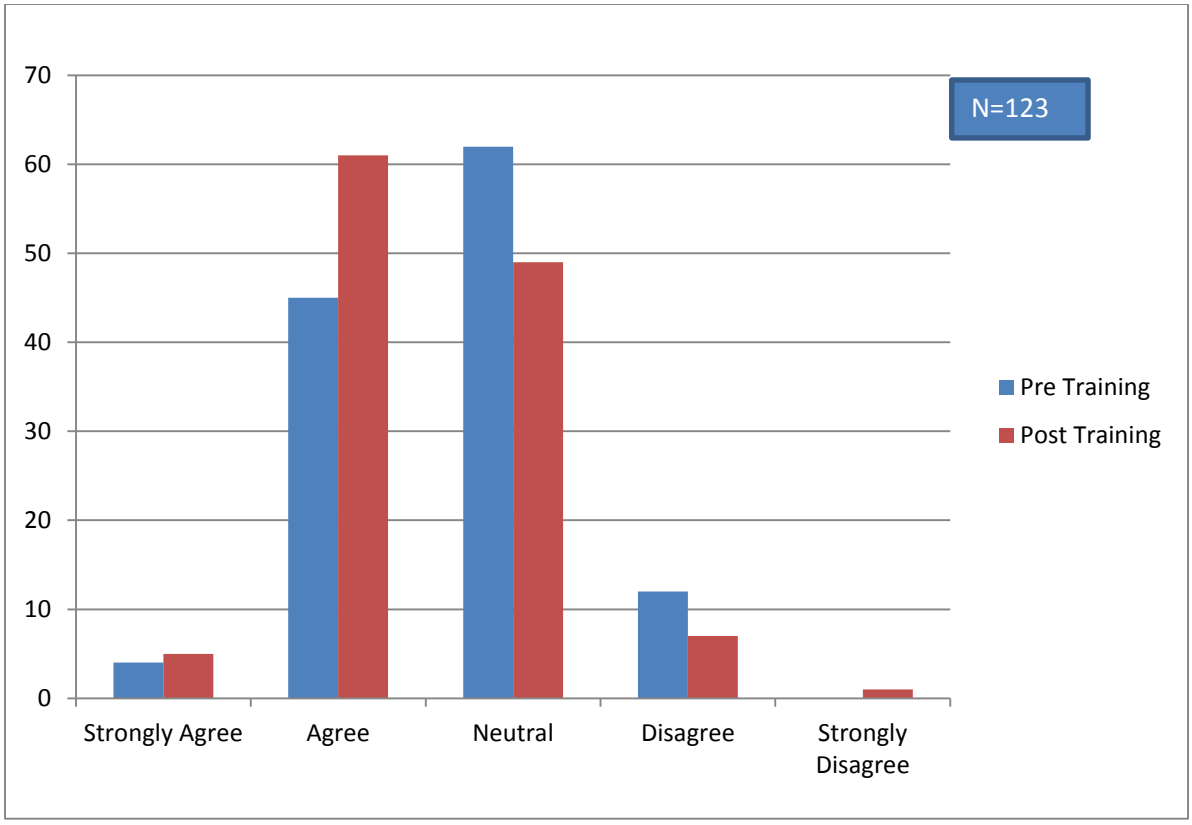
Situation Monitoring

Null hypothesis: There is no difference between the pre and post survey responses in the situation monitoring domain.

The Hypothesis decision: The situation monitoring domain did not have a statistically significant difference in answers by participants from pre- to post-survey with a t = -1.760, p = .081, and CI: -.159 to .009. The participant's survey mean for the situation monitoring domain increased .075 with pre-survey 3.77 and post-survey 3.84. The Pearson's r is .68 indicating moderate magnitude and direction between mean scores.

Conclusion: The null hypothesis must be accepted for this construct.

