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TeamSTEPPS In A Pediatric Operating Room

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Executive Summary

Project Title

TeamSTEPPS in a Pediatric Operating Room**.**

Problem

Despite numerous patient safety and quality programs available and in use in the healthcare environment, adverse events in operating rooms continue to occur. The operating room is a complex and chaotic environment where teamwork is necessary for safe patient care. TeamSTEPPS is an evidence-based program designed to integrate teamwork into clinical practice. The PICO for this project P: All clinical staff in a pediatric operating room, I: Implement the TeamSTEPPS program, C: Minimal teamwork training, O: Increase in perception of teamwork and improvement in efficiency metrics.

Purpose

This project aims to determine if TeamSTEPPS communication tools and strategies improve the perception of teamwork and efficiency in a pediatric operating room.

Goal

Provide staff with teamwork tools to improve the perception of teamwork and efficiency in a pediatric operating room.

Objectives

The outcome objectives for this project are to increase the perception of teamwork and improve efficiencies in a pediatric operating room by using the TeamSTEPPS program.

Plan

The project is designed as a quality improvement project using convenience sampling from a voluntary group of multidisciplinary team members. Pre and post-intervention data were obtained using the TeamSTEPPS, T-TPQ tool. Efficiency data were obtained from electronic medical records.

Outcomes and Results

There are five teamwork domains assessed by the T-TPQ: Team structure, Leadership, Situation Monitoring, Mutual Support, and Communication. Statistically significant results were demonstrated in two domains: Leadership and Situation Monitoring. The mean difference in efficiencies demonstrated that there was no improvement in efficiency metrics after the implementation of TeamSTEPPS. Implications for practice include the need for continued team training, a plan for sustainability of TeamSTEPPS concepts, and a plan to address team dynamics when unexpected stress or change is introduced into the work environment.

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Introduction

Teamwork is essential in healthcare and is an important dynamic that contributes to optimal patient outcomes and efficiency. Successful teams produce reliable results in high-stress, high-stakes healthcare environments like operating rooms. Operating rooms are a unique care environment where people from multidisciplinary backgrounds often have limited or no team training, form teams to care for patients. Multidisciplinary team dynamics are challenging and, if not properly managed, can create catastrophic patient events. Esce et al. (2018) state that teams in operating rooms are often formed by rotating combinations of people who must work together in emergent situations to deliver safe and efficient care. Operating room team structure varies based on patient care needs, tasks required, and clinical expertise. Therefore, safe, efficient patient care requires an underlying foundation of teamwork. The underlying foundation of teamwork can be strengthened by teamwork training. Formal teamwork training provides a means and ability to improve communication and collaboration in the operating room. There are many tools and strategies that can be used to improve teamwork. TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety) is a program offered by the Agency for Healthcare Research and Quality (AHRQ) that can be used to improve teamwork by teaching teamwork concepts (AHRQ, 2019). The program teaches communication skills, encourages structured exchanges of information, and the benefits include enhanced coordination of care and improved patient outcomes (AHRQ, 2019). According to Keebler et al. (2014), "Evidence of TeamSTEPPS effectiveness is accumulating, with research studies demonstrating improvements in team skills such as leadership, situation monitoring, mutual support, and communication" (p. 718).

Problem Recognition and Definition

Purpose, Problem Statement, and PICO

This project aims to determine whether the implementation of TeamSTEPPS communication tools and strategies improves the perception of teamwork and efficiency in the operating room at a pediatric hospital. The project is designed as a quality improvement project using convenience sampling from a voluntary group of multidisciplinary team members. The population is a multidisciplinary group, including nurses, technologists, certified registered nurse anesthetists, and anesthesiologists who work daily in the operating room. Additionally included will be advanced practice registered nurses, physician's assistants, residents, fellows, and attending surgeons from the pediatric surgery department. This project will be limited to teams that are formed for general pediatric surgery. Other surgical services will not be included in the project, limiting the burden of training a large group and managing an overwhelming amount of data, both of which could have a negative effect on project outcomes.

Teamwork is an essential component of effective communication in the operating room and a critical factor in ensuring patient safety. According to Wolf et al. (2010), the Institute of Medicine, The Joint Commission, and AHRQ, have identified communication as a priority in patient safety. The Joint Commission has cited deficiencies in communication as a principal cause of human error in the operating room. Dingley et al. (2008) state that reports from The Joint Commission demonstrate that communication failures were at fault in more than seventy percent of reported sentinel events. Additionally, Plonien and Williams (2015) state that "numerous organizations have been very successful in using TeamSTEPPS as an evidenced-based method to enhance clinical communication within teams and improve patient outcomes in the operating room" (p. 465).

Plonien and Williams (2015) describe that the implementation of TeamSTEPPS may improve OR efficiency by improving team performance. TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety) was developed by the Department of Defense (DoD) and AHRQ to improve healthcare quality and safety. The original design of TeamSTEPPS was based on crew resource management (CRM), where a set of training procedures was created to improve communication in aviation. The Joint Commission (2005) states that consistently applying CRM to healthcare delivery will increase team communication and support teams' timeliness and accuracy in providing safe, effective care in chaotic high-pressure environments like operating rooms. Plonien and Williams further state that TeamSTEPPS methodology employs a common language in communication, together with associated protocols proven to result in improved patient safety outcomes" (Plonien & Williams, 2015, p. 466).

PICO stands for population, intervention, comparison, and outcome. According to Terry (2015), a PICO helps the researcher keep the elements in mind that are important to the evidenced-based practice problem, (p. 28). The PICO for this project is:

Population (P): All clinical staff in a pediatric operating room.

Intervention (I): Implement the TeamSTEPPS program

Comparison (C): Minimal teamwork training

Outcome (O): Increase in perception of teamwork and improvement in efficiencies.

Theoretic Foundation

Three theoretical foundations have been chosen as the framework for this project. Koloroutis (2004) Relationship Based Care (RBC) will serve as the foundational nursing theory. Kotter's Theory of Change Management (1996) (TCM) and Mezirow's Theory of Transformative

Learning Theory (TLT) (1997) will serve as the foundational change and learning theories for this project.

Koloroutis (2004) describes the RBC model as a model for care that places the patient and family as the central focus with three crucial care provider relationships; relationship with patients and families, relationship with self, and relationship with colleagues. There are six elements to the model: leadership, teamwork, professional nursing, care delivery, resources, and outcomes. All of these elements are present in TeamSTEPPS training. The RBC model is familiar to the project organization.

Kotter's TCM is a well-known model for change management and is popular in healthcare for managing change in complicated environments. Kotter (1996) describes eight steps for change that can be grouped into three phases:

> Phase I: Establishing a sense of urgency, creating a guiding team, developing, and a vision and strategy.
>
> Phase II: Communicating the change vision, removing barriers, generate short-term wins.
>
> Phase III: Consolidate the gains and produce more change, sustain, and anchor the changes into the culture.

Baloh et al. (2018) studied TCM's application on the implementation of team huddles in small rural hospitals. They determined that TCM can be a useful guide for nurse managers implementing changes. The TeamSTEPPS action plan described by AHRQ is a ten-step process similar in nature and content to TCM. For this project, the focus will be on TCM Phase I and II.

Phase III is beyond the scope of this project but will serve as a guide for future sustainment and culture change.

