2017

Consensus in Anesthesia Handoff Reporting

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects, and that any and all revisions required by the review committee have been made.

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Walden University 2017

Abstract

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Robin L. Groves Anselm

MSN, Case Western Reserve University, 1994

BSN, University of Akron, 1984

Project Submitted in Partial Fulfillment

Of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 13, 2017

Abstract

Despite some improvement, no consensus exists to perfect quality in anesthesia handoff practice and policy. This quality improvement project was designed to assist a local anesthesia and perioperative workforce questioning the quality of its current handoff. Theories and models used to inform the project included the Inter-Professional Team Collaborative, Lewin's change theory, the continuous quality improvement theory, and the knowledge to action model. The communication assessment tool (CAT) functioned as a needs assessment yielding a gap in handoff practice of 25 participants. The CAT also served as the post project evaluation survey. The situation, background, assessment, and recommendation (SBAR) tool was preferred. Participants received SBAR education, and clinical evaluation experience (CEX) survey training. The CEX described the quality indicators of participant handovers during four consecutive weeks. Descriptive and inferential statistics used to analyze data collections included means and standard deviations, examining trends in the continuous level variables. Reliability of the CAT variables was evaluated through Cronbach's alpha test of internal consistency. Inferential analyses included independent sample *t* tests, Pearson correlations, and analyses of variance (ANOVAs). Statistical significance was evaluated at the conventional level, $\alpha = .05$. The use of the SBAR handoff tool showed parity in communication competency. Quality indicators of overall handoff remained highly satisfactory. Recommendations include the consensual use of SBAR handoff and competency evaluation across the anesthesia community. Modification of handoff practices and policies will enable social change by promoting quality indicators in anesthesia collaborative communication.

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Dedication

Dedicated to my brother, Daniel Lee Groves, in support of the Melanoma Research Foundation.

Acknowledgments

I would like to acknowledge my family, classmates, coworkers, and friends for your encouragement. I would like to acknowledge my project mentor, Dr. Kurt Mueller; my professors at Walden University, particularly my review committee chair Dr. Amelia Nichols; my review committee member, Dr. Kathleen Brewer; and the Dean of the Walden University School of Nursing, Dr. Nancy Moss. Your support and helpful departmental staff was integral in my Doctorate of Nursing Practice scholarly transformation.

Finally, I would like to thank the director of nursing, the director of perioperative services, the director of anesthesia services, and all of the staff at Richmond Heights Regional Medical Center, in Richmond Heights, Ohio, who participated in my project study. It is because of your contributions that I was able to complete this DNP journey.

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Section 1: Introduction

Overview of Consensus in Anesthesia Handoff Quality Improvement Project

Consistency in communication encourages collaboration and helps prevent errors (O'Daniel, 2008). In the United States (U.S.), health care providers are teaming up to provide coordinated and seamless patient care, reducing medical errors and costs, and improving health care quality (Remond, 2014). Health care disciplines communicate differently. A technique that seeks to bridge the gap between the different communication styles of physicians, nurses, and other disciplines is the situation, background, assessment, and recommendation (SBAR) tool. This is a communication briefing model used successfully to enhance handoff communication (Friesen, 2008). Handoff communication by the perioperative and anesthesia workforce must be improved as a team to deliver quality patient care and prevent errors.

Problem Statement

Despite some improvement in implementing anesthesia handoff communication, agreement among the workforce team does not exist on what quality and competency elements are necessary in a uniform anesthesia handoff. The focus of this doctoral project featured a quality improvement design to assist a local anesthesia and perioperative collaborative workforce to align the quality of their current practice in handoff care with The Joint Commission (TJC) safety goal for evidence-based, standardized communication handoff (TJC, 2012). The process of quality improvement allows the advance practice nurse to influence change from a current state of individualized handoff

practice to an evidence-based standardized anesthesia handoff. This change is intended to improve patient outcomes.

Purpose

The purpose of the project was to address a gap in local handoff practices in the perioperative and anesthesia department. I sought to analyze the efficacy of SBAR to maximize quality indicators of team communication competency in the perioperative and anesthesia workforce handoff. Specifically, I examined quality domains of handoff setting, efficiency, communication, content, judgement, humanistic, and overall handoff competency. In addition, I used data regarding minutes spent providing and receiving handoff to estimate the financial value of the SBAR tool in this project setting.

Nature of the Project

Communication ontology quality indicators for perioperative and anesthesia workforce are yet to be formally agreed upon. The scope relates to the science of errors, communication errors, and specifically handoff errors in the anesthesia workforce domain. Workforce handoff reporting performance was improved through measured steps. The data collection for the project involved use of various practice workforce categories as sources of evidence. The anesthesia providers included physicians, certified registered nurse anesthetists, and anesthesia assistants. The perioperative staff consisted of registered nurses. I used a unified inter-professional collaborations model to maximize strengths of multiple workforce disciplines and compensate for the variabilities of individual practice categories. This quality improvement project was made of a collaborating team. The team participated in the communication needs assessment,

identification of practice gap, structured educational module, clinical competency provider and recipient handoffs, and post project communication evaluation. I anticipated that the analysis of the project would show a marked closure in the overall handoff communication gap at this local practice.

Project Question

I used the following project question: In the anesthesia and perioperative workforce settings, do collaborative competency domain datasets indicate evidence of quality improvement when using SBAR as a consensus communication model?

Project objectives. I identified eight main project objectives at the outset:

- Examine anesthesia handoff practice at a local anesthesia department.
- Determine defective elements within the local practice original handoff mechanism.
- Align handoff processes with current evidence-based practices.
- Review with the administration, managers and stakeholders the detected macro and microsystem vulnerabilities of the current handoff.
- Query via a needs assessment of the anesthesia and perianesthesia workforce their impression of current handoff competency and quality.
- Support SBAR as an evidence-based method of team communication for handoff through workforce education and its application to the project clinical experience (CEX) provider and recipient tools.

- Evaluate workforce evidence of post-project handoff competency and quality improvement.
- Disseminate project results.

Significance of the Project

Anesthesia care does not occur in an operating room silo. Stakeholders include the anesthesia department and ambulatory surgery department. These include patient advocates, the anesthesia and perioperative workforce, department managers, department directors, staff development teams, quality improvement teams, financial managers, risk managers, and the regional nursing administrator. An anesthesia workforce can no longer rely on instinct or historical-driven personal communication styles in care delivery. Rather, a collaborative effort must be used to translate and integrate an evidence-based communication model into the personal anesthesia practice arena with the Triple Aim (Institute for Healthcare Improvement, 2017) intent to improve quality, limit or reduce costs, and affect favorable patient outcomes.

Implications for social change in practice. The overarching goals of the U.S. Department of Health and Human Services program Healthy People 2020 include increasing quality, as well as years of healthy life by eliminating health disparities, risk of injury, and decreasing risk of mortality (Nash, 2011). The problem of inadequate handoff reporting has been so prominent that Joint Commission of Accredited Hospital Organizations (JCAHO) was compelled to develop the National Patient Safety Goal 2E which focused on hospitals implementing a standardized approach to handoff communication (Friesen, 2008; Kalkman, 2010). This project contributes to Healthy

People 2020 goals because risks of injury and mortality will be reduced in the project's perioperative and anesthesia settings. The mission of the Institute of Healthcare Improvement (IHI) is to improve health care worldwide with their Triple Aim strategy (Institute for Healthcare Improvement, 2017). This can be accomplished with handoff improvement. The IHI has made readily accessible an SBAR toolkit on its website recommending its use for education, implementation, and evaluation in all settings. In addition, this project aligns with The Joint Commission Center for Transforming Healthcare 2012 Targeted Solutions Tool (TST) aimed at measuring effective hand-offs and providing proven solutions for health care providers (Benjamin, Hargrave, & Nether, 2016). This project will support social change because it sets the stage for global anesthesia providers to calibrate handoff policies and competencies, using a consensus in evidence-based communication handoff practice.

Summary

Deming, the father of the quality evolution, is known for his role in transforming the responsibility of quality to everyone (Deming, 1982, 2000). My role in this project was to facilitate translation of research evidence into local nursing practice using quality improvement (AACN, 2006). At the outset of the project, the anesthesia and perioperative workforce team sought to mitigate a gap in the handoff process as regulatory organizations had prioritized safety in health care team communication for all clinical settings (Lane-Fall et al., 2014). The project stakeholders acknowledged that the anesthesia workforce alignment with best practice in handoffs had not been established, but that they were interested in redesigning their current handoff practices. The project

addressed the handoff gap in local practice using SBAR education, implementation, and clinical competency evaluation. Anticipated findings included closure of the real time practice handoff gap in communication supported by measured clinical competency in handoffs.

Section 2: Background and Context

The level of difficulty in managing and transferring the care of patients is becoming increasingly complex. Quality of anesthesia handoff cannot be an educated guess. Evidence-based practice is essential to safety in today's health care environment. Despite some improvement in implementation of anesthesia handoff communication, agreement among the workforce team does not exist on what quality and competency elements are necessary in a uniform anesthesia handoff. This gap in contemporary practice provides the opportunity to pose the following project question: In the anesthesia and perioperative workforce settings, do collaborative competency domain datasets indicate evidence of quality improvement when using SBAR as a consensus communication model? The purpose of the project was to analyze the efficacy of SBAR to maximize quality indicators of team communication competency in the perioperative and anesthesia handoff. A synthesis of the concepts, models, and theories used to inform the project will follow. The relevance of this doctoral project to nursing practice will be summarized. A synopsis of the local practice background and context will be reviewed. I will describe my role as the DNP student, and I will describe the project team.

Concepts, Models, and Theories

Critical thinking was cultivated in this project by linking the gap in local handoff practice to research and theory. Theories and models used to inform this project included the Inter-Professional Education and Collaborative (IPEC) framework, Lewin's change theory, the Institute for Healthcare Improvement (IHI) Triple Aim, the Continuous

Quality Improvement (CQI) managerial theory, and the Knowledge-To-Action (KTA) evidence-based practice model. Visual representations of these concepts, theories and models are located in the appendices. The rational for the use of the IPEC framework was to utilize the overarching transdisciplinary theory to explain the practice problem in terms that targeted the collaborating team's quality improvement in a meaningful and measurable manner. Lewin's theory of change was used to describe the group process of change in practice. CQI helped operationalize the mission of the CQI directly through plan-do-study-act type cycles (Appendix A). I used the IHI Triple Aim model to narrow the focus of the goals of the team's change. The KTA model assisted me to coordinate the workforce team objectives in a step-by-step fashion.

Overwhelmingly, the plethoric support for improving health care handoff can be easily substantiated by an abundance of advocating organizations. The extensive roots of this advocacy are combined in the following synthesis of primary writings, key theories, and seminal scholars, which bridge the theories and models to the doctoral project topic.

The key theories guiding this doctoral project were the IPEC theory and Lewin's theory of change. The vision of the IPEC model promotes interprofessional education, alleviating professional silo barriers. This format of education and practice enhances collaborative, nonhierarchical relationships in effective teams (Frenk et al., 2010, p. 1,951; IPEC, 2011). The IPEC is notably one of only 10 recommendations by the Commission on Education of Health Professionals for the 21st Century. Preparing future health professionals to collaborate will strengthen health systems and more adequately address global health needs. Integral to this theory is the idea that globally prepared

health workforces are more responsive to actual population and personal health needs adapted to local contexts. At the project initiation, IPEC Core Competencies model (Appendix C) set the stage for accomplishing team-based practice improvement and competency in the local project setting.

Lewin developed a change model involving three steps: unfreezing, changing, and refreezing (Appendix B). The Lewin process of change entails creating the need for change, then moving toward the new, desired level of behavior, and finally, solidifying that new behavior as the norm (Lewin, 1947). Lewin's theory of change outlined the group process of unfreezing, changing, and refreezing as previous habits in handoffs were rejected and replaced with the new norm of evidence-based practice in handoff.

The CQI model founders, Deming and Juran, had philosophical underpinnings substantiating process improvement rather than workforce defect (Deming, 1986). The CQI model guided the mission for quality improvement in anesthesia workforce handoffs because process improvement was needed, not workforce replacement. The IHI's Triple Aim supplied a pathway for how the quality in the project improvement might be measured (IHI, 2017). Berwick, Nolan, and Wittington (2008) describe the integration of three dimensions of health care performance, which must be addressed in the Triple Aim. These include improving the health care experience of the patient, improving the overall health of the population, and reducing per capita cost. Improving local workforce handoff would tailor the successful position of the project's department and organization in all three dimensions, deftly reducing morbidity and mortality through minimization of errors in communication. Knowledge generation and the implementation of existing and new

solutions is an intricate cyclical process that has been summarized by Graham and colleagues as the KTA model (Graham, et al., 2006). The KTA model (Appendix L) helped to demonstrate the cyclical ongoing improvement processes needed to translate and merge evidence-based knowledge about handoffs to the project's local practice.