Table 14. T-TPQ Pre and Post Survey Mean Scores: Situation Monitoring



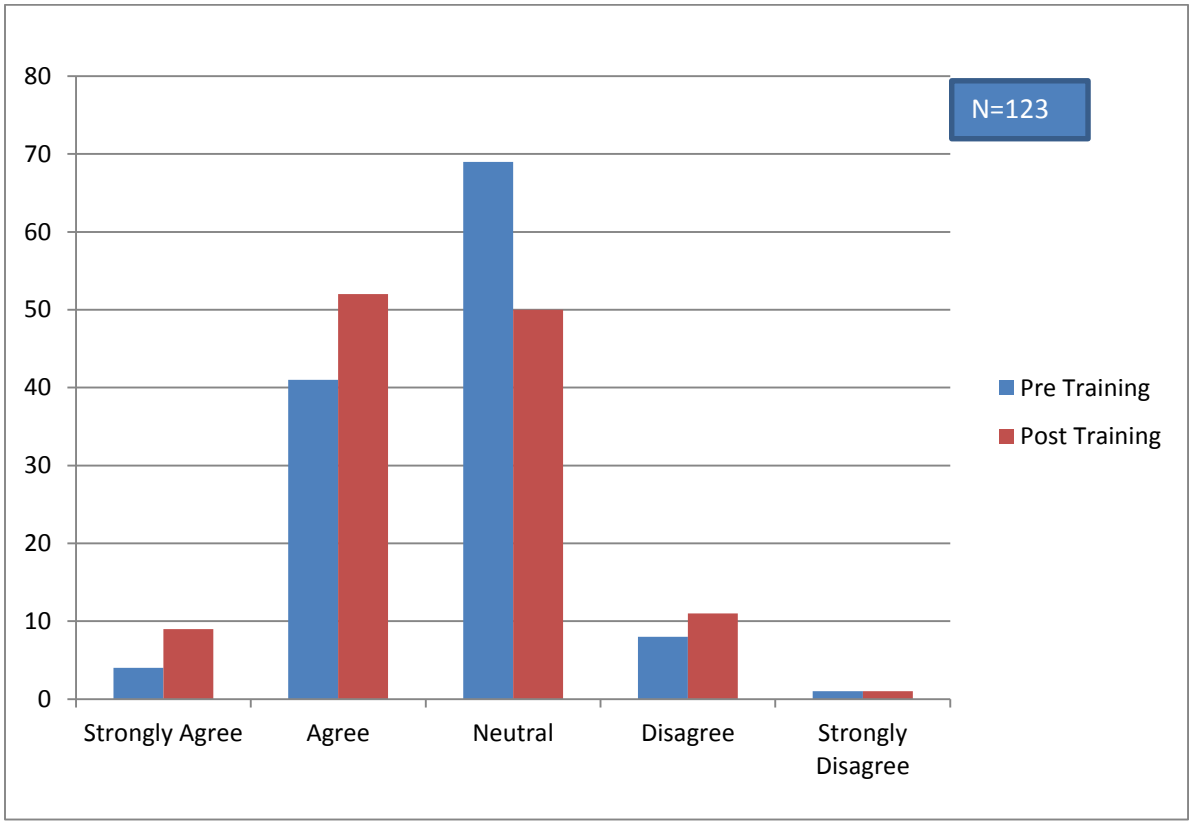
Mutual Support

Null hypothesis: There is no difference between the pre and post survey responses in the mutual support domain.

The Hypothesis decision: The mutual support domain demonstrated a statistically significant difference in answers by participants from pre- to post-survey with a t = -2.067, p = .041 and CI: -.178 to -.003. The participant's survey mean for the mutual support domain increased .090 with pre-survey 3.72 and post-survey 3.81. The Pearson's r is .68 indicating a moderate magnitude and direction between the mean scores.

Conclusion: The null hypothesis must be rejected for this construct.

Table 15. T-TPQ Pre and Post Survey Mean Scores: Mutual Support



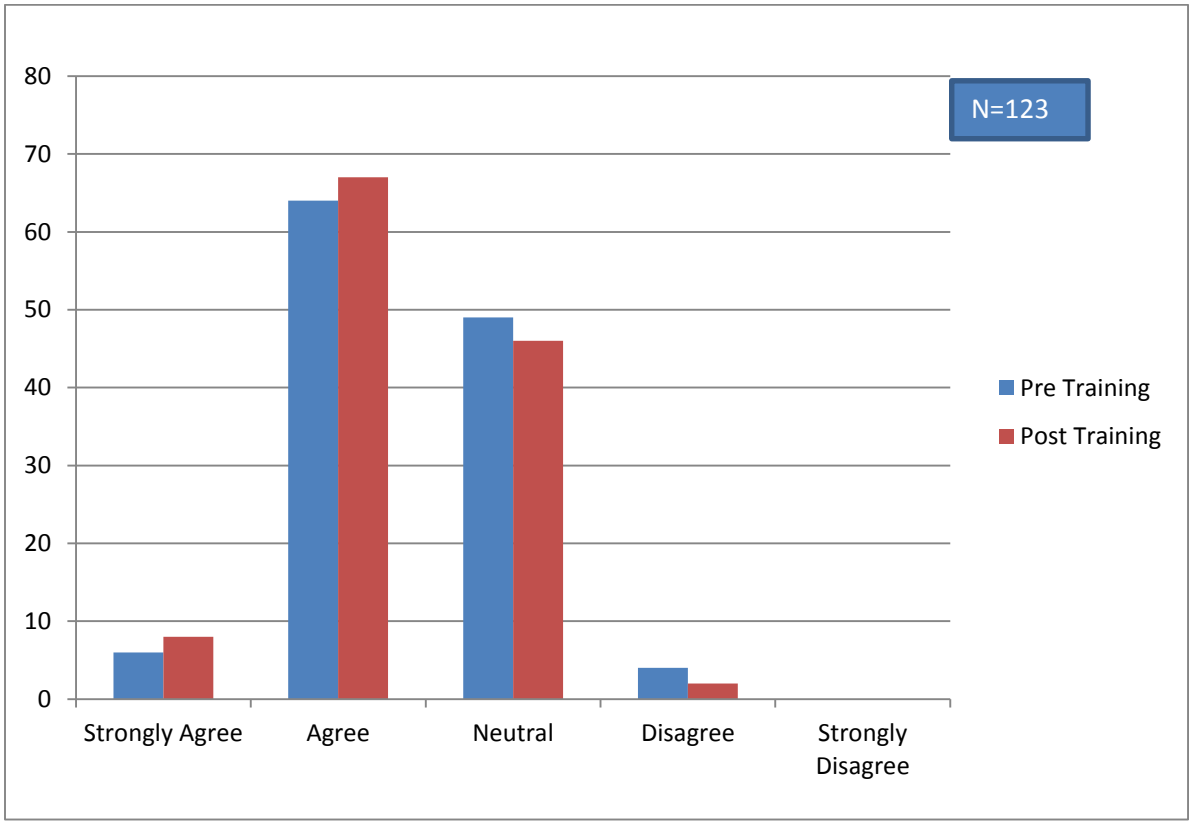
Communication

Null hypothesis: There is no difference between the pre and post survey responses in the communication domain.

