Improving Communication and Teamwork in the Operating Room

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Saint Peter's University

In partial fulfillment of the requirements

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By

Louise Kertesz

Approved: ________________________________, Chairperson

Approval Acknowledged______________________________, DNP Program Director

Approval Acknowledged______________________________, Dean School of Nursing

Date__________________________________
DEDICATION

To my family and friends
ACKNOWLEDGEMENTS

To my mentors at Saint Peter’s University, in particular Dr. Sharyn Tondel, Dr. Kathleen Kane and Dr. Irene McEachen for their professional advice and guidance and their constant friendship. A special thank you to Dean Ann Tritak for registering me for this wonderful DNP program quicker than I could say, “I’ll think about it.”
Abstract

Communication and teamwork are essential components of safe patient care. This evidence-based practice project evaluated the communication and teamwork the operating room staff engaged in during 30 surgical procedures (ophthalmology, plastics, or otorhinolaryngology). Findings provided insight into whether or not the communication and teamwork education that occurred in August, 2012 for registered nurses and surgical technologists was sustained and encultured. This descriptive project utilized a convenience sample consisting of approximately fifty staff members who work in the operating room of a teaching hospital, including surgeons, anesthesiologists, residents, certified registered nurse anesthetists (CRNAs), registered nurses, and surgical technicians. To evaluate the quality of communication the Communication and Teamwork Skills (CATS) Assessment Tool was used. From 2012 to 2014, improvement in CATS scores was marked: for example, the score for the communication category went from 91.60% to 99.5% and that for the coordination category from 93.50% to 97.6%. Study findings suggest that education and quality monitoring with teaching moments improve team-based outcomes and, ultimately, increase patient safety. All operative team members should not only be competent in their individual roles but should also work together in a structure exhibiting the expertise of team members functioning synergistically as team members. A nursing competency with a post-test component on communication and teamwork will be developed.

Key words: communication, teamwork, implementation, CATS Assessment Tool, quality monitoring, surgery
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CHAPTER I- INTRODUCTION AND STATEMENT OF THE EBP PROBLEM

Introduction

The perioperative environment is fast paced and production driven --- pressing time constraints and highly complex procedures foster medical errors and these medical errors contribute to patient harm and death (Penprase, Elstun, Ferguson, Schaper, & Tiller, 2010). It is well established that patient safety is optimized when caregivers function as an effective team. According to Frankel, Gardner, Maynard & Kelly, 2007, effective teamwork and communication skills are cornerstones of safe, reliable, and high-quality health care. Once embedded into the daily routine, efficient teamwork and efficient communication skills enhance staff and patient satisfaction while at the same time facilitating optimal clinical outcomes (Frankel, et al., 2007). When these behaviors are not vigorously practiced, failures in teamwork and communication may significantly contribute to so-called sentinel events, which include wrong-site and wrong-patient procedures (The Joint Commission, 2004). Guimond & Sole (2009) place emphasis on the point of view that patient care is enhanced when there is quality teamwork among perioperative professionals.

Many studies have analyzed breakdowns in communication as the leading root cause of wrong-site surgeries and other sentinel events and have shown that communication failures all too often lead to errors that cause patient harm. Indeed, Makary, Sexton, Freischlag, Holzmueller, Millman, Rowen & Pronovost, (2006) identified teamwork as an integral component of a culture of good communication in the operating room; accordingly, teamwork should be viewed as an important surrogate of patient safety. The Institute of Medicine published To Err is Human: Building a Safer Health System in 1999 and shocked the nation; the report estimated that as many as 98,000 deaths occur in the United States annually as a result of
medical errors. Despite this finding and despite the continued attention medical errors receive from the public, insurance companies, administrators, and health care providers, medical errors continue to occur at alarming rates (Penprase et al., 2010). A six-year prospective study by Stahel, Sabel, Victoroff, Varnell, Lembitz, Boyle, Clark Smith & Mahler (2010) affirmed that errors in communication led to wrong-patient procedures 100% of the time while lack of performing the surgical time out properly led to wrong site surgery 72% of the time.

The Joint Commission’s (TJC) National Patient Safety Goals to prevent wrong-site, wrong-procedure and wrong-patient surgery is supported by requirements for the use of a universal protocol, a preoperative verification process and, where applicable, patient participation during surgical site marking (ECRI, 2006). All of these requirements involve active communication among caregivers and some of these requirements involve active communication between caregivers and the patient. For this reason, TJC mandates that a surgical time out occur immediately prior to the procedure, that it involve the entire operative team, and that it validate each of the following: patient identity, side and site of the operation, and the consented procedure to be performed. In addition to these TJC requirements, in New York State there are five additional items that must be confirmed during the surgical time out, and these include radiological confirmation of surgical site, if applicable; the antibiotic(s) to be administered; patient allergies; and implants that are needed for the surgical case, if applicable; while, in addition, the perioperative team must reach a verbal agreement that all of the time out elements are met. This time-out process checklist must be noted or documented prior to the initiation of surgical incision(s).

The value of teamwork and communication has been studied for years in several high-risk industries, such as aviation. Numerous findings suggest that current weaknesses in operating room communication may be the result of a lack of standardization and team integration. The solution may be a standardized check-list for use in the operating room. A
check-list system provides structure governing how critical communications take place and ensures both that no breakdown in communication occurs and that decisions are made in a context where cross checking data can occur. The cockpit and operating room are both high-risk learning environments, and to some degree these two environments are interchangeable. The adaptation of an operating room specific check-list may ensure effective communication and promotes safer outcomes. However, additional studies of this subject are needed. In response to literature that suggest that poor teamwork and communication adversely affects patient outcomes, healthcare organizations have tried to achieve an improved culture of safety by providing team training of one sort or another, with the goal of this team training being to minimize or eliminate errors and threats to patient safety. However, the literature is inconclusive as to the foremost type of training. While many institutions similar to the hospital have implemented team training; inherent issues within each organizational structure must first be clearly defined, as only then will it be appropriate to investigate how best to maintain the sustainability of team training within each type of organizational structure.

**Statement of the Problem**

The reporting of sentinel events to The Joint Commission is voluntary and may only represent a small percentage of actual events. Currently, 26 states are considered adverse-event-reporting states. New York and New Jersey are states that voluntarily report to TJC. In hospital settings, 4,844 sentinel events were reviewed by TJC in 2004 through June, 2013 (TJC, 2013). Interestingly, there were only 49 sentinel events reviewed by TJC in office-based surgery for that same time frame (TJC, 2013).

From 2011 through June, 2013, the sentinel event categories most frequently reviewed by TJC were unintended retention of a foreign body and wrong-patient, wrong-site, wrong-procedure (TJC, 2013). Both of these categories relate directly to the operating room environment.
Every year, the Joint Commission identifies the root causes of the sentinel events reviewed that year. TJC has identified communication as a leading root cause of sentinel events. TJC defines the communication root cause to include oral, written, and electronic communication among staff, with/among physicians, with administration, and with patient or family. During the time period of 2004 through third quarter 2011, communication ranked third overall as a root cause of sentinel events. From January to June 2013 (N=446), communication was the root cause of 292 sentinel events reviewed by TJC.

From 2004 through June 2013, there were 829 events reviewed by the TJC in which there had been unintended retention of a foreign object and where root cause information was available. In those events, leadership (N=654), human factors (N=546) and communication (N=529) comprise the majority of root causes, according to the TJC. (TJC, 2013). The TJC has published root cause information for wrong-patient, wrong-site and wrong-procedure events from 2004 through June 2013 for 988 events. In this category, leadership (N=812) and communication (N=674) were the root causes, and these two predominated both for major and minor procedures (TJC, 2013).
Statement of the Problem in PICOT Format

Does the use of an observational measure lead to an effective educational/competency program to improve communication in the operating room and does such use of an observational measure also promote patient safety?

P=Population Operating Room Team (all members who care for patients in the operating room)

I=Intervention Educational reinforcement of communication and teamwork skills

C=Comparison Prior education limited to nurses and surgical technicians in August, 2012

O=Outcome Improved Communication and Teamwork Skills (CATS) assessment scores post training

T=Time Eight weeks
CHAPTER II- CRITICAL APPRAISAL OF THE EVIDENCE

Purpose

The purpose of this evidence-based project is to identify the effectiveness of educating the operating room staff in communication and teamwork. This evidence-based project seeks to determine whether such education promotes patient safety in the operating room at an urban teaching hospital. In addition, this project looks at whether the use of an operating-room-specific check list contributes to ensuring effective communication among the staff and whether the time out process contributes positively to patient safety.

It is the goal of this evidence-based project to evaluate the present quality of communication by the operating room team during surgical procedures based on the identified needs of the Communication and Teamwork Skills (CATS) Assessment Tool score. The results of this study provided information on areas of communication and behavior that numerous previous studies have shown to need improvement. Thus, it is hoped that the results of this evidence-based project will serve to provide direction for future education programs and will serve to aid in the development of a nursing competency focused upon promoting optimal patient outcomes.

The objective of the approach being investigated in this evidence-based project is to improve teamwork and communication amongst the operating room staff, as measured by the CATS scores. Positive teamwork and effective communication will ultimately render improvement in patient safety and outcomes.

Literature Review, Evaluation and Syntheses

There are many studies that have analyzed communication breakdowns in healthcare settings. The overwhelming majority of evidence supports the need for improved communication in the operating room. Some researchers have gone even further and have
analyzed the linkages between communication, team performance, and patient outcomes (Gillespie et al., 2010).

Carney, West, Neily, Mills, & Bagian (2010) investigated the disparity in the perceptions of communication between surgeons and perioperative nurses. Their study made use of an operating room version of the Safety Attitudes Questionnaire, a survey developed and validated over several years in different healthcare settings (Carney et al., 2010). The Safety Attitudes Questionnaire measures attitudes in six domains: teamwork climate, safety climate, job satisfaction, perceptions of management, stress recognition, and working conditions. This questionnaire also examined the quality of communication and collaboration among the members of the perioperative team. Carney et al. (2010) administered this questionnaire to surgeons and perioperative nurses (N = 2,461) in 34 hospitals. A total of 2,204 surveys were returned. Perioperative nurses had the highest group response rate. According to Carney et al. (2010), perioperative nurses rated the quality of teamwork they engaged in with other nurses as being higher than the quality of teamwork they engaged in with surgeons, but surgeons rated teamwork as being high both with other surgeons and with nurses – a gap possibly, according to Carney et al. (2010), attributable to differences in perception related to educational preparation and definitions of teamwork. This perceptual difference can result in [and deflect] poor communication because the surgeon or nurse may assume that the perioperative team is in agreement or understands the communication when in fact, critical information is being lost. The authors concluded that the Safety Attitudes Questionnaire was a helpful tool in identifying suboptimal levels of communication, levels that members of the perioperative team might not have otherwise recognized.

