Implementation of a Standardized Handoff Report for Nurse Anesthetists in the Intra-Operative Setting: A Quality Improvement Project

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Abstract

Handoffs amongst anesthesia providers are complex, rapid, and frequent. The responsibilities of a nurse anesthetist consist of providing safe and effective anesthesia before, during, and after surgery. While individual anesthesia providers often use systematic methods for giving report, anesthesia departments typically do not use common reporting tools, which may improve the quality and continuity of information, perception of patient safety, and healthcare worker satisfaction. This Doctor of Nursing Practice (DNP) project aimed to assess anesthesia providers' perceptions of adequacy of the PATIENT Mnemonic to facilitate standardized handoffs of anesthetized patients. This quality improvement project was completed at a Level I trauma center located in the southeastern region of the United States. A pre- and post-survey design was utilized to complete a single Plan, Do, Study, Act cycle to assess user perceptions of the PATIENT Mnemonic amongst a non-randomized group of CRNAs. Based on project data, a shorter version of the PATIENT Mnemonic tailored to anesthesia providers at the project site would do well. Eliminating aspects reported to be redundant or unnecessary would shorten the time it takes to give report, may make the handoff process more seamless, fluid, and similar to how most CRNAs already give report. Two limitations of this quality improvement project were the small sample size and limited time for implementation. Overall, continuing this quality improvement project would be a low cost, low risk, and high reward since it has the potential to reduce patient harm and improve patient outcomes.

Keywords: handoff, CRNA, report, safety

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Section I. Introduction

Background

A handoff is considered the transfer of information, data, and responsibility between two health care professionals (Cohen & Hilligoss, 2010). Handoffs amongst anesthesia providers are often complex, rapid, and frequent. The overarching responsibilities of a nurse anesthetist consist of providing safe and effective anesthesia before, during, and after surgery. It is the duty of the nurse anesthetist to effectively communicate with fellow anesthetists, physicians, and nurses to ensure continuity of care. Anesthesia providers conduct handoffs frequently during the preoperative, intraoperative, and postoperative phases of care (Riesenberg et al., 2023). According to The Joint Commission (2017), detrimental sentinel events and poor patient outcomes can be directly tied to inadequate handoffs. Subsequently, handoffs play a critical role in ensuring continuity of care and patient safety.

Per The Joint Commission, 70% of sentinel events reported over 9 years were attributable to communication issues (Association of periOperative Registered Nurses, 2014). Furthermore, greater than 50% of these communication breakdowns occurred during the handoff period. In an effort to combat these statistics, the American Association of Nurse Anesthetists (AANA, 2019) has established Standard of Care 11: Transfer of Care. Per Allen et al. (2023), temporary intraoperative handoffs amongst Certified Registered Nurse Anesthetists (CRNAs) are common in the operating room. However, the majority of CRNAs do not use a standardized handoff method while communicating information with other anesthesia providers. Due to a lack of standardization in the handoff process within facilities, Standard of Care 11: Transfer of Care is not consistently met by anesthesia providers.

There is compelling evidence that the implementation of standardized handoffs improves the quality of transfer of patient information, staff perceptions of patient safety, and overall provider satisfaction (Canale, 2018). The primary standardized handoff tool dedicated to nurse anesthetists is the PATIENT Transfer of Care Checklist Tool (Wright, 2013). Dr. Suzanne M. Wright created the PATIENT protocol to improve situational awareness amongst CRNAs and establish a structured approach toward the handoff process that would minimize communication errors. The PATIENT mnemonic stands for patient/procedure/position, anesthesia/airway/antibiotic/allergies, temperature, invasive lines, end-tidal CO2 (ETCO2), narcotics, and twitches.

Canale (2018) demonstrated the efficacy of the PATIENT protocol via analysis of preintervention and postintervention survey data. Canale's results demonstrated statistically significant improvements in the quality and continuity of the transfer of information, perceptions of patient safety, and healthcare worker satisfaction following the implementation of Wright's handoff tool. A separate study conducted by Durley (2017) yielded similar results, demonstrating that a majority of participating CRNAs believed Wright's handoff tool serves as an effective way to organize patient information and ultimately optimize patient outcomes.

Organizational Needs Statement

The partnering healthcare facility for this quality improvement project is a level I trauma center located in rural North Carolina. This facility serves as a major surgical home for thousands of patients in the surrounding area. Currently, this healthcare facility does not require use of a standardized handoff tool for CRNAs. Implementation of the PATIENT Transfer of Care Checklist Tool could optimize handoff intraoperatively between nurse anesthetists, improve staff

perceptions on patient safety, adherence to the AANA's Standard of Care 11: Transfer of Care, and overall provider satisfaction.

Problem Statement

The Joint Commission (2017) reported that 70% of reported sentinel events are caused by communication problems, with half of those breakdowns occurring during patient handoff reports. In response to these large numbers of reported events, the Joint Commission recommended implementing standardized processes in patient handoff communications. While individual anesthesia providers often use systematic methods for giving report, anesthesia departments typically do not use common reporting tools, which may improve the quality and continuity of information, perception of patient safety, and healthcare worker satisfaction.

Purpose Statement

This Doctor of Nursing Practice (DNP) project will assess anesthesia providers' perceptions of adequacy of the PATIENT Mnemonic to facilitate standardized handoffs of anesthetized patients. The goal is to gain a better understanding of CRNA perceptions of this method in order to assess its usefulness as a handoff checklist in the transfer of care. It is anticipated that knowledge gained from this project could be used in future quality improvement and policy efforts aimed at improving intraoperative communication between providers through standardization of the handoff process at this facility.

Section II. Evidence

Description of Search Strategies

The PICOT question used to guide this literature search was: During intraoperative handoffs between CRNAs, how do standardized handoff tools affect provider satisfaction in the operating room? The main concepts used when searching the literature for information and evidence addressing potential solutions for the selected topic are located in Appendix A: Literature Concepts Table. These main concepts include intraoperative period, handoff, and CRNAs. A literature search was conducted utilizing the databases PubMed and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) plus the search engine Google Scholar to identify current evidence regarding the efficacy of using standardized handoff tools in the perioperative setting. The PubMed and Google Scholar basic search strategy was: (intraoperative care or intraoperative period or perioperative or operating rooms) AND (handoff or hand off or standardized handoff or communication or report) AND (crna or nurse anesthetist or anesthesia provider). The CINAHL basic search strategy was: ((MH "Intraoperative Period") OR (MH "Intraoperative Care") OR "intraoperative") AND ((MH "Hand Off (Patient Safety)") OR "handoff") AND ((MH "Certified Registered Nurse Anesthetists") OR (MH "Anesthetists") OR "nurse anesthetist").

The PubMed, CINAHL, and Google Scholar search strategies, limits applied, and number of citations found/kept are located in Appendix B: Literature Search Log. Amongst the search engine and two databases, articles published between 2005-2023 were reviewed for pertinence to the PICOT question. Other limits, in addition to the date of publication, include full-text and English language. In total, 2,355 articles were found, 19 articles were deemed pertinent for full-text review, and seven articles were selected based on their relevance to standardized handoffs

amongst CRNAs. Information regarding these seven articles are located in Appendix C: Literature Matrix.

The search strategy employed with PubMed was: (intraoperative care or intraoperative period or perioperative or operating rooms) AND (handoff or hand off or standardized handoff or communication or report) AND (crna or nurse anesthetist or anesthesia provider). Inclusion of multiple stages of the operative period was intentionally selected to gather data regarding handoffs during the pre-operative, intra-operative, and post-operative periods. The search was confined to articles published between 2015 to 2023. Following the initial search, 2,083 articles were found. Initial review of the PubMed results consisted of reading only the title of the article to identify pertinent results. Subsequently, 43 articles were identified during this initial review as being relevant to perioperative handoffs. Following this initial review, the abstracts from all 43 articles were read. Ten articles were selected for further evaluation.

When utilizing Google Scholar, the same search strategy from PubMed was entered into the search box. However, the search was expanded to articles published between 2005 to 2023. This initial search yielded 22 articles. The titles of these 22 articles were reviewed for relevance to the quality improvement project, and eight articles were identified following this initial review. The abstracts of these eight articles were read, and four articles were selected for further evaluation.

The search strategy used with CINAHL was: ((MH "Intraoperative Period") OR (MH "Intraoperative Care") OR "intraoperative") AND ((MH "Hand Off (Patient Safety)") OR "handoff") AND ((MH "Certified Registered Nurse Anesthetists") OR (MH "Anesthetists") OR ("nurse anesthetist")). The search was confined to articles published between 2013 to 2023. Following the initial search, 22 articles were found. Initial review of the CINAHL results

consisted of reading only the title of the article to identify pertinent results. Subsequently, 14 articles were identified during this initial review as being relevant to perioperative handoffs. Following this initial review, the abstracts from all 14 articles were read. Four articles were selected for further evaluation.

References from pertinent articles and practice guidelines from the American Association of Nurse Anesthetists (AANA) were reviewed for additional content. Based on Melnyk and Fineout-Overholt's (2019) levels of evidence hierarchy, one nonexperimental exploratory study (Level VI), five quality improvement projects (Level VI), and one systematic review (Level I) were identified as pertinent to this project upon full-text review.