The hypothesis decision: The communication domain did not have a statistically significant difference in answers by participants from pre-to post-survey with a t = -.305, p = .761 and CI: -.126 to. 092. The participant's survey mean for the communication domain increased .016 with a pre-survey 3.98 and post-survey 4.0. The Pearson's r is .52 indicating a moderately low magnitude and direction between the mean scores.

Conclusion: The null hypothesis must be rejected for this construct.

Table 16. T-TPQ Pre and Post Survey Mean Scores: Communication



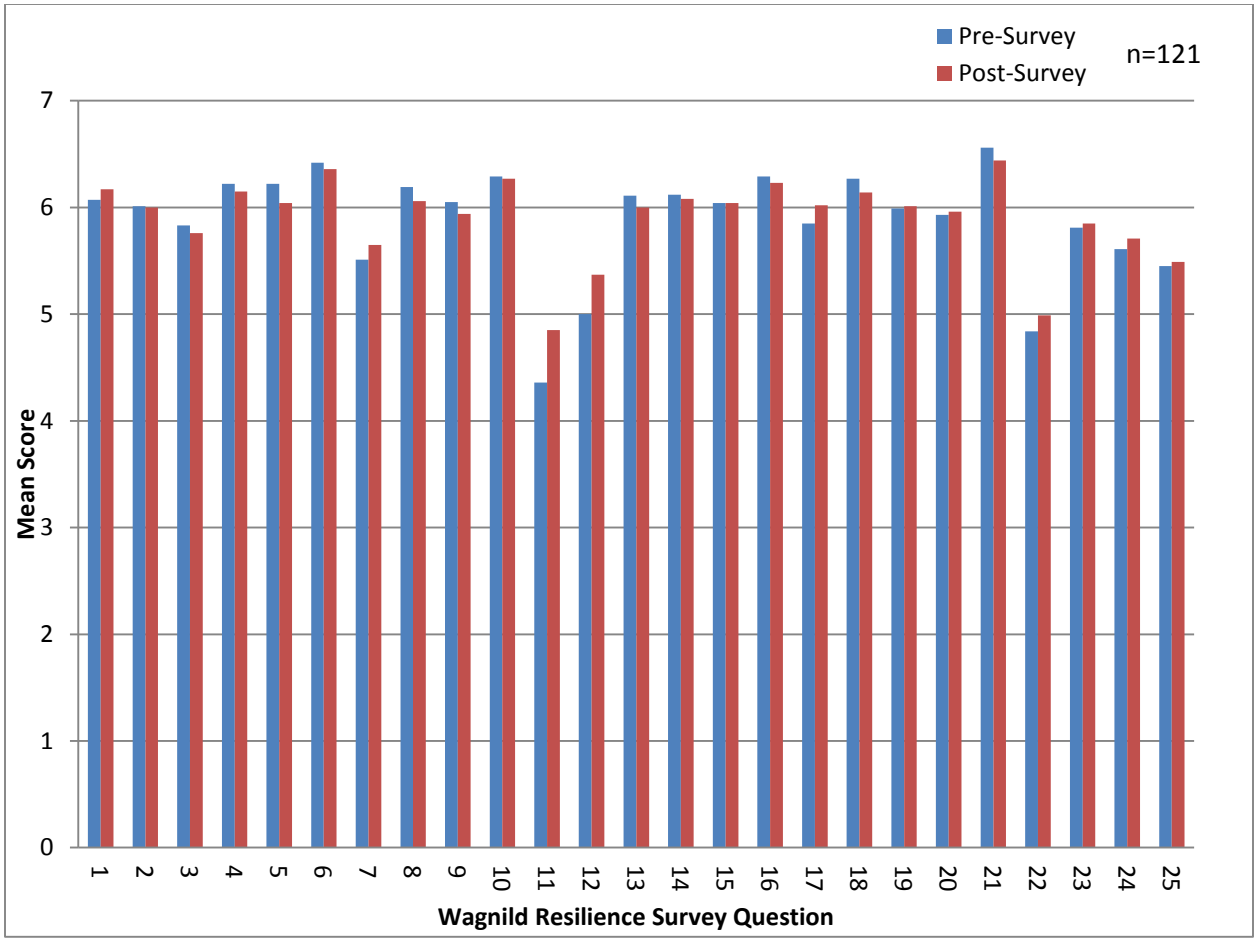
Wagnild Resilience

Null hypothesis: There is no difference between the pre and post survey responses in the Wagnild Resilience Questionnaire.

The hypothesis decision: The resilience questionnaire did not have a statistically significant difference in answers by participants from pre-to post-survey with a t = -.868, p = .387 and CI: -2.87 to. 1.12. The participant's survey mean for the resilience questionnaire increased .876 with a pre-survey 142.66 and post-survey 143.54 indicating moderate resilience. The Pearson's r is .87 indicating a high level of magnitude and direction between the mean scores.