Lingard et al. (2004) examined the events leading up to communication failures, with the goal of developing a team checklist that would lead to improved communications in the operating room. This study involved direct observation of communication in the operating room,
in contrast to most other studies as most studies involve no more than questionnaires or a literature review. Three researchers conducted 90 hours of observation of 48 surgeries involving either general or vascular specialties. They observed a convenience sample of 94 perioperative team members, including surgeons, anesthesiologists, nurses, and clerks. The three researchers, who had 91 years combined operating room experience along with field method experience, used ethnographic field-note methods to record each communication event. Lingard et al. (2004) contrasted these field notes with regard to content, participants, purpose, and contextual features. They observed 421 communication events and, utilizing the above criteria of content, participants, purpose and contextual features, 129 of these were considered communication failures. The authors concluded that the use of a structured checklist communication system in the operating room would likely help reduce the number of communication failures.

Conrardy, Brenek, & Myers (2010) investigated the current state of knowledge regarding the implementation of the Universal Protocol and its relationship to the occurrence of wrong-site, wrong-procedure, and wrong-person surgery. This descriptive research design examined a total of 34 documents from January 1, 1999 through October 31, 2008. The researchers performed a systematic search of the National Library of Medicine database to find specific articles that discussed the implementation process of the Universal Protocol. A document review template was then created. The authors then pilot tested this document review template to reflect the issues associated with the implementation of the Universal Protocol and also to track the documents in their review of the literature. The authors identified four categories of concern as being alarming issues, and these categories were surgeon or staff member behavior, data clarification, Universal Protocol process variations, and the efficacy of the Universal Protocol. Like Carney et al. (2010), Conrardy et al. (2010) found that 14 of 34 documents in the literature review cited communication as a chief concern in the operating room, a finding that substantiates
the viewpoint that communication continues to be a concern in relation to patient safety during surgical procedures.

Using on a comprehensive, prospective insurance database of 27,370 physician-self-reported adverse occurrences in Colorado from January 1, 2002 through June 1, 2008, Stahel et al. (2010) analyzed the frequency, root causes, and outcomes of wrong-site and wrong-patient procedures. The study’s final analysis included a high frequency of never events, these totaling 107 wrong-site and 25 wrong-patient cases. A significant difference was seen in the time-out not having been performed properly, with this lack being a root cause for wrong-site surgery. In addition, the root cause analysis revealed a greater than 56% incidence of diagnosis errors that lead to a wrong-patient procedure. For example, in one case an outcome involving significant harm occurred in a wrong-patient procedure because two patients had identical names and this led to one of them having the wrong surgery; an incident that could have been avoided had a formal preoperative patient identity check been implemented, as recommended in the Universal Protocol. Further, errors in communication were identified as contributing root causes in 100% of all wrong-patient procedure cases (Stahel et al., 2010). The findings of this study are congruent with those of both Lingard et al. (2004) and Conrardy et al. (2010), in that faulty communication and lack of strict adherence to the Universal Protocol has been found to sometimes lead to adverse patient outcomes.

Weaver, Rosen, DiazGranados, Lazzara, Lyons, Salas, Knych, McKeever, Adler, Barker, & King (2010) described the results of an evaluation study conducted as part of a quality improvement project aimed at optimizing teamwork behavior among operating room teams within a large community-hospital health system. The evaluation was a mixed-model design with one perioperative team receiving TeamSTEPPS training while the control perioperative team did not have any specific training. Each of the perioperative teams was comprised of three surgeons and their team-nurses, surgical technicians, anesthesiologists, certified registered nurse
anesthetists, and physician assistants. To minimize treatment diffusion, the groups were located at separate campuses. Weaver et al. (2010) utilized TeamSTEPPS training to facilitate communication and teamwork by optimizing information exchange, situational monitoring, leadership, team structure, and mutual support. The U.S. Department of Defense, Agency for Healthcare Research and Quality, and other leading members of the scientific community have drawn on the science of TeamSTEPPS training by turning groups of clinical experts into expert teams. The TeamSTEPPS training consisted of a four-hour didactic session, including interactive role-playing activities. Weaver et al. concluded that the results of this study provide empirical support for the effectiveness of the TeamSTEPPS program in all four levels of evaluation, these being: reactions, learning, behavior in the operating room, and proxy organizational result. The trainees reported that the training was useful, achieved the learning benchmarks that had been specified previously, increased the quality of teamwork, and demonstrated some positive changes in patient safety culture. The hospital system in which the study was conducted has since integrated elements of TeamSTEPPS into the orientation activities of all hospital employees, including non-clinical staff. This study differed from the aforementioned studies in that the researchers did not initiate team training in response to communication or team behavior deficiencies. Rather, a quality improvement project was the driving impetus for this study - based on the premise that medical care is a team effort, and that this has become especially true as patient care has become more complex.

Nurses who are part of the perioperative team should take the lead in evaluating communication and teamwork in the operating room –for numerous reasons including the fact that surgeons themselves must be so focused on technical and physiological aspects of the procedure that they are often unable to give much attention to the important task of monitoring the quality of communication. The human factor may be a challenge in the operating room; but when strong congruent operative teams are in place and mutual goals are agreed upon,
communication among members of the team can actually become one of its strengths. When optimal teamwork is in place, patients benefit as they are more likely to receive safe, quality care. It is important that each member of the team be a clinical expert in his/her own practice domain, but it is perhaps even more vital that all members of the team function as an expert team that provides safe patient care – with a synergistic interaction among members of the team contributing to the provision of such care.

Theoretical Framework

This project is a quality improvement project that focuses on systems, processes and clinical outcomes. Quality Improvement efforts are not designed to develop nursing science or standards, but rather, to contribute to understanding best practices or the processes of care in which nurses are actively involved (U.S. Department of Health & Human Services, 2012).

Quality improvement is not intended to generate scientific or research driven knowledge, but serves as a tool to improve the processes and outcomes within an organization or clinical setting. The clinical microsystem for this project is the operating room setting and the perioperative team must continuously improve and maintain quality and patient safety while amalgamating analysis and change into their efforts to redesign care within the operating room milieu – it is obvious that the team must do this, obvious because at present errors are known to occur.

This quality improvement initiative will examine communication and teamwork as clinical processes and utilize the Communication and Teamwork Skills Assessment (CATS) tool to help evaluate interdisciplinary perioperative clinical performance during surgery. Data will be collected and analyzed to help understand both the processes and certain related outcomes. The findings of this evidence-based project will help contribute to achieving and maintaining continuous improvement in this setting as a way to promote patient safety. In this, patient safety will be addressed through ongoing monitoring and through educational activities.
The conceptual model chosen for this study is the Iowa Model (Titler, M.G., Kleiber, C., Steelman, V., Rakel, B.A., Budreau, G., Everett, L.Q. & Goode, T., 2001). This model was also chosen because it is used at the hospital where the evidence-based project took place. The Iowa Model (Appendix B) assists nurses in the application of evidence-based practice; the model considers the impact on evidence based practice of the specific characteristics of the organization in which the procedure is performed. This model addresses the key components of evidence-based practice, as these key components are defined by Titler et al. (2001): develop a PICO question, search and evaluate the evidence, utilize the evidence, and evaluate the practice change.

The Iowa Model uses key triggers that can be either problem focused or knowledge focused and uses these triggers to lead the clinician to best utilize the components of this model. Initially, the clinician generates a question either from a problem or as a result of becoming aware of new knowledge. The second step in this model is to determine if there is relevance to organizational priorities. If the question posed is relevant, then the next step in the process is to determine if there is sufficient evidence to answer the question. Once the evidence has been examined and found to be sufficient, a pilot study involving the relevant practice change is performed. If insufficient evidence exists, then the evidence should be reevaluated and a new model, supported by the actual evidence that has been obtained, should be found. Thus, there are two outcomes that may result from the application of this model: One outcome would be to institute a practice change based on available research, if after sufficient time has elapsed so that an evaluation of the trial can be completed and this evaluation demonstrates that the practice change being researched is appropriate. The second outcome would be to generate research. With either end point, there is dissemination of the results and such dissemination has the consequence of moving forward evidence-based practice. (Ciliska, D., DiCenso, A., Melnyk, B.M., & Stetler, C., 2005).
CHAPTER III- METHODOLOGY AND IMPLEMENTATION

Introduction

During surgical procedures, patient care is a team activity. Teamwork involves both technical skills, such as management of surgical equipment, and non-technical skills, which may include communication, decision making, and shared situational awareness (Healey, Undre & Vincent, 2006). Failed communication has been identified as the root cause of nearly 70% of sentinel events (Gillepsie & Chaboyer, 2010). Surgical teams have focused on technical skills with little focus on nontechnical skills. Situational awareness is a nontechnical skill that is increasingly considered to be fundamental to patient outcomes. (Flin & Maran, 2004). Shared situational awareness encompasses teamwork practices in relation to communication, decision making, and actions aimed at reducing the incidence of adverse events and, thus, promoting patient safety (Gillespie, Chaboyer & Murray, 2010).

In reviewing the National Patient Safety Goals set forth by The Joint Commission (2011), nursing leadership at the urban teaching hospital that was the site of the current evidence-based project decided to be proactive in promoting patient safety and the pathway selected to achieve this goal involved examining communication and teamwork in the operating room. It was decided that this examination would be conducted before any adverse outcomes arose. In order to achieve best practice, the perioperative nursing leadership initiated an observational project in 2012, a project that included a systematic process of making a record of communication and teamwork behavior patterns during surgery in the operating room. Using live-time observation during surgery, communication and teamwork behaviors were recorded that otherwise would not easily become evident in a retrospective data review.

Also of significant importance to this project is the 2014 National Patient Safety Goal:Introduction to the Universal Protocol for Preventing Wrong Site, Wrong Procedure. The Universal Protocol applies to all surgical and non-surgical invasive procedures. Evidence
indicates that procedures that place the patient at the most risk include those that involve general anesthesia or deep sedation, although other procedures may also affect patient safety. Hospitals can enhance safety by correctly identifying the patient, the appropriate procedure, and the correct site of the procedure.

**Population**

This descriptive project utilized a convenience sample consisting of approximately fifty staff members who work in the operating room of a teaching hospital, including surgeons, anesthesiologists, residents, certified registered nurse anesthetists (CRNAs), registered nurses, and surgical technicians. Team member consent was obtained from all involved (Appendix C).

The principal investigator for each surgical procedure described the project to the patient and obtained consent (Appendix D) from that patient. The purpose of the project and its benefits were stated. All data gathered was kept confidential and the confidentiality of each participant was also be protected, as no patient identifiers were used.

**Setting**

In this evidence-based project, the investigator observed and evaluated teamwork skills and communication interactions in thirty (30) distinct surgical procedures. This evidence-based project was conducted at an urban teaching hospital in New York City, NY. Real-time surgery was observed in one of nine operating rooms with evaluation of the interactions and communication of the surgical team members.

**Institutional Review Boards**

Prior to initiating this evidence-based project, the Institutional Review Boards for both Saint Peter’s University (Appendix E) and New York Eyes and Ears Infirmary (Appendix F) approved this protocol via expedited review process. The principal investigator also completed the National Institutes of Health (NIH) Office of Extramural Research certification training course “Protecting Human Research Participants” (Appendix G).
Methodology

The investigator observed thirty (30) real-time surgical procedures performed in the operating room at the hospital while evaluating interactions and communication among the surgical team members. This helped assess the effectiveness of the surgical team’s ability to work cohesively in attempting to provide optimal patient care. The investigator observed communication and team behaviors using the Communication and Teamwork Skills Assessment Instrument (CATS) (Appendix H). Feedback from the series of observation(s) assisted the investigator in identifying and evaluating behaviors aimed at improving team skills; furthermore, this approach provided data on whether or not the education on communication provided to registered nurses and surgical technologists in August, 2012 was sustained.