Selected Literature Synthesis

The efficacy of standardized handoff tools has been the focus of multiple perioperative studies. In general, research has been conducted focusing on the utility standardized handoffs have on patient safety, patient outcomes, and efficiency. Halterman et al. (2019) studied the benefits of integrating a checklist in the post anesthesia care unit (PACU) at a 478-bed level I trauma center. Post-intervention results demonstrated a formal checklist decreased the omission of critical health information from anesthesia to PACU nurses. Omissions of data regarding critical aspects of the procedure decreased from 19.2% to 2.2% following the implementation of the checklist. Similarly, Caruso et al. (2017) evaluated the efficacy of a standardized, team-based ICU to OR handoff at a 311-bed pediatric hospital. Upon data analysis, they reported that implementation of a standardized tool improved anesthesia provider satisfaction and patient readiness for surgery. More specifically, patient readiness to be moved from the ICU to the operating room increased from 61% to 97% following the implementation of a standardized handoff tool. While Halterman et al. (2019) focused on OR to PACU handoff, and Caruso et al.

assessed ICU to OR handoff, the results of these two studies collectively demonstrate the positive impact standardized handoff tools can have on the fluidity of patient transfer and perceived patient safety amongst healthcare professionals during the pre-operative and post-operative periods.

Intraoperative breaks and associated handoffs are recurrent events in the OR that vary in length, complexity, and standardization. In a quality improvement project, Allen et al. (2023) reported that 81% of 197 CRNAs surveyed do not utilize a standardized handoff tool despite the high occurrence of intraoperative breaks. Based on their survey results, 88% of the participating CRNAs reported "yes" to taking temporary breaks throughout their shift, with two breaks per shift being the average number taken by each CRNA, and 57% believed a standardized tool should be implemented into their daily practice. Thus, there is a large window of opportunity for a standardized tool to be used frequently by CRNAs throughout the course of a single shift. Because of large numbers of handoffs being conducted between CRNAs in operating rooms, Wright (2013) designed and tested a handoff tool tailored for anesthesia providers.

In order to improve upon the safety and efficiency of CRNA to CRNA handoffs, Wright (2013) developed the PATIENT checklist tool. Using survey research, Wright demonstrates the checklist was perceived as an effective tool to increase situational awareness and minimize handoff variation in a time-effective manner. Following dissemination of the PATIENT checklist, others conducted research to test its efficacy. Quality improvement projects conducted by Durley (2017) and Canale (2018) both focused on implementing the PATIENT checklist. Using survey research, the two studies similarly found improvements with perceptions on patient safety, anesthesia provider satisfaction, and continuity of care. Amongst the 19 CRNAs surveyed in Durley's (2017) study, 68% found Wright's tool to be easily memorizable, 73% found the tool

comprehensive for their handoff needs, and 94% agreed the tool was an effective way to organize patient information. In similar fashion, Canale (2018) conducted pre- and post- implementation survey research utilizing Wright's tool among 20 CRNAs. Results demonstrated almost all the CRNAs agreed that Wright's tool was comprehensive, appropriate for the perioperative setting, and effectively transferred critical information.

While standardized handoff tools, such as Wright's PATIENT checklist, have yielded positive results, Abraham et al. (2021) emphasized in their systematic review that further attention should be directed towards integrating these tools in electronic health record systems and evaluating tangible patient outcomes to bolster the tools' efficacy. As stressed in Canale's (2018) study, a major component of implementing any change in a quality improvement project is buy-in from participants. Additionally, the attitudes of receiving CRNAs who may not be involved in the study can have a significant impact on a participant's ability to adhere to the stipulations established by the project leaders. Thus, extraneous variables must be considered when evaluating pre- and post- implementation data, drawing conclusions, and making decisions based on collected evidence.

Project Framework

The Institute for Healthcare Improvement (IHI, 2023) model for improvement served as the framework for this project. The PDSA cycle focuses initially on establishing what the researcher is striving to achieve (IHI, 2023). During the *plan* phase, it is critical to establish the objectives of the research, state the predictions of the proposed intervention, and create a plan on how to test the intervention. The *do* phase focuses on carrying out the proposed plan and collecting the necessary quantitative and qualitative data to perform a well-informed analysis during the subsequent *study* phase. After dissecting the data collected during the *study* phase, the

act phase aims to improve upon the test performed. During this last phase, the researcher strives to make alterations to the current intervention or implementation of new policies based on the analysis of the results.

The PDSA cycle was used in this project to construct a plan to present, disseminate, and evaluate the efficacy of the PATIENT checklist tool to CRNAs at the affiliated medical center. Additionally, implementation of this framework helped determine critical aspects of the project including timeframe of intervention, survey analysis, and methods for presenting data and conclusions.

Ethical Considerations and Protection of Human Subjects

This quality improvement project underwent an initial quality improvement determination process via a process set up through the East Carolina University College of Nursing and the University and Medical Center Institutional Review Board (UMCIRB). Once developed, the project underwent an additional ethical review process and received approval for implementation within the participating organization. Organizational approval processes can be found in Appendix D: Project Approvals. Collaborative Institute Training Modules on research ethics and compliance were completed by all team members prior to implementation of the project (https://about.citiprogram.org/).

Project participation was limited to CRNAs employed at the affiliated organization's hospital facility. Involvement in this quality improvement project by the CRNAs was voluntary. Participant recruitment relied solely on willingness of potential participants to volunteer. This project refrained from dealing with protected patient information, and there was no direct patient involvement. Thus, the risk to patients and involved anesthesia staff was deemed relatively low. Potential risks identified within this project revolved around the implementation of the PATIENT

checklist tool in the clinical setting as utilizing an unfamiliar tool, in this case a standardized handoff tool, which may cause some increased stress and demand upon a CRNA attempting to integrate a new tool into their daily practice.

Section III. Project Design

Project Setting

This quality improvement project was completed in the surgical center of a Level I trauma center located in the southeastern region of the United States. Annually, more than 27,000 procedures are conducted under anesthesia at this medical facility. In total, there are 26 main operating rooms, which are shared amongst inpatient and ambulatory cases.

Due to the high volume of surgical cases conducted at this healthcare facility, participating CRNAs had many opportunities to implement the PATIENT checklist tool into their handoff routine. That being said, the rapid pace of turnover and high acuity level of patients may deter some CRNAs from venturing away from their normal practice.

At this healthcare facility, CRNA-to-CRNA handoff exhibited an opportunity for standardization and structure. Prior to the initiation of this quality improvement project, there were no reports of preexisting initiatives to change the methods in which CRNAs conducted their handoffs. The relative novelty of implementing a standardized handoff at this location served as a facilitator for the use of Wright's tool.

Project Population

CRNAs were the population involved in this quality improvement project. A CRNA is an advanced practicing registered nurse whose duties consist of administering safe and effective anesthesia before, during, and after surgery. CRNAs work with anesthesiologists, surgeons, and nurses to optimize a patient's experience throughout the perioperative period. It is the CRNA's goal to provide safe, efficacious, and patient-centered care for all individuals.

Formerly established relationships with CRNAs helped in assembling a group of participants willing to participate in this study. Eight CRNAs were asked to voluntarily partake

in this quality improvement project. Five out of the eight participating CRNAs had less than or equal to 5 years of experience. The other three CRNAs had six to ten years of experience. While willingness to use Wright's checklist was facilitated by the tool's specificity for CRNA-to-CRNA handoff, resistance to change in practice may share a relationship with length of anesthesia experience. Thus, length of experience could serve as an obstacle in promoting consistent use of Wright's PATIENT checklist tool.

Project Team

The project team consisted of four Student Registered Nurse Anesthetists (SRNAs) and three faculty members. Each SRNA served as the primary investigator for their own individual projects. While group work was completed during the developmental stages of the project, the SRNAs worked individually during the implementation and analysis stages. As part of the project, the SRNAs developed an educational PowerPoint, a badge buddy with the PATIENT mnemonic, and surveys disseminated to participating CRNAs. These implementation resources were created under the instruction of two faculty members, a non-CRNA faculty member, and a CRNA faculty member. The non-CRNA faculty member served as the course director and played an integral role in guiding the SRNAs throughout the process of constructing their thesis, developing implementation resources, receiving project approval, and analyzing collected data. The second faculty member, a CRNA, served as the project chair, whose primary role was to provide guidance on project development and insight regarding clinical practice. The third faculty member, also a CRNA, served as the clinical contact person who assisted in recruiting participants and confirming facility and IRB approval.

Methods and Measurements

Using a pre- and post-survey design, this quality improvement project sought to complete a single PDSA cycle to evaluate the PATIENT checklist tool's ability to optimize handoff intraoperatively between nurse anesthetists, improve staff perceptions on patient safety, adherence to the AANA's Standard of Care 11: Transfer of Care, and overall provider satisfaction. The faculty member serving as the clinical contact person accrued a list of CRNAs willing to participate in a study assessing the use of a standardized handoff tool. Following agreement to volunteer in this quality improvement study, participants were sent an email (Appendix E), including a narrated PowerPoint introducing the purpose of the project, details regarding the PATIENT checklist tool, and their projected roles in collecting data (Appendix F). Additionally, each volunteer was supplied a badge buddy (Appendix G) to promote the use of Wright's tool. Within the initial email, each volunteer was given a Qualtrics link to complete a pre-implementation survey (Appendix H). At the conclusion of this project, all participating CRNAs were sent a final email, which included a Qualtrics link to complete a post-implementation survey (Appendix I) to share their thoughts regarding the efficacy of the PATIENT checklist tool.