Primary writings regarding the current state of the science of error were developed by Reason (1990), who actualized the Swiss Cheese Systems Model for managing the risk of organizational accidents. This model illustrates that although many layers of defense lie between hazards and accidents, there remain flaws in each layer that, if aligned, can allow an accident to occur (Perneger, 2005). It is also known as the cumulative act effect (Appendix D). Reducing errors of omission by preventing the order of magnitude in errors, or "Swiss Cheese Effect," adds additional safety layers, to thwart serious safety events. Serious quality events correspond with roughly eight errors. This is relevant to anesthesia communication, because on average, approximately four to five handoffs occur on each uncomplicated case. In a situation where there are eight or more handoffs, each containing one or more omission by various workforce members, the risk profoundly increases for a serious safety event. Quality handoff communication is necessary because the operating room and perioperative settings are special within hospitals, and they are considered one of the most unique and complex work environments in health care (Friesen, 2008). Quality of emergency room handoffs also apply to anesthesia due to the likelihood of participation in emergency situations in the operating room, as well as meeting the urgent need for emergency airway management in the emergency room or other hospital location. Coupling the settings of emergency

situations in the operating room, or even operating situations in the emergency room, has inherent risk of communication adverse events, but does provide the opportunity for two health care providers to assess the same situation and identify problems. This unique attribute is amplified specifically in peer-to-peer handoff intra-operatively for anesthesia providers, particularly on extremely lengthy cases where multiple handoffs expectedly occur.

The human component of any system will inevitably produce error (Gawron, 2006). Preventing events of harm through the use of collaborative communications in health care creates an environment in which individuals can speak up and express concerns, and share a common language to alert team members to an unsafe situation (Leonard, Graham, and Bonacum, 2004). This seminal form of teamwork communication is an adaption from the aviation industry over the past 25 years, and makes use of Crew Resource Management (CRM). Now required globally in aviation, CRM sought to standardize communication and teamwork (Leonard, Graham, & Bonacum, 2004). Similar to the field of aviation is the trademark in the anesthesia community of patient safety. The anesthesia workforce team in the doctoral project desired to improve the quality of communication in handoffs, exemplifying this trademark.

Power Distance is a theory developed by Geert Hofsted which addresses cultural dimensions (Shoenfelder, 2015). This theory defined the extent to which less powerful members of a particular culture accept and expect that power is distributed unequally within the hierarchy. Malcom Gladwell has worked to educate the field of medicine on how cultural barriers of authority gradient in cockpit communication gravely affected

CRM. Gladwell's teachings advocate allowing clarifying questions, support crosschecks, and champions coaching to improve team communication safety (Nash, 2010). Gladwell's teachings are particularly important in the field of anesthesia, as variability in anesthesia provider services can occur in practice models. The doctoral project anesthesia workforce services model was the Anesthesia Care Team (ACT) model. Although it is a team, hierarchal gradients can occur as the anesthesiologist functions as the team leader in this particular setting. The anesthesiologist in the project had practice traits similar to those described by Morrow (2016), which relates how highly reliable health care organizations destigmatize failure. These practice traits encourage employees to come forward with near-misses, and focus on processes and safeguards which work best.

According to Cook, Woods, and Bogner (1994) complexities of human errors, including behavior shaping factors have been an important historical element in developing algorithms for emergency situations in anesthesia, such as airway management. According to Norman (2013) the goal of human factors engineering is to optimize the relationship between humans and systems by studying behaviors, abilities, and limitations. Using this knowledge, systems for interpersonal communications can be designed to reduce error rates. Human centered design is just emerging in scholarly medicine, being open to understanding how human factors effect and change practice. A consensus for a communication algorithm for anesthesia would be a significant contribution, behaviorally designed around changing handoff practice through the use of a people-centered approach. At the project setting, a people-centered approach included using the pneumonic of SBAR to formulate behavioral communication modifications in

personal practice. An example of this is a team member altering handoff practice by allowing sufficient time to relay important information or allow a fellow team member to ask clarifying questions.

Clarification of Terms

In this doctoral project, handoff is chosen by the project team as the designated term inclusive in the literature for exchange of information in handover, report, transfer of care, sign out, and sign off. In addition, the anesthesia workforce team in this project specifically relates to anesthesia providers, whereas the workforce team is inclusive of the anesthesia and peri-operative teams.

Relevance to Nursing Practice

This project contributed to the global clinical community of anesthesia, advance practice nursing and all nursing colleagues, through the comparison of findings related to clinical SBAR practice handoff competency, and advancing the science of communication errors in the anesthesia workforce. These advancements included improving, defining, and auditing collaborating collegial competencies in handoff practice and potentially influencing policy regarding anesthesia communication error ontology. While the specialty of anesthesia can make correcting the issue seem like a vexing conundrum, utilizing lessons learned by the nursing profession addressing inter-professional collaborating gaps in handoffs will springboard our achievements by identifying previous strategies and approaches. Moreover, in the U.S. alone, the Association of Operating Room Nurses (AORN) and American Society of Peri-Anesthesia Nursing have established action plans and checklist recommendations for the

effective handoff. In June of 2015, the Anesthesia Patient Safety Foundation (APSF) as an organization, embarked on improving anesthesia handoffs to the post anesthesia recovery receiver (aspf.org). Though no studies to that date indicated a specific ideal structured tool, it was the priority of the APSF to create a succinct checklist aimed at improving information exchange as a 2-way communication (apsf.org). Still, no consensus tool was established. One encouraging recommendation was that the organization was interested in future endeavors to incorporate the surgical and anesthesia handoff in an effort to create a comprehensive, multidisciplinary handoff process. In addition, a larger study was thought to possibly allow measurement of the effect that a standardized handoff process will have on patient outcomes (apsf.org).

Techniques for improving communication in health care originate in methods used by the military. Specifically, the Navy Sector Submarine Division, and aviation, astronautic, nuclear, and fire safety industries use evidenced based models to facilitate prompt and appropriate communication. The scholarly SBAR technique for health care was refined by Michael Leonard, MD, a physician leader for patient safety, along with colleagues Doug Bonacum and Susanne Graham (IHI, 2015). Redesigning a workforce practice to modernize the standard of care regarding handoff reporting has become a growing recommendation by the global health care policy influencers. The current state of practice recommendations favoring SBAR include the Agency for Healthcare Research and Quality, the Institute for Healthcare Improvement, the Joint Commission of Hospitals, the National Academies of Science, Engineering and Medicine, Health and Medicine Division, (previously the Institute of Medicine), the National Committee for

Quality Assurance, the Robert Woods Johnson Foundation, the World Alliance for Patient Safety, and the World Health Organization (AHRQ, 2015; IHI, 2017; IOM, 2001; TJC, 2012; NCQA, 2015; RWJF, 2015; WAPS, 2004; WHO, 2010). Though not an exhaustive list, it comprehensively points the compass of care towards SBAR handoff, which is widely used throughout the world for team communication (RWJF, 2015). Collaborating teams in anesthesia, as well as sole providers such as Certified Registered Nurse Anesthetists or physician Anesthesiologist, who desire best practices within their professional specialty, will seek to use this information to improve or validate competencies in anesthesia handoffs.

Local Background and Context

The main campus metropolitan hospital system of the doctoral project is a major not-for-profit medical complex in Northeastern Ohio. The organizational mission is to heal, to teach, to discover. The vision is to provide superior quality and personalized patient experience. Core values include excellence, diversity, integrity, compassion, and teamwork. Throughout Ohio, 150 regional affiliations exist in this system. The main campus uses advanced health information technology in electronic medical record use. The institutional context of the doctoral project was one regional hospital affiliation site. Founded in 1961 the project site is a full-service, 125-bed acute care facility serving the residents of Eastern Cuyahoga County, providing a wide range of comprehensive medical and surgical services. This site did not use electronic medical records at the outset of the project. The provider population included the ambulatory surgery perioperative and anesthesia workforce team. The operating room governance was decentralized, allowing

the workforce team to choose how to proceed with addressing their identified gap in handoff practice.

The project site participated as part of the Institute for Quality and Innovations connected with the main organization. The hospital system utilizes TeamSTEPPS as an evidence-based system known to improve communication and teamwork skills among health care professionals. Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS, 2017) was released by the Department of Defense Patient Safety Program (PSP) in 2006 as a systematic approach to integrate teamwork into practice at medical facilities. Although TeamSTEPPS does support the use of SBAR for handoffs, their tool was limited to long term care and nursing home sites (AHRQ, 2017). Therefore, the project workforce did not rely on a SBAR tool in TeamSTEPPS as a resource for this project.

State government context of the practice problem can be supported in the State of Ohio Nurse Practice Act. Here, it is legally delineated into what constitutes standards for professional practice for all registered nurses. Pertinent examples include standards of professional practice regarding quality of practice, communication, leadership, collaboration, and professional practice evaluation. In addition, the Ohio APRN Practice Act supports using evidence in the depth and breadth of knowledge and skills used for clinical competency.

Federal context of this doctoral project involves The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) which has provided the first standardized patient satisfaction perspective assessment used throughout the U.S.

(CMS, 2017). For health care organizations, the tie between HCAHPS and reimbursement became significant with the signing of the Patient Protection and Affordable Care Act (PPACA) in 2010. This federal legislation requires hospitals and other care providers to meet standards for patient safety and satisfaction in order to receive federal funding and reimbursement (United States Congress, 2010). Also, this publically reported forum provides an avenue for consumers to view data from HCAHPS which may influence their health care decisions.

Role of the DNP Student

The DNP project experience provided an immersion opportunity for professional growth. Curriculum elements in the Doctorate of Nursing Practice program addressed during the project included scholarship and leadership in advance practice nursing, promoting quality improvements, strategizing to refine patient and population health outcomes, and informing health care policy makers at the project site. I contributed the main project idea, the methodology tools, the implementation plan, and evaluation plan. I also participated actively as a project manager.

Motivations for the project stemmed from the my own practice in anesthesia reflecting much needed improvement in workforce handoff processes. Bias was thought to be avoided by not using the my primary workplace for the project, but may have occurred by an eager project site workforce, who ultimately had to wait for the project approval in order to get underway. It is plausible that this may have not impacted the project dramatically as this was a hospital site participating in the process of quality improvement project processes frequently.

Role of the Project Team

A team effort was necessary to accomplish the project. Stakeholder members of the team included myself as the project manager, my mentor, unit administrators and managers, the medical director of anesthesiology, and supporting ancillary staff. My mentor contributed through the role of a project champion. The administrative leadership and unit managers assisted in providing approval of the project, agreement of methodological tools, and encouraged participation of human resources preoperatively and postoperatively. The director of anesthesia supported the project with participation encouragement of anesthesia staff intraoperatively, and peri-operatively. In addition, the director shared insight about the project at the organizational operating room governance meeting.

Timeline Description

I initially estimated the overall timeline of the doctoral project as six months beginning in May, 2015 pending internal review board (IRB) approval sought in July 2015. However, the actual timeline ran approximately one year longer. This resulted from recurring efforts towards the necessary doctoral student's university IRB processes combined with the hospital system IRB processes. The forward progression of these processes may have been hindered by the project site not being my primary worksite, and to some degree the expected modifications to the timeline, though feasible, were frustrating to all involved. I performed the pre-intervention communication needs assessment in one day, and the actual project implementation time was four weeks. The post intervention communication assessment ran for 1 week following implementation.

The projected time frame for project team members to review and provide feedback on the project results is through March of 2017.

Summary

This section contains a description of the doctoral project's background and context vetted evidence of the history, scope, and implications of handoff practice quality improvement. This evaluation of the context of the science of errors, the science of communication errors, and the science of anesthesia communication errors, contributes to perspective on the local handoff practice gap. A more in-depth analysis of overall anesthesia handoff practices as well as gaps in practice will be provided in the review of literature in the subsequent section.

Section 3: Collection and Analysis of Evidence

Approach

I established the background and context of this project through evidence of the history, scope, and implications of handoff practice. This evaluation using the context of the science of errors, the science of communication errors, and the science of anesthesia communication errors, contributed to perspective on the local handoff practice gap. The unique purpose of this project was to align the perioperative and anesthesia team members desire for a sustainable improvement in handoff competency and consistency with current best practice. In this section, I will analyze sources of evidence that I relied on to appropriately address the practice question. A synthesis of these sources will follow as well as a summary of this section. I will present the findings and recommendations presented in Section 4.

Practice-Focused Question

To begin understanding the approach, I revisited the practice-focused question. The project question was: Do collaborative competency domain datasets indicate evidence of quality improvement when using SBAR as a consensus communication model by the anesthesia and perioperative workforce?

Sources of Evidence

Evidence-based practice guided this quality improvement project. The goal of evaluating sources of evidence for the nature of anesthesia workforce handoff

competency was accomplished by conducting a systematic literature review and evaluating sources generated for the doctoral study.

Evidence in Published Research and Outcomes

An exhaustive review of published research and outcomes regarding anesthesia communication handoff practices aligned the gap in practice at the project site with evidence and knowledge about the inherent maturation of anesthesia handoffs. This enabled me to comprehensively understand the practice issue by studying the history, scope, implication, known gaps or barriers, protocols, trends in mnemonic tools used, and whether quality indicators for competency exist. Major themes in the literature were identified and discussed.