The support for this evidence-based project includes the Senior Vice President for Clinical Operations/Chief Nursing Officer, the Vice-President of Perioperative Services and the Perioperative Nursing Care Coordinator of the urban specialty, teaching hospital in which the evidence-based project was conducted. These supportive hospital administrators recognized that by providing education and creating a nursing competency, the perioperative team will be better prepared for more successful patient safety outcomes while fostering a more dynamic communication process which promotes a healthy work environment.

Implementation

Following an informational staff meeting, consent to participate in this project was obtained, from all perioperative team members (Appendix C). Perioperative staff (physicians, registered nurses, surgical technologists, certified registered nurse anesthetists and residents) were given adequate time to ask questions about the project and the principal investigator of the current project was available via email and telephone to answer any questions of the staff should they arise. Consent was voluntary for all staff and all were given the right to refuse or to withdraw at any time during the project without compromising their employment status, as was
explained. The purpose of this project and likely benefits was detailed. Operating room team members were asked to sign consent forms, and these were valid for the entire duration of the project. Operating team members were identified by their role title. The principal investigator for each surgical procedure described the study to the patient and obtained consent from that patient. The purpose of the project and its benefits were stated. All data gathered was kept confidential and the confidentiality of each participant was also protected, as no patient identifiers were used.

The observations of real-time surgeries as well as the accompanying evaluations of the interactions and communication of surgical team members took place in the operating room. The goal was to assess the effectiveness of the surgical team’s ability to work cohesively in providing optimal patient care. The principal investigator observed team behaviors using the Communication and Teamwork Skills Assessment Instrument (CATS). CAT scores provided information that helped determine the type of competency that will assist the OR members in improving their teamwork and communication skills. The overriding purpose of this project is to advance patient safety in the operating room by promoting optimum communication and teamwork among perioperative team members.

The consent for the operating room team member was obtained once for the duration of the project. An operative team consent was obtained for each surgeon, anesthesiologist, CRNA, circulating registered nurse, OR technician, and/or resident who volunteered to be part of this observational/educational project. A patient consent was obtained prior to surgery and explained by the principal investigator. The key elements of the informed consent were explained to the subjects and included the following:

1. Background information/Purpose of project
2. Explanation of procedures to be followed
3. Description of risks/discomfort & benefits
4. Voluntary nature of the study
5. Compensation
6. Confidentiality/Anonymity
All participants were informed as to their rights as volunteers in this project. The right to refuse or withdraw at any time during the project, without comprising the participant’s employment status was explained. Patients who refused to be observed during surgery did not have their surgical care compromised. Consent was obtained from each adult patient and surgical team member who is an employee of the hospital. The purpose of this project and benefits were stated. All data gathered was kept confidential and no patient identifiers were used. The operative team was identified by their role title. Confidentiality of each participant’s data was protected. All consents obtained (operative team members and patients) were kept in a locked cabinet in the locked office of the perioperative nurse coordinator.

Project data was coded using a unique identification number, without using any personal identifiers as coding mechanisms, and stored in a single password protected computer. Data was stored in a single password protected computer.

Surgical procedures were observed by the principal investigator using the Communication and Teamwork Skills Assessment Tool (CATS). The CATS Assessment was developed through rapid-cycle improvement and piloted through observation of videotaped simulated clinical scenarios, real-time surgical procedures, and multidisciplinary rounds. The CATS Tool uses specific behavior markers, these being grouped into four categories—coordination, cooperation, situational awareness, and communication.

Each category contains a glossary of terms that are used to observe specific interactions during a particular time of the procedure. The scoring system is designed to allow the observer to mark each time-specific behavior and communication and to grade their quality. Three columns on the assessment tool provide the following: “Observed and Good”, “Variation in Quality” (meaning incomplete or of variable quality), and “Expected but not Observed.”
Observers score behaviors on the degree to which the behavior meets the definition in the glossary. Scoring is based on the total number of observations and the quality of the observed performance. The CATS has been used to assess actual clinical performance of surgical teams in practice.

For each procedure, CATS administration and assessment took approximately two hours (surgical case dependent) over the course of two months to complete. The training curriculum for the principal investigator included video-assisted and case-scenario presentations based on the CATS Assessment Instrument. This training took place in the spring of 2011, in the presence of two other registered nurses who were involved in the initial observational project. Inter-rater reliability was established by having each of these three registered nurses observe and assign a score to three surgeries. The registered nurse observers then compared their scores and debriefed afterwards while testing the scoring methodology. The nurse observers and the project leader met on five separate occasions during the spring of 2011.
CHAPTER IV- RESULTS

Results

The 30 surgeries were observed across three specialties- ophthalmology, plastics, and otorhinolaryngology; all 30 of the procedures (100%) were planned (ie, elective). The mean length of surgery was 57.4 minutes.

There were 14 attending surgeons, 5 surgical residents, 1 physician assistant, 10 certified registered nurse anesthetists (CRNAs), 1 anesthesiologist, 27 registered nurses, and 21 surgical technicians who participated in the 30 surgical procedures. Of the total of 48 registered nurses and surgical technicians, 25 of the registered nurses and 14 of the surgical technicians note English as their second language. Of the registered nurses, 15 have national certification in the operating room (CNOR) and all have their bachelor of nursing degree. Only two surgical technicians are nationally certified, as this is neither a requirement nor financially compensated (which may deter some people from obtaining such certification).

Preoperative briefings (ie, time outs) involving a surgeon, anesthesia provider (anesthesiologist or certified registered nurse anesthetist), registered nurse, and a scrub person were observed in all 30 surgeries. A surgical resident or physician assistant may have also been present for the preoperative briefing (ie, time out). Two out of the 30 time outs were observed but scored as being ‘observed, inadequate,’ whether because of interruptions (talking) or because of a missed element (6.6%). There were 12 additional preoperative briefings in which relevant information was shared prior to surgery. The surgeon spoke aloud to the perioperative team (anesthesia provider, registered nurse, scrub person and/or resident and physician assistant) and described the next steps for the procedure and/or care of the patient. These additional 12 preoperative briefings were all scored as being ‘observed, adequate.’

The cross monitoring by team members, reflecting awareness of each other’s actions and the resulting activity of giving voice to concerns, was scored as being 99.1%. In relation to
cross monitoring, there was an incident during which the foot pedal for the electrocautery unit was required but it had not been placed within reach of the surgeon and so it was not available when needed. This element was scored as being ‘observed, inadequate’; the situation was quickly remedied but it should have been taken care of earlier since the surgeon requested the foot pedal prior to the start of surgery. Receptive to assertion and ideas was scored at being 99.3%. One incident was scored as being ‘observed, but inadequate’ – what happened was that the registered nurse announced that she was leaving the room with a frozen section specimen but there was no acknowledgment from the surgeon or other operative team members that they had heard what she said.

Overall, the category of communication had the most assigned points (998) during the observation of the surgeries, the total score being 99.5%. Closed loop communication achieved a total of 99.7% and the category of SBAR achieved a total of 100%. Using names of team members scored the lowest, at 96.5%; while verbal updates finished at 99.1%.

Behaviors during crisis situations were relevant only to one of the otorhinolaryngology surgeries: A patient received a wrong antibiotic pre-incision. Once discovered by the surgeon intraoperatively, the situation was de-escalated when the anesthesiologist discussed appropriate precautionary care to prevent an adverse event. The patient’s vital signs were stable and it was decided that these vital signs would be closely monitored intra- and post-operatively by the anesthesia team. There was discussion of the possibility of administering an antihistamine, but the anesthesiologist decided to take a cautionary wait and see approach instead. The entire situation was handled in a professional manner and the patient had no adverse outcome. The surgery continued and was completed without further incident.
<table>
<thead>
<tr>
<th>2014 Results Category</th>
<th>Behavior</th>
<th>Observed, Adequate</th>
<th>Observed, Inadequate</th>
<th>Expected but not observed</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>42/43</td>
<td>97.6%</td>
</tr>
<tr>
<td></td>
<td>Briefing- Verbalize plan; Time Out</td>
<td>40</td>
<td>2/1</td>
<td>41/42</td>
<td>97.6%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Debriefing</td>
<td>1</td>
<td></td>
<td>1/1</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Awareness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>81/81</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Visually scan environment</td>
<td>44</td>
<td></td>
<td>44/44</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Verbalize adjustments in plan as changes occur</td>
<td>37</td>
<td></td>
<td>37/37</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Cooperation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>173/174</td>
<td>99.4%</td>
</tr>
<tr>
<td></td>
<td>Request external resources, ask for help as needed</td>
<td>26</td>
<td></td>
<td>26/26</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cross monitoring</td>
<td>56</td>
<td>1/0.5</td>
<td>56.5/57</td>
<td>99.1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Verbal assertion</td>
<td>12</td>
<td></td>
<td>12/12</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Receptive to assertion and ideas</td>
<td>78</td>
<td>1/0.5</td>
<td>78.5/79</td>
<td>99.3%</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>994/998</td>
<td>99.5%</td>
</tr>
<tr>
<td></td>
<td>Closed loop</td>
<td>421</td>
<td>2/1</td>
<td>422/423</td>
<td>99.7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SBAR</td>
<td>22</td>
<td></td>
<td>22/22</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Verbal updates</td>
<td>173</td>
<td>3/1.5</td>
<td>174.5/176</td>
<td>99.1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use names of team members</td>
<td>41</td>
<td>3/1.5</td>
<td>42.5/44</td>
<td>96.5%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communicate with patient/family</td>
<td>122</td>
<td></td>
<td>122/122</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appropriate tone of voice</td>
<td>217</td>
<td></td>
<td>217/217</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Totals 2014</td>
<td></td>
<td>1284</td>
<td>12/6</td>
<td>1290/1296</td>
<td>99.5%</td>
<td></td>
</tr>
</tbody>
</table>