Conclusion: The null hypothesis must be rejected for the resilience questionnaire.

Table 17. T-TPQ Pre and Post Survey Mean Scores by Question: Resilience



Results Related to Evidence-based Question

When all of the constructs of the T-TPQ are combined into one null hypothesis there are essentially two null hypotheses for this study. The first is that there will be no change in teamwork as measured by the T-TPQ after a TeamSTEPPS training program. The second is that there will be no change in resilience scores after a TeamSTEPPS training program. The first null hypothesis may be rejected for the domain of mutual support only. Mutual support was the only domain that had a statistically significant increase with $p > .05$. While the increase was statistically significant, the effect size was low at .002. The second null hypothesis must be accepted. There was not a significant difference in resilience scores pre- and post-training.

Limitations, Recommendations, Implications for Change

Limitations

Limitations include the study design, brief intervention time and trainer expertise. As mentioned earlier, one of the study limitations is the validity and reliability of the quasi-experimental design. The before and after test design of a dependent group may be influenced by history, maturation, testing, instrumentation and generalizability (Kane & Radosevich, 2011). An additional limitation is the brief time exposure of the four hour training and the possible level of impact that could be expected in testing mean differences after such a brief intervention. There was also varying presentation skill levels in the trainer team. The mutual support presenters were the team of OR Assistant Nurse Managers. They were very skilled and impactful in their style and appeal to the participants.

Recommendations and Contributions to Nursing Theory

The significant increase in mutual support scores lends support to the Relationship Based Care (RBC) theory (Koloroutis, 2004). Despite the patient and family being the central focus of RBC, teamwork and creating a culture of caring on the unit is another key component of relationships in the model. Koloroutis highlights the importance of a "shared purpose" among multidisciplinary team members and how this purpose may increase outcomes (Koloroutis, 2004, p. 16). It is undeniable that mutual support is highly relational in nature.

The concept of mutual support and relationship to HWE and HRO is an additional opportunity recommendation. There are seven questions behind the construct of mutual support that speak to HWE and HRO:

1) Staff assist fellow staff during high workload
2) Staff request assistance from fellow staff when they feel overwhelmed
3) Staff caution each other about potentially dangerous situations
4) Feedback between staff is delivered in a way that promotes positive interactions and future change
5) Staff advocate for patients even when their opinion conflicts with that of a senior member of the unit
6) When staff have a concern about patient safety, they challenge others until they are sure the concern has been heard
7) Staff resolve their conflicts, even when the conflicts have become personal

Of the five domains mutual support is the only domain that implies relational activity or relationship, underlying the connection of mutual support to teamwork.

Recommendations and Contributions to Research

The results of the study also indicate the importance of exploring the concept of mutual support and its relationship to teamwork and resilience. Judith Jordan (2004) made a case for moving beyond the concept of resilience as an individual trait. Jordan (2004) suggests five ways to enhance capacity for relational resilience including:

1) Migration from individual control to an archetype of supported vulnerability
2) Movement from a uni-directional need for support to mutual empathetic involvement
3) Separation of self-esteem to relational confidence
4) Leveling hierarchy and encouragement of mutual growth and constructive conflict resolution
5) Movement from self-motivated meaning to more expansive relational awareness

Through the lens of relational resilience, higher team functioning or teamwork may be impacted through development of a culture of supported vulnerability, flexibility, empowered conflict resolution, mutuality, confidence and awareness (Jordan, 2004).

Relational resilience is also explored by Hartling (2008) who believes that resilience may be strengthened through relationship engagement that challenges an individual's intellectual development, sense of worth, empowerment, competence and connection. Hartling (2008) agrees that the concept of resilience should migrate from the idea of individual intrinsic toughness to one of a human capacity that may be developed and strengthened through relationships. The proposed definition of resilience in this adapted view involves the ability to connect, reconnect and resist disconnection in response to hardships, adversities, trauma and alienating social and cultural practices (Hartling, 2008). Relational resilience is based on engagement in relationships in which the individuals feel known, valued and recognized. The

experience of knowing that one makes a difference to another provides the boost of emotional energy that strengthens one's ability to be resilient. The sense of connection that results from relationship provides the groundwork for mutual empathy, responsiveness to others, mutual empowerment, authenticity (Hartling, 2008). It is quite possible that the focus of this study should have been on relational resilience as opposed to individual resilience.

The T-TPQ is a replication study for TeamSTEPPS research. Although the mean gains were not significant in four of the five of the constructs, the mean scores did increase in all areas. A crosswalk can be imagined between select TeamSTEPPS tools and how they provide an environment in which relational resilience may be enhanced.