Literature Review

A systematic review using Thoreau in Walden University library portal of databases was performed. The search was limited to evidence-based, peer-reviewed journal articles using Boolean phrase for *anesthesia* AND *handover* AND *tool*, which yielded eight articles between years 2000 and 2014. This was followed by a search limited to evidence-based, peer-reviewed journal articles using Boolean phrase for *anesthesia* AND *handover* AND *safety*, which yielded 23 articles between the years 2000 and 2014. The most updated search was limited to evidence-based, peer-reviewed journal articles using Boolean phrase for *anesthesia* AND *handoff*, which yielded 4 additional articles between the years of 2015 and 2017. Exclusion criteria included articles relating to transfers of care outside of the perioperative setting. I used the GRADE (Gyatt, 2011) system to appraise the literature review, which overall yielded a medium to high grade.

No consensus for an anesthesia handoff tool was uncovered. Furthermore, no quality indicators for communication competency in anesthesia handoff have been operationalized. I grouped articles based on three topics of handoff communication in anesthesia. The three topics are: Evidence that shaped the past handoff, evidence shaping the present handoff, and evidence shaping the future handoff.

Evidence That Shaped the Past Handoff

Historically, anesthesia handoff reporting has been a rather informal verbal experience summing up the information regarding the patient and the procedure. The anesthesia handoff reporting was brief and sometimes it was missing altogether, such as in the preoperative segment of patient care. Personalized handoff style dominated in the anesthesia field. Keeping in mind that anesthesia workforce attends patients outside of the operating room, probably the best handoffs occurred in the operating room and obstetrical suites. This may not be saying a great deal, as 88% of handoffs were perceived as inadequate in these settings alone. Obstetrical anesthetists surveyed by Sabir et al in 2006, discovered 4% of units reported critical incidents following inadequate handovers in the course of twelve months. In addition, handover policies were available in 10% of units, but documented in writing only 7% of the time.

In the year of 2000, the IOM was making strides to cross the quality chasm with the goal of reducing errors leading to undesirable patient outcomes. Analyses of errors to determine root cause proved useful. A common thread of health care communication error accounted for up to 85% of errors causing an adverse event. Communication became a targeted area for improvement. Basic contributing factors in two-way

communication error became a focus. This included provider error, message error, receiver error, and feedback error (Appendix O). In 2001, the recommendation came from the IOM to redesign and modernize the processes of care for handoff reporting. The standardization of handoffs was one solution, using any number of checklists. Developed in 2002, the National Patient Safety Goals were introduced by the JCH to address specific patient safety issues (JCAHO, 2006). By 2006, JCH had fully endorsed the use of a systems approach giving NPSG 2 E guidelines for handoff. Subsequently, multiple clinical providers identified 46 clinical mnemonic tools in various departmental locations. But adoption saturation of these mnemonic innovations lagged. Barriers to adoption helped illuminate the complexity of the problem in the high-risk settings such as operating rooms and perioperative settings. By 2009, JCH recognized that more rigorous efforts were needed to drill down on the issue of handoff reporting to prevent health care communication errors and capture improved patient outcome. By 2012, JCH continued to work toward improving the effectiveness of communication among caregivers. Evidence of the past has shown an association between poor-quality handoffs and adverse events (Segall et al., 2012).

Evidence Shaping the Present Handoff

A major weakness of the past is that handoff modalities varied greatly, from written, verbal, telephoned, face-to-face, taped, bedside, to reading the actual chart (Staggers & Blaz, 2012). This justified expanded utilization of evidence-based methods to unify current communications, identifying how communication between team members should be simplified. A systematic review by Riesenberg, Leitzsch, and Little

(2009) focused on mnemonic tools used to improve handoff uniformity. Their findings revealed that the SBAR model was the most commonly used, appearing in 70% of 46 articles reviewed. A subsequent study by Riesenberg, Leitzsch, and Cunningham (2010) concluded that scanty research is the culprit in best practice identification (p.24). Both studies implicate lack of quantitative data available on handoff effectiveness. Recommended components to a checklist could measure quality based on content inclusion for handoff adequacy outlined by Segall (2012). To this end, a paucity remains regarding quantitative evidence about established tools or protocols for assessing the quality of a handoff (Horwitz et al., 2012).

What followed in the next several years was research documenting relationships between successful or unsuccessful handoffs and importance of team communication. To summarize anesthesia team communication errors in this section, I grouped errors into the following classifications:

- Modality - proficiency of providers and recipients in speaking, writing, listening, rebuffing interferences.
- Cognitive - noise, irritation, distraction, inattention, synthesis, fixation error, respectful appreciation cues.
- Linguistic - pronunciation, grammar, vocabulary, syntax.
- Form- omission, insertion, substitution, interruption, brevity, content, timing.
- Type - systematic error, competency error, medical product failure, resource or design failure.

- Contributing factors - human factors, power distance, multitasking, magnitude of error factors, anticipatory guidance, situation awareness, decision ownership, changes in supervision, and delegation.

Inconsistencies by team members have been implicated in the partial transfer of information, absent or inefficient execution of clinical tasks, and other communication issues affecting successful handoff (Segall et al., 2012). At this time, there are several broadly supported themes directly aimed at improving team handover processes. In particular, the utilization of a checklist has been advocated, to avoid missing or disorganized information (Singh-Radcliff, 2013). A survey study by Sabir et al. (2006) indicated that handoff policies were only available in 10% of obstetrical units where emergency cesarean surgeries take place. Furthermore, Sabir and colleagues discovered that the documentation of handoff use occurred 7% of the time. Catchpole et al. (2007) participated in a prospective intervention study measuring the change in performance before and after the implementation of a new handover protocol that was developed through detailed discussions with a Formula 1 racing team and aviation training captains. The team concluded that introducing the new handover protocol lead to improvements in all aspects of the handover. Similarly, a study by Choromanski (2014) revealed current intra-operative handover practices are suboptimal and poignantly notes that a national patient handover guideline would improve anesthesia related patient safety. Qualitative methods were used by Smith and Pope (2008) to analyze transcripts of practice observations and in-depth interviews of recovery room collaborative communication. Conclusions reflected differing expectations among anesthesia and nurses regarding

content and timing of information needed in handoff. Segall et al. (2012) studied a systematic review of primarily cross-sectional designed literature, identifying barriers to effective handoffs, and indicating an association between poor quality handoffs and adverse events. The hypothesis by Craig (2012) was supported in a prospective interventional study using the implementation of a structured handoff to significantly improve handoff performance. Nagpal (2013) used a prospective pre-post intervention study to demonstrate a significant reduction in information omissions and task errors as well as improved teamwork communication through standardization of handover protocol.

The development, implementation, and evaluation of a communication checklist tool designed to improve situation awareness, was examined by Wright (2013,) and was found to impact positively this vital element of collaborative communication. Starmer (2013) introduced a handoff bundle, the study of which confirmed the implementation improved handoff without changing workflow. Agarwal et al. (2015) instituted a checklist, improving both efficiency in transfer of information and retention by anesthesia providers. McLaren (2013) proved that a standardized handoff improved thoroughness and delivery of handoff without prolonging overall handoff time. De Meester (2013) used a pre-post interventional study design corroborated SBAR communication reduced unexpected death rates in the PACU. Hudson et al. (2014) tested and substantiated that handoff of anesthesia care is a critical time in care, associating poor handoff with greater risk of in-hospital morbidity and mortality.

Despite the widespread comprehension by the anesthesia and perioperative workforce that a checklist improves the handoff, practice adoption is not extensive. The current state of anesthesia and peri-operative workforce handoff is progressing, but much room is left to insure quality and competency. Anesthesia professionals have not generally been formally required to demonstrate their competence in handoff communication. In contrast, mandatory collaborative communication handoff training and demonstration of competence are currently required for residents who matriculate through Accreditation Council for Graduate Medical Education (ACGME) programs (Lane-Fall et al., 2014). Not only is demonstrating competency to communicate consistent with safe patient care, but the requirements for anesthesia professionals should be consistent with other team members in similarly complex settings. Improved staff communication in JCH's NPSG.02.03.01 (2017), highlights the ongoing dedication to this ongoing health care industry issue. Next, evidence shaping the future of handoff will be discussed.

Evidence shaping the future handoff. The evolution of anesthesia and peri-operative workforce handoff is transforming. Though significant variations in structure and practice of handoffs persists (Payne, 2012), the robustness of support from advocating organizations dramatically indicates the future workforce will be using practice guideline as a standard of care. Systematically, this style of reporting eases workflow by being effortless to follow and by clearly identifying all informational elements to be included. For example, attorney and author, James Lieber outlined five key strategies for businesses of health care to adopt which would reduce medical error

(Makary and Daniel, 2016). First on his list is adoption of the structured handoff, targeting the prevalence of communication errors indicated in a third of all health care error, and taking advantage of lessons learned to address the practice issue (Makary & Daniel, 2016).

The future is here, and it is time for the profession to put to use what has been learned from the past and present, to shape the future of anesthesia and peri-operative workforce handoffs. The Future of Nursing IOM Report (2010) campaigns for nursing leadership to respond to the constantly changing and evolving industry of health care. Multiple professional societies are backing improvements in handoff to improve safety. These organizations foster a culture of safety and open communications among all disciplines in health care.

Examples of anesthesia professional organizational mission statements examined regarding handoff communication include The American Association of Nurse Anesthetists (AANA), and the American Society of Anesthesiologists (ASA). A trademark of the entire anesthesia community is vigilance in patient safety. The AANA promotes a patient-centered approach for pre-procedural briefings, checklist implementation for transfers of care, CQI and a culture of open communication among team members (AANA.com). The ASA promotes safety through inter-professional communication as well. The ASA founded Anesthesia Patient Safety Foundation (apsf.org), which has identified inter-professional communication as a major factor in medical error and patient safety. A growing number of contemporary abstracts submitted to the foundation have included interest in the topic of handoff communication among

anesthesia personnel (apaf.org). A significant contribution for optimizing patient safety would include policy development for future anesthesia and peri-operative workforce handoffs.

Authoritative health care organizations, such as the JCH, AHRQ, and IHI, and WHO, have shifted to support the SBAR mnemonic as a means of urgently addressing collaborative communication handoffs. A five month pilot of SBAR method handoffs, tracked findings of potential care failures (Hoefner-Notz, 2013). However, the author noted that further evaluation of competency in SBAR usage is needed. Use of a consensus model such as SBAR may help map out semantic consistencies in anesthesia communication error data (Mokkarola, 2008). Furthermore, Mokkarola identifies that it is essential to develop a reporting type system to collect, analyze, interpret, and share the data. Aggregation of this data will serve as a sustainable early warning type system, signaling the error defect, as well as a remedial action system if the patient has not received the standard of excellence in workforce handoff (Hogan, 2014).

Evidence Generated for the Doctoral Project

The following section describes evidence and data that was primarily generated for the purpose of the doctoral project. This data was not part of the normal operations of the site.

Project design/methods. The evidence-based practice model KTA (Ward, 2009) with a 4-week Plan-Do-Study-Act iteration (Appendix L) applied in the planned quality improvement project. This was based upon the steps of knowledge transfer outlined by

the Agency for Healthcare Research and Quality (AHRQ). The following steps describe the three major stages as they relate to the project:

(1) Knowledge creation and distillation - accomplished through creating knowledge of the gap in collaborative communication handoff practices, and distilling how the gap existed at the project location through a needs assessment. The CQI strategy and Plan-Do-Study-Act (PDSA) style was ideal for the diverse employee workforce.

(2) Diffusion and dissemination - accomplished with the workforce education of SBAR handoff. SBAR training scenarios and competency assessments were implemented for the planned quality improvement. Planned workforce education regarding SBAR competency, and a series of practice scenarios as well as SBAR checklist inclusion items were coordinated with nursing leadership and anesthesia leadership. Two peer-to-peer day training sessions and one at will video SBAR training module made up the educational intervention. Communication evaluations occurred before and after implementation. The training and competency assessments were structured using an inter-professional educational collaborative approach.

(3) Organizational adoption and implementation – accomplished through real time clinical implementation and competency evaluation. Additional follow-up with leadership evaluation occurred post project to assess sustainability.

Population and sampling. The project site was not using electronic medical recording, unlike the main hospital system. The convenience sample population participating in the project included ambulatory surgery preoperative and postoperative nurses, operating room nurses, certified registered nurse anesthetists, and medical

anesthesiologist providers.

Data collection and protection of human subjects. The design was a prospective, quality improvement project. Measurement methods for the project was pre- and post-intervention paper and pencil survey. The setting was a regional community hospital site. Participants were from a purposive convenience sample of core program handoff team-members limited to the anesthesia and post anesthesia care workforce. Internal Review Board (IRB) approval was April 4, 2016 at the hospital system in Cleveland, Ohio (IRB# NHR-16-19). The Walden University IRB approval on May 19, 2016 for this study was 0519160419910.

The inter-professional collaborative design effort supported improved morale and quality, taking advantage of team dynamics to enhance behavior change that happened from within each individual and each group for lasting results. Surveys were completed anonymously, and anonymity was maintained as there were no personal identifiers, thus protecting the rights of human subjects.