### Crisis Situation Behaviors 2014

<table>
<thead>
<tr>
<th>Category</th>
<th>Behavior</th>
<th>Observed, Adequate</th>
<th>Observed, Inadequate</th>
<th>Expected but not observed</th>
<th>Totals</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination</td>
<td>Event manager established</td>
<td>1</td>
<td></td>
<td>1/1</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Cooperation</td>
<td>Escalates asserted concern</td>
<td>1</td>
<td></td>
<td>1/1</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Critical language</td>
<td>1</td>
<td></td>
<td>1/1</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>2012 Results Category</td>
<td>Behavior</td>
<td>Observed, Adequate</td>
<td>Observed, Inadequate</td>
<td>Expected but not observed</td>
<td>Totals</td>
<td>%</td>
</tr>
<tr>
<td>-----------------------</td>
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<td>--------------------------</td>
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<td>---</td>
</tr>
<tr>
<td><strong>Coordination</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>123.5/132</td>
<td>93.5%</td>
</tr>
<tr>
<td>Briefing- Verbalize plan; Time Out</td>
<td>116</td>
<td>15/7.5</td>
<td>1</td>
<td>123.5/132</td>
<td>93.5%</td>
<td></td>
</tr>
<tr>
<td><strong>Awareness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>133.5/140</td>
<td>95.3%</td>
</tr>
<tr>
<td><strong>Cooperation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>516/521</td>
<td>99%</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1455.5/1588</td>
<td>91.6%</td>
</tr>
<tr>
<td>Closed loop</td>
<td>454</td>
<td>150/75</td>
<td>20/0</td>
<td>529/624</td>
<td>85%</td>
<td></td>
</tr>
<tr>
<td>SBAR</td>
<td>53</td>
<td>5/2.5</td>
<td>1/0</td>
<td>55.5/59</td>
<td>94%</td>
<td></td>
</tr>
<tr>
<td>Verbal updates</td>
<td>330</td>
<td>10/5</td>
<td>7/0</td>
<td>335/347</td>
<td>96.5%</td>
<td></td>
</tr>
<tr>
<td>Use names of team members</td>
<td>184</td>
<td>21/10.5</td>
<td>1/0</td>
<td>194.5/206</td>
<td>94.4%</td>
<td></td>
</tr>
<tr>
<td>Communicate with patient/family</td>
<td>81</td>
<td>2/1</td>
<td></td>
<td>82/83</td>
<td>98.8%</td>
<td></td>
</tr>
<tr>
<td>Appropriate tone of voice</td>
<td>235</td>
<td>2/1</td>
<td></td>
<td>236/237</td>
<td>99.6%</td>
<td></td>
</tr>
<tr>
<td><strong>Totals 2012</strong></td>
<td>2104</td>
<td>219/109.5</td>
<td>34/0</td>
<td>2213.5/2357</td>
<td>93.9%</td>
<td></td>
</tr>
</tbody>
</table>

**Data Analysis**

The Communication and Teamwork Skills Assessment Instrument (CATS) is organized around four categories, each with a specific type of content; and each of these categories is focused on a behavior that is observed and scored according to the quality of the communication.

- “Observed Adequate” column =1 point
- “Observed Inadequate” = .5 point
- “Expected but not Observed” =0 (no point)

Scores are added together to achieve a weighted total. Thereafter, a second total is obtained by adding up the total numbers of marks. The quality score of a behavior equals the weighted-total divided by the total number of marks, which is then expressed in a hundred point scale. In this manner, a quality score is established for each behavior and such a score may be determined for each observation period.

In the current project, scores were obtained for coordination which includes briefing and debriefing; awareness including visually scanning environment and verbalizing adjustments in plan as changes occur; cooperation incorporating the sub elements requesting external resources, cross monitoring, verbally asserting and being receptive to assertions and ideas; and
communication with the sub categories of closed loop, SBAR, verbal updating, using names, communicating with patient/family and using appropriate tone of voice.

Behaviors during crisis situations was also scored on the basis of what was observed; and for this purpose the following three categories were used: ‘adequate,’ ‘observed inadequate,’ or ‘expected but not observed.’ And scores were obtained for coordination with event manager establishes adequate coordination; cooperation with escalates asserted concern and communication incorporating critical language.

Table 1 presents a 2-sample z-test (2-tailed) to compare differences in sample proportions between CATS summary variables. The 2-sample z-test to compare differences in sample proportions is effective for testing the null hypothesis that there is no difference between two group proportions or more formally that the difference is zero (H0: p1 - p2 = 0, where p1 is the proportion from the first group and p2 is the proportion from the second group).

Analysis indicated that there was not a statistically significant difference in proportions for the CATS summary variables Coordination (Z=1.0, p>.05), Briefing/Time Out (Z=1.0, p>.05), SBAR (Z=1.2, p>.05), and Cooperation (Z=0.5, p>.05). However, analysis did indicate a statistically significant difference in proportions for the CATS summary variables Awareness (Z=2.0, p<.05), Communication (Z=8.7, p<.05), and Closed loop (Z=8.1, p<.0001).

Table 1. Results of a 2-Sample Z-Test to Compare Differences in Sample Proportion between CATS Summary Variables

<table>
<thead>
<tr>
<th>CATS Summary Variable</th>
<th>2012</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sample Proportion</td>
<td>Sample Size</td>
</tr>
<tr>
<td>Coordination</td>
<td>93.5%</td>
<td>132</td>
</tr>
<tr>
<td>Briefing/Time Out</td>
<td>93.5%</td>
<td>132</td>
</tr>
</tbody>
</table>
**CHAPTER V- RECOMMENDATIONS**

**Discussion**

The overall aim of this evidence-based project was to describe whether an educational inservice presented in August, 2012 to operative registered nurses and surgical technicians impacted the communication and teamwork skills of the operating room staff in such a way as to ultimately lead to improved safety in patient care. Marked improvement was seen in CATS scores from 2012 to 2014 (Appendix I). These improved scores could reflect communication and teamwork skills that are now encultured into practice. This increase in CATS score could also be attributed to the ongoing quality monitoring of surgical time outs and the accompanied teaching moments. A more detailed cross comparison of the CATS scores for both 2012 and 2014 notes the improvement in all areas of communication and teamwork skills (Appendix J).

In this study, quality monitoring was random and included all surgical specialties. In the hospital where the study was conducted, this same type of quality monitoring continues to this day, now being conducted by assigned operating room nurses; the reason for this continuing activity is that the hospital’s administration has concluded that it is imperative if quality is to be maintained to continue to assess the knowledge and skills of an operative team. Further, monitoring quality
can itself serve an educational function in that staff may come to inquire how to improve their outcomes. In addition, it is telling that re-learning takes place on the spot and becomes a way to foster positive reinforcement and a sense of accomplishment.

In this evidence-based project, most of the teams observed were comprised of people who had worked together on a regular basis for some time. Of the three specialties observed, the ophthalmology teams were the most stable in that they included the same people for every procedure included in this study (as opposed to an ad hoc team). The types of surgeries conducted in this medical specialty are highly specialized and routine. For example, the scrub person, the circulating nurse and the CRNA each remained in their roles for the duration of the procedure. Most of these procedures were performed back to back and without variation, except for the laterality of the involved eye. The supplies and equipment were displayed beforehand and any extra instruments that might be required were present in the operating room and ready to be opened, if needed. In the ophthalmology specialty, barely a word was spoken between any of the team members during the entire procedure; the surgeon did not have to ask the scrub person for anything— he just held out his hand while gazing into the eye pieces of the microscope. The scrub person also intuitively and through experience knew when to irrigate the eye with a balanced saline solution, and prompting by the surgeon was unnecessary. The only pause in the procedure occurred when the surgeon requested the intraocular lens and at that time a second verification was completed prior to opening the lens, as per policy.

The results of this project support the notion that staff members who work together on a regular basis have a greater opportunity to develop a situational awareness and a shared mental model, both because of their similar commitment to positive patient outcomes and their ability to modify their behaviors to align with their colleagues’ actions. According to Weaver et.al, (2010), incorporating team training with a focus on situation monitoring contributes to continued improvements in healthcare. Other studies have documented that a shared mental model is
critical to effective teamwork in the operating room, as this environment presents with a variety of situations and these might be difficult to navigate otherwise (Gillespie, Chaboyer, & Fairweather, 2012). Team communication is likely to be most effective if everyone has the same understanding of and expectations for the surgery and if all team members are aware of pertinent patient information.

The results of this evidence-based project overwhelmingly suggest that education and quality monitoring with teaching moments can improve team-based outcomes. This project measured the effectiveness of education-based interventions on teamwork and communication; however, it did not specifically examine how to enhance team performance. The literature supports a range of ways to improve team performance: for example, it can be improved by maintaining team composition; and by discussing patient history in a preoperative huddle with all team members. And the literature indicates that team performance is affected by whether or not the surgery is emergent or planned. The ophthalmology teams observed in this project each have been working together on a regular basis for at least two years. And all the ophthalmology surgeries studied were scheduled (elective). Thus, it might be difficult to determine whether preexisting team characteristics or the education intervention had the greater effect on the outcome.

It was the ultimate goal of this evidence-based project to examine the effects of the training and education interventions on communication and teamwork behaviors in relation to patient safety outcomes. Clearly, patient safety was of major concern when a crisis arose during an otorhinolaryngology surgery in which the wrong antibiotic was given to the patient. This crisis situation and the behavior that accompanied it was reflected in the CATS tool and scored, in the categories of coordination, cooperation, and communication as being ‘observed, adequate.’ Although the patient’s penicillin allergy was noted in the patient’s medical record, the anesthesiologist had already administered a dose of “kefzol” prior to incision. Once the surgeon
(event manager) discovered the error (escalates asserted concern), he quickly asked for possible solutions (critical language) directed at the anesthesiologist. The anesthesiologist acknowledged her error and assured the surgeon that she would monitor closely the patient’s vital signs well into the postoperative period. Further discussion (critical language) ensued regarding the administration of an antihistamine agent but the anesthesiologist wanted to take a wait and see approach. Once the crisis was over, the surgery proceeded without further incident. The communication between the surgeon and anesthesiologist remained professional and polite despite the emotions attached to an error that could have had serious consequences. It should be noted that the anesthesiologist assigned to this case was relatively new to the hospital and just started working there the week before. There was a CRNA assigned to the case but for intubation it is required that an anesthesiologist be present. The antibiotic was administered following the intubation but before the “time out,” which is standard practice as the antibiotic must be given within one hour of incision. Everyone else on the surgical team had worked together previously and was very familiar with the other team members and with the case at hand. However, the anesthesiologist was relatively new to the staff and to the routines of the hospital. Further, the anesthesiologist was responsible for other CRNAs who were working in other procedures at that same time. The incident supports anecdotally the notion that when team members are familiar with each other and possess similar knowledge and skills, competent results are far more likely to be obtained time after time. A competent team can reproduce optimal outcomes in surgery after surgery, regardless of a change in the nature or complexity of the surgery (Marco, 2011).

Limitations

There are several limitations to this evidence-based project. First, the measures used to evaluate behaviors may, because they are dependent on the observer’s ability to interpret events, be considered as being somewhat subjective. However, the same person served as the observer
in all thirty cases; has extensive experience; is a perioperative nurse who currently practices as
an advanced practice nurse in the operating room; and is familiar with the subtle nuances of the
environment. Furthermore, inter-rater reliability was established in the 2012 study with the
observer and two other registered nurses; these three nurses compared scores on the same
surgery and the following debriefing, while testing the scoring methodology. Thus, in 2014 it
was concluded that having the single nurse be the observer in all the cases would yield reliable
data. Additionally, in measuring the constructs used in this project, the observer used definitions
underpinned by the previous study, the 2012 study; and the behaviors these definitions referred
to are directly observable.

Second, demographic data derived only from the staff nurses and the surgical technicians.
Although demographic data did not appear to impact the results, it would have been interesting
to have determined information regarding the highest level of education, age, years in practice or
profession, gender, and ethnicity of each of the nurses and technicians.