Since this project is based on teaching new skills to adult learners, it is also necessary to include a theoretical model that provides a framework for adult learning. Mezirow's TLT is grounded on the adult learner being able to reflect on their knowledge, experiences, and assumptions to change their frame reference, which then allows for transformational learning to occur (Mezirow, 1997). Transformative learning begins with an assumption that in order for new information to be meaningful, the information must be incorporated into an already existing frame of reference by the learner. This project's education process is built on assuming that adult learners have an existing frame of reference related to the importance of teamwork in a patient care environment. The education will be provided as an active process involving thoughts, feelings, and perspectives of the learners. The project objectives and methodology have been developed to include independent thinking and reflective judgment related to teamwork perceptions.

Review of Evidence

Literature Review

Teamwork, patient safety, and operational efficiency are critical to desirable patient outcomes in the operating room. In 1999, a fundamental principle identified by the Institute of Medicine report, *To Err is Human*, promoted effective team functions. Sexton et al. (2006) describe that communication and collaboration breakdowns among OR team members can have catastrophic results for patients. Breakdowns in communication and collaboration among teams working in operating rooms occur for a variety of reasons. One strategy to improve communication and

collaboration is teamwork training, which focuses on communication techniques that improve communication, especially in high-stakes patient care situations.

A literature review was conducted using Scopus, CINAHL Plus, Web of Science, PubMed, Cochrane, and EBSCO. Key terms relevant to the search included: TeamSTEPPS, teamwork, team communication, patient safety, multidisciplinary surgical teams, operating rooms, and operating room efficiency. The initial search focused on articles from 1990 through 2020. The search was narrowed to include articles within the past fifteen years, in order to capture research starting three years after the DoD and AHRQ initiated the TeamSTEPPS program, which resulted in 195 articles. From the original 195 articles, 57 articles were chosen based on titles, and then 23 articles were chosen for further review; two articles were eliminated for being informative in nature, leaving 21 articles to be included in the level of evidence review. In addition to exploring research literature, an extensive review of practice recommendations was conducted to evaluate evidence set forth by professional organizations including the Association of Operating Room Nurses, American College of Surgeons, American Society of Anesthesiologists, Institute of Healthcare Improvement, and AHRQ.

Polit and Beck (2012) describe levels of evidence as a grading system for identifying the strength of research. Based on the levels described by Dang and Dearholt (2017) in the Johns Hopkins EBP Models and Guidelines, the review yielded moderate to low levels of evidence in the studies chosen for review.

Table 1 Summary of Evidence Levels Review

Evidence Description	Level of Evidence	Number of Articles per Level (Total=21)
Experimental study, randomized controlled study (RCT), Systematic review of RCT	I	0
Quasi-Experimental Study	II	1
Non-experimental Study	III	11
Opinion of respected authorities, including clinical practice guidelines and panels	IV	1
Based on experiential and non-research evidence	V	8

Table based on Johns Hopkins Nursing Evidenced-based Practice: Models and Guidelines(2017)

The literature review demonstrated that teamwork is essential to effective communication and safe patient care. Teamwork training and communication strategies are themes that emerged from the literature as necessary for effective teamwork.

Effective Teamwork and Communication

Teamwork is an essential component of effective communication in an operating room. Different perceptions and a lack of shared goals and mental models can contribute to communication failures and lead to patient harm. A study conducted by Makary et al. (2006) concluded that teamwork is in the eye of the beholder after study results demonstrated that perceptions of teamwork varied between team members based on role. Physicians rated teamwork as good, while nurses rated teamwork as mediocre. The research conclusion suggests that given the importance of good communication in the operating room, organizations should identify disconnects between disciplines and focus on team behaviors. Etherington, et al. (2019) conducted a literature review which demonstrates the importance of interprofessional communication for surgical patient safety and suggests that organizations should implement

teamwork solutions to improve communication. Kertesz, et al. (2019) demonstrated an improvement in team communication by providing teamwork training and suggests that in addition to being competent in individual roles, team members should be able to function as a team. These results present a unique opportunity to assess teamwork perceptions and provide team training for a multidisciplinary team in the operating room.

TeamSTEPPS

A literature review reveals that TeamSTEPPS is a well-researched, effective, evidence-based solution to improve teamwork and communication. Obenrader et al. (2019) implemented a TeamSTEPPS training program in an emergency department and demonstrated an increase in teamwork perception and communication. Mayer et al. (2011) studied the impact of a TeamSTEPPS program on two intensive care units. They demonstrated an improvement in the perception of teamwork and efficiency related to emergently placing patients on extracorporeal membrane oxygenation. There is evidence in the literature suggesting that there should be a structured format and plan for implementing a TeamSTEPPS project. Ward et al. (2017) describe that facilitation (a technique used by a person to learn the new skill) and context (environment or setting) is critical to a successful TeamSTEPPS implementation project. Zhu et al. (2016) performed a study and identified two critical factors in the successful implementation of TeamSTEPPS are strategic goals and organizational preparedness to improve teamwork.

TeamSTEPPS and Operating Room Efficiency

The literature demonstrated that TeamSTEPPS is a tool that can be used to improve teamwork and communication in the operating room, but there were few studies that examined the impact of a TeamSTEPPS project on operating room efficiency. TeamSTEPPS is not an

intervention designed to improve efficiency, however efficiency is an important metric in the context of implementing any quality program. Operating efficiently is a way to decrease costs and improve patient and team satisfaction. Shams, et al. (2016) evaluated the impact of implementing TeamSTEPPS on operating room efficiency in an otolaryngology department. Data was collected over a year following a TeamSTEPPS program implementation. The data collection demonstrated no statistically significant decrease in efficiency. The authors concluded that operating room efficiency was preserved after the implementation of TeamSTEPPS. In a similar study conducted in the same organization, Weld, et al. (2016) demonstrated an improvement in efficiencies within a urology service. Both of these studies suggest that the organization did not experience a negative impact in efficiencies after implementation of TeamSTEPPS.

Limitations of the Literature Review

While there were hundreds of research articles published related to TeamSTEPPS projects across many different team care settings, there were no research findings explicitly related to pediatric multidisciplinary operating room teams. Esce et al. (2018), investigated the use and perceptions of team training programs by pediatric surgeons and anesthesiologists and demonstrated that those who participated in team training found it helpful and suggested the expansion of team training programs may be valuable in improving a culture of safety in children's hospitals. Another area of limitation identified is the sustainability of TeamSTEPPS programs and concepts. Sustainability is only briefly mentioned in the literature and often as something that requires further study.

Project Plan

Market/Risk Analysis

Operating Rooms are chaotic high-stress, high-stakes, patient care environments. Teamwork is essential for excellent communication and optimizing patient safety. In the seminal report *To Err is Human* from the Institute of Medicine (2000), teamwork was highlighted as a significant way to improve patient safety in hospitals. Teamwork is complex in an operating room where the team members are a diverse group of multidisciplinary caregivers, each with their own culture and language. They must form a workgroup that performs a specialized function, often with little notice or opportunity to get to know each other. While the team often shares the same goal of moving the patient through surgery in the safest manner possible, there are other factors that complicate teamwork. These factors include hierarchal leadership structures, individual communication techniques, and differing levels of experience and training.

Guidance statements about the importance of teamwork in healthcare are available from many professional organizations including, Association of Operating Room Nurses, American College of Surgeons, American Society of Anesthesiologists, and Agency for Healthcare Administration. Regulatory agencies, Centers for Medicare and Medicaid Services, Joint Commission, and the Florida Department of Health all expect teamwork to be infused into the hospital work environment. Payors, both public and private, demand that safe care be provided and in an accountable care environment, they refuse to pay for avoidable patient harm. Payment structures for operating rooms are often based on the type of case and not the length of the case. In order to maximize revenue and decrease cost, it is vital that the operation proceed in an efficient manner. The most important reason to improve teamwork and operating room efficiency is for the patient.