Instruments. Handoff communication competency among workforce participants was assessed both pre and post intervention. A validated tool for assessing overall communications quality is the CAT (Communications Assessment Tool). This was adapted with permission, for assessing team handoff instead of an individual evaluation. The CAT (Appendix I) tool consists of fourteen domains scored on a 1- 5 scale. In addition, the Handoff CEX by Horwith (2013), (Appendix J and Appendix K), are validated competency tools for handoff provider and recipient communications. The anesthesia SBAR handoff tool (Appendix M) was adapted from the SBAR Guidelines for

Communicating (Appendix E) with physicians, and SBAR Worksheet (Appendix F) which any providers may use to organize information in preparation for communicating with a physician regarding the condition of a critically ill patient. The structured anesthesia SBAR handoff tool (Appendix H) was a thoughtful, viable, measureable instrument succinct enough to be given to providers as a laminated card one attached with their name-badge or personal lariat. Options for accessibility was discussed and included a downloadable portable document format (pdf) file for providers to put on their smart phones, but the project stakeholders preferred the laminated cards. I purchased these cards from saferhealthcare.com. Multiple evaluations per recipient on provider, and vise-versa with repeated observation increased reliability during the project course. Analysis of competency included application usage in the real-time workplace. Tracked information through the use of the Clinical Experience (CEX) form was completed at the end of each handoff report. The CEX form contains seven domains for providers and six domains for recipients for evaluating clinical communication competency using a scale of 1-9. Average duration of handoff over the course of the project was assessed using the CEX forms.

Needs assessment. Positioning the needs assessment as a valuable tool in delivering strategic collaborative communication consultative services, allowed the delivery of exactly what the providers needed to meet departmental goals. The project providers understood that conducting a needs assessment enabled understanding of communications needs in the department relating to patient safety, and recommendations made helped the anesthesia department be more successful and meet their goals in a measurable, definable way. Participant time and effort was valued by their department management and it was communicated how the project mission and goals aligned with the departmental mission and goals for improving handoff quality indicators. This produced successful project buy-in.

Stakeholders included the anesthesia department and ambulatory surgery department. This included patient advocates, the caregivers, department managers, department directors, staff development teams, quality improvement teams, financial managers, risk managers, and the regional nursing administrator. To help stakeholders understand what contributes to a fumbled handoff, needs assessment information was aligned with the SBAR competency assessment tool. The communication needs assessment was a single survey conducted with the workforce to evaluate the role of their current handoff communication systems. A modified Communication Assessment Tool (CAT) with a Likert scale was used (Appendix I).

All stakeholders benefited from a myth-buster or fact-style sheet handed out early in the project. This provided basic facts regarding miscommunications in handoff communications (Appendix N). Conducting a needs assessment showed project providers

I was willing to invest time and effort to really understand their workforce needs. I acted as program coordinator, being a more consultative partner and opening the opportunity for teamwork in communications from the beginning. The needs assessment was the elemental foundation equalizing competing needs and identifying the existence of communication differentiations at play among workforce providers.

Planned project data analysis and synthesis. Evaluation strategies included the use of a valid provider and recipient evaluation forms (Appendix I, J, and K) with data analysis for duration of handoff, and domain variables of both providers and recipients, giving nominal, ordinal, and ratio data. Reliability through multiple week testing was feasible. A one sample t-test was prepared as part of the statistical analysis of the quantitative evaluation of the project. Systems used to record the needs assessment is paper and pencil survey for needs assessment using the CAT assessment tool. Once the educational segment was completed, caregivers used a paper and pencil CEX tool for evaluating handoff recipients and providers. The CEX tools for competencies was used for evaluation weekly and over time from the first and fourth weeks of the project. These same tools can be used by the managers and organization to evaluate the change overtime at intervals post project. The paper CEX tools were collected, and data organized, tracked and analyzed using the IMB SPSS Statistics Version 21 (SPSS) software, and Microsoft Excel software. Paper and pencil survey collection took place with the use of two locked collection boxes. Outlier providers on vacation or off did not have the opportunity to participate.

After administering the survey, the next step in the project process was to analyze the responses of the participants. Handling survey data included conducting a precise survey data analysis for accurate interpretation of the results. Data validation ensured that the survey questionnaires were completed and present consistent data. In the case of incomplete questionnaires, I counted the actual number of respondents that were able to answer a particular question. Homogenous subgrouping of the responses made data analysis faster and easier. Before inputting the survey data into electronic data files, a limited data coding of location and provider types was conducted. Data coding simply meant converting the nominal and ordinal scale data in such a way that the statistical package or software used handled the survey data accurately. In order to perform data coding, responses were grouped into categories such as setting, efficiency, communications, content, judgement, humanistic, and overall completeness. Standard data analysis included computing for the proportion of variables and standard descriptive statistics. The surveys used have a nine-point scale. No recoding of response variable scales were necessary from the original tools. The usual practice that ordinal scales (five-point scale, seven-point scale, etc.) will convert into their numerical equivalents. For example, in a five-point scale, wherein “strongly agree” is equivalent to “5” and whereas “strongly disagree” is equal to “1” was applied. Advanced statistical procedures were performed to determine the relationship among the ordinal scale variables. Handling the nominal data included identifying the percentage of responses per category. This would strengthen the evidence that the SBAR intervention improved or supported parity of competency.

Project evaluation plan. It was important to explain the impact of neglecting the contribution that health care communications have in patient safety, and the cost of doing nothing puts the department at risk for noncompliance with JCH National Patient Safety Foundation. Evaluation of the project begins with the star-up. Basis in the CQI model permitted overall evaluation format using the 2004 IHI Assessment Scale for Collaboratives (Appendix P). This was given to the steering committee stakeholders to evaluate their opinion of whether the program measured the Triple Aim of quality.

Analysis and Synthesis

Assessment of the sources of evidence shows that the field of anesthesia broadly supports the future use of a checklist for handoff. The profession is at the initial stages of implementing standardized anesthesia workforce handoff practice protocols, but has no consensus model and no quality indicators for competency in handoff.

To strengthen management engagement and support, the stakeholder steering committee was organized through e-mail invitation. Scheduled activities for initial meetings were outlined, such as educating the stakeholders regarding the problem of fumbled handoff reporting and the impact on patient safety. Making a positive impact on the consensus model for anesthesia caregiver handoff required a strategy that reflected this reality. The project coordinator explained that initial meetings would follow a PDSA format. Management expertise was leveraged to facilitate progression of the project, and utilizing resources they felt might be needed in order to have their support and promotion of the program. Macro system issues involving the project were organizational, and encompassed organizational culture, including patterns of attitudes, beliefs, core values,

shared mission, and goals. Tradition, or the way things had always been done, was challenged since the culture supported stagnant practice methods. Open communication and the use of a shared vision, equity, and involvement helped remodel the culture as suggested by White and Brown (2012). Cultural change process was necessary to achieve a venue for assessing workforce handoff competency standards.

Micro system issues involving the project were those affecting individuals, such as handoff tool selection preference, project participant personal aims, and various clinical demands. Making sure that individuals thoughts, feeling, input were valued as part of the project process was important. This was accomplished through actively listening to participants comments and how they viewed the current science of communication in handoff reporting. This accentuated how willing individuals are able to translate knowledge to their practice.

Formulation of evidence-based practice guidelines enables the anesthesia and peri-operative workforce to come to a consensus on standardize handoff. This fosters competency through consistency and collaboration in communication during handoff which helps prevent errors and omissions in care (O'Daniel, 2008). The benefit of the change is to both the patient and the provider.

Summary

As health care continues to evolve and become more specialized, increasing numbers of clinicians involved compounds the complexity of patient care adding to the abundance of data communicated (IOM, 2009). Breaches in communication present a major patient safety threat and can impact the quality of care delivered (Friesen, 2008).

Currently, a consensus model for anesthesia handoff communication does not exist. Furthermore, assessment of the systematic review of the literature showed no evidence of known quality indicators for competency in anesthesia and peri-operative handoff. This evidence supported the gap in practice identified at the project site. This gap yields suboptimal quality indicators of communication competency, which cannot be ignored. Ineffective handoffs lead to a spectrum of undesirable patient safety problems (Friesen, 2008).

The CAT was used as a project needs assessment tool. The ordered communication tool, SBAR, was used to promote provider inter-professional collaborative communication. Provider communication competency was evaluated using the CEX tools. Post project evaluation CAT was used to assess inter-professional collaborative communications improvement or parity. The IHI Assessment Scale for Collaboratives was used to evaluate the overall project. Reducing associated costs of communication errors and omissions while promoting excellence in workforce handoff reporting may prove to show linkage between quality indicators for communication competency and economic value in patient care outcomes. In Section 4, I discuss project findings and recommendations.

Section 4: Findings and Recommendations

Evidence-based practice is essential to safety in handoff communication. Despite some improvement in individual anesthesia handoff, agreement among the workforce team does not exist on what quality and competency elements are necessary in a uniform anesthesia handoff. This gap in contemporary practice provides the opportunity to pose the following project question: In the anesthesia and perioperative workforce settings, do collaborative competency domain datasets indicate evidence of quality improvement when using SBAR as a consensus communication model? The purpose of the project was to analyze the efficacy of SBAR to maximize quality indicators of team communication competency in the perioperative and anesthesia handoff.

I used the CAT as a project needs assessment tool, and SBAR to promote provider interprofessional collaborative communication. Provider communication competency was evaluated using the CEX tools. In addition, I used post project evaluation CAT to assess interprofessional collaborative communications improvement or parity. The IHI Assessment Scale for Collaboratives was used to evaluate the overall project.

Discussion of Project Findings and Recommendations

To evaluate the overall project, I developed a plan to analyze the survey results. I have used findings through data analysis to show a breakdown of the results of the survey.

Findings and Implications

The purpose of the project was to analyze the efficacy of SBAR to maximize quality indicators of competency in the perioperative and anesthesia team handoff. I used means and standard deviations to examine trends in the continuous level variables. Reliability of the variables was evaluated through Cronbach's alpha test of internal consistency on the CAT. Inferential analyses included independent sample *t* tests, Pearson correlations, and analyses of variance (ANOVAs). Statistical significance was evaluated at the conventional level, $\alpha = .05$.

Detailed Analysis for Communication Assessment Tool

Analysis of the project pre- and post-CAT results examined reliability using Cronbach's alpha test. The independent sample *t* test examined differences in communication assessment scores in pre- and post-CAT. The ANOVA examined differences in pretest and posttest communication assessment scores between the three types of clinical locations

Reliability of Communication Assessment Tool

I assessed the reliability of the CAT through use of Cronbach's alpha test of internal consistency. I evaluated the coefficients of Cronbach's alpha as suggested by George and Mallery (2016), where $\alpha \geq .9$ excellent, $\alpha \geq .8$ good, $\alpha \geq .7$ acceptable, $\alpha \geq .6$ questionable, $\alpha \geq .5$ poor, and $\alpha < .5$ unacceptable. The internal consistency for the pretest and posttest scales had excellent reliability ($\alpha > .90$). See Table 1 for the results of the reliability analysis.

Table 1

Cronbach's Alpha Coefficients for Communication Assessment Tool

Composite score	α	*n*
Communication assessment (pretest)	.98	12
Communication assessment (posttest)	.99	12

Independent sample *t* test. An independent sample t test was conducted to examine for differences in communication assessment scores between the pretest and posttest. An independent sample *t* test is an appropriate statistical analysis when assessing for differences in continuous dependent variable between two groups (Pagano, 2009). The continuous dependent variable corresponded to communication assessment scores. The independent grouping variable corresponded to pretest and posttest.

The homogeneity of variance assumption was assessed with a Levene's test. The results were not statistically significant for communication assessment ($p = .776$), suggesting that the assumption was met. The overall findings of the independent sample *t* test indicated that there were not significant differences in communication assessment scores between pretest and posttest ($t\ [29] = -1.85$, $p = .074$). However, it is noted that the *p* value approached the significance threshold of .05 and the average scores increased after the posttest. Table 2 presents the findings of the independent sample *t* test.

Table 2

Independent Sample t Test for Communication Assessment Scores Between Pretest and Posttest

Scale	Pretest (n = 25)		Posttest (n = 6)		t(29)	p
	M	*SD*	*M*	*SD*		
Communication assessment tool	3.54	1.07	4.46	1.21	-1.85	.074

Analysis of variance. An Analysis of Variance (ANOVA) was conducted to examine for differences in pretest communication assessment scores between the three types of clinical locations. An ANOVA is an appropriate statistical analysis when assessing for differences in a continuous dependent variable between groups (Tabachnick & Fidell, 2013). Only the pretest scores were examined due to there being a larger sample size in comparison to the posttest scores (n = 25 vs n = 6). In addition, for the pretest there was a fairly equal distribution of participants in each of the treatment categories. The continuous dependent variables in this analysis to pretest communication assessment scores. The independent grouping variable in this analysis corresponded to clinical location (Anesthesia, ASC, and Endo).

Prior to analysis, the homogeneity of variance assumption was assessed with Levene's test and the results were not statistically significant for pretest communication assessment scores (p = .922); thus, the assumption was met. The overall findings of the ANOVA indicated that there were not significant differences in pretest communication assessment scores by type of clinical location (F (2, 22) = 1.64, p = .217, η^2 = .130). Anesthesia participants had the highest communication assessment scores (M = 4.06),

followed by ASC (M = 3.46), and Endo (M = 3.12). Table 3 presents the findings of the overall ANOVA. Table 4 presents the means and standard deviations for the communication assessment scores by type of treatment location.