Table 17. TeamSTEPPS Tools and Relational Resilience Impact

TeamSTEPPS Mutual Support Tools	Relational Resilience Impact
Task Assistance	Helping others with tasks. Fostering a climate where it is expected that assistance will be actively sought and offered.
Feedback	Shared information that is timely, respectful, specific, directed towards improvement and considerate
Advocacy and Assertion	Asserting corrective action when viewpoints differ in a firm and respectful manner
Two Challenge Rule	Levels hierarchy and empowers all team members to stop the line when there as a patient safety issue
CUS	Assertive statement; I'm ***c***oncerned, I'm ***u***ncomfortable, this is a ***s***afety issue!
DESC Script	Constructive approach for managing and resolving conflict

Recommendations and Contributions to Advanced Nursing Practice

TeamSTEPPS is a valuable tactic to enhance working relationships on and between nursing units. The T-TPQ tool itself may provide an effective measurement of relational resilience within the mutual support construct. The concept of mutual support and relational resilience may be of more value in measuring teamwork and resilience, however programs to increase individual resilience may be used in combination for a double pronged approach.

Implications for Change

Implications for practice include a longitudinal component in the TeamSTEPPS journey. It is possible that over time and repeated exposures to TeamSTEPPS tools, the outcomes could change. A brief four hour training may not be sufficient exposure to drive significant results.

Additional implications center on the power of relationships and their impact in health care settings. Relationships, mutual support and teamwork are in many ways connected and build on each other. TeamSTEPPS tools in addition to building team relationships likely result in the unit culture that thrives.

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Appendix A: TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ)

Instructions: Please complete the following questionnaire by placing a check mark in the box that corresponds to your level of agreement from Strongly Agree to Strongly Disagree. Please answer every question, and select only one response for each question. The questionnaire is anonymous, so please do not put your name or any other identifying information on the questionnaire.

Team Structure		Strongly agree to 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 to 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.					
11	My supervisor/manager ensure that adequate resources (e.g., staff, supplies, equipment, information) are available.					
12	My supervisor/manager resolves conflicts successfully.					
13	My supervisor/manager models appropriate team behavior.					
14	My supervisor/manager ensures that staff are aware of any situations or changes that may affect patient care					

Situation Monitoring		Strongly agree to Strongly disagree				
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 Strongly agree to Strongly disagree

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.					

Communication Strongly agree to Strongly disagree

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 B

Wagnild 25 Item Resilience Survey **Strongly disagree to strongly agree**

		1	**2**	**3**	**4**	**5**	**6**	**7**
1	When I make plans, I follow through with them.							
2	I usually manage one way or another.							
3	I am able to depend on myself more than anyone else.							
4	Keeping interested in things is important to me.							
5	I can be on my own if I have to.							
6	I feel proud that I have accomplished things in life.							
7	I usually take things in stride.							
8	I am friends with myself.							
9	I feel that I can handle many things at a time.							
10	I am determined.							
11	I seldom wonder what the point of it all is.							
12	I take things one day at a time.							
13	I can get through difficult times because I've experienced difficulty before.							
14	I have self-discipline.							
15	I keep interested in things.							
16	I can usually find something to laugh about.							
17	My belief in myself gets me through hard times.							
18	In an emergency, I'm someone people can generally rely on.							
19	I can usually look at a situation in a number of ways.							

20	Sometimes I make myself do things whether I want to or not.							
21	My life has meaning.							
22	I do not dwell on things that I can't do anything about.							
23	When I'm in a difficult situation, I can usually find my way out of it.							
24	I have enough energy to do what I have to do.							
25	It's okay if there are people who don't like me.							

Appendix C: Systematic Review of the Literature Example

	Interprofessional education in team communication: working together to improve patient safety BMJ Quality and Safety	Building a culture of safety through team training and engagement. 2012 BMJ Quality and Safety
Author/Year	Brock, D., Abu-Rish, E., Chiu, C., Hammer, D., Wilson, S., Vorvick, L., Blondon, K., Schaad, D., Liner, D. & Zierler, B. 2013	Thomas, L. & Galla, C; 2012
Database and Keywords	CINAHL; education, interdicioplinary communication, skills training, quality improvement, patient safety, outcomes of education	CINAHL; Teamwork, patient safety, quality improvement, organizational culture, multi-institutional systems
Research Design	Quantitative; pre and post survey	Quantitative; pre and post survey
Level of Evidence	level 4 (Melnyk and Fineout-Overhold scale)	level 4 (Melnyk and Fineout-Overhold scale)
Study Aim/Purpose	The effectiveness of a simulation based interprofessional TeamSTEPPS training in impacting student attitudes, knowledge and skills around interprofessional communication.	Vision to build a sustainable culture of safety as the foundation for the organization too guide daily practice creating a zero tolerance for errors, and empowerment to speak up and influence actions to facilitate safety/T o build a culture of patient safety and structure to optimize teamwork and ongoing engagement of the health care team
Population Studied/Sample Size/Criteria/ Power	Medical, nursing, pharmacy and PA students/306 initial size; 149 completed	15 facility system in North shore health system, NY Pilot hospital 239 beds and 1300 employees
Methods/Study Appraisal/ Synthesis Methods	4 hr training interdisciplinary with pre and post assessments to examine attitudes, beliefs	Utilized Kotter's change management theory; emphasized core values of safety. Utilized train the trainer and 4 hr class; pre and post assessments

Primary Outcome Measures and Results	significant increases in all measures; attitudes toward team communication, motivation, utility of training, self efficacy, mutual support, communication, knowledge of TeamSTEPPS, patient advocacy	Significant increases in all 12 measures in post survey over 3 years; range from 2% increase to 15% increase in some measures