The Qualtrics pre- and post- implementation surveys were confidentially completed by each participating CRNA. These surveys consisted of Likert-type scale, free response, and dichotomous (yes or no) questions. Survey questions were designed to provide insight regarding current methods of communication in the operating room, perceptions on standardized handoffs, opinions specifically regarding the PATIENT checklist tool, factors influencing their current handoff practices, and ways to optimize handoffs between CRNAs. Pre- and post-intervention data were collected from April 8th, 2024 to April 19th, 2024.

This project was initiated on April 8th, 2024, and it ended on April 19th, 2024. During the agreed upon dates of the study, participating volunteers used the PATIENT checklist tool to conduct CRNA to CRNA handoffs for lunches and change of shift report. Following the specified period of utilizing the PATIENT checklist tool, participants were sent an anonymous Qualtrics post-implementation survey (Appendix I) to evaluate their satisfaction with the PATIENT checklist tool, desire to use a department specific handoff mnemonic, and barriers preventing adoption of a standardized tool.

Section IV. Results and Findings

Results

This Doctor of Nursing Practice (DNP) project assessed anesthesia providers' perceptions of adequacy of the PATIENT Mnemonic to facilitate standardized handoffs of anesthetized patients. The goal was to gain a better understanding of CRNA perceptions of this method in order to assess its usefulness as a handoff checklist in the transfer of care. Pre-implementation surveys were sent to eight CRNAs on April 5th, 2024. Upon evaluating the initial Qualtrics results, all eight CRNAs completed the pre-implementation survey. The collected data confirms the PATIENT checklist tool is not currently used at this facility.

Following the completion of the pre-implementation survey, the PATIENT checklist tool was available to be used between April 8th, 2024 to April 19th, 2024. During this period of time, participants were sent a subsequent reminder email in case they did not complete the initial pre-implementation survey. At the end of this trial period, the CRNAs were sent a third email which included a link to a post-implementation survey. This data was collected via Qualtrics and analyzed with Excel. All eight CRNAs completed the post-implementation survey between April 22nd, 2024 to May 10th, 2024.

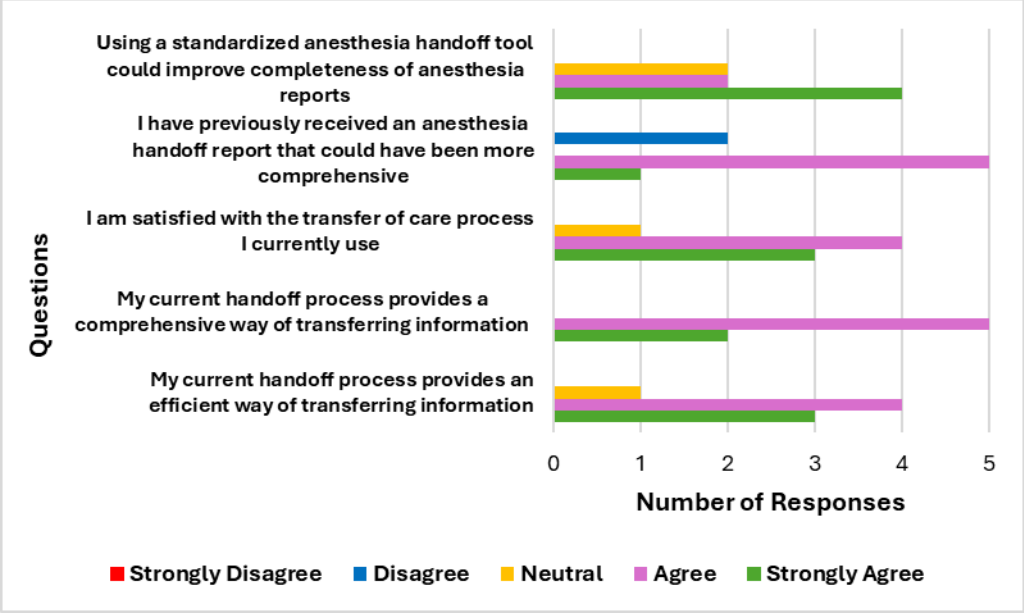
All eight CRNAs submitted responses to the pre-implementation survey. Five CRNAs reported having five years or less of experience as a nurse anesthetist, while three CRNAs reported having between six to ten years. When questioned whether they had a systematic way of reporting to anesthesia providers, four CRNAs reported “yes,” while four CRNAs reported “no.” Over 70% of the participating CRNAs indicate that anesthesia providers at this facility do not utilize a common standardized approach in conducting their handoff reports. When asked if they

were familiar with Wright's PATIENT Mnemonic prior to implementing this project, four of the CRNAs reported "yes," while four CRNAs reported "no."

Figure 1 depicts the data gathered from the pre-implementation Likert-type survey questions. When the eight CRNAs were questioned about their satisfaction with the current handoff process they employ, seven of the CRNAs either "agreed" or "strongly agreed" their current handoff process is efficient and comprehensive. Additionally, seven of the CRNAs either "agreed" or "strongly agreed" they were satisfied with their current transfer of care process. Interestingly, six of the CRNAs reported receiving a handoff report from a colleague which could have been more comprehensive. Six of the CRNAs either "agreed" or "strongly agreed" that use of a standardized handoff tool could improve the completeness of anesthesia reports.

Figure 1

CRNA Pre-Implementation Likert-type Responses (n = 8)

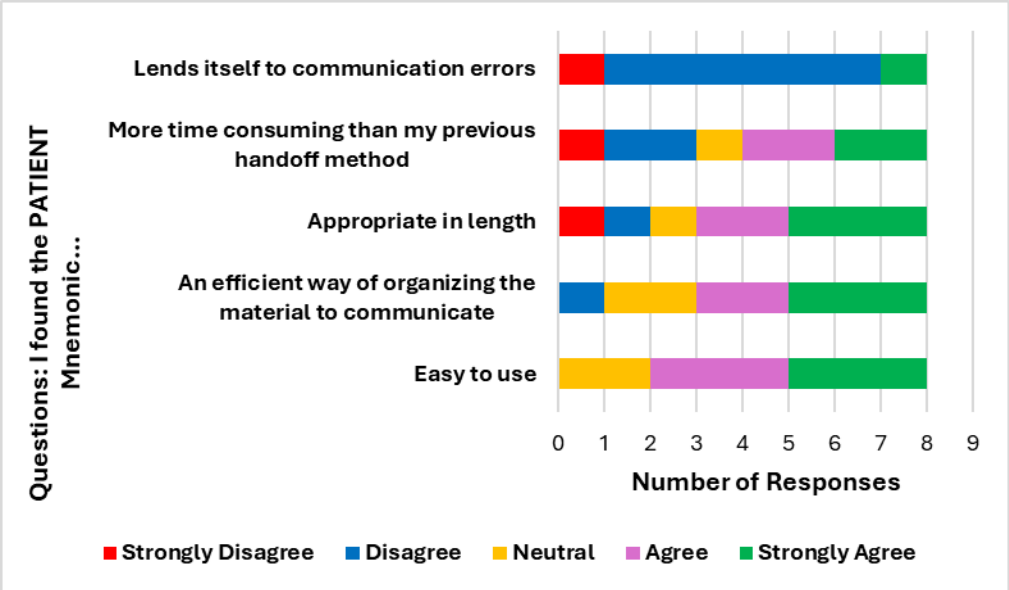


When asked to provide input on what factors influence their current handoff practices, three factors stood out. These factors included type and length of case, and experience of the receiving CRNA.

There was a 100% response rate to the post-implementation survey (n = 8). Six CRNAs reported using the PATIENT Mnemonic four or more days during the two-week trial period. One CRNA reported using the PATIENT Mnemonic every day. When evaluating the individual experiences with the PATIENT Mnemonic, a second Likert-type survey question was presented. The data from the Likert-type survey question is presented in Figure 2. Six CRNAs reported the PATIENT Mnemonic "easy to use," and two CRNAs reported "neutral." More than 50% of the CRNAs selected "agree" or "strongly agree" when asked if the PATIENT Mnemonic was efficient (5 of 8) and appropriate in length (5 of 8). The responses were fairly split when asked if the PATIENT Mnemonic was more time consuming than their previous handoff method (2 strongly agreed, 2 agreed, 1 was neutral, 2 disagreed, and 1 strongly disagreed). Seven of the CRNAs agreed the PATIENT Mnemonic does not lend itself to communication errors.

Figure 2

CRNA Post-Implementation Likert-type Responses (n = 8)



Five of the CRNAs reported being either “satisfied” or “very satisfied” with the PATIENT Mnemonic, while two reported being “neutral.” One CRNA reported being “dissatisfied” with the PATIENT Mnemonic.

When asked to provide feedback on why they would or would not adopt the PATIENT Mnemonic into their own practice, multiple CRNAs reported they are satisfied with the current handoff process they utilize and would not be adopting it due to the length and time it takes to implement the tool. Additionally, one CRNA reported the Epic charting system does an adequate job in laying out key handoff information under the pre-admission testing (PAT) tab. One CRNA reported they already use the PATIENT Mnemonic in their daily practice, and another CRNA stated they would be a proponent of implementing the tool into their own practice to standardize the process at this facility.