The results of this project do not support the notion that cultural differences between
caregivers in the operating room may create obstacles to effective communication. Since greater
than 80% of nurses and surgical technicians in this project have English as their second
language, cultural differences did not appear to create a barrier to communication and team work
skills. There is evidence in the literature supporting the suggestion that cultural problems may
appear in relation to the historical hierarchy of the various disciplines participating in a surgical
procedure. There has often been a barrier impeding communication between the less educated
team members and the more highly educated team members. Further, there may be cultural
barriers based on other factors, and these may include gender and ethnicity (Gillespie, Chaboyer
& Murray, 2010). For example, some Asian nurses may have a cultural barrier to assertive
language with surgeons, even during critical moments.
Lastly, the sample of 30 surgeries may be considered too small and not representative of such more complex specialty surgeries such as cardiac and neurologic surgery. Those usually last many hours and may even require multiple team changes. Also, the surgeries studied in this investigation were drawn from a single hospital site, and this site may differ in known and unknown ways from other larger hospitals. In spite of this, the sample used in this study was representative of the types of typical cases in the operating room of the selected hospital.

Conclusion

The operating room is a dynamic, highly technical, and stressful environment where a patient may be at increased risk for harm. To avoid harms, communication and teamwork behaviors in the operating room must be standardized through use of checklists, structured by the event at hand and carefully orchestrated in relation to each team member’s role. The introduction and consistent reinforcement of team training interventions does improve team communication and ultimately increases patient safety, as evidenced in this project. It is important that all operative team members not only be competent in their individual roles, but that they also work together exhibiting expertise as team members.

Recommendations

The true measure of success for any training intervention is to create a highly reliable team in which learned communication and team work behaviors are sustained over time. In order to achieve sustainability, there must be administrative support and action at all levels in the organization. Further, there must be “buy-in” from the staff directly affected by any change that is implemented in the clinical milieu. This can be achieved by having select staff actively involved as “team champions” who support and mentor other team members. This evidence-based project started as a single-session education event and later extended into daily quality monitoring by team champions who incorporated “teachable moments” for staff, teachable moments in which communication and team work behaviors were reinforced. The perioperative
nursing care coordinator also held weekly meetings in which numerous topics, including the WHO checklist, the time out process, and standardized communication techniques were discussed and reinforced. Further, the marked improvement in the 2014 CATs scores will be acknowledged in a competency video (Appendix L) and viewing this video and correctly answering a minimum of 80% on the post-test questions will be a mandatory portion of the operating room nurses’ and surgical technicians’ annual performance evaluation. This video will include comments by operating room staff (surgeons, CRNAs, anesthesiologists, registered nurses and surgical technicians) who mutually share the highest motivation to achieve outstanding patient results. This competency video will foster the positive communication and teamwork behaviors that have become embedded in the operating room’s culture of patient safety. Further research is needed to identify the optimal team training interventions or programs. If team training interventions such as the ones implemented in this evidence-based project lead to safer patient care, then they merit consideration.
References


Weaver, S.J., Rosen, M.A., DiazGranados, D., Lazzara, E.H., Lyons, R., Salas, E., Knych, S.A.,
performance in the operating room? A multilevel evaluation. *The Joint Commission
Journal on Quality and Patient Safety, 36*(3), 133-142.