Appendix D: Joint IRB Porter Adventist Hospital

Porter Adventist Hospital
Centura Health

Joint IRB Office
2525 South Downing Street
Denver, Colorado 80210-5876
Phone: 303-778-2554
Fax: 303-778-565

Thursday, February 12, 2015
Belinda Shaw, RN
Associate CNO
2525 S. Downing St.
Denver, CO 80210
RE: Study Number 1497
Evaluating TeamSTEPPS training in the Intensive Care/Step-down Unit and Perioperative areas in a tertiary care hospital
NEW PROTOCOL_FOLLOW UP_ EXPEDITED
Follow-up to the board's stipulations, and decision to defer the submission. Included find the original submission and response to the board stipulations cover letter dated December 31, 2014 with the amended protocol revision TeamSTEPPS 12.31.14 (clean copy and tracked changes).
Protocol submission from the December 9, 2014 IRB meeting:
Cover letter dated November 18, 2014 requesting review and approval. Included find:

- IRB Documents
  - Project Determination form
  - Submission checklist
  - Research Impact Statement
  - Invoice
  - Non-Exempt Application
- TeamSTEPPS_Protocol version 11.18.14
- Participate Consent form version 11.19.2014
- Request for a waiver of Authorization for use and disclosure of PHI
- Principal and sub-investigator documents
  - Belinda Shaw - Resume 11.2014, Financial disclosure form dated November 18, 2014, CITI Training 6.6.14, License verification generated 11/24/2014
  - Cynthia Oster - Resume 11.14, Financial disclosure form dated November 24, 2014, NIH "Protecting Human Research Participants" Training 6.6.14, License verification generated 11/24/2014

Dear Belinda Shaw:
This letter is to inform you of the action taken by the Porter, Littleton and Parker Joint IRB regarding the above-mentioned submission.

The board's action is as follows:
Action: Approval Expedited (Full Board Acknowledgment Receipt)
This action occurred on: 2/10/2015

Initial Approval Date: 1/30/2015 **Expiration Date:** 1/29/2016 **Review Interval:** 12 months

We extend the healing ministry of Christ by caring for those who are ill and by nurturing the health of the people in our communities.

Porter Adventist Hospital
Centura Health

Joint IRB Office
2525 South Downing Street
Denver, Colorado 80210-5876
Phone: 303-778-2554
Fax: 303-778-5650

Stipulations: *None.*
Recommendations/Comments: None.
Research Porter Adventist Hospital
Sites:
Sub-Investigators: Cynthia Oster, PhD

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Porter Adventist Hospital
Centura Health.

2525 South Downing Street
Denver, Colorado 80210-5876
Phone: 303-778-2554
Fax: 303-778-5650

Study #: 1497 **Principal Investigator:** Belinda Shaw, RN **Investigator Information/Responsibilities**

1. If this response contains a board requested stipulation, you must submit your response within 90days from the date of the letter. The JOINT IRB office will send reminders at approximately 30, and 60 days. The board will take necessary action to suspend the research due to non-compliance, if a response is not received within 90 days.

2. Continuing review - providing among other things, an update on the progress of the study and any new information that has come to light since the inception of the study is required. The review must occur within 1 year (or sooner if designated by the IRB) from the anniversary date of the convened meeting at which the IRB reviewed and approved the protocol. You must submit your report at least 45 days before the expiration date to give the IRB adequate time to review the report, and avoid a lapse in approval. If the approval expires, cease enrollment until approval is given by the fully convened IRB. The study expiration date is referenced above, and is included on responses sent from the IRB office. Please be cognizant of your expiration date. You may also receive a reminder notification from the IRB office prior to the expiration date.

3. You are required, at all times during this research, to promptly report to the Board any changes in research activity, unanticipated problems in the research, adverse events, or scientific misconduct involving risks to subjects or others.

4. You must refrain from initiating changes in this approved research without first obtaining the Board's review and approval. This includes study advertisements, and minor changes to any protocol documents or consent forms (you must use the stamped IRB approved consent form). Pre-approval is not required where the initiation of a research change is necessary to eliminate apparent immediate hazard to human subjects. Failure to comply with these obligations may result in the termination of the Board's approval of this research.

5. All future submissions must include a cover letter with the IRB study number, full study title, investigator name, a detailed description, and a summary of changes for all revisions.

6. Research study participant records (only for studies where Centura is a designated site or studies conducted by Centuraemployed physicians) shall keep records of experimental drugs and devices 30 years after date of experiment (medical record must also be retained); Non-drug and device records shall be kept 10 years after date of research

7. The Porter, Littleton and Parker JOINT IRB is organized and operates according to the ICH Good Clinical Practice guidance, complies with applicable laws, and regulation as described in [21 CFR Parts 50, 56] & [45 CFR 46].

Laurie Groth
IRB Coordinator
Porter, Littleton, Parker and Castle Rock Adventist Hospitals*We extend the healing ministry of Christ by caring for those who are ill and by nurturing the health of the people in our communities.*

Appendix E: IRB Approval Regis

REGIS UNIVERSITY

OFFICE OF ACADEMIC GRANTS

IRB – REGIS UNIVERSITY

March 05, 2015

Belinda Shaw
6150 S Perry Park Road
Larkspur, CO 80118

RE: IRB #: 15-103

Dear Belinda,

Your application to the Regis IRB for your project, "Evaluating TeamSTEPPS training in the Intensive Care/Step-Down Unit and Perioperative areas of a tertiary care hospital", was approved as an exempt study on March 04, 2015. This study was approved per exempt study category of research 45CFR46.101.b(#2).