Three of the CRNAs provided feedback when asked how the PATIENT Mnemonic could be improved. Two recommended the tool would be more efficacious if shortened. One of these CRNAs recommended “position,” “procedure,” “anesthesia,” “temperature,” and “$EtCO_2$” be removed from the PATIENT Mnemonic. The third CRNA commented that in order for the PATIENT Mnemonic to be streamlined, certain subjects should be clustered together. For example, the CRNA stated “I would typically discuss ventilation at the same time I discuss airway.”

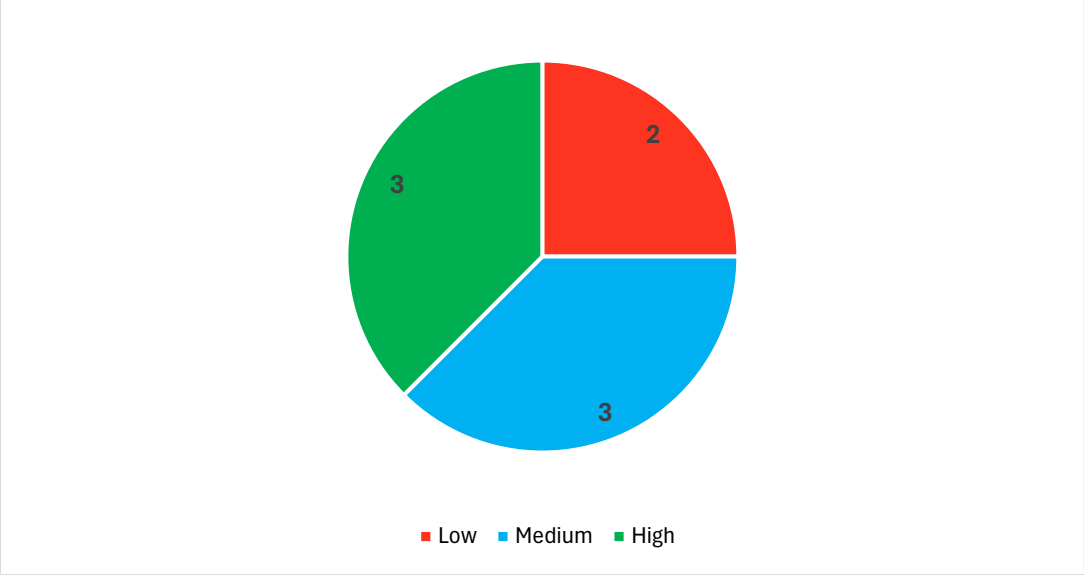
When the CRNAs were asked if they thought the establishment of a department specific handoff mnemonic would be helpful, four CRNAs responded “yes” and four responded “no.” CRNAs were asked to provide feedback regarding barriers to implementation of a standardized handoff tool at this facility. Two stated limited time for breaks was a barrier, and one stated “peer disinterest” and “interruptions” were barriers to mnemonic implementation. One

commented the implementation of a mnemonic would be feasible if the department supplied all anesthesia staff with a badge buddy to aid using the tool.

Lastly, when asked what their level of support would be for future use of the PATIENT Mnemonic, three responded with “high,” three responded with “medium,” and two responded with “low.” This data is portrayed as a pie chart in Figure 3.

Figure 3

Post-Implementation Level of Support for Future Use of the PATIENT Mnemonic (n = 8)



Analysis

Based on the demographic data collected, 62% (5/8) of the participating CRNAs reported having five years or less of experience. One could speculate that length of anesthesia experience could be both a facilitator and barrier in this quality improvement project. From one perspective, a CRNA with less than five years of experience may be more open to changes in their practice. Subsequently, the likelihood of them implementing Wright’s PATIENT checklist tool into their daily routine may be higher. Conversely, a newer graduate CRNA may feel uncomfortable straying away from their normal routine and gravitate toward familiarity. A seasoned CRNA,

with six to ten years of experience, may be steadfast in their own methods of conducting handoff, or be receptive to new methods because they are confident in their clinical skills if something were to go awry.

Half of the participating CRNAs (4/8) reported using a systematic way to conduct their handoffs. Five of eight CRNAs reported that anesthesia providers at this facility do not use a common standardized method of conducting their report. When the participants were asked about their familiarity with Wright's PATIENT Mnemonic, half (4/8) of the CRNAs were familiar with the checklist, while the other half (4/8) were not familiar with it prior to implementation.

Eighty-seven percent (7/8) of the respondents reported their current handoff process to be both efficient and comprehensive. Moreover, 7 of 8 respondents reported being satisfied with their current handoff method. Interestingly, 6 of 8 respondents believe they have received a handoff that could be improved upon in its comprehensiveness. Seventy-five percent of respondents either "agree" or "strongly agree" a standardized handoff tool could improve completeness of anesthesia reports. Thus, while more than 87% of CRNAs believe their own handoff method is sufficient, they may be open to the implementation of a standardized tool within the department in order to improve the quality of handoff reports.

When asked what factors influence their current handoff practice, 7 of 8 respondents reported the "type of case" and "length of case" and 5 of 8 respondents reported the "experience of receiving CRNA." Thus, it may be beneficial to further investigate whether a particular handoff tool, such as the PATIENT Mnemonic, should be tailored towards particular cases or new graduate CRNAs.

The post-implementation survey results and the perception on the PATIENT Mnemonic were surprisingly positive as a whole. Following the conclusion of this quality improvement

project, one should consider how many hours or shifts it truly takes to gain an adequate understanding of the PATIENT Mnemonic, and whether it adds or subtracts to the quality of one's handoff report. Using the PATIENT Mnemonic one time may not be sufficient to gain proficiency. However, one could argue that these participants are highly aware with what works in their own anesthesia practice.

Over 50% of participating CRNAs found the PATIENT Mnemonic easy to use (6/8), efficient (5/8), comprehensive (7/8), and appropriate in length (5/8). Additionally, 7 of the 8 CRNAs believed the tool does not lend itself to communication errors. The responses were fairly split when it came to perception on the tool being more time consuming than their previous handoff method. Thus, one could conclude that a majority of the participating CRNAs believe the PATIENT Mnemonic provides more positive attributes than negative attributes in the clinical setting.

Five of the CRNAs were either "very satisfied" or "satisfied" with the PATIENT Mnemonic tool, while only one CRNA was "dissatisfied." The two CRNAs that marked "neutral" could potentially be swayed in either direction depending on if certain aspects of the tool were added or subtracted.

When the CRNAs were asked to comment on why they would or would not like to adopt the PATIENT handoff tool into their personal practice, seven of the CRNAs provided feedback. Five of the seven participants reported the PATIENT Mnemonic is not necessary because they either have an established method of giving report to other anesthesia providers, the Epic charting system already provides an adequate layout of information for report, or they are simply not satisfied with the format of the PATIENT Mnemonic.

In order to bolster the tool's support among these CRNAs, abbreviating the PATIENT Mnemonic may increase its chances of widespread implementation. Shortening the tool would appease those who found the PATIENT Mnemonic too long.

In the post-implementation survey, the CRNAs were asked, "Do you think it would be helpful if the department created a department specific handoff mnemonic?" Four answered "yes," and four answered "no." It would be interesting if we knew how many years the CRNAs who answered "no" have been working. Did they answer "no" because they are heavily established in their practice as a CRNA, or are they so freshly graduated they want to continue using whatever method they practiced in school?

Limited time for breaks is a recurrent issue that is understandably a concern when it comes to completing handoffs. The longer it takes you to complete a handoff report, the less time you will have for a break. The comment regarding "peer disinterest" and "interruptions" brings up an important point regarding extraneous factors that anesthesia providers have very little control over. Regardless of the handoff tool a CRNA is using, it will not serve its purpose if the anesthesia provider taking report is noncompliant with the handoff process, in a rush to complete the handoff, or if there are many disruptions during the process.

Based on project data, a shorter version of the PATIENT Mnemonic tailored to anesthesia providers at the project site may do well. Eliminating aspects reported to be redundant or unnecessary would shorten the time it takes to give report, may make the handoff process more seamless, fluid, and similar to how most CRNAs currently give report.

Section V. Implications

Financial and Nonfinancial Analysis

Expenses incurred to implement this quality improvement project arose primarily from the construction of badge buddies for all eight CRNAs. These badge buddies consisted of a copy of Wright's PATIENT Mnemonic. Each badge buddy was laminated and placed in the personal mailboxes of each CRNA at the facility. The cost for printing and laminating the badge buddies was $5 (U.S.) per item, or $40 in total. The use of the anonymous Qualtrics surveys was free through a license supplied from East Carolina University. There were no fees charged pertaining to IRB approval by the participating facility.

If the facility chose to print badge buddies for each employed CRNA, it is likely the cost per item would be significantly lower due it being a bulk order. A major factor to consider is the in-house resources readily available at the facility, and the materials selected for printing and lamination. If the facility is capable of constructing the badge buddies in-house, this would eliminate a significant third-party cost and shipping fees. A less expensive alternative to badge buddies would be to place a laminated copy of the PATIENT Mnemonic at each anesthesia machine. Subsequently, the facility would only have to produce 26 laminated copies versus over 100 badge buddies for each anesthesia provider.