Every patient who enters a hospital or undergoes a surgical procedure deserves a care team that demonstrates effective teamwork which enhances safety and leads to excellent outcomes.

SWOT Analysis

The acronym SWOT stands for strengths, weaknesses, opportunities, and threats. A SWOT analysis is a way to assess what an organization does well, where weaknesses exist, and potential opportunities and threats related to a project or process. Fortenberry (2010) describes that strengths and weaknesses are internal qualities, and opportunities and threats are external to the organization. By conducting the SWOT analysis, the organization can mitigate potential barriers and enhance the opportunity for success.

The organization demonstrates several strengths, including a high level of teamwork and the capacity to do good work. The team members are focused on a pediatric surgical specialty and thus share a common language and goal. The team has been well trained and frequently practice speaking up for patient safety. They demonstrate efficiency in commonly measured metrics; for example, on-time first case starts. Improving patient safety presents a compelling business case to aid in the acceptance of this project.

In addition to many existing strengths, there are weaknesses that needed to be accounted for in the development and administration of this project. These weaknesses include; the lack of individual accountability, time constraints, acceptance and "buy-in" by all team members, a silo culture, and change resistance. Individual accountability is the expectation that every team member is accountable for their own performance. Recognizing and understanding that not all team members have the desire or knowledge to be accountable or have the time to dedicate to learning team behaviors is important in the context of this project. TeamSTEPPS provides a framework that can assist with overcoming the weaknesses identified.

Opportunities for the success of this project exist in meeting regulatory requirements for improved teamwork, the opportunity to improve recruitment of new employees who desire to be part of a well-functioning team, increases in caseload, and an opportunity to demonstrate improved teamwork external to the organization.

Threats include environmental factors, regulatory non-compliance, and failure to align with health system priorities. The threats for this project are not unique to this organization and can best be managed by awareness and anticipatory plans for mitigation.

Driving and Restraining Forces

The primary driving force is improved teamwork, which can positively impact patient safety and efficiency in the operating room. TeamSTEPPS training, which includes providing teams with teamwork tools to optimize patient outcomes, is one method that can improve teamwork. Restraining forces include an individual's difficulty in accepting change, time for team training, and the ability to sustain a program through competing programs to improve patient care. All of these restraining forces can be addressed with proper planning and implementation of this project.

Stakeholders and Project Team

The stakeholders for this project include a diverse group of organizational leaders, team members, and community members who will benefit from having an operative team that works together to provide excellent pediatric patient care. Individual stakeholders are the project participants, a multidisciplinary team of nurses, techs, and physicians. The project team includes the project lead, and those who will directly support, lead, and mentor the project lead through the process.

Cost-Benefit Analysis

TeamSTEPPS is a program that is provided free of charge by AHRQ. In 2018, AHRQ moved the TeamSTEPPS 2.0 training format to on-line self-paced learning. This format allows flexibility in training busy groups of healthcare providers who often do not have time to attend traditional or formal educational offerings. Currently, in the organization, there is time built into the operating schedule every week for training. This time is already budgeted and will allow for training to occur at no additional cost to the organization. There are potential non-monetary and cost avoidance benefits from TeamSTEPPS training, including improved teamwork culture, improved patient safety, increased team satisfaction, prevention of medical errors, and improved efficiencies.

Mission, Vision, and Goals

According to Zaccagnini and White (2014), the DNP project's mission statement describes why the project is being conducted. This project's mission is "Implementation of a TeamSTEPPS program will improve the perception of teamwork and improve efficiency in the operating room." The vision allows the ability to see the big picture of the impact of the mission. This project's vision is "Drive change that can be sustained for improved multidisciplinary team teamwork to improve patient safety." The goal is an improvement in the perception of teamwork and efficiency in the operating room.

Process and Outcome Objectives

The outcome objectives of this project are to increase the perception of teamwork and improve efficiencies in the operating room. The outcomes will be measured by results from the T-TPQ assessment and data from the electronic medical record.

Logic Model

The W.K. Kellogg Foundation (2004) describes a logic model as a picture or a road map that visually represents how planned work will achieve a desired outcome. Logic models may be simple or complex. All logic models should have the basic components of inputs, activities, and outcomes. Inputs are the resources required to support the project. Activities are the actions required in the project. Outcomes are the goals of the program and represented as short-term, intermediate, and long term (See Appendix B for Logic Model).

The Conceptual model for this project (see Appendix C), demonstrates that the center or core of the problem is the team members who work in a pediatric operating room. There are linkages between the team members and the community's needs and assets. Desired results, influential factors, strategies, and assumptions are defined. These constructs are critical to the success of this project and help bridge the gap between the PICO question and other inputs, resources, and desired results that are not evident in the PICO question.

Setting

The organization is located on the west coast of Florida and is dedicated to caring for infants, children, and adolescents. The organization is a 259-bed academic medical center, which provides care in more than fifty specialties, is a regional pediatric referral center, and a pediatric trauma center. Twelve operating rooms offer a wide range of services, including general surgery, neurosurgery, urology, otolaryngology, orthopedics, cardiac, plastics, and gastroenterology on an elective and emergent basis. Approximately 10,000 surgical cases are performed each year. The operating room is staffed by a team of registered nurses, technicians, advanced practice providers, anesthesia providers, and surgeons.

Methodology and Measurement

This project seeks to determine if the implementation of TeamSTEPPS communication tools improves the perception of teamwork and efficiency in a pediatric operating room. There are two desired outcomes for this project:

- Outcome 1: Improve the perception of teamwork. This outcome will be measured by the assessment of data obtained on the T-TPQ assessment.
- Outcome 2: Improve efficiency metrics. The efficiency metrics that will be assessed are total case counts, total operating minutes, average case length (in minutes), first case on-time starts, and turnover time between OR cases (in minutes). This data will be obtained from a database of reports available in the electronic medical record.

In addition to the independent variable, which is the introduction of the TeamSTEPPS program to the OR team, and the dependent variables of increased perception of teamwork and improved efficiency, are extraneous variables to be considered. This project's extraneous variables include investigator effects, meaning that the group might be influenced in the survey and program since the investigator is their nursing leader. There are also participant variables to consider, where individual characteristics or experiences could affect the outcomes. OR Team members attended a four-hour required patient safety offering in 2019. This education might impact their responses to a survey questionnaire. There are concerns about other variables beyond control, such as high patient volume, staff turnover with associated staff shortages, and new employees joining the team, all of which might impact the outcomes of the project. One way to ensure that the extraneous variables that may arise in the course of this project do not interfere with the data is to keep track of the variables as the project progresses. For example, it

might be beneficial to monitor OR staff turnover, vacancies, and new team members or surgical procedures that begin during the project.

This is a quality improvement project. Convenience sampling will be used to obtain data pre and post-intervention. Terry (2015) describes that quantitative research is concerned with patterns that are unique to a population and can be useful for investigating the effectiveness of an intervention (p. 82). Surveys often collect data in this type of study. Survey data results are interpreted, and inferences are made to determine if the conclusions from the sample survey can be replicated or might have a similar effect on a larger population. The survey data for this project will be analyzed using descriptive statistics: "Descriptive statistics provide us with a useful strategy for summarizing data and providing a description of a sample but cannot provide information for causal analysis," (Fisher and Marshall, 2016, p. 97). Descriptive statistics allow for before and after similarities and differences in outcomes data. The data will be presented using tables. A context specific database and dictionary were developed to track data and definitions (See Appendix K).