The designation of "exempt" means no further IRB review of this project, as it is currently designed, is needed.

If changes are made in the research plan that significantly alter the involvement of human subjects from that which was approved in the named application, the new research plan must be resubmitted to the Regis IRB for approval.

Sincerely,

Patsy Cullen

Patsy McGuire Cullen, PhD, PNP-BC
Chair, Institutional Review Board
Professor & Director
Doctor of Nursing Practice & Nurse Practitioner Programs
Loretto Heights School of Nursing
Regis University

cc: Patsy Cullen

3333 Regis Boulevard, H-4, Denver, CO 80221-1099
REGIS.EDU | O 303-458-4206 | F 303-964-5528 | E oag@regis.edu

Appendix F: CITI Training

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)

HUMAN RESEARCH CURRICULUM COMPLETION REPORT

Printed on 06/06/2014

LEARNER	Belinda Shaw (ID: 4193238) 6154 S Perry Park Rd Larkspur CO 80118 USA
DEPARTMENT	Nursing-DNP
PHONE	7205603374
EMAIL	shaw152@Regis.edu
INSTITUTION	Regis University
EXPIRATION DATE	06/05/2017

SOCIAL BEHAVIORAL RESEARCH INVESTIGATORS AND KEY PERSONNEL

COURSE/STAGE:	Basic Course/1
PASSED ON:	06/06/2014
REFERENCE ID:	13148010

REQUIRED MODULES	**DATE COMPLETED**
Introduction	06/03/14
History and Ethical Principles - SBE	06/03/14
The Regulations - SBE	06/06/14
Assessing Risk - SBE	06/06/14
Informed Consent - SBE	06/06/14
Privacy and Confidentiality - SBE	06/06/14
Regis University	06/06/14

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI Program participating institution or be a paid Independent Learner. Falsified information and unauthorized use of the CITI Progam course site is unethical, and may be considered research misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Program Course Coordinator

Appendix G: Consent to Participate in a Research Study

Participant Name: **Date:**

Protocol: **[Number]**

Title of the Study: **Evaluation of TeamSTEPPS Training in the Intensive Care Unit and Perioperative Units in a Tertiary Care Hospital**

Sponsor: None

Principal Investigator: Belinda Shaw, RN, DNPc, CEN, NE-BC
Associate CNO
Porter Adventist Hospital
2525 S Downing Street
Denver, CO 80210
303-765-3793

Sub-Investigators: Cynthia A. Oster, PhD, MBA, RN, CNS-BC, ANP
Nurse Scientist
CNS– Critical Care and Cardiovascular Services
Porter Adventist Hospital
2525 South Downing Street
Denver, CO 80210
303-778-5266

Research Sites: Porter Adventist Hospital
2525 South Downing
Denver, CO 80210
303/778-1955

INTRODUCTION

You have received this form because you are being asked to participate in a research study. Your participation in this and any research study is completely voluntary. Take your time in reading this consent form and discuss participation with your friends and family. Before you sign this form, please ask any questions you have about the trial, which are not clear to you. We will try to answer fully any questions you may have before, during, or following this study.

PURPOSE

You are being asked to take part in this study because you are a member of the ICU/SDU and Perioperative teams at Porter Adventist Hospital. Teamwork is essential in these areas of nursing practice and has been identified as an opportunity for improvement by both ICU/SDU and perioperative team members. The purpose of this study is to evaluate TeamSTEPPS training in the ICU/SDU and perioperative units in a tertiary care hospital. Outcomes to be measured are teamwork perceptions and resilience. Your participation will last approximately four hours and will end at the conclusion of the one training session. 200 subjects will be recruited to participate in the study from a single research site.

PROCEDURES

TeamSTEPPS is a teamwork training program that was designed by the Department of Defense (DOD) and the Agency for HealthCare Research and Quality (AHRQ). It is an evidence based program designed through twenty years of teamwork research. You are being asked to participate in one four hour TeamSTEPPS training program. TeamSTEPPS training will be offered at Porter Adventist Hospital in January, February and March of 2015 in a four hour block at varying times and days of the week to allow attendance at your convenience. The TeamSTEPPS training will be taught by a group of ICU/SDU and perioperative nurses who have participated in a TeamSTEPPS train-the-trainer program. You will be paid your regular salary during the 4 hour training session regardless of you participating in this study.

Outcomes to be measured are your teamwork perceptions and resilience. Data will be collected during the 4 hour training session. Data will be collected before and after the Team STEPPS curriculum is presented during the training session. You will be asked to complete two questionnaires: the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) and the Wagnild Resilience Questionnaire. Each questionnaire will be completed before and after training. The TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) is 35 questions and the Wagnild Resilience Questionnaire is 25 questions in length. Completion of the two questionnaires will take approximately 30 minutes; the first 15 minutes of the training session and the last 15 minutes of the training session.

This study is a school related project that is required for the primary investigator's completion of the Doctorate in Nursing Practice program at Regis University.