Appendices
## Appendix A

<table>
<thead>
<tr>
<th>Citation</th>
<th>Conceptual Framework</th>
<th>Design Method</th>
<th>Sample Setting</th>
<th>Major Variables</th>
<th>Measurements</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal Worth to Practice</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carney, B., West, P., Neily, J., Mills, P., &amp; Raglan, J. (2010, June). Differences in nurse and surgeon perceptions of teamwork: Implications for use of a briefing checklist in the OR. Association of Perioperative Registered Nurses, 91(6), 722-729.</td>
<td>Not mentioned</td>
<td>Purpose: Confirm differences in perceptions about communication and collaboration between perioperative nurses and surgeons in Veterans Health Administration Hospital (VHA) in order to help them improve their practice in the operating room. One day medical team training (MTT) program developed by National Center for Patient Safety (NCPS) at VHA hospital for physicians, nurses, and other allied health professionals working in the OR.</td>
<td>Safety Attitude Questionnaire (SAQ) administered to n=2,451 attending the first 34 consecutive learning sessions. Response rate n=2,024 (82%) Clinical area in OR n=1,753 Position identified n=1,581 Non-identified positions n=151 Identified as surgeons or perioperative nurses n=690 nurses n=378 surgeons n=312 71% of perioperative nurse respondents were female, average age 47 years 82% of surgeon respondents were male; average age 51 years</td>
<td>IVs occupation (nurse or physician) DVs perception of teamwork</td>
<td>Safety Attitude Questionnaire (SAQ) 59 items as part of a program evaluation to confirm the premise that better communication will provide safer treatment for patients. Completion of questionnaire is voluntary and anonymous</td>
<td>Respondents rate quality of communication and collaboration on 5 point Likert Scale (1 = very low) to 5 (very high). Six items relate to teamwork climate which is perceived quality of collaboration between personnel using 5 point Likert Scale (1 disagree strongly) to 5 (agree strongly).</td>
<td>Ratings of communication and collaboration experienced with surgeon and perioperative nurse by Rater Profession. Mean rating of communication and collaboration of experience with surgeons M=4.4; given by nurses M=3.5; significant difference F=1.34, P&lt;0.001. Surgeons rate themselves higher than nurses. Mean rating M=4.3 was given by both nurses and surgeons for communication and collaboration with nurses. Mean Teamwork Climate Item Scores: On 5/6 items assessing teamwork climate, surgeons had significantly more favorable perception than nurses. Rating by surgeon on 'nursing input will be received' was M=4.3 but only M=3.8 rating by nurses.</td>
<td>Strengths: OR closed on the day of learning session to demonstrate leadership support and optimize staff attendance. Recognized that scores from 2009 VHA patient safety culture surgery were below benchmark from AHRQ Hospital Survey on Patient Safety Culture. SAQ can be used to measure teamwork, identify disconnect and evaluate interventions aimed at raising patient safety. SAQ can uncover problems in communication that may not otherwise be recognized. Limitations: Did not analyze perceptions of anesthesiologists, certified registered nurse anesthetists (CRNAs), physician assistants (PAs), surgical technicians or other OR personnel.</td>
<td>I</td>
</tr>
<tr>
<td>Citation</td>
<td>Conceptual Framework</td>
<td>Design Method</td>
<td>Sample Setting</td>
<td>Major Variables</td>
<td>Measurements</td>
<td>Data Analysis</td>
<td>Findings</td>
<td>Appraisal Worth to Practice</td>
<td>Level of Evidence</td>
</tr>
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<tr>
<td>Loehre, E. (2011, May). Causes of Near misses: Perception of Perioperative Nurses. Association of Perioperative Registered Nurses, 21(6), 722-729.</td>
<td>van Vuuren (1998) modified version of the Simple Model of Incident Causation created by Van der Schoot.</td>
<td>Descriptive research design using a mixed methods approach (survey)</td>
<td>Population comprised of approximately 377 perioperative nurses where general surgery was performed in five hospitals of a mid-Atlantic healthcare system.</td>
<td>24-item near miss survey: general information, recovery factors, causal factors</td>
<td>Quantitative and qualitative approaches to analyze near-miss experiences by perioperative RNs.</td>
<td>Descriptive analysis: Tuesday had the highest number of near misses (24%) and time of day the near misses took place ranged from 12:30 AM to 5 PM. Highest location was the OR (46%).</td>
<td>Strengths: results consistent with Commonwealth of Pennsylvania’s PA-PSRS, the Joint Commission, and research performed by Seldin Barach that have shown the following causal factors: assessing staffing effectiveness and dealing with agency/float staff, inconsistent programs/training, compliance with policies and procedures, design and use of equipment, fatigue, wrong procedure and behavior/attitude issues.</td>
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<td>Purpose of study was to examine the near miss experiences of RNs working in the perioperative setting to understand their perception of the causes of near misses.</td>
<td>Power analysis indicated sample size of 100 surveys and a convenience sample of no less than 25 perioperative nurses needed.</td>
<td>Final sample included all nurses who signed informed consents, a total of 65 of 377 for a response rate of 17%.</td>
<td>24-item near miss survey: general information, recovery factors, causal factors</td>
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<td>Collected 163 surveys during a three-month period; 220 near misses; surveys sent out (74% return rate).</td>
<td>Sample of participating nurses consisted of 45 women and two men. Number of years of practice at the time of the near miss was mean of 7.4 years. Years of experience at health care facility at time of near miss was mean of 7.4 years.</td>
<td>24-item near miss survey: general information, recovery factors, causal factors</td>
<td>24-item near miss survey: general information, recovery factors, causal factors</td>
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<td>Exclusion: Non-RN health care professionals and RNs who did not participate in perioperative survey (n=8).</td>
<td>Sample size of 100 surveys and a convenience sample of no less than 25 perioperative nurses needed.</td>
<td>24-item near miss survey: general information, recovery factors, causal factors</td>
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<td>Conardy, J.A., Braven, E., &amp; Myers, S. (2010, August). Determining the state of knowledge for implementing the Universal Protocol recommendation: An integrative review of the literature. <em>Association of Peri-Operative Nurses</em>, 52(2), 194-207.</td>
<td>Reason’s Vulnerable Systems Syndrome theory and Bibb and Warner’s Identifying, Organizing, and Synthesizing (IOS) strategy</td>
<td>Descriptive research design</td>
<td>Inclusion dates January 1, 1999-October 31, 2008. English publications. Literature search through a systematic search of the National Library of Medicine database to include empirical and theoretical documents that discussed the implementation process of the Universal Protocol. Excluded documents that did not address the Joint Commission’s Universal protocol recommendations for wrong site, wrong procedure and wrong patient. Team consisted of one principal investigator and two co-investigators with total OR experience more than 15 years. All three members obtained the same results in literature search terms, which established interrater reliability. Initially 65 documents but eliminated 31 documents that did not meet inclusion criteria. Final documents n=34.</td>
<td>No IV or DV</td>
<td>Created the sample summary table to summarize and describe the major characteristics of the documents selected for the study. Created document review template to reflect research question and track documents in review of literature. Trained the team of reviewers through discussion and clarification. Pilot tested the document review template to establish interrater reliability. Created evidence table workbook to document bibliographic information and summary content. Created an analysis and interpretation workbook to provide more depth in information. Created and completed the annotated bibliography, synthesized the research and presented the results.</td>
<td>Analyzed data by using the manifest content analysis, focusing on occurrence of key words and phrases by using the IOS strategy by creating the analysis and interpretation table and the annotated bibliography.</td>
<td>34 documents met inclusion criteria. Identified significant trends, gass and areas of concern-30 documents that included information regarding significant trends with six major focus areas, 17 potential gaps in implementation of Universal Protocol, and 24 documents that addressed areas of concern in four categories. Significant trends in Universal Protocol elements (21 documents), communication (14 documents), systems processes (24 documents), team performance (15 documents), organizational/cultural behavior (3 documents), and patient assessment (6 documents). Identification of gass as missing or confusing elements of Universal Protocol. Areas of concern (4 categories): surgeon/staff behavior, data clarification, incomplete Universal Protocol and efficacy of the Universal Protocol.</td>
<td>Strengths: significant trends listed the top three root causes of 33 wrong site surgeries (2005) and communication (73%), procedural compliance (64%) and leadership (46%) are issues. Communication continues to be a concern in patient safety. Patient verification is an ongoing process; surgeon involvement in all elements of Universal Protocol; built in redundant checks so as not to miss information; recognition of surgeon/staff behavior; promotion of active communication that promotes a healthy work environment. Limitations: use of bibliographic database and only five documents out of 34 provided information on how the Universal Protocol was implemented and audited in facilities.</td>
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<td>Gillespie, B., Cheboyger, W., &amp; Murray, P. (2010, December). Enhancing communication in surgery through team training interventions: A systematic literature review. Association of Operating Room Nurses, 52(6), 642-657.</td>
<td>None</td>
<td>• Systematic literature review</td>
<td>12 studies: All but one of the studies used a combination of survey methods and structured observations, and four studies relied solely on survey methods. Eleven studies used a single-group pretest/posttest design.</td>
<td>IV-enhanced communication/teamwork DVs team training interventions</td>
<td>None</td>
<td>• All but one (91.7%) used a single-group pretest/posttest design. Five of the studies (41.7%) used survey methods and structured observations, and four studies (33.3%) relied solely on survey methods. Three studies (25%) used secondary data (hospital databases or patient records). Five studies (41.7%) included outcome metrics in combination with team-based outcome measures. Two studies (16.7%) measured secondary outcomes alone and five studies (41.7%) focused solely on team-based outcomes. Eight studies (66.7%) used a combination of team-building strategies and five of these studies (41.7%) used debriefings as part of their training; two studies (25%) used simulation. All 12 studies incorporated checklists and where mentioned in study, team training interventions varied anywhere from nine hours to 27 months.</td>
<td>• All but one (91.7%) used a single-group pretest/posttest design. Five of the studies (41.7%) used survey methods and structured observations, and four studies (33.3%) relied solely on survey methods. Three studies (25%) used secondary data (hospital databases or patient records). Five studies (41.7%) included outcome metrics in combination with team-based outcome measures. Two studies (16.7%) measured secondary outcomes alone and five studies (41.7%) focused solely on team-based outcomes. Eight studies (66.7%) used a combination of team-building strategies and five of these studies (41.7%) used debriefings as part of their training; two studies (25%) used simulation. All 12 studies incorporated checklists and where mentioned in study, team training interventions varied anywhere from nine hours to 27 months.</td>
<td>Strengths: Team training interventions can improve team-based outcomes; structured, standardized and carefully orchestrated communication must be used by surgical teams to increase patient safety. Limitations: May have excluded studies that focused on other aspects of teamwork; small sample; did not conduct meta-analysis; no study specifically examined how to enhance team performance.</td>
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<td>Lingard, L., Ispin, S., Whyte, S. Regehr, G., Bakar, G., Reznick, R., Bonnen, J., Dragg, B., Doran, D., &amp; Grobey, P. (2004). Communication failures in the operating room: An observational classification of recurrent types and effects. Quality Safety Health Care, 13. Retrieved September 6, 2011, from <a href="http://www.qshc.bmj.com">http://www.qshc.bmj.com</a></td>
<td>Rhetorical framework was used in data analysis to define the parameters of communication failure. This framework is useful in examining group discourse in complex social settings, considers content of communication alongside three other critical factors: audience, purpose, and occasion.</td>
<td>• Observational, systematic design</td>
<td>• Convenience sample of OR team members in general and vascular services.</td>
<td>• 94 team members observed, including 16 anesthesia staff, 5 anesthesia fellows, eight surgical fellows, three anesthesia residents, 12 surgical residents, 14 surgical staff, three clinical clerks, and 31 nurses. No team member declined to participate.</td>
<td>• Ethnographic field note methods were used to record communication events including time of event, participants, content, contextual features, and any immediate visible effects.</td>
<td>• Field notes were analyzed in a constant comparative manner by three researchers to identify failures in communication events. Analysts alternated independent analysis with group discussion.</td>
<td>• 421 procedural relevant communication events: 128 classified as communication failures related to rhetorical factors.</td>
<td>• Rhetorical framework applied to communication failure: 45.7% occasion (suboptimal timing), 35.2% content, 24% purpose, and 20.9% audience.</td>
<td>• Second phase of analysis within each of the four rhetorical categories (content, audience, purpose, and occasion) were analyzed for trends in type of exchange and effects on system processes.</td>
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<td>Stahel, P. F., Sabel, A.L., Victoroff, M., Vaghoj, J., Lambs, A., Boyle, D.J., Clarke, T.J., Smith, W. R., &amp; Mehler, P. S. (2010, October). Wrong-site and wrong-patient procedures in the universal protocol era. Analysis of a prospective database of physician self-reported occurrences. Archives of Surgery; 145(10), 978-984.</td>
<td>None</td>
<td>Retrospective analysis of a prospective physician insurance database</td>
<td>• Total of 107 wrong-site and 25 wrong-patient cases were included in final analysis</td>
<td>• Total of 107 wrong-site and 25 wrong-patient cases were included in final analysis</td>
<td>• IV= frequency and root cause DV1=wrong-site DV2=wrong-patient</td>
<td>• Determine whether there were significant differences between root causes in the 2 categories (wrong-patient and wrong-site)</td>
<td>• Root causes of adverse occurrences: wrong-patient n=25 error in diagnosis 55%, error in treatment 22%, error in communication 100%, error in judgment 8%, and system issue 84%</td>
<td>• Strengths: Coincides with previous studies that have identified communication breakdown as leading cause of wrong-site surgery. Support of Joint Commission’s NPSG of formal readbacks. Patients are equally susceptible to wrong-site procedures outside of the OR-nonsurgical specialties. Universal Protocol should be universally implemented and adhered.</td>
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<td>Wubbels, L. S. G. L., Dekker, W., van Wijngaard, J. D. H., Goossens, R. H. M., Mulier, F., Klein, J., and Leng, M. F. (2011, April). Discrepant perceptions of communication, teamwork and situation awareness among surgical team members. <em>International Journal of Quality in Healthcare</em>, 23(2), 159-166.</td>
<td>None</td>
<td><em>Designed as a multiple case study among five Dutch hospitals</em></td>
<td><em>Five Dutch Hospitals: one university hospital, three teaching hospitals, and one general hospital in Netherlands</em></td>
<td><em>Questionnaire to elicit surgical team member’s opinion on the current state of communication, teamwork and situation awareness in the Operating Theatre (OT)</em></td>
<td><em>Questionnaire sent to team members</em></td>
<td><em>Data analysis performed using SPSS 16.0 for Mac</em></td>
<td>*Communication had three subcategories: exchanging information/surgeons rated this as adequate (mean = 3.05) while other team members rated this lower (mean = 2.12). Strengths: Overall findings consistent with previous research in that surgeons have positive perceptions of communication and teamwork while nurses have mostly negative perceptions. One method to improve shared understanding is by means of preparatory briefings to establish a shared mental model among team members. Limitations: only five hospitals participated, comparing response rates to similar studies was complicated because of large differences in outcome measures, and the university hospital was missing its first page of questionnaire due to human error.</td>
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<td>Weaver, S. J., Rosen, M.A., Diaz-Granados D., Lazzara, E.H., Lyons, R., Salas, E., Krych, S.A., McKeeer, M., Adler, L., Barker, M., and Ling, H.D. (2010, March): Does teamwork improve performance in the operating room? A multilevel evaluation. The Joint Commission Journal on Quality and Patient Safety 36(3), 133-142.</td>
<td>- Fitpatrick's (1994) four levels of training evaluation: trainee reactions, training, learning, behavior on job, and results.</td>
<td>- Quasi-experimental research design.</td>
<td>- Convenience sample of OR team members in general and vascular services.</td>
<td>- 94 team members observed, including 16 anesthesia staff, six anesthesia fellows, eight surgical fellows, three anesthesia residents, 13 surgical residents, 14 surgical staff, three clinical clerks, and 31 nurses. No team member declined to participate.</td>
<td>- Training curriculum of TEAMSTEPPS consisted of a four-hour didactic session from June-July 2008. Competencies included communication, leadership, mutual support and situation monitoring.</td>
<td>- Level 1: Reactions—Likert scale that was rescaled for data presentation that 0 is neutral response while 3 is strongly disagree and 3 is strongly agree.</td>
<td>- Level 1: Reactions—51% felt more confident in their ability to work as an effective team member after training.</td>
<td>- Strengths: Results provide empirical support for the effectiveness of the TEAMSTEPPS program on all levels of evaluation—training was useful and viable, achieved learning benchmarks, increased the degree of quality teamwork, and demonstrated positive changes in patient safety culture. Limitations: control group did not meet all qualifications due to confounded campus differences, low statistical power may have limited certain effects (observational analysis) because of small sample size.</td>
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The Iowa Model of Evidence-Based Practice to Promote Quality Care

- Problem Focus/Triggers
  1. Risk Management Data
  2. Process Improvement Data
  3. External/Intra-Benchmarking Data
  4. Financial Data
  5. Indicators of Clinical Outcomes

- Knowledge Focus/Triggers
  1. New Research or Case Literature
  2. National Agencies or Organizational Statements & Guidelines
  3. Philosophies of Care
  4. Questions from Institutional Standards Committee

- Consider Other Triggers

- Is the Topic a Priority to the Organization?
  - Yes
    - Form Team
    - Assess the Research Literature
    - Critique & Synthesize Research for Use in Practice
  - No

- Plot the Change in Practice
  1. Define Outcomes to Be Achieved
  2. Identify Baseline Data
  3. Design Intervention
  4. Implement Change on Pilot Units
  5. Evaluate Process & Outcomes
  6. Modify the Practice Guidelines

- Assess if a Sufficient Research Base?
  - Yes
    - Conduct Research
    - Monitor and Analyze Outcomes, Processes, and Outcome Data
      - Environment
      - Staff
      - Cost
      - Patient and Family

- No

- Continuously Evaluate Quality of Care and How Knowledge

- Institute the Change in Practice

- Disseminate Results

Reference:

DO NOT REPRODUCE WITHOUT PERMISSION

REQUESTED TO:
- Nancy Tiber, PhD, RN
- Chief Nursing Research Officer
- The University of Iowa Hospitals and Clinics

Date: Oct 15, 2001

Revised: July 1999 © UHC
Appendix C

INFORMED CONSENT FOR CLINICAL RESEARCH
NEW YORK EYE AND EAR INFIRMARY

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES

Teamwork and Communication in the Operating Room Post-Training Team Member

Principle Investigator:
Christina Walker, RN, MA, NCC
TEL. # (212) 979-4653

Supervisors:
Dr. Sonja Tennaro RN
Senior VP for Clinical Operations/CNO
Editha Esquires RN MHA CNOR
Vice Pres. Perioperative Services

Co-Investigators:
Louise Kertesz RN MSN ANP-BC CNOR

Introduction:
You are invited to participate in a research study investigating communication and behaviors amongst perioperative team members during surgery. This study is being conducted by Christina Walker, RN, MA, NCC and Louise Kertesz MSN, ANP-BC, CNOR at New York Eye and Ear Infirmary. You were selected as a possible participant in this research because you actively participate as a team member in the operating room during surgical procedures. Please read this form and ask questions before you decide whether to participate in this study.

This consent form gives you detailed information about the research study that the investigator will discuss with you. Please read the form and talk to the researcher about any questions you may have. Once you understand the study, you will be asked to sign the form if you wish to participate.