As a first step, a pre-assessment, the TeamSTEPPS Teamwork Perception Questionnaire (T-TPQ) was administered to the group. The T-TPQ is a validated tool, with 35 questions, which can be administered for many different purposes depending on the data needs (AHRQ, 2017). For this project, the T-TPQ was then administered as an assessment in an electronic format, before providing TeamSTEPPS training. TeamSTEPPS was then introduced to the study group by computer-based modules. AHRQ suggests that users adhere to the prescribed training format, but the delivery method for TeamSTEPPS can be customized to meet the needs of a workgroup. This provided flexibility in introducing the training to a group of busy nurses, techs,

anesthesiologists, and surgeons who cannot devote long periods of time to team training. Fifteen days following the TeamSTEPPS intervention, the T-TPQ was repeated.

A paired sample *t*-test was used to compare the T-TPQ data gathered pre and post-intervention to determine if there were statistical differences between pre and post-TeamSTEPPS implementation on the perception of teamwork. Paired sample *t*-tests have four assumptions as presented by Statistics Solutions (2020) which will be considered in this project: the dependent variables will be continuous, observations are independent of each other, the dependent variables will be normally distributed, and outliers will be removed from the data. A *p*-value determines statistical significance, and in this project data with a *p*-value of 0.05 or less was considered statistically significant. The OR efficiency metrics were calculated using a mean and then the mean difference was calculated for two different but comparable time periods. Polit (2010) describes the mean as the most commonly used index of central tendency. The mean difference is a measure that indicates the difference between the mean value in two different groups.

Outcome #1: Perception of Teamwork: The perception of teamwork was assessed using the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ). The T-TPQ contains a total of thirty-five questions, seven questions in five constructs. A mean score was calculated for each of the following teamwork constructs: Team structure, leadership, situational monitoring, mutual support, and communication. A power analysis conducted using a web-based calculator (Statistical Decision Tree 2020) demonstrates an ideal population sample size for this project was 64 in each group, which would demonstrate a power of 0.8, effect size of 0.5, and a significance level of 0.05.

Outcome #2: Improved Efficiency Metrics: The project plan was to assess improvements in operating room efficiency metrics after the implementation of TeamSTEPPS education. Data

representing on-time first case starts, turnover time between OR cases, and length of OR cases, was gathered to determine if the implementation of TeamSTEPPS had an impact on efficiency outcomes. The data to determine efficiency was extracted from the EMR for two comparative time periods, November and December 2019 and 2020. A mean and mean difference for each metric was calculated.

Higgins and Straub (2006) state that researchers must evaluate both the validity and reliability of the measurement methods (p.23). Construct validity refers to the confidence in which a measurement tool measures what it is intended to measure. The tool chosen for this project, T-TPQ, is determined to be a construct valid tool for measuring perceptions of teamwork (Keebler et al. 2014 p. 718). Keebler et al. (2014) determined that the T-TPQ reliability using Cronbach's alpha equals 0.978.

Threats to validity were addressed using proper sampling techniques. The goal was to ensure that the appropriate sample sizes were obtained to provide a power of 80%. The nature of convenience sampling creates easy access to the desired population, but there are threats that must be recognized. Threats included potential bias, such as over or under-representation of the sample group and external variables. In this project, unplanned external variables such as a pandemic or introduction of a new electronic medical record platform may have either positive or negative effects on the surveys and data collected.

Recruitment and Protection of Human Subjects

Participants were recruited by email where written information was provided on the project aim and structure. Information shared included participation in the T-TPQ surveys, TeamSTEPPS education, and TeamSTEPPS safety measures.

Participation in the project was voluntary, and all participants are adults older than age eighteen years. No identifying information was collected during the project. The T-TPQ surveys are anonymous, and the data for efficiency measures was collected without identifying factors. Consent was implied with the return of the surveys. The population of interest did not meet the definition of vulnerable populations of pregnant women, human fetuses, neonates, children, or prisoners, as described by the U.S. Department of Health and Human Services (2019). Shivayogi (2013) states that consideration of being classified as vulnerable may need to be given to employees in hierarchical organizations like hospitals. Based on this statement, caution will be used to make sure the population did not feel pressured or coerced to participate in the project. The project lead completed the Collaborative Institutional Training Initiative (CITI Program) for social-behavioral researchers. Permission to begin the project was obtained from the Institutional Review Board at Regis University and Senior Nursing Leadership at the organization.

Project Findings and Results

Outcome 1: Improve the Perception of Teamwork

The T-TPQ survey was administered twice to assess the perception of teamwork in two time periods; pre-intervention and post-intervention. Ninety-five people were invited to participate in the project. Twenty-eight people completed the pre-assessment T-TPQ and eighteen people completed the post-assessment T-TPQ. Inferential statistics including the paired samples *t*-test and a correlation were run using SPSS software. The paired samples *t*-test compares the mean scores for differences that are statistically significant to determine if the intervention worked. An average score was calculated for each teamwork construct. A paired-samples t-test was conducted to compare aggregated pre-intervention data (MEAN PRE) to aggregated post-

intervention data (MEAN POST) to determine whether there is statistical difference between the paired observations. There is no difference between the MEAN PRE and MEAN POST survey responses in the Team Structure, Mutual Support and Communication constructs. There was a statistical difference in the Leadership and Situation Monitoring constructs each with a *p*-value less than 0.05.

Table 2 Paired Samples Statistics and *t*-test Outcomes

CONSTRUCT	MEAN PRE	MEAN POST	*t*	*p*
Team Structure	3.67	3.73	-0.449	0.654
Leadership	3.57	3.10	2.99	0.003
Situation Monitoring	3.27	3.93	-4.955	0.000
Mutual Support	4.01	3.84	1.459	0.147
Communication	4.06	4.08	-0.227	0.821

Outcome 2: Improve Efficiency Metrics

Data was collected for two, thirty day time periods and compared by calculating the percentage change between the metrics in the two time periods. There was an increase in the number of operating minutes, average case length, and turnover time. There was a decrease in on-time first case starts. The percentage change of the efficiency data demonstrates that there was not an increase in efficiency. Average case length, first case on time starts and turnover time did not improve after TeamSTEPPS education.

Table 3 Percentage Change

	2019 Nov	2020 Nov	Percentage Change		2019 Dec	2020 Dec	Percentage Change
Case counts	129	110	-15%		125	150	20%
Total operating minutes	13,200	13,406	2%		11,240	16,314	45%
Average case length (minutes)	102	122	20%		90	109	21%
First Case On time starts	62.5%	27.8%	-56%		56.3%	38.5%	-32%
Turnover time (mean minutes)	35	43	23%		37	38	3%

Limitations, Recommendations, Implications for Change

Limitations

There were limitations associated with this project that fall within two categories; project design and unplanned variables. The project was designed as a quality improvement project administered over a short period of time. The project focused on only one service line in one operating room in a pediatric hospital. A single service line makes it hard to discern if the results could apply to a broader audience. The short timeline left little time for the group to absorb education and work through practice changes in a collaborative manner. Restrictions on face-to-face education within the organization related to COVID-19 meant that the education modules were administered electronically to each individual. Ideally, TeamSTEPPS education should occur as a multidisciplinary group and not in individual silos. Interdisciplinary education allows for collaborative work and an increased perception of teamwork as the team works together to solve a clinical problem. Other design limitations include a small sample size and a lack of staff engagement in the project related to the stress of working in healthcare during a pandemic and other competing priorities.