RISKS/DISCOMFORTS/PRECAUTIONS

The principal investigator will answer any questions about this study. There are no anticipated risks or discomforts to you as a participant. You can leave the study at any time with no risk to your employment status.

MEDICAL CARE FOR INJURY RELATED TO THIS STUDY

There no medical treatments or costs associated with this study.

BENEFITS

No promise of benefits has been made to you, nor have any guarantees been offered, either formally or implied. There may not be any direct benefits to you from being in this study. With results from this study we have a chance to learn about the impact of the TeamSTEPPS training curriculum on teamwork and resilience.

ALTERNATIVE THERAPY

You have the option not to take part in this study.

FINANCIAL RESPONSIBILITY

There will be no financial responsibilities to you during this study. You will be participating in this study during your normal work hours and will receive your normal salary.

PARTICIPATION/WITHDRAWAL

It is your choice to take part in the study or to decide not to take part. You may refuse and or leave the study at any time. There will not be consequences for your employment if you choose to do so. If you choose not to take part in the study, you will be asked why you do not want to take part in the study.

You are free to ask questions at any time during the study. By signing this consent form, you will not lose any benefits to which you have the right to receive. There are no consequences to you if you choose or choose not to participate in this study.

INVITATION FOR QUESTIONS :

IRB Office Representative
Porter, Littleton & Parker Adventist Hospitals Joint IRB
2525 S. Downing St.
Denver, CO 80210
(303) 778-2554

Regis University IRB for Human Subjects Participation
Regis University Office of Academic Grants
447 Main, Mail Code H-4
3333 Regis Boulevard
Denver, CO 80221
irb@regis.edu
303-346-4206

If you have any questions about this study or your rights as a research subject, or if you have a study-related injury, you should contact:

Belinda Shaw, RN, DNPc, CEN, NE-BC
Associate CNO
Porter Adventist Hospital
2525 S Downing Street
Denver, CO 80210
303-765-3793

Cris Finn, PhD, RN, FNP, MS, MA, FNE
Associate Professor; Coordinator Clinical Development
Loretto Heights School of Nursing Regis University
3333 Regis Blvd. Mail Code G-8
Office 311 Carroll Hall
Denver, CO 80221-1099
cfinn@regis.edu phone 303-458-4236 or 1-800-388-2366 ext 4236

A copy of the "Research Subject's Bill of Rights" is included at the end of this consent form. You will get a copy of this form.

CONFIDENTIALITY OF RECORDS

I understand that my identity and all information pertaining to me that is collected for this study will remain confidential and de-identified. However, in order to meet the obligations of federal law, I understand that case records from this study may be subject to review by representatives of the Porter, Littleton and Parker Adventist Hospitals Joint Institutional Review Board, authorized FDA or other government regulatory agencies' personnel and faculty at Regis University. I hereby consent to such review and disclosure.

AUTHORIZATION AND SIGNATURE

BEFORE YOU SIGN THIS FORM, PLEASE ASK ANY QUESTIONS YOU HAVE ABOUT THE STUDY, WHICH ARE NOT CLEAR TO YOU. WE WILL TRY TO ANSWER FULLY ANY QUESTIONS YOU MAY HAVE BEFORE, DURING, OR FOLLOWING THIS STUDY.

Your signature below means that you have read this consent form and that you understand the contents of this form and that all your questions about study procedures, possible risks and benefits of this study, other therapies, and privacy of your health information have been answered and you voluntarily agree to take part in this study. You will be given a signed and dated copy of this consent form to take home.

Signature	Date
Witness [if applicable]	Date

The investigator's signature represents his/her acknowledgment of the complete consent document for the above subject; the investigator's signature does not necessarily represent that the investigator was present during the consent process.

Principal Investigator	Date
Witness [if applicable]	Date

RESEARCH SUBJECT'S BILL OF RIGHTS

As a research subject I have the right to:

1. Know what the study is trying to find out.
2. Know what will happen to me.
3. Know the procedures, drugs, or devices and their differences from standard practice.
4. Know what are the frequent/important risks, side effects, or discomforts you may experience during the research.
5. Know you should be kept informed of any risks to you that arise during the study.
6. Know what the benefits are for your participation?
7. Know what other treatments are available to you, and how they compare to the study treatment.
8. Know that you are free to ask questions at anytime.
9. Know what other treatments are available to you, if something happens to you as a result of the study.
10. Know you can decide not to be in the study after it has begun, and it won't affect any further treatment given to you by you doctor.
11. Know you can make the decision on your own without pressure when considering whether to participate in the study.
12. Know you can keep a copy of this consent form.

Your rights, safety, and well-being are highly important and should triumph over the interests of science and society. Before a research study starts, likely risks and inconveniences should be weighed against the likely benefit for the study subject and society. A study should be started and continued only if the likely benefits give good reason for the risks. Each person involved in conducting a study should be qualified by education, training, and experience to perform his or her particular tasks. Methods with procedures that assure the quality of every part of the trial should be implemented.

For further information regarding patient rights in research, contact the Porter, Littleton and Parker Adventist Hospitals Joint Institutional Review Board at 303-778-2554.

Appendix H: Project Timeline: 2015

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
IRB Approval	X							
Develop Training Team	X							
Curriculum Development		X						
Training			X	X				
Data Analysis							X	
Capstone Presentation								X