There is really no direct or indirect monetary benefit that can be quantified from this project since we were assessing CRNAs' perceptions on the PATIENT checklist. The healthcare facility did not have to provide any funding for this project. While there is potential for reduction in cost associated with this quality improvement project, the economic impact of this tool was not part of the data analysis. That being said, the participating facility did receive the benefit of

evaluating the results of the project, which has the potential to impact future initiatives addressing perioperative handoff.

One possible negative aspect of this quality improvement project was the potential for longer handoff times while using the PATIENT Mnemonic, which may have resulted in extended breaks. If the relief CRNA takes a long time to receive a handoff report during break, it could mean that another anesthesia provider in a different operating room will not get relieved in a timely manner. An analysis of medical errors and litigations against physicians revealed that claims of negligence are frequently due to a lack of attention span towards the patient (Studdert et al., 2006). Thus, if an anesthesia provider does not receive adequate break time or lunch, it could increase the risk of adverse perioperative patient outcomes.

Implications of Project

In summary, the AANA (2019) has firmly established it is the duty of the nurse anesthetist to effectively communicate with fellow anesthetists, physicians, and nurses to ensure continuity of care via Standard of Care 11. Based on data collected in this project, the overall consensus regarding the PATIENT Mnemonic was that a shorter version tailored for anesthesia providers at this facility may do well if it were trialed. Eliminating redundant or unnecessary aspects of the tool would decrease the time it takes to give report, and make the handoff process more seamless, fluid, and similar to the way in which most CRNAs may already be giving report. The participating CRNAs seem to agree the PATIENT Mnemonic is easy to use, efficient, comprehensive, appropriate in length, and does not lend itself to communication errors. These findings align with the positive conclusions drawn from Canale (2018) and Durley (2017) about Wright's PATIENT Mnemonic.

The data collected from this quality improvement project serves as confirmation the PATIENT Mnemonic has potential to improve communication and patient safety at this particular facility. Implementation of the PATIENT Mnemonic would help ensure this facility stays compliant in enforcing the AANA's Standard of Care 11 by standardizing the way in which report is conducted among anesthesia providers. As formerly discussed, more than 50% of perioperative communication breakdowns occur during the handoff period (Association of periOperative Registered Nurses, 2014), and poor patient outcomes can be directly tied to inadequate handoffs. Thus, the PATIENT Mnemonic could serve a dual purpose at this facility by promoting compliance with the AANA's standards and decreasing the likelihood of detrimental events and poor patient outcomes.

Sustainability

Overall, the widespread implementation of Wright's PATIENT Mnemonic would be a low-cost intervention that has the potential to mitigate the risks of high-cost unwanted events and poor patient outcomes. Badge buddies or laminated printouts of the PATIENT Mnemonic would likely be an annual or biannual expense that would not require frequent assessments or revisions. In order to promote consistent use of the handoff tool, verbal reminders could be given during monthly anesthesia staff meetings. These staff meetings could also be used as a time to collect valuable feedback from staff on how the PATIENT Mnemonic can be optimized and improved upon at this facility.

If the facility was interested in gathering data regarding the PATIENT Mnemonic on a larger scale, an analogous project could be constructed using a larger pool of CRNAs through the employment of multiple Plan, Do, Study, Act cycles. As previously stated, the printing and

laminating costs of the badge buddies or handouts would be a fiscally reasonable task for a facility of this size.

Dissemination Plan

The details and results of this quality improvement project were provided via oral presentation and poster display to faculty, project stakeholders, and other SRNAs. The presentation, while given in person, was made available via Zoom during the fall of 2024. CRNAs who partook in this quality improvement project were invited to virtually attend the Zoom meeting. This paper and affiliated poster were uploaded to an online digital archive referred to as The Scholarship.

Section VI. Conclusion

Limitations

Two limitations of this quality improvement project were the small sample size and limited time for implementation. Given the sample size was eight CRNAs, this increases the risk of any single response impacting results and data analysis. If this project is replicated in the future, having a larger group of CRNAs could strengthen the data's validity. Additionally, expanding the window of time in which the project is conducted could assist in assuring the PATIENT Mnemonic is being used often and correctly. Because the implementation time was only two weeks, it is possible premature opinions were made about the PATIENT Mnemonic. A third limitation of this project is the reliance it has on subjective recall from the CRNA participants.

Recommendations for Future Implementation and/or Additional Study

Having a larger pool of CRNAs and extended implementation period would help bolster the validity of the collected data. In order to promote active participation in this project, it may be helpful to have the CRNA participants log their daily or weekly experience with the PATIENT Mnemonic. Doing so would eliminate the reliance on each participant's subjective memory.

In order to truly assess the efficacy of the PATIENT Mnemonic, it would be beneficial to integrate the concept into the EPIC charting system. For example, when a CRNA is giving a handoff report to another anesthesia provider, they would click a "PATIENT Mnemonic" button. Upon clicking this button, a summative sheet would appear that goes through each letter of the acronym. When the handoff report is complete, the CRNA would click a button signifying the PATIENT Mnemonic was successfully completed with another anesthesia provider. This form of

EPIC charting would hold practitioners accountable and help improve patient safety by bolstering communication between anesthesia providers. Additionally, an electronic record would provide researchers with valuable quantitative data that is more reliable than subjective reports in survey form.

Overall, continuing this quality improvement project would be a low cost, low risk, and high reward endeavor since it has the potential to reduce patient harm and improve patient outcomes. In order to encourage participant buy-in, it is critical to emphasize the strong data that supports the implementation of standardized handoffs. Presentation of data from articles like Canale (2018) and Durley (2017) help rally support through the establishment of confidence in the PATIENT Mnemonic. Emphasizing Wright's handoff tool has established validity and reliability can help garner support from even the most skeptical of CRNAs. If properly integrated into a facility's system, the PATIENT Mnemonic has the potential to optimize perioperative communication and improve patient care.

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Appendix A

Literature Concepts Table

Keywords, PubMed MeSH and CINAHL Subject Heading Used for Literature Search

	Intraoperative Period	**Handoff**	**CRNA**
Keywords (these are the "normal" words you would say or use)	Intraoperative care OR Intraoperative period OR Perioperative OR operating rooms	Handoff OR Hand off OR Standardized handoff OR Communication OR Report	CRNA OR Nurse anesthetist OR Anesthesia provider
PubMed MeSH (subject heading specific to PubMed: find in Query Details under Advanced)	Intraoperative care [mesh] Intraoperative period [mesh] Operating rooms [mesh]	Communication [mesh]	Nurse anesthetist [mesh] Anesthesia [mesh]
CINAHL Subject Terms (Subject headings specific to CINAHL you will be directed to when searching your keywords)	Intraoperative Period Intraoperative Care Intraoperative	Hand Off Patient Safety Handoff	Certified Registered Nurse Anesthetist Anesthetists Nurse Anesthetist
Other (Google Scholar; can be just keywords)	N/A	N/A	N/A

Appendix B

Literature Search Log

Search date	Database or search engine	Search strategy	Limits applied	Number of citations found/kept	Rationale for inclusion/exclusion of items
9/24/2023	PubMed	(intraoperative care or intraoperative period or perioperative or operating rooms) AND (handoff or hand off or standardized handoff or communication or report) AND (crna or nurse anesthetist or anesthesia provider) (("intraoperative care"[MeSH Terms] OR ("intraoperative"[All Fields] AND "care"[All Fields]) OR "intraoperative care"[All Fields] OR ("intraoperative period"[MeSH Terms] OR ("intraoperative"[All Fields] AND "period"[All Fields]) OR "intraoperative period"[All Fields]) OR ("perioperative"[All Fields] OR "perioperatively"[All Fields]) OR ("operating rooms"[MeSH Terms] OR ("operating"[All Fields] AND "rooms"[All Fields]) OR "operating rooms"[All Fields])) AND ("handoff"[All Fields] OR "handoffs"[All Fields] OR (("hand"[MeSH Terms] OR "hand"[All Fields]) AND "off"[All Fields]) OR (("reference standards"[MeSH Terms] OR ("reference"[All Fields] AND "standards"[All Fields]) OR "reference standards"[All Fields] OR "standardization"[All Fields] OR "standard"[All Fields] OR "standards"[All Fields] OR "standardisation"[All Fields] OR "standardisations"[All Fields] OR "standardise"[All Fields] OR "standardised"[All Fields] OR "standardises"[All Fields] OR "standardising"[All Fields] OR "standardization	2015-2023	2083 found/10 kept	-Inclusion of multiple stages of operative period (intra and peri) to gather data regarding handoffs during pre, intra, and post operative periods -the term “handoff” may be reported as “communication” and/or “report” depending on geographic location, unit of focus, test group, etc.