During the project implementation phase, the unplanned variables were COVID-19, a change in the electronic medical record platform, and a weather event. Like others working in

healthcare settings today, this operating room team experienced enormous stress and change in the eight months before and during the project implementation due to the COVID-19 pandemic. As described by Adams and Walls (2020), limited resources, changing requirements, work-life balance disruptions, and mental fatigue have contributed to stress and anxiety in healthcare workers related to COVID-19. Stress and fatigue may have contributed to low participation in the project. In addition to working in a stressful COVID-19 healthcare environment, the organization introduced another significant change at the start of this project; a new electronic medical record platform. The new electronic medical record go-live date coincided with the start of this project, adding to the team's pace of work and stress. The electronic medical record implementation potentially altered the perception of teamwork among the group, as individual disciplines struggled with learning a new documentation system. Finally, the Atlantic Hurricane season of 2020 was one of the busiest on record. According to the National Oceanic and Atmospheric Administration (2020), there were thirty named storms and twelve of them hit the continental United States. Hurricane Eta crossed through Central America, briefly made land-fall in south Florida, then travelled up through the Gulf of Mexico. On November 11, 2020, Hurricane Eta, struck just north of the Tampa Bay area, impacting the area with tropical force winds and flooding related to storm surge, (NOAA, 2020). Tropical Storm Eta occurred during the post-assessment survey period and may have impacted participation and results as the OR team was forced to quickly shift their focus from normal operations to storm preparations. None of these limitations are unique to this project or operating room, as healthcare teams across the globe are experiencing similar challenges.

Recommendations and Implications for Change

A greater emphasis on teamwork requires a culture change. Nilsen et al. (2020) describe that organizational changes in healthcare are more likely to succeed when healthcare professionals have the opportunity to influence the change, feel prepared for the change, and recognize the value of the change. TeamSTEPPS is a developed program and proven method to improve teamwork perception; yet evidence demonstrates that implementation and sustainment of TeamSTEPPS teamwork processes prove to be difficult and are highly influenced by culture. Following Kotter's TCM this project focused on phases I and II. Phase III, which is out of scope for this project, will serve as a guide for future sustainment and culture change. Implications for change should include a long-term plan for continued TeamSTEPPS education that includes change management and acceptance by organizational culture. Thomas and Galla (2013) suggest that refresher training should be done at intervals to maintain knowledge and continue to practice teamwork strategies. There is evidence in the literature that TeamSTEPPS can improve the perception of teamwork and improve operational efficiency. For this reason, it is essential that TeamSTEPPS be embedded into other processes in the operating room and across the organization, inclusive of other quality and safety projects, new employee on boarding, and overall culture. Further exploration of ideas to energize and engage participants in teamwork training and quality projects is needed.

Contribution to Nursing Theory

The T-TPQ constructs that demonstrated a statistical difference, Leadership and Situation Monitoring, could have affected staff having a greater understanding of the construct after education was provided. The importance of leadership and situation monitoring in an organization related to teamwork cannot be underestimated. With regard to the foundational

nursing theory for this project, Relationship Based Care, Kolorutis (2004) highlights the importance of leadership in a relationship-based culture "in which leaders encourage people to develop to their fullest capacity; leadership will emerge from people in surprising and gratifying ways," (p. 53). Situation Monitoring as defined in the TeamSTEPPS guide by AHRQ (2020) is the process of continually scanning and assessing a situation to gain and maintain an understanding of what is going on around you. By viewing TeamSTEPPS through the lens of RBC, the concepts of leadership and situational monitoring will serve as an operational framework to transform practice and contribute to nursing theory. One way to ensure that leadership and situation monitoring are adopted and used by this group is to continue teamwork training. Therefore, it is recommended that TeamSTEPPS training continues with a goal to improve the perception of teamwork in the operating room.

Contribution to Nursing Research

This project adds to professional knowledge of TeamSTEPPS education's impact on the perception of teamwork in an operating room. There is an opportunity in nursing research to continue to study teamwork to advance care and strive for optimal outcomes for patients. Opportunities to advance research include already known areas, similar to this project which focused on the perception of teamwork of a small healthcare team within the same organization to other less studied areas, for example, teamwork across systems over long periods of time. The evidence suggests that unit-based teamwork improvements, like TeamSTEPPS, will advance professional practice overall. Future research should include how hierarchy or position affects functions within the team and what happens to team dynamics when unexpected stress or change is introduced into the work environment.

Contribution to Advanced Leadership

This project presents the reality of managing or leading when there are many competing priorities. While patient safety is always at the forefront of a nursing leader's mind and should assist with driving a culture toward better teamwork, the day-to-day reality of the impact of highly stressful events needs to be considered when leading a team of caregivers. One way to mitigate the effects of unanticipated events is to have a process for the sustainability of quality projects. Nursing leaders should engage in sustainability efforts to improve quality as part of everyday work. According to research conducted by Fleiszer et al. (2016), "sustainability activities can be used in an ongoing, coordinated, and integrated fashion to achieve broad-quality focused goals, into which new requirements for change may be incorporated." (p. 316). These activities will guide teams toward better teamwork when there are competing priorities and unclear requirements.

Contribution to Health Policy

In a regulatory environment, the importance of teamwork in patient care environments is recognized. Teamwork processes are clearly described as necessary by regulatory and patient safety agencies at the local, national and global level; however, there is a gap in evidence supporting exactly how to teach and implement teamwork processes. Teamwork is complex and dependent on individuals, so what works best in one area may not work in another. AHRQ and The Joint Commission have evidence and provide guiding statements on the importance of teamwork. In one study using TeamSTEPPS, Forse et al., (2011), was able to link teamwork to regulatory requirements and demonstrate sustainment in processes. This project allowed for an assessment and contribution to improving organization-level policies and practices related to teamwork and the importance of teamwork to patient safety and optimal outcomes. In the future,

there is an opportunity to analyze existing local, state, and national policies to ensure continued alignment and contribution to health policy that encourages teamwork in health care.

Conclusion

In summary, this quality project sought to determine whether the implementation of TeamSTEPPS communication tools and strategies improves the perception of teamwork and efficiency in a pediatric operating room. According to Kumar et al. (2019), "focusing on improving teamwork and efficiency is a concept that requires minimal resources, but has the potential to yield incredible amounts" (p. 337). Strengthening the underlying foundation of teamwork by providing teamwork training is a key factor in optimal patient outcomes. Formal teamwork training can provide a means and ability to improve communication and collaboration in the operating room. The results from this project demonstrated statistically significant results in two teamwork domains and there was no improvement in efficiency metrics. Implications for practice include the need for continued team training, a plan for sustainability of TeamSTEPPS concepts, and a plan to address team dynamics when unexpected stress or change is introduced into the work environment.