Table 3

ANOVA for Pretest Communication Assessment Scores by Type of Treatment Location

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
Type of clinical location	2	3.55	1.77	1.64	.217	.130
Error	22	23.85	1.08			
Total	25	341.39				

Table 4

Means and Standard Deviations for Pretest Communication Assessment Scores by Location

Continuous variables	*M*	*SD*
Communication assessment scores		
Anesthesia	4.06	0.93
ASC	3.46	1.05
Endo	3.12	1.13

Note. ASC, ambulatory surgery center.

Detailed Analysis for CEX

Descriptive statistics were first used to examine for the trends in the CEX Domains (Week 1-4). The means and standard deviations were calculated for all the domains at each time period. Tables 5-8 present the findings of the descriptive statistics.

Descriptive statistics.

Table 5

Means and Standard Deviations for CEX Domains (Week 1)

CEX domains (Week 1)	Red (receivers)			Green (givers)		
	n	*M*	*SD*	*n*	*M*	*SD*
Setting	9	8.33	1.12	11	7.73	1.19
Organization/efficiency	9	8.44	0.88	11	8.00	1.41
Communication skills	9	8.67	0.71	11	8.27	1.01
Content	9	8.78	0.44	0	-	-
Clinical judgement	6	7.50	1.76	10	7.90	1.37
Humanistic qualities/professionalism	9	8.67	1.00	11	8.09	1.14
Overall competence	8	8.75	0.71	11	8.09	1.14

Note. CEX, clinical evaluation experience.

Table 6

Means and Standard Deviations for CEX Domains (Week 2)

CEX domains (Week 2)	Red (receivers)			Green (givers)		
	n	*M*	*SD*	*n*	*M*	*SD*
Setting	6	6.67	1.97	14	7.79	1.42
Organization/efficiency	6	6.17	2.14	14	7.79	1.25
Communication skills	6	6.50	2.07	14	7.71	1.20
Content	6	6.67	2.07	0	-	-
Clinical judgement	6	7.17	1.47	14	7.93	1.14
Humanistic qualities/professionalism	6	6.67	1.63	14	8.00	1.18
Overall competence	6	5.67	1.75	14	7.86	1.10

Note. CEX, clinical evaluation experience.

Table 7

Means and Standard Deviations for CEX Domains (Week 3)

CEX domains (Week 3)	Red (receivers)		
	n	*M*	*SD*
Setting	4	8.00	0.82
Organization/efficiency	4	8.00	0.82
Communication skills	4	8.75	0.50
Content	4	8.25	0.96
Clinical judgement	3	7.33	2.08
Humanistic qualities/professionalism	4	8.25	1.50
Overall competence	4	8.00	0.82

Note. CEX, clinical evaluation experience.

Table 8

Means and Standard Deviations for CEX Domains (Week 4)

CEX Domains (Week 4)	Red (receivers)			Green (givers)		
	n	*M*	*SD*	*n*	*M*	*SD*
Setting	6	6.50	0.84	2	8.50	0.71
Organization/efficiency	6	7.83	0.75	2	8.50	0.71
Communication skills	6	8.00	0.63	2	8.50	0.71
Content	6	7.67	1.37	0	-	-
Clinical judgement	6	8.00	1.10	2	8.50	0.71
Humanistic qualities/professionalism	6	8.17	0.75	2	8.50	0.71
Overall competence	5	8.40	0.89	2	8.50	0.71

Note. CEX, clinical evaluation experience.

Pearson correlations. A Pearson correlation was used as a statistical analysis in order to assess the strength of association the domains of the CEX. A Pearson correlation is an appropriate statistical analysis when assessing the strength of association between two continuous variables (Pagano, 2009). In Weeks 1, 2, and 4, several of the variables demonstrated significant relationships. Noteworthy correlations shown below indicate continued high levels of competency in overall handoffs over the course of the project.

Week 3 had a small sample size of four (Red) recipient participants; therefore, significant associations were not found within this time period. An unexpected dip in competency related to the setting variable occurred in week 4. Tables 9-12 present the findings of the Pearson correlations.

Table 9

Pearson Correlations between CEX Domains - Week 1

Variables	1	2	3	4	5	6	7
1) Setting	1.00						
2)Organization/efficiency	.75**	1.00					
3) Communication skills	.66**	.90**	1.00				
4) Content	.42	.61	.13	1.00			
5) Clinical judgement	.60*	.82**	.72**	.66	1.00		
6) Humanistic Qualities/professionalism	.74**	.83**	.86**	-.19	.65**	1.00	
7) Overall competence	.72**	.86**	.86**	-.22	.63**	.98**	1.00

*denotes significance at $p < .05$, ** denotes significance at $p < .01$.

Table 10

Pearson Correlations between CEX Domains - Week 2

Variables	1	2	3	4	5	6	7
1) Setting	1.00						
2)Organization/efficiency	.65**	1.00					
3) Communication skills	.51*	.95**	1.00				
4) Content	.21	.92**	.98**	1.00			
5) Clinical judgement	.48*	.51*	.43	-.24	1.00		
6) Humanistic qualities/professionalism	.62**	.82**	.80**	.79	.43	1.00	
7) Overall sign-out competence	.65**	.81**	.77**	.57	.34	.84**	1.00

*denotes significance at $p < .05$, ** denotes significance at $p < .01$.

Table 11

Pearson Correlations between CEX Domains - Week 3

Variables	1	2	3	4	5	6	7
1) Setting	1.00						
2) Organization/efficiency	.99**	1.00					
3) Communication skills	.82	.82	1.00				
4) Content	.43	.43	.17	1.00			
5) Clinical judgement	.96	.96	.97	.97	1.00		
6) Humanistic Qualities/professionalism	.00	.00	-.33	.87	.00	1.00	
7) Overall sign-out competence	.50	.50	.00	.85	.69	.82	1.00

*denotes significance at $p < .05$, ** denotes significance at $p < .01$.

Table 12

Pearson Correlations between CEX Domains - Week 4

Variables	1	2	3	4	5	6	7
1) Setting	1.00						
2)Organization/efficiency	.63	1.00					
3) Communication skills	.75*	.89**	1.00				
4) Content	.53	.71	.93**	1.00			
5) Clinical judgement	.48	.76*	.87**	.94**	1.00		
6) Humanistic Qualities/professionalism	.51	.80*	.87**	.84*	.97**	1.00	
7) Overall sign-out competence	.27	.78*	.79*	.89*	.91**	.88**	1.00

*denotes significance at $p < .05$, ** denotes significance at $p < .01$.

Independent sample t-test. A series of independent sample t-tests were conducted to examine for differences in the domains of the CEX by givers and recipients of handoff. The continuous dependent variable corresponded to the domains of the CEX: Setting, Organization/Efficiency, Communication Skills, Content, Clinical Judgement, Humanistic Qualities/Professionalism, and Overall Competence. The independent groups

corresponded to givers (green dot) and recipients of information (red dot).

The homogeneity of variance assumption was assessed with a Levene's test. The results of Levene's was not statistically significant for any of the CEX domains ($p >$ .776), suggesting that the assumption was met. The overall findings of the independent sample *t*-tests indicated that there were not significant differences in any of the CEX domains between the givers and receivers of information. Table 13 presents the findings of the independent sample *t* tests.

Table 13

Independent Sample t Test for CEX Domains between Recipients and Givers of Information

Scale	Red		Green		*t*	*p*
	M	*SD*	*M*	*SD*		
Setting	7.40	1.47	7.81	1.27	0.98	.330
Organization/efficiency	7.68	1.49	7.93	1.27	0.64	.524
Communication skills	8.00	1.41	8.00	1.11	0.00	.999
Content	7.92	1.47	-	-	-	-
Clinical judgement	7.52	1.47	7.96	1.18	1.13	.264
Humanistic qualities professionalism	8.00	1.38	8.07	1.11	0.21	.832
Overall competence	7.74	1.66	8.00	1.07	0.67	.506

Analyses of variance. A series of ANOVAs were conducted to examine for differences in the CEX domains between the four time periods (Week 1 – Week 4). The continuous dependent variables corresponded to the domains of the CEX: Setting, Organization/Efficiency, Communication Skills, Content, Clinical Judgement, Humanistic Qualities, and Overall Competence. The independent grouping variable in

this analysis corresponded to time (Week 1, Week 2, Week 3, and Week 4). The homogeneity of variance assumption was met for all the ANOVAs ($p > .05$).

Setting. The overall findings of the ANOVA indicated that there were not significant differences in Setting scores between the four weeks ($F(3, 48) = 1.28$, $p = .292$, $\eta^2 = .074$).

Organization/efficiency. The overall findings of the ANOVA indicated that there were not significant differences in Organization/Efficiency scores between the four weeks ($F(3, 48) = 1.59$, $p = .204$, $\eta^2 = .090$).

Communication skills. The overall findings of the ANOVA indicated that there were significant differences in Communication Skills scores between the four weeks ($F(3, 48) = 3.66$, $p = .019$, $\eta^2 = .186$). By examination of post-hoc Tukey comparisons, Week 1 Communication Skills scores ($M = 8.45$) were significantly greater than Week 2 Communication Skills scores ($M = 7.35$).

Content. The overall findings of the ANOVA indicated that there were significant differences in Content scores between the four weeks ($F(3, 48) = 3.38$, $p = .038$, $\eta^2 = .325$). By examination of post-hoc Tukey comparisons, Week 1 Content scores ($M = 8.78$) were significantly greater than Week 2 Content scores ($M = 6.67$).

Clinical judgement. The overall findings of the ANOVA indicated that there were not significant differences in Clinical Judgement scores between the four weeks ($F(3, 43) = 0.31$, $p = .821$, $\eta^2 = .021$).

Humanistic qualities. The overall findings of the ANOVA indicated that there were not significant differences in Humanistic Qualities scores between the four weeks ($F(3, 48) = 1.41$, $p = .250$, $\eta^2 = .081$).

Overall competence. The overall findings of the ANOVA indicated that there were significant differences in Overall Competence scores between the four weeks ($F(3, 46) = 3.25$, $p = .030$, $\eta^2 = .175$). By examination of post-hoc Tukey comparisons, Week 1 Overall Competence scores ($M = 8.37$) were significantly greater than Week 2 Overall Competence scores ($M = 7.20$). Week 4 Overall Competence scores (M=8.43) were highest. Table 14 presents the findings of the ANOVA.

Table 14

ANOVAs for CEX Domains by Week

Scale	Week 1	Week 2	Week 3	Week 4	*F*	*p*	η^2
			M				
Setting	8.00	7.45	8.00	7.00	1.28	.292	.074
Organization/efficiency	8.20	7.30	8.00	8.00	1.59	.204	.090
Communication skills	8.45	7.35	8.75	8.13	3.66	.019	.186
Content	8.78	6.67	8.25	7.67	3.38	.038	.325
Clinical judgement	7.75	7.70	7.33	8.13	0.31	.821	.021
Humanistic qualities	8.35	7.60	8.25	8.25	1.41	.250	.081
Overall competence	8.37	7.20	8.00	8.43	3.25	.030	.175

Recommendations

An evaluation of how the survey performed in terms of response rate, saw a trend of greater response at the needs assessment and first two weeks of the project than in the latter weeks of the project. Drop outs to a particular question occurred and was marked

as not applicable (N/A) by the subject. Interestingly, these questions correlated to collaboration type questions on the CAT used for the needs assessment. Even more interesting, no question drop out occurred in the CAT used at project completion. Some drop out occurred as well throughout the project phase when the CEX tool was used. To address drop outs of survey information, additional time explaining each aspect of survey areas of response at the front end of the project would be useful. This would orient the subjects better to all areas needing to be filled out completely. To address lag in response numbers towards the end of the project, the project could be shortened by a week, or halved. Also, running the project during non-summer months and non-holiday weeks could be planned. This would help avoid missing staff due to holiday or vacation.

Although physical distribution of the surveys to staff remained the same throughout the entire project, a difference in response was noted from the parameter of location. More responses came from the PACU location overall, though some response came from all locations identified. Five percent of handoffs measured occurred intraoperatively between CRNA and a peer CRNA during the course of this project. A similar project evaluating only peer to peer CRNA subjects would provide a more rich result of trends for this subset, versus the entire peri-operative group at this project setting.

Some caregivers decided to include comments on the survey sheets though there was not a designation. Future projects could include a word cloud for these comments, providing qualitative data. I suggest the possibility of conducting formal qualitative analysis in subsequent projects.

Contribution of the Doctoral Project Team

The doctoral project team included myself, my mentor, the unit managers, and the director of anesthesia. I contributed the main project idea, the methodology tools, the implementation plan, and evaluation plan. My mentor contributed through the role of a project champion. In addition, the mentor was integral in devising additional implementation strategies necessary to carry out the project in the particular clinical setting. Two different CEX surveys were used for four weeks. One was to be filled out by the handoff recipient and one by the handoff provider or giver. Specifically, my mentor eased the correct survey selection through the use of color coding. The handoff receiving looked for the red dot on the survey. The handoff giver looked for the green dot on the survey. This simple, yet effective color coding reduced confusion regarding proper survey selection.