		s"[All Fields] OR "standardizations"[All Fields] OR "standardize"[All Fields] OR "standardized"[All Fields] OR "standardizes"[All Fields] OR "standardizing"[All Fields] OR "standards"[MeSH Subheading] OR "standards"[All Fields]) AND ("handoff"[All Fields] OR "handoffs"[All Fields])) OR ("communicate"[All Fields] OR "communicated"[All Fields] OR "communicates"[All Fields] OR "communicating"[All Fields] OR "communication"[MeSH Terms] OR "communication"[All Fields] OR "communications"[All Fields] OR "communicative"[All Fields] OR "communicational"[All Fields] OR "communicatively"[All Fields] OR "communicativeness"[All Fields] OR "communicator"[All Fields] OR "communicator s"[All Fields] OR "communicators"[All Fields]) OR ("reportable"[All Fields] OR "reporting"[All Fields] OR "reportings"[All Fields] OR "research report"[MeSH Terms] OR ("research"[All Fields] AND "report"[All Fields]) OR "research report"[All Fields] OR "report"[All Fields] OR "reported"[All Fields] OR "reports"[All Fields])) AND ("crna"[Journal] OR "crna"[All Fields] OR ("nurse anaesthetist"[All Fields] OR "nurse anesthetists"[MeSH Terms] OR ("nurse"[All Fields] AND "anesthetists"[All Fields]) OR "nurse anesthetists"[All Fields] OR ("nurse"[All Fields] AND "anesthetist"[All Fields]) OR "nurse anesthetist"[All Fields]) OR (("anaesthesia"[All Fields] OR "anesthesia"[MeSH Terms] OR "anesthesia"[All Fields] OR "anaesthesias"[All Fields] OR "anesthesias"[All Fields]) AND ("provide"[All Fields] OR "provided"[All Fields] OR "provider"[All Fields] OR "provider s"[All			

		Fields] OR "providers"[All Fields] OR "provides"[All Fields] OR "providing"[All Fields]))))			
9/24/2023	CINAHL	((MH "Intraoperative Period") OR (MH "Intraoperative Care") OR "intraoperative") AND ((MH "Hand Off (Patient Safety)") OR "handoff") AND ((MH "Certified Registered Nurse Anesthetists") OR (MH "Anesthetists") OR "nurse anesthetist")	2013-2023	22 found/4 kept	-Only included “intraoperative” to keep results more focused on CRNA to CRNA handoff since CINAHL is nursing focused database
9/24/2023	Google Scholar	(intraoperative care or intraoperative period or perioperative or operating rooms) AND (handoff or hand off or standardized handoff or communication or report) AND (crna or nurse anesthetist or anesthesia provider)	2005-2023	250 found/5 kept (reviewed 10 pages)	-Inclusion of multiple stages of operative period (intra and peri) to gather data regarding handoffs during pre, intra, and post operative periods -the term “handoff” may be reported as “communication” and/or “report” depending on geographic location, unit of focus, test group, etc.

Appendix C

Literature Matrix

Year	Author, Title, Journal	Purpose & Conceptual Framework or Model	Design and Level of Evidence	Setting	Sample	Tool/s and/or Intervention/s	Results
2013	Wright, S. M. (2013). Examining transfer of care processes in nurse anesthesia practice: Introducing the PATIENT protocol. *AANA Journal*, *81*(3), 225–232.	Examine current transfer of care practices of Certified Registered Nurse Anesthetists (CRNAs) as they manage patients during the intraoperative period and develop, implement, and evaluate the efficacy of PATIENT checklist tool -No conceptual framework or model noted	2-phase, nonexperimental exploratory study; Level 6	Operating suites at 2 large community hospitals and 1 large teaching hospital in central Virginia	The survey was sent to a convenience sample of 1,000 CRNAs practicing throughout the United States; The pilot group testing the PATIENT checklist consisted of a convenience sample of 74 CRNAs	Phase 2 of the study involved the evaluation of the PATIENT checklist tool through the electronic administration of a 10-item mixed-methods survey questionnaire	"The development of a standardized transfer of care communication tool can serve to promote situational awareness in a swift and organized manner and may minimize existing variation in handoff processes" (Wright, 2013, p. 232)
2017	Caruso, T. J., Marquez, J. L. S., Gipp, M. S., Kelleher, S. P., & Sharek, P. J. (2017). Standardized ICU to OR handoff increases communication without delaying surgery. *International Journal of Health Care Quality assurance*, *30*(4), 304–311.	Determine whether a standardized ICU to OR handoff process would increase the number of team handoffs and improve patient transport readiness -No conceptual framework or model noted -Authors developed a standardized ICU to OR handoff using a	Quality Improvement; pre/post intervention observation; Level 6	A 311-bed, freestanding, academic, pediatric hospital in Northern California containing 19 anesthetizing locations, 40-bed neonatal intensive care unit	57 audits were completed	The intervention consisted of designing a multidisciplinary, face-to-face handoff between sending ICU providers and receiving anesthesiologist and OR nurse, verbally presented in the I-PASS format; Data collected included frequency of handoff, patient transport readiness, turnover time between OR cases, and anesthesia provider satisfaction	"A standardized, team-based ICU to OR handoff increased the frequency of face-to-face handoffs, patient readiness and anesthesia provider satisfaction within increasing turnover between cases" (Caruso, 2017, p. 304)

		previously published handoff model: The I-PASS mnemonic		(NICU), 24-bed pediatric intensive care unit (PICU), and 20-bed cardiovascular intensive care unit (CVICU			
2017	Durley, T. (2017). Application of the Patient Checklist Tool in anesthesia handoffs. *Northern Michigan University: DNP Scholarly Projects, 2.*	Determine if CRNAs believe the established PATIENT transfer of care protocol enhances communication between CRNAs during the anesthesia handoff process -Utilized the Perioperative Patient Focused Care Model	Quality Improvement; pre/post intervention observation; Level 6	Regional medical center (location and # of beds not specified)	19 CRNAs	A mixed methods questionnaire, created by Suzanne Wright, containing six Likert style questions and four open ended questions evaluating the use of the PATIENT checklist tool was utilized	"Utilization of the PATIENT protocol during the CRNA handoff improved the quality of communication; Utilization of the PATIENT protocol has the potential to enhance patient safety, improve care, and lead to positive patient outcomes; Healthcare institutions providing any type of anesthesia could implement and mandate the PATIENT protocol be utilized during all transfer of care occurrences" (Durley, 2017, p. 32)
2018	Canale, M. (2018). Implementation of a standardized handoff of anesthetized patients. *AANA Journal*, *86*(2), 137-145.	To implement a standardized handoff to improve the quality and continuity of the transfer of information, perceptions of patient safety, and healthcare worker satisfaction	Quality Improvement; pre/post intervention observation; Level 6	The perioperative department of an 800-bed regional medical center in West Central Florida	20 CRNAs involved in the transfer of care of anesthetized patients; Purposive, nonprobability, snowball	The team modified and adopted their own version of Wright's PATIENT mnemonic, which was implemented for 2 weeks; The change team completed an anonymous postintervention survey; Preintervention and	Preintervention and postintervention survey data demonstrate statistically significant improvements in the quality and continuity

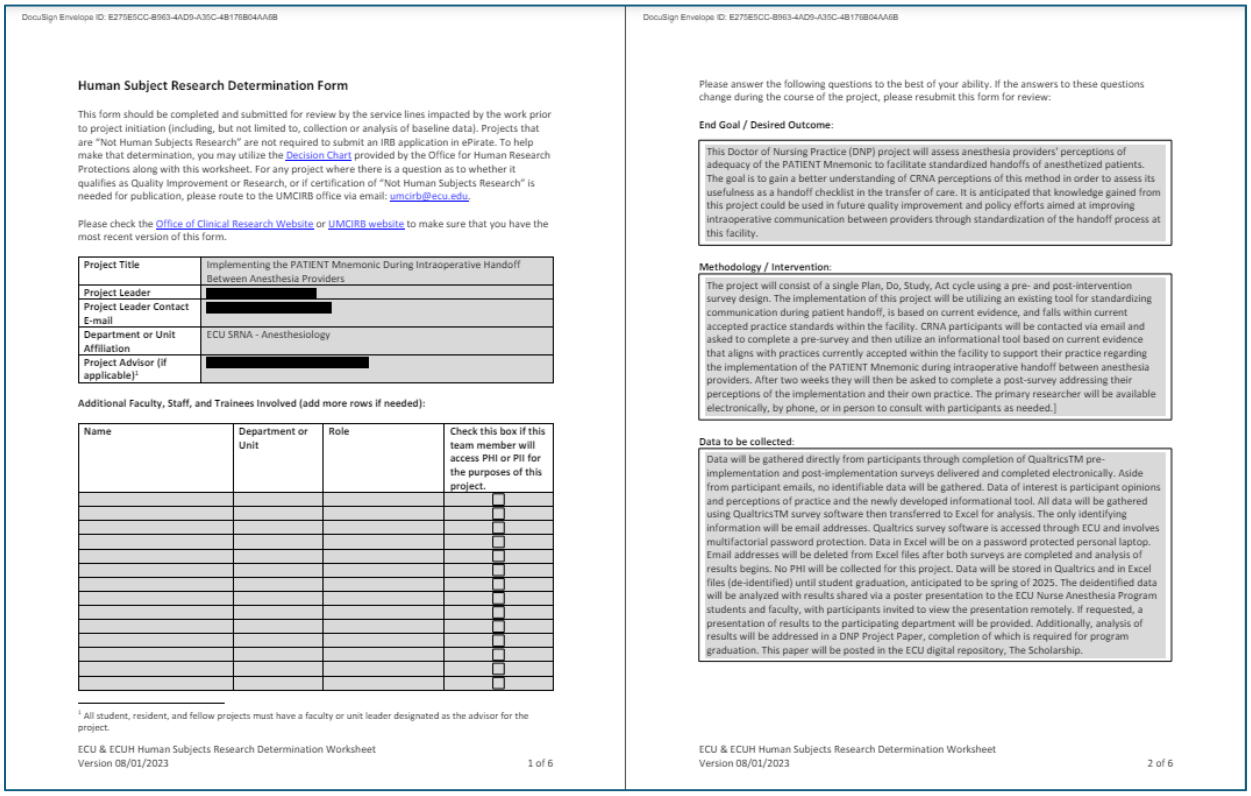
		-Follows the Johns Hopkins EBP model and guidelines, and implements concepts and principles of the TeamSTEPPS framework			sampling from a convenience sample of CRNAs to create a "change team." Early adopters, innovators, laggards, and potential naysayers were specifically selected	postintervention survey data were analyzed	of the transfer of information, perceptions of patient safety, and healthcare worker satisfaction
2019	Halterman, R. S., Gaber, M., Janjua, M. S. T., Hogan, G. T., & Cartwright, S. M. I. (2019). Use of a checklist for the postanesthesia care unit patient handoff. *Journal of Perianesthesia Nursing*, *34*(4), 834–841	To evaluate the benefits of implementing a checklist in the postanesthesia care unit (PACU) setting to decrease the omission of health information during the handoff from anesthesia to PACU nurses -No conceptual framework or model noted	Quality Improvement; pre/post intervention evaluation; Level 6	A 478-bed level I trauma health center located in Eastern Georgia	Seventy-eight PACU handoffs of the 209 patients admitted were randomly assessed during this period capturing 37% of the total reports given	PACU nurses recorded use of the handoff checklist and if five items of health information were included in the handoff during the preintervention and postintervention phase	"Checklist use increased from 0% to 73% with omitted information decreasing with checklist use; The use of a PACU handoff checklist can improve transfer of care by ensuring the provider receives more pertinent medical information during these transfers" (Halterman, 2019, p. 834)
2021	Abraham, J., Pfeifer, E., Doering, M., Avidan, M. & Kannampallil, T. (2021). Systematic review of intraoperative anesthesia handoffs and handoff tools. *Anesthesia & Analgesia*, *132*(6), 1563-1575.	To develop synthesized evidence regarding the effect of intraoperative handoffs on outcomes; To characterize the structure and content of intraoperative handoff tools and to assess their impact on outcomes	Systematic review; Level 1	This review was conducted and reported based on the Preferred Reporting Items for Systematic	All available literature on intraoperative handoffs published before September 6, 2019 was searched	Two threads of research were included: 1) studies evaluating the impact of intraoperative handoffs on outcomes; and 2) studies evaluating the impact of intraoperative handoff tools (or interventions) on outcomes	"To improve the quality and outcomes of handoffs, future efforts should focus on design and implementation of standardized handoff tools integrated within EHR systems, consider the use of similar

		- Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) framework		Reviews and Meta-Analysis (PRISMA) framework	using strategies created by a medical librarian; 14 studies were included in this systematic review		metrics for evaluating handoff process and clinical outcomes, and improve the execution and reporting of studies using standard protocols and guidelines" (Abraham, 2021, p. 1563)
2023	Allen, R., Nemec, C., O'Guin, C., Wright, S., & Dalley, C. B. (2023). Temporary intraoperative handoff report among nurse anesthetists: Utilization of standardized handoff tools and barriers to implementation. *AANA Journal*, *91*(2), 130–136.	To explore the usage of standardized handoff tools among certified registered nurse anesthetists, as well as the barriers to implementation during temporary intraoperative handoff -No conceptual framework or model noted	Quality Improvement; Level 6	An electronic survey was deployed by the Research Department of the American Association of Nurse Anesthesiology (AANA)	The survey site was visited by 197 CRNAs, completed by 180 CRNAs, and partially completed by 17 CRNAs	The survey consisted of 16 electronic questions divided into five sections: demographics, frequency of temporary intraoperative breaks, usage of standardized handoff tools, barriers to standardization, and aspects of implementation.	"Temporary intraoperative breaks are a common occurrence among CRNAs; however, most participants do not utilize a standardized handoff tool in their facility when communicating report with an oncoming anesthesia provider. Notably, the majority of CRNAs in this study believed that such tools should be used when performing handoff; Significant differences in perceived barriers to standardized handoff tool implementation were noted among CRNAs who used a handoff tool compared with those who did not" (Allen et al., 2023, p. 135)

Note: Key to Levels of Evidence: I: Systematic review/meta-analysis of randomized controlled trials (RCTs); II: RCTs; III: Nonrandomized controlled trials; IV: Controlled cohort studies; V: Uncontrolled cohort studies; VI: Descriptive or qualitative study, case studies, EBP implementation and QI; VII: Expert opinion from individuals or groups. Adapted from Evidence-based practice in nursing and healthcare: A guide to best practice (4th ed.), by B. M. Melnyk and E. Fineout-Overholt, 2019, p. 131.

Appendix D

IRB Approval



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Human Subject Research Determination Form

This form should be completed and submitted for review by the service lines impacted by the work prior to project initiation (including, but not limited to, collection or analysis of baseline data). Projects that are "Not Human Subjects Research" are not required to submit an IRB application in ePirate. To help make that determination, you may utilize the Decision Chart provided by the Office for Human Research Protections along with this worksheet. For any project where there is a question as to whether it qualifies as Quality Improvement or Research, or if certification of "Not Human Subjects Research" is needed for publication, please route to the UMCIRB office via email: umcirb@ecu.edu.

Please check the Office of Clinical Research Website or UMCIRB website to make sure that you have the most recent version of this form.

Project Title	Implementing the PATIENT Mnemonic During Intraoperative Handoff Between Anesthesia Providers
Project Leader	[redacted]
Project Leader Contact E-mail	[redacted]
Department or Unit Affiliation	ECU SRNA - Anesthesiology
Project Advisor (if applicable)[1]	[redacted]

Additional Faculty, Staff, and Trainees Involved (add more rows if needed):

Name	Department or Unit	Role	Check this box if this team member will access PHI or PII for the purposes of this project.
			☐
			☐
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[1] All student, resident, and fellow projects must have a faculty or unit leader designated as the advisor for the project.

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Please answer the following questions to the best of your ability. If the answers to these questions change during the course of the project, please resubmit this form for review:

End Goal / Desired Outcome:

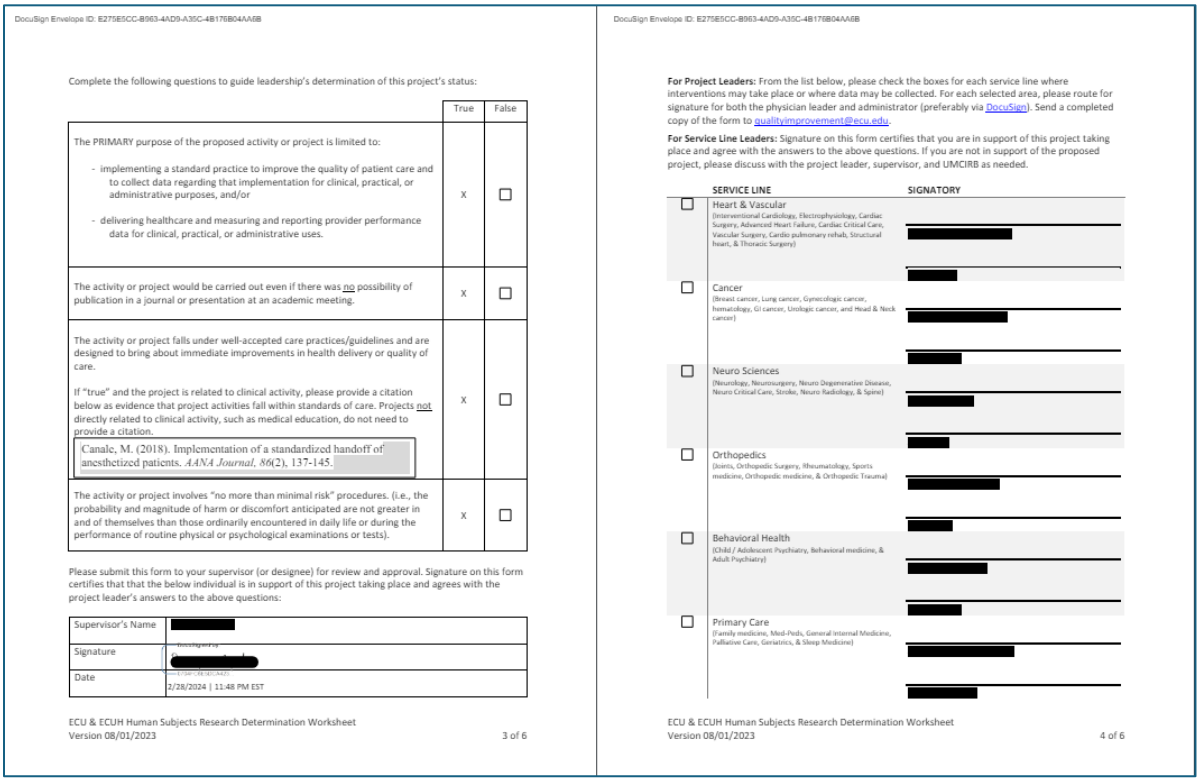
This Doctor of Nursing Practice (DNP) project will assess anesthesia providers' perceptions of adequacy of the PATIENT Mnemonic to facilitate standardized handoffs of anesthetized patients. The goal is to gain a better understanding of CRNA perceptions of this method in order to assess its usefulness as a handoff checklist in the transfer of care. It is anticipated that knowledge gained from this project could be used in future quality improvement and policy efforts aimed at improving intraoperative communication between providers through standardization of the handoff process at this facility.