You will be informed of any new information, which might affect your decision to participate in this research study. If any information is gained that might adversely affect your long-term health, you will be contacted.

Alternatives:
You may choose not to participate in the study.

Financial Cost:  
Taking part in this study will not involve any additional financial cost.

Compensation:  
For your participation in the study you will not receive any money or other compensation.

Confidentiality:  
Your name will not be used in the study we will be assigning numbers to the surgical procedures we observe. Your name or any other personally identifying information will not be used in reports or publication of this study.

Right to Refuse or Withdraw:  
The choice to take part in this study is yours. Make the choice based on what has been explained to you and what you have read about the study. If you choose to take part in this study you have the right to withdraw at any time. If you withdraw from the study at any time, there will be no penalty.

Conflict of Interest:  
None

Questions:  
If you have any questions, please ask and we will do our best to answer them. If you have additional questions in the future, you can reach Christina Walker RN MA at 212-979-4653. Any questions on your rights as a research subject, you can call Joseph B. Walsh MD Chairman of NYEE IRB at 212-979-4447 for information.

CONSENT:  
I have read this consent form and have discussed it with Louise Kertesz RN for the procedure described above. I have been given the opportunity to ask questions, which have been answered to my satisfaction. I have been given a copy of the signed consent form.

I understand that I will be informed of any new findings developed during the course of the randomized study. The investigator may withdraw me from this research if circumstances arise which warrant doing so.

Healthcare Team Member Statement

By initialing after each statement, I agree:

| A) Have understood the consent form | A) |
B) Have had the opportunity to ask questions and discuss this study

C) Have received satisfactory answers to all my questions

D) Have received enough information about this study

E) Understand that I am free to leave this study at any time without having to give a reason.

IF YOU DID NOT INITIAL ANY OF THE SIX STATEMENTS LISTED ABOVE, YOU SHOULD NOT SIGN THIS CONSENT

Name of Participant (Print)                  Participant’s Initials

Signature of Participant                           Date

Witness (Print)                                   Date
Appendix D

PATIENT INFORMED CONSENT FOR CLINICAL RESEARCH

NEW YORK EYE AND EAR INFIRMARY

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES

| Teamwork and Communication in the Operating Room Post- Training |

Principle Investigator:
Christina Walker, RN, MA, NCC
TEL. # (212) 979-4653

Supervisors:
Dr. Sonja Tennaro RN
Senior VP for Clinical Operations/CNO
Editha Esquires RN MHA CNOR
Vice Pres. Perioperative Services

Co-Investigators:
Louise Kertesz RN MSN ANP-BC CNOR

Introduction:
You are being asked to take part in a research study. The research team will be observing the quality of communication by the operating room team during surgical procedures. In order to decide whether you should agree to be part of this research study, you should understand about its risks and benefits to make an informed judgment. This is called the informed consent.

This consent form gives you detailed information about the research study that the investigator will discuss with you. Please read the form and talk to the researcher about any questions you may have. Once you understand the study, you will be asked to sign the form if you wish to participate.

Purpose of the Research:
The purpose of the research study is to observe the quality of communication between the members of the surgical team participating in the surgery. The surgical team has partaken in improvement training and the data collected from this study will further identify areas on team interactions that may or may not need continued improvement and training.

Description of the Research Procedure:
When you enter the operating room you will introduced to the Investigator who will be observing the surgical procedure. The investigator will be observing your communication with
the team before you receive anesthesia. While the procedure is being performed the co-investigator will be observing the interactions and communication between the surgical team (surgeons, residents, anesthesiologist, nurse anesthetists, circulating nurse, and Scrub tech/nurse). The observation will continue until you are discharged to the recovery room.

Risk and Benefits:
The study involves research that presents no risk. There is no physical risk/side effects involved in your taking part in this study. No guarantee is being offered that you will benefit from this study. While there may not be direct benefit to you, you will provide useful information that may be helpful in improving care of patients in the Operating Room.

New Information:
You will be informed of any new information, which might affect your decision to participate in this research study. If any information is gained that might adversely affect your long-term health, you will be contacted.

Alternatives:
You may choose not to participate in the study.

Financial Cost:
Taking part in this study will not involve any additional financial cost.

Compensation:
For your participation in the study you will not receive any money or other compensation.

Confidentiality:
Your name will not be used in the study we will be assigning numbers to the surgical procedures we observe. Your name or any other personally identifying information will not be used in reports or publication of this study.

Right to Refuse or Withdraw:
The choice to take part in this study is yours. Make the choice based on what has been explained to you and what you have read about the study. If you choose to take part in this study you have the right to withdraw at any time. If you withdraw from the study at any time, there will be no penalty.

Questions:
If you have any questions, please ask and we will do our best to answer them. If you have additional questions in the future, you can reach Christina Walker RN MA at 212-979-4653. Any questions on your rights as a research subject, you can call Joseph B. Walsh MD Chairman of NYEE IRB at 212-979-4447 for information.
CONSENT:

I understand I may refuse to participate, or I may withdraw from this study at any time without affecting my relationship with Christina Walker, RN, MA and the study team or further treatment.

I have read this form or it has been read to me and I understand it. I agree to participate in this research study. I understand I will receive a signed and dated copy of this form.

I authorize the release of my medical records for research or regulatory purposes to the sponsor, the FDA, DHHS agencies.

By signing this consent form, I have not waived any of the legal rights, which I otherwise would have as a subject in a research study.

Patient’s Statement

By initialing after each statement, I agree that I

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<td>C) Have received satisfactory answers to all my questions</td>
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<td>D) Have received enough information about this study</td>
<td>D)</td>
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<tr>
<td>E) Understand that I am free to leave this study at any time without having to give a reason and without affecting my medical care</td>
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<td>F) Understand that my medical records may be reviewed by the company sponsoring the study and by government authorities</td>
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IF YOU DID NOT INITIAL ANY OF THE SIX STATEMENTS LISTED ABOVE, YOU SHOULD NOT SIGN THIS CONSENT FORM
Name of Participant (Print)  Participant’s Initials

Signature of Participant  Date

Name of Person Interpreting Consent (Print)

Signature of Person Interpreting Consent  Date

Witness (Print)  Date
Appendix E

Institutional Review Board

To:    Louise Kertesz, MSN, RN, CORN
        Graduate Student
        Nursing Department
        Saint Peter's University

From:  Dr. Peter P. Cook, chair
        SPU Institutional Review Board

Date:  January 29, 2014

Project Title: Improving Teamwork and Communication in the Operating Room for Safe Patient Care

Protocol Approval Date: January 29, 2014 – May 31, 2014

In accordance with DHHS Regulations for Protection of Human Subjects (45 CFR 46.110), the human subjects application for this project underwent Expedited review and was approved as minimal risk to subjects. This project is approved as of January 29, 2014 and the approval remains active until May 31, 2014.

The IRB notes approval of this observational study by the IRB Committee of the New York Eye & Ear Infirmary, with Christian Walter as principal investigator and Louise Kertesz as co-investigator. Protocol #1333, IRB Oversight of the New York Eye and Ear Infirmary.

The investigator agrees to conduct the research in accordance with the Belmont Report and the SPUIR Institutional Review Board guidelines, as well as the use of all approved instruments and forms.

Re-review of this project is required if:

You wish to continue the project beyond May 31, 2014.

There are any changes in the research protocol.

There are any reports of injury or unanticipated problems involving risks to human subjects.

Note: any injuries or adverse events must be reported to the IRB within three days of the event.
Appendix F

THE NEW YORK EYE & EAR INFIRMARY (NYEE) IRB ACTION
Approval Period: November 12, 2013 - November 11, 2014

TO: Christina Walker

DATE: November 12, 2013

FROM: INSTITUTIONAL REVIEW BOARD (IRB)
JOSEPH B. WALSH, M.D., CHAIRMAN

SUBJECT: YOUR PROTOCOL: #13.31 Teamwork and Communication in the Operating Room Post Training

Approved

Sponsor: "SELF/DEPT. SPONSORED", Experimental Drugs?: Yes, FDA regulated?: No answer provided., Manufacturer: No answer provided.,
Subject research to be done at 2nd Floor OR, Aims: Real-time surgical procedures performed in the operating room will be observed while evaluating the interactions and communication of the surgical team members. This will help assess the effectiveness of the surgical team’s ability to work cohesively in providing optimal patient care post-training. The co-investigator will observe team behaviors using the Communication and Teamwork Skills (CATS) Assessment Instrument. The feedback from the series of observation(s) will assist in identifying whether or not the education/training provided in August, 2012 was sustained and provided an overall improvement of team skills.,
Number of subjects to be enrolled at this site: 120, At ALL sites: 120, Level of Risk to subject: Minimal risk.
Sponsor protocol #: 0, Sponsor Protocol Version/amendment #: 1, Consent form version/amendment#: 1, Minors to be enrolled?: No, Non-English speaking subjects to be enrolled?: No.

PI response:
From: <Walsh, Joseph <jwalsh@nyee.edu>>
Date: Wednesday, October 30, 2013 12:14 PM
To: "Walker, Christina" <cwalker@nyee.edu>, Robert Jordan <rjordan@nyee.edu>, "Tarun Sound" <tsound@nyee.edu>

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The New York Eye and Ear Infirmary
310 East 14th Street
New York, NY 10003-4297
Tel: 212-997-4000
FAX: 212-997-4018
www.nyee.edu
Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that Louise Kortum successfully completed the NIH Web-based training course “Protecting Human Research Participants.”
Date of completion: 10/19/2013
Certification Number: 1307235
## Appendix H

**Communication and Team Skills (CATS) Assessment Instrument – Updated version**

<table>
<thead>
<tr>
<th>Category</th>
<th>Behavior</th>
<th>Observed, Adequate</th>
<th>Observed, Inadequate</th>
<th>Expected but not observed</th>
<th>Comments</th>
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<td><strong>Coordination</strong></td>
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<td>Coordination</td>
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<td>Briefing – Verbalize plan</td>
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<td>Debriefing</td>
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<td><strong>Awareness</strong></td>
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<td>Visually scan environment</td>
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<td></td>
<td>Verbalize adjustments in plan as changes occur</td>
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<td><strong>Cooperation</strong></td>
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<td>Request external resources, ask for help as needed</td>
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<td>Receptive to assertion and ideas</td>
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<td>Closed loop</td>
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<td>SBAR</td>
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<td></td>
<td>Verbal updates – think aloud</td>
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<td>Communication</td>
<td>Critical language</td>
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</tbody>
</table>

**Definition of Communication and Team Skills Behavior Markers – Updated version**

*Briefing - Verbalize Plan* - A conversation and two-way dialogue of concise and relevant information shared prior to a procedure or activity. Surgical “time out” may be a briefing. Elements: Get the person’s attention; Make eye contact; Introduce yourself; Use names; Use SBAR; Supply explicitly asked for information; Talk about next steps; Encourage ongoing monitoring and cross-monitoring. Speak aloud next steps for the procedure and/or care of patient. Anticipate procedure eg: “frozen section for this case, make sure pathology aware”

*Debriefing* - A conversation and two-way dialogue of concise and relevant information shared after the procedure or activity is completed. Debriefing identifies what went well, what could have been done differently, and what was learned.