The leadership of the unit managers assisted in providing approval of the project, agreement of methodological tools, and encouraged participation of human resources preoperatively and postoperatively. The director of anesthesia supported the project with participation encouragement of anesthesia staff postoperatively, and intraoperatively. There was a fluctuation of anesthesia providers and caregivers float in and out between facilities regularly. This required the anesthesia leaders to continuously champion the project's subject participation on a continuum, rather than just at the beginning or the project or at intervals.

Strengths and Limitations of the Project

The significant challenge that limited the project was the delay in project initiation. Several attempts at IRB approval through both the project and university sites, prevented data collection. This stifled the clinical site enthusiasm that was present at the time frame just following needs assessment. To correct this in the future, efforts to place the needs assessment more immediately to the project initiation phase may prevent loss of momentum.

A second limitation of the project was a lower response rate than expected at the post-CAT evaluation. To correct this, project planning could work with the project site supervision and management to coordinate timing when employees are abundant rather than during a high vacation summer month. Even still, the trends in data collection showed useful evidence.

A strength of the project was learning that qualitative data could have been captured with ease with the addition of an area on the survey for subject anecdotal comments. These comments could have been collected and analyzed using a word cloud to reveal trends.

Another strength, is that project points to additional research opportunity in identifying more specific data for subsets of the domains. I recommend applying the anesthesia communication error groupings aforementioned in chapter three. For example, cognitive error in the setting domain examines noise, irritation, distraction, inattention, synthesis, fixation error, respectful appreciation cues.

Overall project evaluation by stakeholders who used the IHI Assessment Scale for Collaboratives (Appendix P) revealed a rating 4.5. This score correlates with sustained improvement in most outcomes measured, 75% of goals achieved, and a spread to a larger population has begun.

The uniqueness of this project was the tandem handoff evaluation of intraoperative peer to peer collaborative communications of CRNA's. Data collection regarding CRNA handoff competency is a novel area in the science of communication error worthy of additional inquiry.

Finally, the project confirmed economic value through identifying time as the measure of cost-effectiveness in the project. Delays in relaying critical information concisely and completely causes a double-back or an additional crosscheck, increasing the amount time needed to deliver customer services. This increase in time is inefficient and costly to the organization, its caregivers, and the patient.

Summary

The purpose of the project was to analyze the efficacy of SBAR to maximize quality indicators of competency in the perioperative and anesthesia team handoff. Cronbach's alpha test of reliability determined that the CAT had excellent reliability. Findings of an independent sample *t*-test indicated that there were not significant differences in communication assessment scores between pretest and posttest. Findings of an ANOVA indicated that there were not significant differences in pretest communication assessment scores by type of treatment. Descriptive statistics were utilized to examine the trends in the CEX domains. Pearson correlations were used to

examine the strength of associations between the domains at each time period. Findings of independent sample *t*-tests indicated that there were not significant differences in any of the CEX domains between the givers and receivers of information. A series of ANOVAs indicated that there were significant differences in Communication Skills, Content, and Overall Competence between the four time periods. In the final section, I will discuss the project dissemination plan.

Section 5: Dissemination Plan

Project Dissemination Plan

The plan to disseminate this work to the institution experiencing the problem in practice includes sharing the data analysis findings through an executive report to organizational stakeholders involved. This includes an executive summary for the director of nursing, the unit managers, the director of anesthesia, and my mentor. Following approval by the organization, I plan to share the data analysis of the project with the Shared Governance Committee of the organization. The data of the survey will be shared with participants in their continuing education meeting. Additionally, I will seek opportunities to share at healthcare conferences specializing in anesthesia and healthcare communication.

Analysis of Self

I will provide an analysis of how the DNP project experience provided an immersion opportunity for professional growth. Curriculum elements in DNP Program addressed include scholarship and leadership in advance practice nursing, promoting quality improvements, strategizing to refine patient and population health outcomes, and informing health care policy makers.

Leadership Development

The project experience throughout the DNP Program at Walden University School of Nursing has enhanced my ability to respond to organizational and system issues in health care. This was accomplished through the use of the philosophies,

theories, and strategies of the science of leading change. The evidence-based practice project development allows me to put words into action. I learned this synthesis of information in the program with the processes of application at the project site. I have developed relationships with leaders in a major health care system, which have not developed in my current role as clinical certified registered nurse anesthetist. These experiences have prepared me to assume a leadership role in the development of health policy, especially concerning evidence-based care related to anesthesia advanced practice nursing. I have developed confidence as an effective team leader and have used the interprofessional collaborative model to establish interprofessional teams. I have been prepared through the curriculum of the DNP program, and Internal Review Board experiences, to provide leadership in the evaluation and resolution of ethical and legal issues. This differs from when I first began the project experience as continuous mastery of policy development and intentional influence in leadership skills have since been learned and put into practice. Because of the immersion in the project site experiences, I have become more adept at professional coaching, scholarly inquiry, and translating evidence-based knowledge into not only personal practice, but that of advance practice nursing in my local health care setting. In addition, I advocated current nurse anesthesia practice issues and health policy within the organizational health care system. Finally, I have been able to outline the elements of a quality improvement project that meets the needs of the project site's patients and facility.

Advanced Nursing Practice

John Quincy Adams (as cited by Pozin, 2014) stated that if one's actions inspire others to dream more, learn more, do more, and become more, then one is a leader. The project experience was congruent with the advanced practice foundational competencies specified by the DNP Essentials. This process has allowed my actions to influence change from a current state of practice related to anesthesia handovers to an evidence-based improved anesthesia handover. In addition, the model and theory applied in the test of change project can be used as a consensus model for the specialty of anesthesia. One new element would be the practice of inter-professional collaborative communication competencies for anesthesia handover report providers and recipients. The Inter-Professional Education Collaborative (IPEC) vision of inter-professional collaborative practice as key to the safe, high quality, accessible, patient-centered care desired by all (IPEC, 2011) was a model of care adopted by leadership and staff in the anesthesia department and ambulatory care unit at the project site. The manifestation of leadership during the DNP program and project course has been a personal journey, but one that has impacted change in other anesthesia providers at my local clinical practice level.

Promoting Quality Improvement

My proficiency in quality improvement strategies and in creating and sustaining changes at the organizational and policy levels will be ongoing. Personal interest in quality improvement will be ceaseless, and I will use quality indicators in anesthesia and health care communications to improve patient care and provide valid measures of improvement process performance. My ability to use information systems and technology

to implement quality improvement initiatives has markedly improved throughout the DNP program. My proficiency in these areas changed throughout the project experience through the use of search engines to gather evidence-based peer-reviewed information regarding the DNP proposal. Personal abilities to gather data, and transform the information into a meaningful use at the project level assisted me and project colleagues to translate research into practice. Considerations vital to the project implementation collaborative team include social, technological, political, and financial variables. These topics the team could view as barriers and facilitators of the project. As a functional change agent implementing a DNP evidence-based project, it was key to strategize for successful assessment of stakeholders' willingness to change. Dr. Kris Mauk notes that conversations such as these are crucial to introducing change to organizations (Laureate Education, 2012). The use of technology to monitor benchmarks, for example, is a reflection of how anesthesia can be a willing participant in the continuous improvement culture. The use of competencies is another method to illustrate how the project can measure health care collaborative communication improvements in order to improve safe anesthesia handovers. The project site managers were particularly helpful in assisting in all stages of the project and viewed the plan as a way to accomplish a well-needed process improvement for the department and institution.

Improving Health Outcomes

An analysis of personal abilities to guide improvements in practice and outcomes of care leads me to reflect on how the use of servant leadership strategies to develop, implement, and evaluate a DNP project improved the project patient safety and quality of

care. The American Association of Colleges of Nursing (AACN, 2006) envisioned all APN programs evolving to a doctorate of nursing practice (DNP) by 2015. This evolution to the doctoral level for APN education stems from the three Institute of Medicine (IOM) reports, *Too Err is Human*, *Crossing the Quality Chasm*, and *Health Professions Education: A Bridge to Quality*, which emphasized widespread problems related to patient safety and called for urgent and dramatic restructuring of traditional health professions education (O'Grady, 2008). When I considered skills used to empower others through education, I deployed appreciative coaching, inter-professional collaboration, and advocacy roles to improve patient care outcomes. Contemplation of personal competency in developing and sustaining therapeutic relationships with patients and collegial professional relationships facilitated optimal care and patient outcomes through the clarity of organizational vision.

Informing Health Care Policy

The project experience has prepared the me to design, influence, and implement health care policies that frame health care financing, practice regulation, access, safety, quality, and efficacy. I learned to assess project budgeting, and practice protocols. Relating the DNP project improvement to patient access to safe, timely, consistent, care improved efficiency in project care delivery. I have shown that quality indicators for anesthesia handoff competency can impact patient outcomes and reduce medical error. My ability to critically analyze health policy proposals, health policies, and related issues from the perspective of consumers, stakeholders, nursing, and other health professionals, has improved in this project experience. I have gathered information of evidence to

supply to stakeholders and policy makers. I have prepared an executive summary for the Chief Nursing Officer of the project site. I have has become a resource for organizational policy makers to contact when they have questions concerning advanced nurse anesthesia handoff practice. I have explained how this role is vital and integral for population access to excellence in anesthesia, surgical, and procedural care. Personal relationships have been formed with leaders in the organization in order to influence their policy intentions and also be a key contact resource person.

In conclusion, the DNP project experience not only effected change in me as a project manager, but also in those around me in clinical practice. Henry Kissinger said that the task of the leader is to get people from where they are to where they have not been (as cited by Dickerson, 2013). Mother Theresa was correct in saying that what one person can do, another cannot do, but together they can do great things (as cited by Dickerson, 2013). This was true at the project setting. I used assessment, design, implementation, and evaluation skills to improve anesthesia handoff reporting at the project site. I was able to influence a department who had no standardized handoff reporting to a place where they have never been. That was what I did. The project workforce used tools proven for collaborative communication and modified them to a useful, reliable format for their setting. That was what workforce did. Together, an accomplished project empowered partnerships with providers to implement a consensus model for anesthesia handovers, and audit their competencies of this practice, to improve patient outcomes, sharing the vison of the departmental and organizational system. The professional and legal responsibility of nursing includes the use of updated practice

knowledge which creates an increasing emphasis on the need to demonstrate ongoing education and competency (Dickerson, 2010). The project site has enabled me to professionally develop by witnessing clinical circumstances, and participating in a project process aligned with The American Academy of Colleges of Nursing (AACN) Doctorate of Nursing Practice (DNP) learning objectives (AACN, 2006).

Finally, part of the responsibility of advance practice nursing is to share the findings of the project through dissemination (Laureate Education, 2012). Applying the Sustainability Leadership Institute's (2011) theories to project dissemination, compelled me to make a sustainable difference by raising awareness of the advance practice nurse in relation to the global health quality improvements. In doing so, as a student leader, I adopted new ways of seeing, thinking and interacting that resulted in innovative, lasting solutions to improve patient safety and outcomes, through evidence-based practice. I personally influenced the project practice setting, applying concepts of sustainability in an internal context of leadership to encourage a positive social change in others over time.

Summary

It was identified that there are a number of clinical mnemonics available for clinical handover report, but that in current anesthesia practice there was no consensus model on handover reporting or the process of competencies for the anesthesia and peri-operative workforce. The evidence in the literature identified a gap in a unified consensus model in anesthesia workforce handoff technique as well as competencies. This allows for an opportunity to apply evidence-based practice to improve the quality, consistency,

and competencies in peer-to-peer handoff report. Discussion of correlations found in clinical structured handoff use and a reduction in anesthesia related safety events were included.

The need for improved collaborative communications in the peri-operative clinical setting was evaluated with the CAT survey. The ordered communication SBAR tool was used to assess and promote provider inter-professional collaborative communications. The use of the SBAR handoff tool showed evidence of parity in competency in the project collaborative workforce communication. Overall handoff communication remained highly satisfactory.

There was consensus in the CEX evaluations that the use of the SBAR tool by the project participants showed parity with competency in collaborative handoff communication. The post-project CAT survey showed improved overall team communication.

Recommendations include the consensual use of SBAR handoff and competency evaluation across the anesthesia community. Furthermore, Advance Practice Certified Registered Nurse Anesthetists are poised as practice experts, to influence social change through policy supporting the development of anesthesia communication error ontology. Reduction of associated costs of communication errors and omissions while promoting excellence in anesthesia handoff showed linkage between evidence-based care and economic value in patient care outcomes. Underserved countries dependent upon volunteer anesthesia services will benefit from this expanded quality of workforce collaborative handoff to improve world health care.

Relevance for Anesthesia Clinical Practice

This paper contributes to the global clinical community of anesthesia and advance practice nursing through the analysis of the efficacy of SBAR to maximize quality indicators of team communication competency in the perioperative and anesthesia workforce handoff. In addition, a synthesis of literary evidence was provided describing the science of errors, including the study of human factors, inter-professional collaborative communication, error ontology, and auditing of collegial competencies in workforce handover practice. Clinicians desiring best practices within their professional specialty of anesthesia will seek to use this information to advance quality indicators for competency in anesthesia workforce handoffs.