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Appendix A

Systematic Review of the Literature Example

Article/Journal	TeamSTEPPS improves operating room efficiency and patient safety. *American Journal of Medical Quality 31*(5). 408-414.	Prevalence and perceptions of team training programs for pediatric surgeons and anesthesiologists. *Journal of Surgical Research 232*. 559-563.
Author/Year	Weld, L.R., Stringer, M.T., Ebertowski, J.S., Baumgartner, T.S., Kasprenski, M.C., Kelley, J.C., Cho, D.S., Tieva, E.A., & Novak, T.E. (2016).	Esce, A., Rodeberg, D., Rothstein, D., Browne, M., & Wakeman, D. (2018).
Database/Keywords	PubMed TeamSTEPPS, communication, medical errors, operating room efficiency, operative briefings.	PubMed Operating room, team training, Crew resource management, TeamSTEPPS, Patient safety, Pediatric surgery.
Research Design	Quantitative	Quantitative
Level of Evidence	V	V
Study Aim/Purpose	The purpose of this project was to evaluate operating room efficiency and patient safety within a urology service related to improved channels of communication among operating room personnel during the first year of implementation of TeamSTEPPS.	This study sought to evaluate the availability of team training programs at children's hospitals and the perception of these programs by surgeons and anesthesiologists.
Population/Sample size **Criteria/Power**	1,481 post-TeamSTEPPS urology cases were compared to 1513 pre-TeamSTEPPS urology cases. Safety data 699 cases in first 6 months, 782 cases in second 6 months.	Population= 1500 152 surgeons and 12 anesthesiologists completed the survey. Response rate=10%.
Methods/Study Appraisal **Synthesis Methods**	To evaluate operating room efficiency data, statistical comparisons with the appropriate t test or $\chi 2$ test were made after TeamSTEPPS versus before TeamSTEPPS. For patient safety data, a $\chi 2$ test was performed comparing patient safety issues from the first 6 months of the year during TeamSTEPPS implementation to the second 6 months.	Electronic survey of pediatric providers from surgery (general, plastic, urologic, orthopedic, Otolaryngologic, and ophthalmology) and anesthesia. The survey asked about completion and perceptions regarding the efficacy of team training programs. Descriptive statistics and a student t-test were used to evaluate the data.
Primary Outcome Measures/Results	The mean in-room to turnover-to-surgeon time, mean turn-over-to-surgeon to surgical start time, mean surgical time, and mean case time were significantly shorter with TeamSTEPPS. The mean case time including	Institutions offered TeamSTEPPS or another crew resource management style team training program for 39% of respondents. Of those with a program, 77% of respondents had completed training. Although most (76%) who

	anesthesia and surgical time decreased by 10.1% with TeamSTEPPS. The on-time first-start rate was significantly higher with TeamSTEPPS. The mean late interval for first-start cases and mean turnover time was similar before and with TeamSTEPPS. Before the project, the overall rate of patient safety issues was 15.8%. The rate declined to 6.2% at midyear and remained near that rate for the remainder of the year ($P < .001$).	participated in team training programs did so by requirement, 90% found it helpful. Of the 61% of surgeons who said their institution did not offer team training programs, 60% said they would participate if one were offered and an additional 32% said they might participate.
Conclusions/Implications	Operating room efficiency by reducing mean case time by 10.1% and increasing on time first-start rates by 20.9%. Patient safety improved, with the rate of reported patient safety issues declining by more than half within the first 6 months of TeamSTEPPS implementation.	Team training programs are considered beneficial among pediatric surgeons and anesthesiologists who have completed them. Unfortunately, despite substantial evidence showing training for team work improves team functioning and patient outcomes, many pediatric surgical teams do not have team training programs at their institutions. Further expansion of team training programs may be valuable to improving a culture of safety in children's hospitals.
Strengths/Limitations	Limitations: limited to a urological service at a large teaching hospital, findings may not be applicable in other settings. Strength: long study time (1 years). Adds to growing evidence the importance of team work on patient safety and efficiency.	Limitations: low response rate, failed to collect demographic data that would identify the institution of the respondent. Not multidisciplinary. Strength: one of the few studies that focused on pediatric. Identified the value of team training and the need for creative programs that are designed for busy clinicians.
Funding Source	None.	None.
Comments	Barriers to the implementation of TeamSTEPPS in the operating room include concerns about time requirements for the briefings. Significant improvement in patient safety reports after TeamSTEPPS.	The biggest barriers to participation in team training were not enough free time or that the team training program was not offered to their department.