*Visually Scan Environment* – Clinicians look up, look at one another, look at equipment, look around the room. Especially before incision- surgeon/staff scan room to make sure all equipment is there and set up right.

*Verbalize Adjustments in Plan as Changes Occur* – Speak aloud new plans, changes in strategy or intervention, and new timelines as procedure progresses. Change in procedure once it is started- “We need a frozen, this looks suspicious.”
Request additional external resources, ask for help if needed - Speak aloud asking for help from outside the team—other clinicians, rooms, equipment, consults, etc.

Cross Monitoring – Team members have an awareness of each other’s actions, verbally stating concerns, sharing workload, verbally updating others in a manner less formal than briefing, Speak aloud timeframes for particular interventions: “We’ll give this another two minutes and if there’s no change we’ll try X.” Ask aloud for team’s suggestions, opinions, comments or ideas. “Please put on a sleeve, you may have touched the wall.” “I gave the scrub a 2-0chromic while you stepped out with the frozen.” “Can you please check to make sure that I set this up correctly?”

Verbal assertion -Speak up, - If team members are uncomfortable or unclear, they speak aloud their concerns and state an alternative viewpoint or suggest an alternative course of action. Individuals are sufficiently persistent to clearly state their opinion. If team members perceive something as unsafe, they speak aloud to indicate that. “Counts are not correct—hold off on closing”

Receptive to assertion and ideas – Team members respond in a positive, non-hostile manner to the concerns and ideas of fellow team members. “Are the counts correct yet? Can we close?”

Closed loop communication – When a request is made of team members, someone specifically affirms aloud that they will complete the task and state aloud when the task has been completed.

SBAR – Use of specific structured communication that states the Situation, Background, Assessment and Recommendation. Use during relief.

Verbal updates of situation – think aloud – Team members verbally state their perceptions, actions, and plans as the procedure progresses. Keeping abreast of the procedure, anticipate needs, including counts and specimens. “We’ll be closing as soon as we get the frozen margins” or “Do you want the suture on the specimen to designate short superior/long lateral?” “That looks like a tiny space, do you want Dr. Smith’s retractor?”

Use Names - team members – Use team members’ names.

Communicate with patient/family – Team members speak to and respond to the patient and their family-if present

Use appropriate tone of voice – Team members use a tone of voice that is calm, professional, and not unnecessarily loud.
Establish Event Manager if Crisis Arises - Verbally identify who’s in charge if situation becomes a crisis; event manager does not participate in active interventions but maintains situational awareness and verbalizes plans, needs, and timeframes.

Escalate asserted concerns – Teammates initiate chain of command if their expressed, asserted concerns are not addressed

Critical Language – Use of key phrases understood by all team members to mean “stop and listen, we have a potential problem”. Specific phrases may differ from one institution or work unit to another.
### Appendix J

#### 2014 Results

<table>
<thead>
<tr>
<th>Category</th>
<th>Behavior</th>
<th>Observed, Adequate</th>
<th>Observed, Inadequate</th>
<th>Expected but not observed</th>
<th>Total</th>
<th>%</th>
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#### Crisis Situation Behaviors 2014

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<td>1/1</td>
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<tr>
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<td>1/1</td>
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<td>Totals</td>
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<td>516/521</td>
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<td>34/0</td>
<td>2213.5/2357</td>
<td>93.9%</td>
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</table>
Appendix J

Definitions

Close Call
A popular term for a serious medical error that does not result in harm to the patient (Segen's Medical Dictionary, 2012).

Near Miss
An unplanned event that did not result in injury, illness, or damage – but had the potential to do so. Only a fortunate break in the chain of events prevented an injury, fatality or damage; in other words, a miss that was nonetheless very near (TJC, 2013).

Retained Surgical Sponge
An error made during surgery in which one or more surgical sponges remains in the operative field after closing the patient, which may become a source for infection (Segen's Medical Dictionary, 2012).

Retained Surgical Item
An error made during surgery in which one or more surgical sponges remains in the operative field after closing the patient, which may become a source for infection (Segen's Medical Dictionary, 2012).

Sentinel Event
A sentinel event is an unexpected occurrence involving death or serious physical or psychological injury, or the risk thereof. Serious injury specifically includes loss of limb or function. The phrase, "or the risk thereof" includes any process variation for which a recurrence would carry a significant chance of a serious adverse outcome. Such events are called "sentinel" because they signal the need for immediate investigation and response. (TJC, 2013).
Surgical Safety Checklist

A simple checklist developed by the World Health Organization which has been shown to reduce surgical morbidity and mortality and sentinel events by such simple exercises as confirming the patient’s identity, site, procedure and consent, allergies, airway/aspiration risk, risk of blood loss, sponge counts, etc. (Segen's Medical Dictionary, 2012).

Time Out

The process a surgical team utilizes prior to the start of a surgical procedure to prevent a wrong-site, wrong-side, wrong-procedure or wrong-person surgery (TJC, 2013).

Unintentional Retained Foreign Object (URFO)

URFOs refer to any item or foreign object related to any operative or invasive procedure that is left inside a patient (TJC, 2013).
Time Out Process

- Patient on table. Perioperative team (RN circulator, scrub person, anesthesia provider(s), surgical assistant and surgeon. Patient not draped but asleep.
- RN: “Can we do our time out?” Scrub person preparing table and anesthesia providers talking while showing syringes and surgeon and assistant looking at x-rays or chart report. No one paying attention.
- RN: “Can we do our time out? We have to get started!” Everyone now stops and the time out begins. RN leads “Patient is Mary Smith, DOB 10/2/1986, procedure is a removal of bilateral breast implants”
Time Out Process

- She is interrupted by anesthesia who continues to talk. RN states, “We are doing the time out. Please pay attention and stop what you are doing.” Anesthetist redirects their attention to the RN. The RN continues with the site marking, allergies, position, special equipment, implants, radiologic studies.

- Anesthesia: “Patient has no allergies as Melissa RN stated and I will wait on the antibiotic until after cultures, right Dr. Surgeon?”

- Surgeon: “I am going to need 2 sets of cultures: anaerobic, aerobic, and C&S. Also, please make sure we have a lot of irrigation with Kantrix 1 mg to every liter of saline. Also, thanks Dr. Anesthesia for waiting on the IV antibiotics until after cultures. I will let you know when to give it.”

- RN continues: “Venodyne boots are on and are there any other safety issues that need mentioning?” No? Then are we all in agreement? Perioperative team: “Yes”

Time Out Process Catch Phrases throughout segment

- Standardized Communication-
  - Focuses on the patient not the people
  - Standardized format allows all parties to know what is going to be communicated, the communication structure and the required elements.

- Assertive Communication-
  - Being organized in thought and communication
  - Being competent technical and socially
  - Owned by the entire team
  - Must be valued by the receiver to be successful
SBAR

- Two RNs giving relief report during the middle of a case.
  - RN1: “Hi RN2! Glad to see you back from vacation.”
  - RN2: “Hi RN1! Vacation was great! I’ll show you pictures later. What’s going on here?”
  - RN1: “We have Mary Smith DOB 10/2/1986 who is having bilateral breast implant removal. She has no allergies and had these implants placed approximately 5 months ago and now are infected.”
  - RN2: “Oh, that’s too bad. Did you do any cultures?”
  - RN1: “Yes, cultures for aerobic, anaerobic and C&S are there. There is one set for each side.” RN1 shows the cultures that are labeled and bagged and reviews the lab slip.
  - RN1: “The only med on the field was Kantrex (shows vial) and it was for irrigating. Irrigation is done, correct? Scrub person?”
  - RN1: “Yes, irrigation is done. Right now I need a 4-0 biosyn” Scrub person says.

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SBAR

- RN1 pops a biosyn onto field and adds it to the count. Both RN1 and RN2 start counting sutures, laps and sponges, and miscellaneous items audibly and visibly. Relief counts ok.
- RN1 asks, “Is there anything else before I go?” and RN2 looks on table and sees a mosquito clamp and asks “Is this part of the count?” RN1, “Yes, it fell. Initial instrument counts are correct with paper.”
- RN2: “Enjoy your lunch!”
SBAR Catch Phrases throughout segment

- Hand offs are interactive communications allowing the opportunity for questioning between the giver and the receiver of patient information.
- Hand offs include up-to-date information regarding the patient’s care, surgery, condition and any recent anticipated changes.

Medication Administration/Labeling in the OR (Closed Loop Communication)

- Nurse to scrub person in OR prior to patient on table.
- Nurse checks (preference card? MD orders?) with vial of Lidocaine 1% in hand and reads aloud, “Lidocaine 1% on field for local injection. Patient has no allergies.”
- Nurse presents vial to scrub person reading aloud, “Lidocaine 1%. 30ml expiration date November 2015. Patient has no allergies.”
- Scrub stops and reads aloud with RN. Receives medication via sterile transfer device in cup and labels confirming aloud, “Lidocaine 1% 30ml.” Scrub then draws up 10ml of lidocaine 1% and proceeds to label the 10ml syringe on non-calibrated/marked side of syringe.
- Fast forward to beginning of case, surgeon asks for “local, please.” Scrub person repeats aloud, “Lidocaine 1% 10ml local. Patient has no allergies.” Surgeon states “Yes, please. Thanks.”
Medication Administration Catch Phrases throughout segment

- Consistency In Communication
  - Focuses on the patient and individual needs
  - Requires interdisciplinary teamwork and interaction

- Task to completion
  - Drug retrieval, preparation, and administration are all performed in a manner that is free of distractions.

Post test competency questions

Perioperative leaders should demonstrate to employees and others that the needs of certain individual staff members (i.e., surgeons) are more important than others and should reinforce that all OR personnel should share this same vision and way of thinking.

True    False
Post test competency questions

Ways that OR nurses/technicians can become more assertive and empowered to speak up include
   a. Sharing and listening to personal stories
   b. Practicing how to handle different scenarios through role playing and scripting
   c. Being socially confident and assertive at all times
   d. Focusing attention on the consistency and quality of safety behaviors
1. a, and c.
2. b, and d.
3. a, b, and d.
4. All of the above

Post test competency questions

Actions that can help to change behavior include
   a. Using the phrase "it is a patient safety issue" when speaking up
   b. Showing frustration or anger to demonstrate the seriousness of the behavior
   c. Using clearly state opinions during a confrontation
   d. Using threats and influence to implement changes
Post test competency questions

1. The definition of a handoff includes
   a. It is recognized as the highest point of vulnerability in patient safety
   b. Handoff includes communication which is verbal, written, or simultaneous verbal and written channels
   c. Nurse-to-nurse, shift-to-shift, unit-to-unit and facility-to-facility are transitions of care in which a handoff occurs
   d. The result of inadequate handoffs is that safety often fails
   1. a., b., and d.
   2. a. and b.
   3. a., b., and c.
   4. All of the above

Post test competency questions

2. The SBAR (situation, background, assessment and recommendation) tool standardizes behavior between the physician and nurse and forces both the sender and receiver to move through a discussion in a predictable, logical flow that is not dependent on personality, status or hierarchy, sex, ethnic background or differences in communication styles. It speaks the same language.
   True   False