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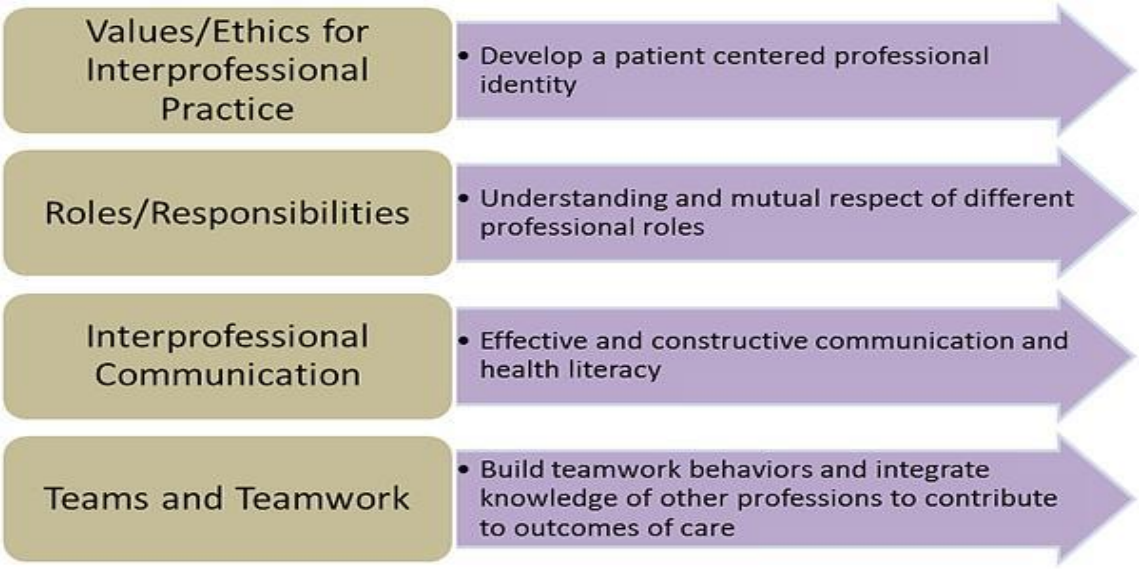
Appendices

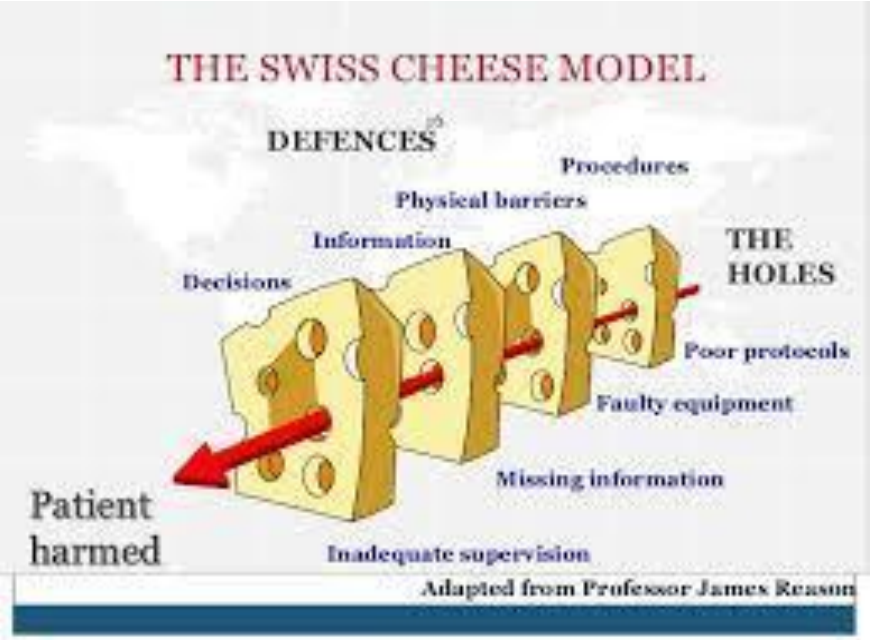
Appendix A: Consensus in Anesthesia Handoff Reporting

Appendix B: Lewin's Change Model

Appendix C: Inter-professional Teamwork and IOM Core Competencies



Appendix D: The Swiss Cheese Model



Appendix E: Guidelines for Communicating with Physicians Using the SBAR Process

1. Use the following modalities according to physician preference, if known. Wait no longer than five minutes between attempts.

1. Direct page (if known)
2. Physician's Call Service
3. During weekdays, the physician's office directly
4. On weekends and after hours during the week, physician's home phone
5. Cell phone

Before assuming that the physician you are attempting to reach is not responding, utilize all modalities. For emergent situations, use appropriate resident service as needed to ensure safe patient care.

2. Prior to calling the physician, follow these steps:

- Have I seen and assessed the patient myself before calling?
- Has the situation been discussed with resource nurse or preceptor?
- Review the chart for appropriate physician to call.
- Know the admitting diagnosis and date of admission.
- Have I read the most recent MD progress notes and notes from the nurse who worked the shift ahead of me?
- Have available the following when speaking with the physician:
  - Patient's chart
  - List of current medications, allergies, IV fluids, and labs
  - Most recent vital signs
  - Reporting lab results: provide the date and time test was done and results of previous tests for comparison
  - Code status

3. When calling the physician, follow the SBAR process:

(**S) Situation:** What is the situation you are calling about?

- Identify self, unit, patient, room number.
- Briefly state the problem, what is it, when it happened or started, and how severe.

(B) Background: Pertinent background information related to the situation could include the following:

- The admitting diagnosis and date of admission
- List of current medications, allergies, IV fluids, and labs
- Most recent vital signs
- Lab results: provide the date and time test was done and results of previous tests for comparison
- Other clinical information
- Code status

(A) Assessment: What is the nurse's assessment of the situation?

(R) Recommendation: What is the nurse's recommendation or what does he/she want?

Examples:

- Notification that patient has been admitted
- Patient needs to be seen now
- Order change

4. Document the change in the patient's condition and physician notification.

This SBAR tool was developed by Kaiser Permanente. Please feel free to use and reproduce these materials in the spirit of patient safety, and please retain this footer in the spirit of appropriate recognition.

Appendix F: SBAR Report to Physician about a Critical Situation

S	**Situation** **I am calling about** <patient name and location>. **The patient's code status is** <code status> **The problem I am calling about is**_____. I am afraid the patient is going to arrest. **I have just assessed the patient personally:** _____ **Vital signs are**: Blood pressure _/ _, Pulse , Respiration and temperatu **I am concerned about the:** Blood pressure because it is over 200 or less than 100 or 30 mmHg below usual Pulse because it is over 140 or less than 50 Respiration because it is less than 5 or over 40. Temperature because it is less than 96 or over 104.
B	**Background** **The patient's mental status is:** Alert and oriented to person place and time. Confused and cooperative or non-cooperative Agitated or combative Lethargic but conversant and able to swallow Stuporous and not talking clearly and possibly not able to swallow Comatose. Eyes closed. Not responding to stimulation. **The skin is:** Warm and dry Pale Mottled Diaphoretic Extremities are cold Extremities are warm **The patient is not or is on oxygen.** The patient has been on_____(l/min) or (%) oxygen for_____minutes (hours The oximeter is reading______% The oximeter does not detect a good pulse and is giving erratic readings.
A	**Assessment** **This is what I think the problem is:** <say what you think is the problem> ____ **The problem seems to be cardiac infection neurologic respiratory I am not sure what the problem is but the patient is deteriorating.** **The patient seems to be unstable and may get worse, we need to do somethir**

R	**Recommendation** **I suggest or request that you** <say what you would like to see done>. transfer the patient to critical care come to see the patient at this time. Talk to the patient or family about code status. Ask the on-call family practice resident to see the patient now. Ask for a consultant to see the patient now. **Are any tests needed:** Do you need any tests like CXR, ABG, EKG, CBC, or BMP? Others? **If a change in treatment is ordered then ask:** How often do you want vital signs? How long to you expect this problem will last? If the patient does not get better when would you want us to call again?

Appendix G: SBAR Report Competency Check Off

BRONSON

SBAR Report Competency Check Off

BEFORE Calling the Physician:

- Assess the patient.
- Review the chart for the appropriate physician to call.
- Read the most recent physician and nursing notes.

- Admitting Diagnosis: _____
- Code Status: _____

- Allergies: _____
- IV Fluids: _____
- Significant Labs: _____
- Significant Test Results: _____

Every SBAR report is different. Focus on the problem. Be concise. Not everything in the outline below needs to be reported – just what is needed for the situation.

S

Situation

- **Name**_____ **Δ Unit** _____
- **Patient Name** **Δ Room #**
- **I am concerned about**

Background

- **The patient is in the hospital because**_____

B

- **Vital signs are** _____
- **The pulse ox is**____and patient is on_____oxygen.
- The patient is complaining of _____
- The patients **physical assessment** demonstrates This is a change from
- Their pain level is_____.
- The patients **mental status / emotional state is** _____

A

Assessment

- My assessment of the situation is _____ might be happening.
- Tell the physician if the problem is **severe** and may be **life threatening**.

R

Recommendation

- I think the following needs to be done:
  - ρ Medication _____
  - ρ Tests _____
  - ρ Physician needs to come now and assess the patient.
- Do you want me to call you back for any reasons?

Name: _____

Department/Unit: _____

Date: _____

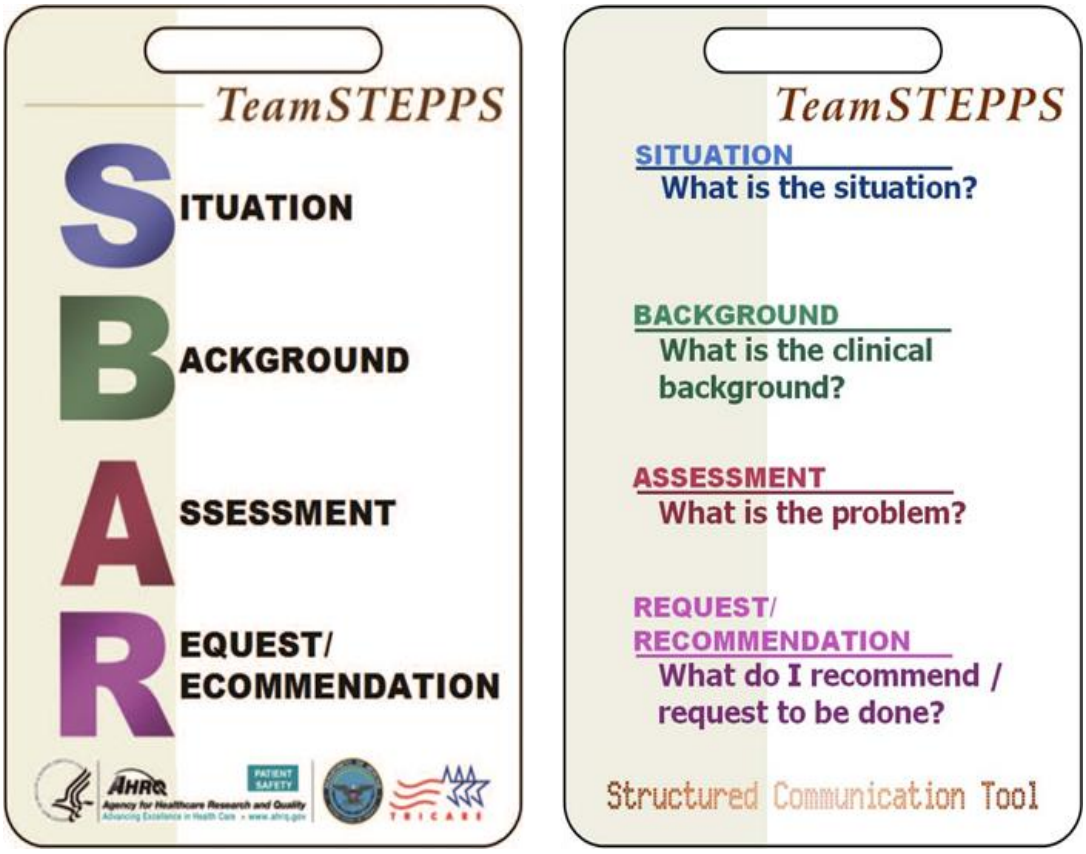
Time: _____

Physician_____

Did the employee demonstrate competency in SBAR: Yes No

Signature of Reviewer: _____

Appendix H: TeamSTEPPS



Appendix G: Communication Assessment Tool

Communication with patients is a very important part of quality medical care. We would like to know how you feel about the way your resident physician communicated with you. Your answers are completely confidential, so please be as open and honest as you can. Thank you very much.

1	**2**	**3**	**4**	**5**
poor	**fair**	**good**	**very good**	**excellent**

Please use this scale to rate the communication of the resident or medical provider with you.