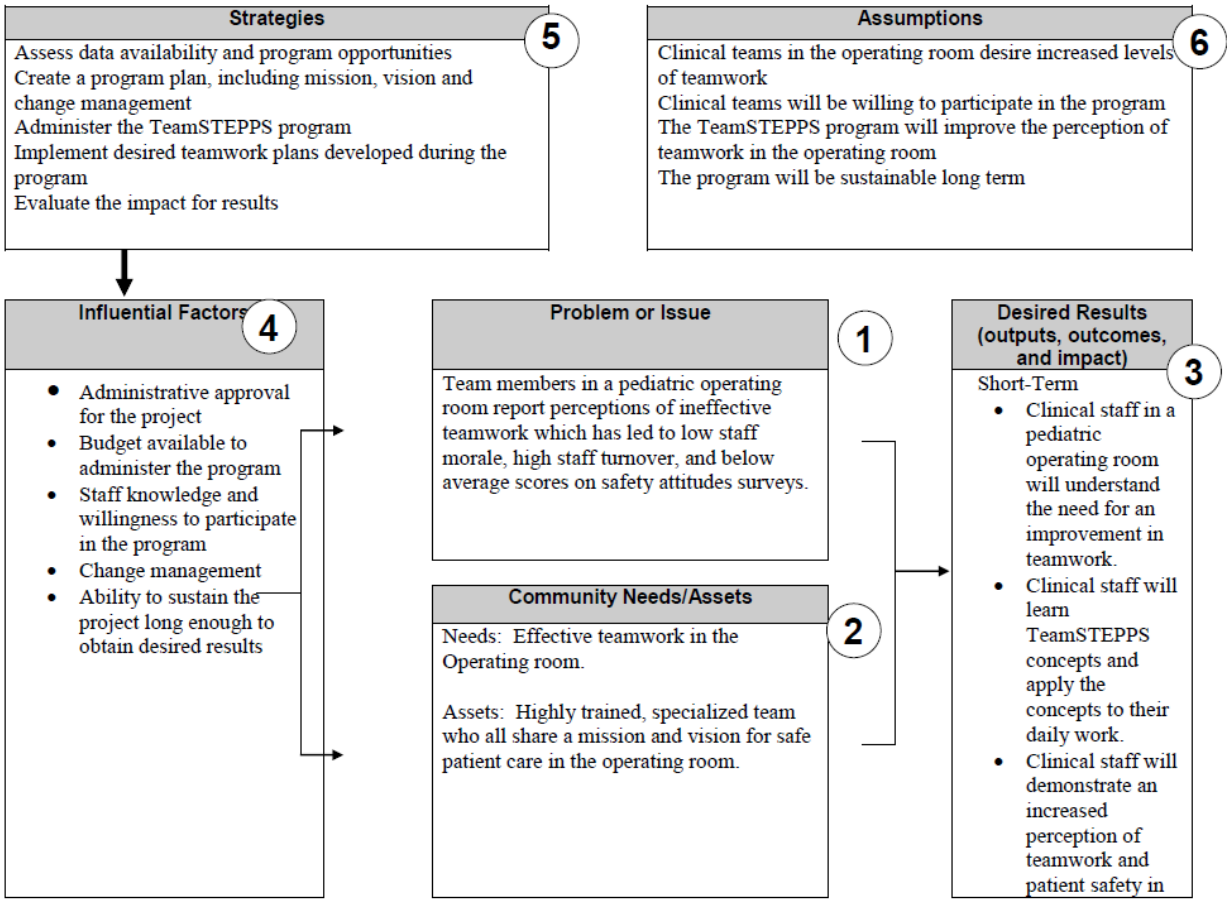
Appendix B

Logic Model

RESOURCES	ACTIVITIES	OUTPUTS	SHORT & LONG-TERM OUTCOMES	IMPACT
Access to Safety Attitudes data Access to TeamSTEPPS program and materials Budget money for program resources, including staff pay, materials, and basic office supplies to be used during the program Explore opportunities for training beyond face-to-face classroom education Staff time away from patient care for training (consider a Saturday retreat)	Create goals and vision for the program Obtain JHACH administrative approval for the project idea Develop a budget for the program including staff time and materials Obtain background information and data for safety attitudes assessment Obtain TeamSTEPPS program and materials Develop tool or data method for pre and post questionnaire Administer survey (if needed) Develop plan for TeamSTEPPS program, including leader recruitment Schedule TeamSTEPPS training sessions Implement teamwork ideas that arise from TeamSTEPPS program (huddles, checklists, leader rounding, etc.) Complete post survey data collection Share the results of the project	Approval from JHACH leadership obtained Project budget completed Data from safety attitudes assessment obtained If required, survey developed TeamSTEPPS program developed TeamSTEPPS program scheduled Greater than 80% clinical staff participation in surveys and education TeamSTEPPS program by eligible operating room clinical staff members completed	Short-Term Clinical staff in a pediatric operating room will understand the need for an improvement in teamwork. Clinical staff will learn TeamSTEPPS concepts and apply the concepts to their daily work. Clinical staff will demonstrate an increased perception of teamwork and patient safety in the operating room. Long Term: TeamSTEPPS principles will be the cultural norm in the operating room. Operating room team members will report greater levels of engagement and perceptions of safety as evidenced by increasing scores on safety and engagement surveys and decreased staff turnover.	Effective team communication evidenced by scores above national benchmarks on safety attitudes surveys Sustained patient and staff safety evidenced by decreased reportable safety events Sustained perception of effective teamwork evidenced by increased morale and decreased staff turnover

Appendix C

Conceptual Diagram



Evaluation Logic Model Guide, W.K. Kellogg Foundation, Page 57

Appendix D

Measurement Tool/Instrument

TeamSTEPPS Teamwork Perceptions Questionnaire

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

11. My supervisor/manager ensures 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**	**Agree**	**Neutral**	**Disagree**	**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**	**Agree**	**Neutral**	**Disagree**	**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**	**Agree**	**Neutral**	**Disagree**	**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.					

Teamwork Perceptions Questionnaire (T-TPQ), (2017). Agency for Healthcare Research and Quality, Rockville, MD.

https://www.ahrq.gov/teamstepps/instructor/reference/teampercept.html

Appendix E

Project Timeframe

DNP Project Planner-TeamSTEPPS	May 2019	June 2019	July 2019	Aug 2019	Sept 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	June 2020	July 2020	Aug 2020	Sept 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021
Project Planning																									
Identify a problem																									
Develop a PICO																									
Basic literature review																									
Project Development																									
Identify a population																									
Evaluate project potential at the org																									
Define outcomes																									
Devlop logic model																									
Continued literature review																									
Define the scope																									
Develop objectives																									
Define the process																									
Evaluate measurement tool																									
Develop mission/vision																									
Define and choose theories																									
Complete Regis project proposal																									
Define timeline																									
Complete project budget																									
Complete Citi																									
IRB approval																									
SWOT Analysis																									
Obtain Org approval																									
Finalize content design																									
Project Implementation																									
Complete Pre-TTPQ																									
Administer learning modules																									
Complete post-TTPQ																									
Gather efficiency data																									
Data Analysis																									
Analyze data																									
Report results																									
Project Finalization																									
Complete final paper																									
Project Defense																									

Appendix F

Project Budget

Item	Budget	Actual
Personnel		
Staff Training and work effort	0	0
Equipment		
None identified	0	0
Supplies and Materials		
Printing	250	0
Reference Materials	300	0
Facility Costs		
None identified	0	0
Educational Materials		
TeamSTEPPS Training Program	0	0
Misc		
Raffle prizes	500	200
Food	120	0
Total	1,170	200

Appendix G

IRB Approval Letter

REGIS UNIVERSITY

REGIS.EDU

Institutional Review Board

DATE:	September 2, 2020
TO:	Lisa Kerrick, DNP
FROM:	Regis University Human Subjects IRB
PROJECT TITLE:	[1646137-1] TeamSTEPPS in the Operating Room
SUBMISSION TYPE:	New Project
ACTION:	DETERMINATION OF NOT RESEARCH
DECISION DATE:	September 2, 2020

Thank you for your submission of New Project materials for this project. The Regis University Human Subjects IRB has determined this project does not meet the definition of human subject research under the purview of the IRB according to federal regulations.

The project may proceed as written.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact the Institutional Review Board at irb@regis.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Regis University Human Subjects IRB's records.

Appendix H

CITI Training Certificate

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Lisa Kerrick (ID: 8925144)
- **Institution Affiliation:** Regis University (ID: 745)
- **Institution Email:** lkerrick@regis.edu
- **Institution Unit:** Nursing

- **Curriculum Group:** Human Research
- **Course Learner Group:** Social Behavioral Research Investigators
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 35383149
- **Completion Date:** 12-Feb-2020
- **Expiration Date:** 11-Feb-2023
- **Minimum Passing:** 80
- **Reported Score*:** 91

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	12-Feb-2020	5/5 (100%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	12-Feb-2020	3/5 (60%)
Conflicts of Interest in Human Subjects Research (ID: 17464)	12-Feb-2020	5/5 (100%)
History and Ethical Principles - SBE (ID: 490)	12-Feb-2020	4/5 (80%)
The Federal Regulations - SBE (ID: 502)	12-Feb-2020	5/5 (100%)
Assessing Risk - SBE (ID: 503)	12-Feb-2020	5/5 (100%)
Informed Consent - SBE (ID: 504)	12-Feb-2020	4/5 (80%)
Privacy and Confidentiality - SBE (ID: 505)	12-Feb-2020	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	12-Feb-2020	5/5 (100%)
Cultural Competence in Research (ID: 15166)	12-Feb-2020	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	12-Feb-2020	4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?k14d5867c-d00a-4da9-a0e4-7d6dccc79d6e-35383149

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Lisa Kerrick (ID: 8925144)
- **Institution Affiliation:** Regis University (ID: 745)
- **Institution Email:** lkerrick@regis.edu
- **Institution Unit:** Nursing

- **Curriculum Group:** Human Research
- **Course Learner Group:** Social Behavioral Research Investigators
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 35383149
- **Report Date:** 12-Feb-2020
- **Current Score**:** 95

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Defining Research with Human Subjects - SBE (ID: 491)	12-Feb-2020	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	12-Feb-2020	5/5 (100%)
Assessing Risk - SBE (ID: 503)	12-Feb-2020	5/5 (100%)
Consent and Cultural Competence (ID: 17263)	12-Feb-2020	5/5 (100%)
Informed Consent - SBE (ID: 504)	12-Feb-2020	4/5 (80%)
Privacy and Confidentiality - SBE (ID: 505)	12-Feb-2020	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	12-Feb-2020	4/5 (80%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	12-Feb-2020	5/5 (100%)
History and Ethical Principles - SBE (ID: 490)	12-Feb-2020	4/5 (80%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	12-Feb-2020	5/5 (100%)
Cultural Competence in Research (ID: 15166)	12-Feb-2020	5/5 (100%)
Conflicts of Interest in Human Subjects Research (ID: 17464)	12-Feb-2020	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?k14d5867c-d00a-4da9-a0e4-7d6dccc79d6e-35383149

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Appendix I

Agency Letter of Support

JOHNS HOPKINS
MEDICINE
JOHNS HOPKINS
ALL CHILDREN'S HOSPITAL

Letter of Agreement

August 6, 2020

To Regis University Institutional Review Board (IRB):

I am familiar with Lisa Kerrick's quality improvement project entitled TeamSTEPPS in the Operating Room. I understand Johns Hopkins All Children's Hospital's involvement to include allowing employees to participate in the project, including surveys and education, providing archival data on surgical efficiency, and allow data collection to occur related to TeamSTEPPS T-TPQ assessment data.