Circle your answer for each item below.

	poor				*excellent*
Scale	1	2	3	4	5
1. Greeted me in a way that made me feel comfortable	1	2	3	4	5
2. Treated me with respect	1	2	3	4	5
3. Showed interest in my ideas about my health	1	2	3	4	5
4. Understood my main health concerns	1	2	3	4	5
5. Paid attention to me (looked at me, listened carefully)	1	2	3	4	5
6. Let me talk without interruptions	1	2	3	4	5
7. Gave me as much information as I wanted	1	2	3	4	5
8. Talked in terms I could understand	1	2	3	4	5
9. Checked to be sure I understood everything	1	2	3	4	5
10. Encouraged me to ask questions	1	2	3	4	5
11. Involved me in decisions as much as I wanted	1	2	3	4	5
12. Discussed next steps, including any follow-up plans	1	2	3	4	5
13. Showed care and concern	1	2	3	4	5
14. Spent the right amount of time with me	1	2	3	4	5

|__|__|__|__|MM/YY MD/MS|__|__|__|__|__|__|

|__|__|__|__|MM/YY MD/MS|__|__|__|__|__|__|_x

Appendix J: Handoff CEX Provider Evaluation Forms

Handoff PROVIDER Evaluation Form

Evaluator: _____ Evaluatee: _____ Unit: _____ Date: _____

Evaluatee experience: ○ < 1 year ○ 1-2 years ○ 3-5 years ○ >5 years Situation: ○ end of shift ○ transfer between services ○ Admission

Setting (○ not observed)

≥ 5 interruptions; Noisy, chaotic	1	2	3	4	5	6	7	8	9	*No interruptions; silent*
	Unsatisfactory			Satisfactory			Superior			

Organization/efficiency (○ not observed)

Disorganized; Rambling	1	2	3	4	5	6	7	8	9	*Standardized sign-out; concise*
	Unsatisfactory			Satisfactory			Superior			

Communication skills (○ not observed)

Not face-to-face; Understanding not confirmed; No time for questions; Responsibility for tasks unclear; Vague language	1	2	3	4	5	6	7	8	9	*Face-to-face sign-out; Confirms understanding; Elicits questions; Assigns responsibility for tasks; Concrete language*
	Unsatisfactory			Satisfactory			Superior			

Content (○ not observed)

Information omitted or irrelevant; Omits clinical condition; 'to dos' lack plan, rationale	1	2	3	4	5	6	7	8	9	*Includes all essential information describes clinical condition 'to dos' have plan, rationale*
	Unsatisfactory			Satisfactory			Superior			

Clinical judgment (○ not observed)

No recognition of sick patients; No anticipatory guidance	1	2	3	4	5	6	7	8	9	*Sick patients identified; Anticipatory guidance provided with plan of action*
	Unsatisfactory			Satisfactory			Superior			

Humanistic qualities/professionalism (○ not observed)

Hurried, inattentive Inappropriate comments re: pts, family, staff	1	2	3	4	5	6	7	8	9	*Focused on task appropriate comments re: patients, family, staff*
	Unsatisfactory			Satisfactory			Superior			

Overall sign-out competence (○ not observed)

	1	2	3	4	5	6	7	8	9	
	Unsatisfactory			Satisfactory			Superior			

Evaluation time: Observing: _____min Providing feedback: _____min

Evaluator satisfaction with evaluation:

Low 1 2 3 | 4 5 6 | 7 8 9 High

Evaluatee satisfaction with evaluation:

Low 1 2 3 | 4 5 6 | 7 8 9 High

Comments: _____

Appendix K: Handoff CEX Recipient Form

Handoff RECIPIENT Evaluation Form

Evaluator: _____ Evaluatee: _____ Unit: _____ Date: _____

Evaluatee experience: ○ < 1 year ○ 1-2 years ○ 3-5 years ○ >5 years Situation: ○ end of shift ○ transfer between services ○ Admission

Setting (○ not observed)

≥ 5 interruptions; Noisy, chaotic	1	2	3	4	5	6	7	8	9	*No interruptions; Silent*
	Unsatisfactory			Satisfactory			Superior			

Organization/efficiency (○ not observed)

Disorganized; Ill-prepared	1	2	3	4	5	6	7	8	9	*Prepared for note-taking; takes notes*
	Unsatisfactory			Satisfactory			Superior			

Communication skills (○ not observed)

No interaction; No questioning; No read-back; No acceptance of responsibility for tasks; Vague language	1	2	3	4	5	6	7	8	9	*Face-to-face sign-out; Asks questions; Read-back of assigned tasks; Accepts responsibility; Concrete language*
	Unsatisfactory			Satisfactory			Superior			

Clinical judgment (○ not observed)

No recognition of sick patients; No request for anticipatory guidance	1	2	3	4	5	6	7	8	9	*Sick patients recognized; Anticipatory guidance requested*
	Unsatisfactory			Satisfactory			Superior			

Humanistic qualities/professionalism (○ not observed)

Hurried, inattentive Inappropriate Comments re: pts, family, staff	1	2	3	4	5	6	7	8	9	*Focused on task; appropriate comments re: patients, family, staff*
	Unsatisfactory			Satisfactory			Superior			

Overall sign-out competence (○ not observed)

	1	2	3	4	5	6	7	8	9	
	Unsatisfactory			Satisfactory			Superior			

Evaluation time: Observing: _____min Providing feedback: _____min

Evaluator satisfaction with evaluation:

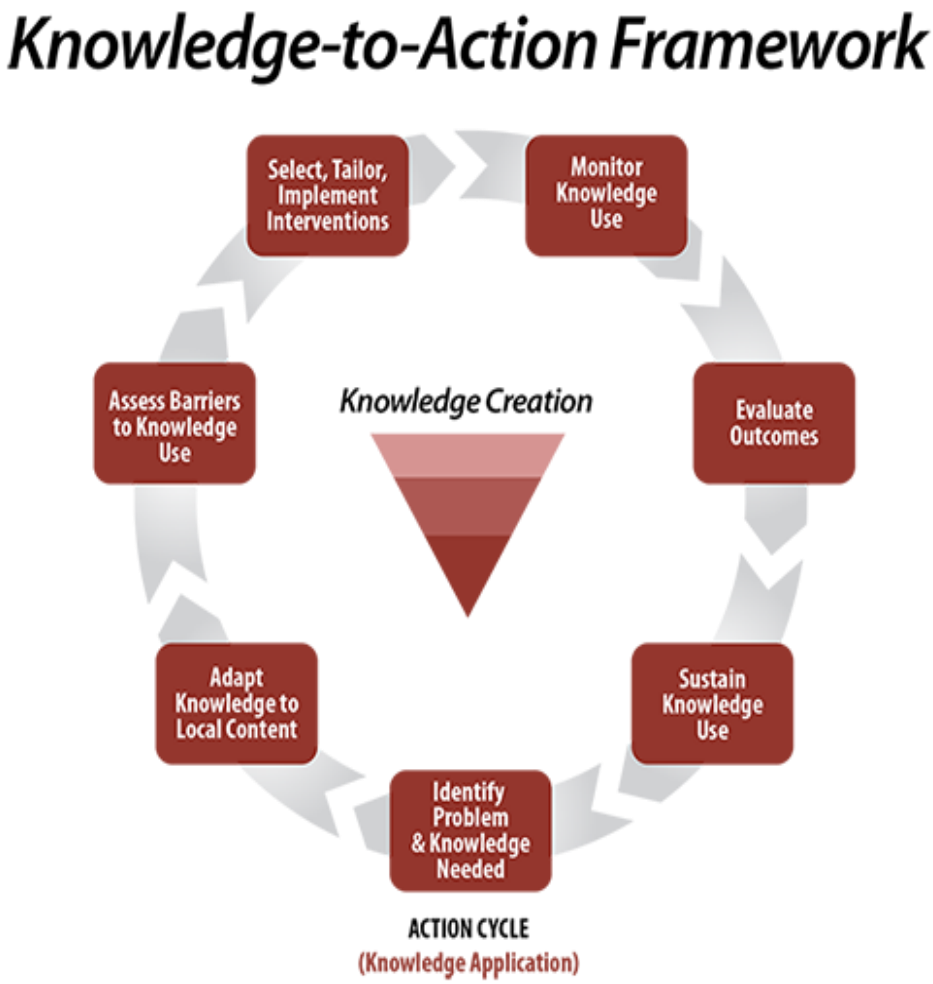
Low	1	2	3	4	5	6	7	8	9	High

Evaluatee satisfaction with evaluation:

Low	1	2	3	4	5	6	7	8	9	High

Comments: _____

Appendix L: Knowledge-to-action Framework



Appendix M: Adapted Anesthesia SBAR Report

SITUATION
PATIENT
ID_____SURGEON_____
_____
PROCEDURE_____
PROCEDURE STATUS_____DURATION_____
DIAGNOSIS_____

BACKGROUND
RELEVANT PMH_____
ALLERGIES_____MEDS_____
WEIGHT_____HEIGHT_____

ASSESSMENT
MALLAMPATI_____THYROMENTAL
DISTANCE_____
TEETH_____SURGICAL
HX_____
AIRWAY_____ADJUNCTS_____
_____
DRIPS_____
_____
INTRAOPERATIVE
MEDS_____
LAST PAIN MED_____LAST
RELAXANT_____
REVERSED_____EMERGENCE
PLAN_____
SPECIAL
MONITORING_____
____
INPUT_____URINE_____EBL_____

RECOMMENDATION
AIRWAY_____PAIN
MGMT_____MONITORING_____
ANESTHESIA CONTACT_____PAGER/PHONE
#_____
Concerns _____
Satisfied with Report_____

Appendix N: Stakeholder Fact Sheet for Handoff Communications

1. Inadequate handoff reporting has been so prominent that Joint Commission of Accredited Hospital Organizations (JCAHO) has been compelled to develop the National Patient Safety Goal 2E which states that hospitals must implement a standardized approach to handoff communications (Kalkman, 2010), (Friesen, 2008).
2. Hand-off communication is a high priority for regulatory and educational purposes (Lane-Fall, 2014).
3. There is an association between poor-quality handoffs and adverse events (Segall et al., 2012).
4. Anesthesia Patient Safety Foundation (apsf.org) states communication plays a major role in medical error and patient safety.
5. Choromanski, (2014) suggests in a preliminary study that current intra-operatvive handover practices among anesthesia providers are suboptimal and that national patient handover guidelines are required to improve patient safety.
6. In the Choromanski study in 2014, no handover protocol was being used at one institution, and 88 percent queried believed their protocol was insufficient.
7. National Committee for Quality Assurance (NCQA) states regardless of when the error occurs, handoff miscommunications often result from a lack of protocols.
8. The Institute for Healthcare Improvement (IHI) states that healthcare systems and medical practices that invest in focused communication skill development can expect to see measurable improvements in patient satisfaction scores, clinical outcomes and clinician job satisfaction (IHI, 2015)).
9. A study of incidents reported by surgeons found communication breakdowns were a contributing factor in 43 percent of incidents, and two-thirds of these communication issues were related to handoff issues (Freisen, 2008).
10. Institute of Medicine (IOM) reported that “it is in inadequate handoffs that safety often fails first”.

Appendix O: Two-Way Communication Process

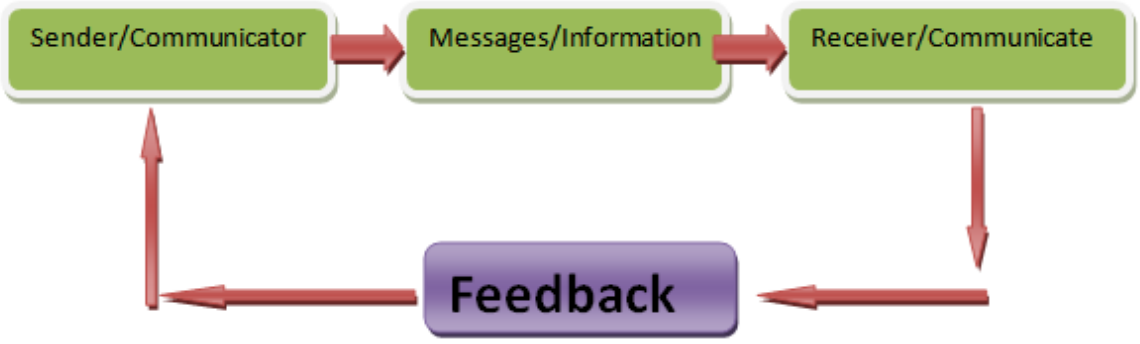


Figure: Two-way communication process

Appendix P: Assessment Scale for Collaboratives

Assessment Scale for Collaboratives

Assessment/Description	**Definition**
1.0 Forming team	Team has been formed; target population identified; aim determined and baseline measurement begun.
1.5 Planning for the project has begun	Team is meeting, discussion is occurring. Plans for the project have been made.
2.0 Activity, but no changes	Team actively engaged in development, research, discussion but no changes have been tested.
2.5 Changes tested, but no improvement	Components of the model being tested but n improvement in measures. Data on key measures are reported.
3.0 Modest improvement	Initial test cycles have been completed and implementation begun for several components. Evidence of moderate improvement in process measures.
3.5 Improvement	Some improvement in outcome measures, process measures continuing to improve, PDSA test cycles on all components of the Change Package, changes implemented for many components of the Change Package.
4.0 Significant improvement	Most components of the Change Package ar implemented for the population of focus. Evidence of sustained improvement in outcome measures, halfway toward accomplishing all of the goals. Plans for spread the improvement are in place.
4.5 Sustainable improvement	Sustained improvement in most outcomes measures, 75% of goals achieved, spread to larger population has begun.

5.0 Outstanding sustainable results	All components of the Change Package implemented, all goals of the aim have been accomplished, outcome measures at national benchmark levels, and spread to another facility is underway.