I understand that this quality improvement project will be carried out following sound ethical principles and provides confidentiality of project data, as described in the proposal.

Therefore, as a representative of Johns Hopkins All Children's Hospital, I agree that Lisa Kerrick's quality improvement project may be conducted at our agency/institution.

Sincerely,

Melissa Macogay

Melissa Macogay, MBA,BSN,RN,CCRN-K,NE-BC
Vice President, Chief Nursing Officer
Johns Hopkins All Children's Hospital
Nursing Administration
600 5th Street South
St. Petersburg, Florida 33701
P 727-767-7013
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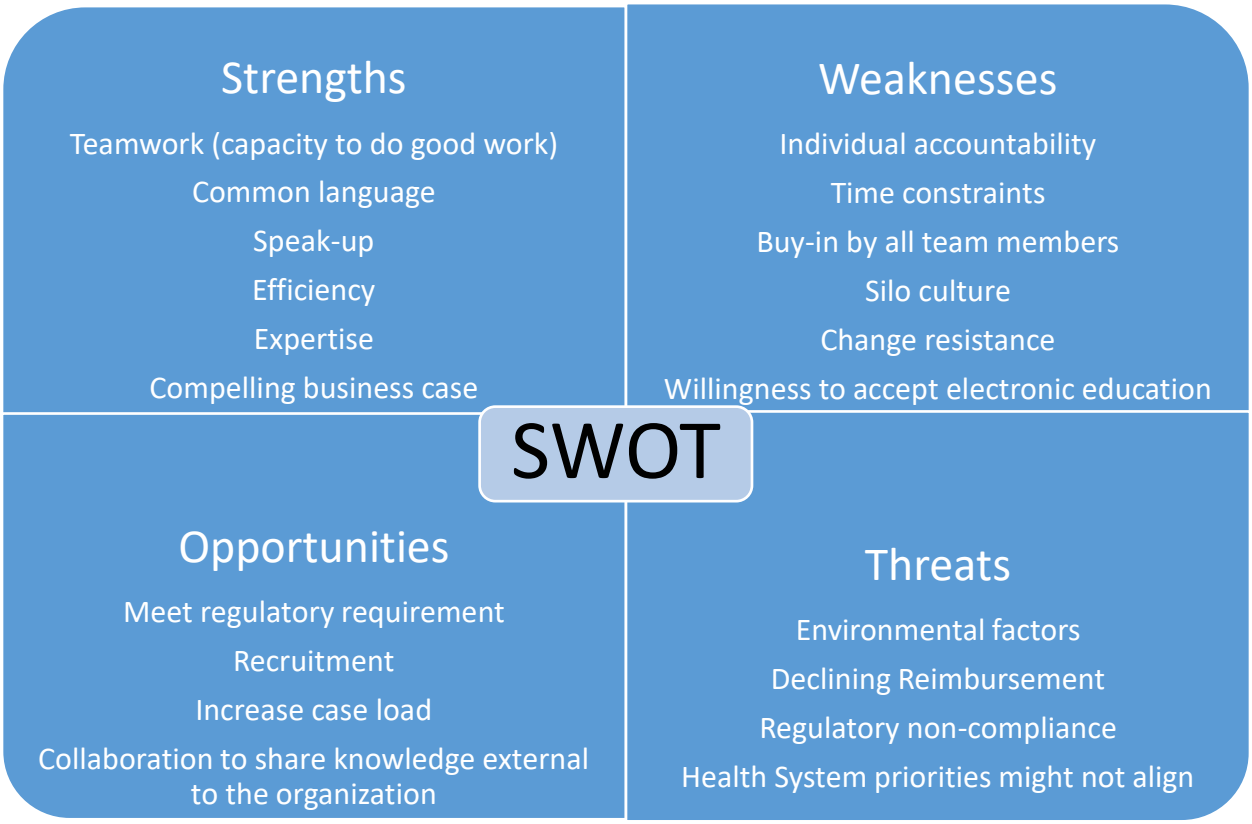
www.HopkinsAllChildrens.org

Appendix J

SWOT Diagram



Appendix K

Context data base and dictionary

Demographics:Not collected								
Dependent Variables								
Names	Descriptions	Data Format	Level of Data	Data Source	Response Values	DOMAIN CODE	Location of Data Repository	Notes
Objective #1								
AGG PRE	T-TPQ PRE	Numerical	Interval	Survey	1-5		Survey data file	Descriptive statistics; paired sample t-test; correlations
AGG POST	T-TPQ POST	Numerical	Interval	Survey	1-5		Survey data file	Descriptive statistics; paired sample t-test; correlations
DOMAIN	Team Structure	Numerical	Interval	Survey		10	Survey data file	Descriptive statistics; paired sample t-test; correlations
DOMAIN	Leadership	Numerical	Interval	Survey		11	Survey data file	Descriptive statistics; paired sample t-test; correlations
DOMAIN	Situation Monitoring	Numerical	Interval	Survey		12	Survey data file	Descriptive statistics; paired sample t-test; correlations
DOMAIN	Mutual Support	Numerical	Interval	Survey		13	Survey data file	Descriptive statistics; paired sample t-test; correlations
DOMAIN	Communication	Numerical	Interval	Survey		14	Survey data file	Descriptive statistics; paired sample t-test; correlations
Objective #2								
First Case On-time	FC	Numerical	Nominal	EMR Data	In before 0736	Time in room	EMR data file	Calculate Mean Difference
Turnover time	TO	Numerical	Nominal	EMR Data	Wheels out-wheels in	Minutes	EMR data file	Calculate Mean Difference
Case Length	CL	Numerical	Nominal	EMR Data	Incision to close	Minutes	EMR data file	Calculate Mean Difference

Data Dictionary

DOMAIN 10: T-TPQ Questions 1-7

DOMAIN 11: T-TPQ Questions 8-14

DOMAIN 12: T-TPQ Questions 15-21

DOMAIN 13: T-TPQ Questions 22-28

DOMAIN 14: T-TPQ Questions 29-35

First case on-time starts: Defined as wheels in the OR at or before 0735. Case data will be represented as mean start on time.

Turnover time: Defined as the period of time between OR cases from wheels out to wheels in when the surgeon/service is the same. Data will be represented as a mean in minutes.

OR case length: Defined as operating time from incision open to incision close. Data will be represented as mean of minutes per OR case.