Methodology / Intervention:

The project will consist of a single Plan, Do, Study, Act cycle using a pre- and post-intervention survey design. The implementation of this project will be utilizing an existing tool for standardizing communication during patient handoff, is based on current evidence, and falls within current accepted practice standards within the facility. CRNA participants will be contacted via email and asked to complete a pre-survey and then utilize an informational tool based on current evidence that aligns with practices currently accepted within the facility to support their practice regarding the implementation of the PATIENT Mnemonic during intraoperative handoff between anesthesia providers. After two weeks they will then be asked to complete a post-survey addressing their perceptions of the implementation and their own practice. The primary researcher will be available electronically, by phone, or in person to consult with participants as needed.]

Data to be collected:

Data will be gathered directly from participants through completion of QualtricsTM pre-implementation and post-implementation surveys delivered and completed electronically. Aside from participant emails, no identifiable data will be gathered. Data of interest is participant opinions and perceptions of practice and the newly developed informational tool. All data will be gathered using QualtricsTM survey software then transferred to Excel for analysis. The only identifying information will be email addresses. Qualtrics survey software is accessed through ECU and involves multifactorial password protection. Data in Excel will be on a password protected personal laptop. Email addresses will be deleted from Excel files after both surveys are completed and analysis of results begins. No PHI will be collected for this project. Data will be stored in Qualtrics and in Excel files (de-identified) until student graduation, anticipated to be spring of 2025. The deidentified data will be analyzed with results shared via a poster presentation to the ECU Nurse Anesthesia Program students and faculty, with participants invited to view the presentation remotely. If requested, a presentation of results to the participating department will be provided. Additionally, analysis of results will be addressed in a DNP Project Paper, completion of which is required for program graduation. This paper will be posted in the ECU digital repository, The Scholarship.



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Complete the following questions to guide leadership's determination of this project's status:

	True	False
The PRIMARY purpose of the proposed activity or project is limited to: - implementing a standard practice to improve the quality of patient care and to collect data regarding that implementation for clinical, practical, or administrative purposes, and/or - delivering healthcare and measuring and reporting provider performance data for clinical, practical, or administrative uses.	x	☐
The activity or project would be carried out even if there was no possibility of publication in a journal or presentation at an academic meeting.	x	☐
The activity or project falls under well-accepted care practices/guidelines and are designed to bring about immediate improvements in health delivery or quality of care. If "true" and the project is related to clinical activity, please provide a citation below as evidence that project activities fall within standards of care. Projects not directly related to clinical activity, such as medical education, do not need to provide a citation. Canale, M. (2018). Implementation of a standardized handoff of anesthetized patients. *AANA Journal, 86*(2), 137-145.	x	☐
The activity or project involves "no more than minimal risk" procedures. (i.e., the probability and magnitude of harm or discomfort anticipated are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests).	x	☐

Please submit this form to your supervisor (or designee) for review and approval. Signature on this form certifies that that the below individual is in support of this project taking place and agrees with the project leader's answers to the above questions:

Supervisor's Name	[redacted]
Signature	[redacted]
Date	2/28/2024 | 11:48 PM EST

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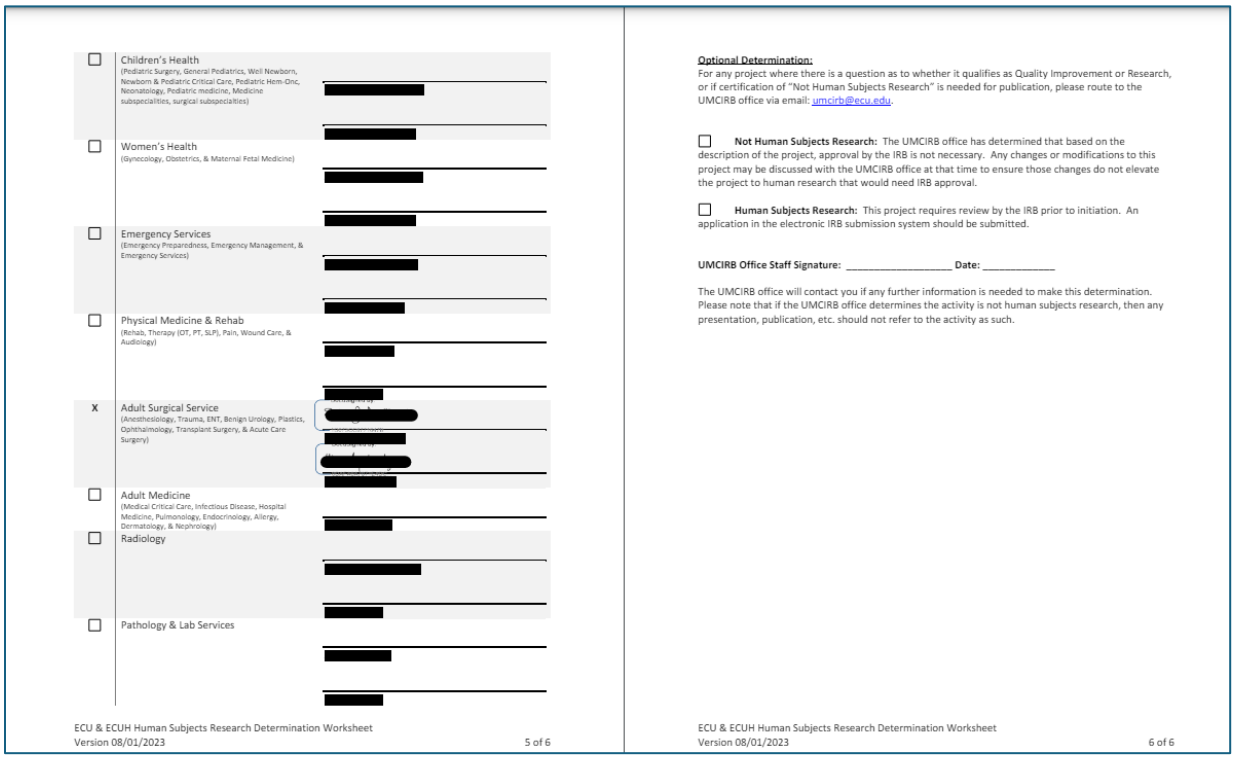
For Project Leaders: From the list below, please check the boxes for each service line where interventions may take place or where data may be collected. For each selected area, please route for signature for both the physician leader and administrator (preferably via DocuSign). Send a completed copy of the form to qualityimprovement@ecu.edu.

For Service Line Leaders: Signature on this form certifies that you are in support of this project taking place and agree with the answers to the above questions. If you are not in support of the proposed project, please discuss with the project leader, supervisor, and UMCIRB as needed.

	SERVICE LINE	SIGNATORY
☐	Heart & Vascular (Interventional Cardiology, Electrophysiology, Cardiac Surgery, Advanced Heart Failure, Cardiac Critical Care, Vascular Surgery, Cardio pulmonary rehab, Structural heart, & Thoracic Surgery)	[redacted]
☐	Cancer (Breast cancer, Lung cancer, Gynecologic cancer, hematology, GI cancer, Urologic cancer, and Head & Neck cancer)	[redacted]
☐	Neuro Sciences (Neurology, Neurosurgery, Neuro Degenerative Disease, Neuro Critical Care, Stroke, Neuro Radiology, & Spine)	[redacted]
☐	Orthopedics (Joints, Orthopedic Surgery, Rheumatology, Sports medicine, Orthopedic medicine, & Orthopedic Trauma)	[redacted]
☐	Behavioral Health (Child / Adolescent Psychiatry, Behavioral medicine, & Adult Psychiatry)	[redacted]
☐	Primary Care (Family medicine, Med-Peds, General Internal Medicine, Palliative Care, Geriatrics, & Sleep Medicine)	[redacted]



☐ Children's Health
(Pediatric Surgery, General Pediatrics, Well Newborn, Newborn & Pediatric Critical Care, Pediatric Hem-Onc, Neonatology, Pediatric medicine, Medicine subspecialities, surgical subspecialties)
[redacted]

☐ Women's Health
(Gynecology, Obstetrics, & Maternal Fetal Medicine)
[redacted]

☐ Emergency Services
(Emergency Preparedness, Emergency Management, & Emergency Services)
[redacted]

☐ Physical Medicine & Rehab
(Rehab, Therapy (OT, PT, SLP), Pain, Wound Care, & Audiology)
[redacted]

X Adult Surgical Service
(Anesthesiology, Trauma, ENT, Benign Urology, Plastics, Ophthalmology, Transplant Surgery, & Acute Care Surgery)
[redacted]

☐ Adult Medicine
(Medical Critical Care, Infectious Disease, Hospital Medicine, Pulmonology, Endocrinology, Allergy, Dermatology, & Nephrology)
[redacted]

☐ Radiology
[redacted]

☐ Pathology & Lab Services
[redacted]

ECU & ECUH Human Subjects Research Determination Worksheet
Version 08/01/2023 5 of 6

Optional Determination:
For any project where there is a question as to whether it qualifies as Quality Improvement or Research, or if certification of "Not Human Subjects Research" is needed for publication, please route to the UMCIRB office via email: umcirb@ecu.edu.

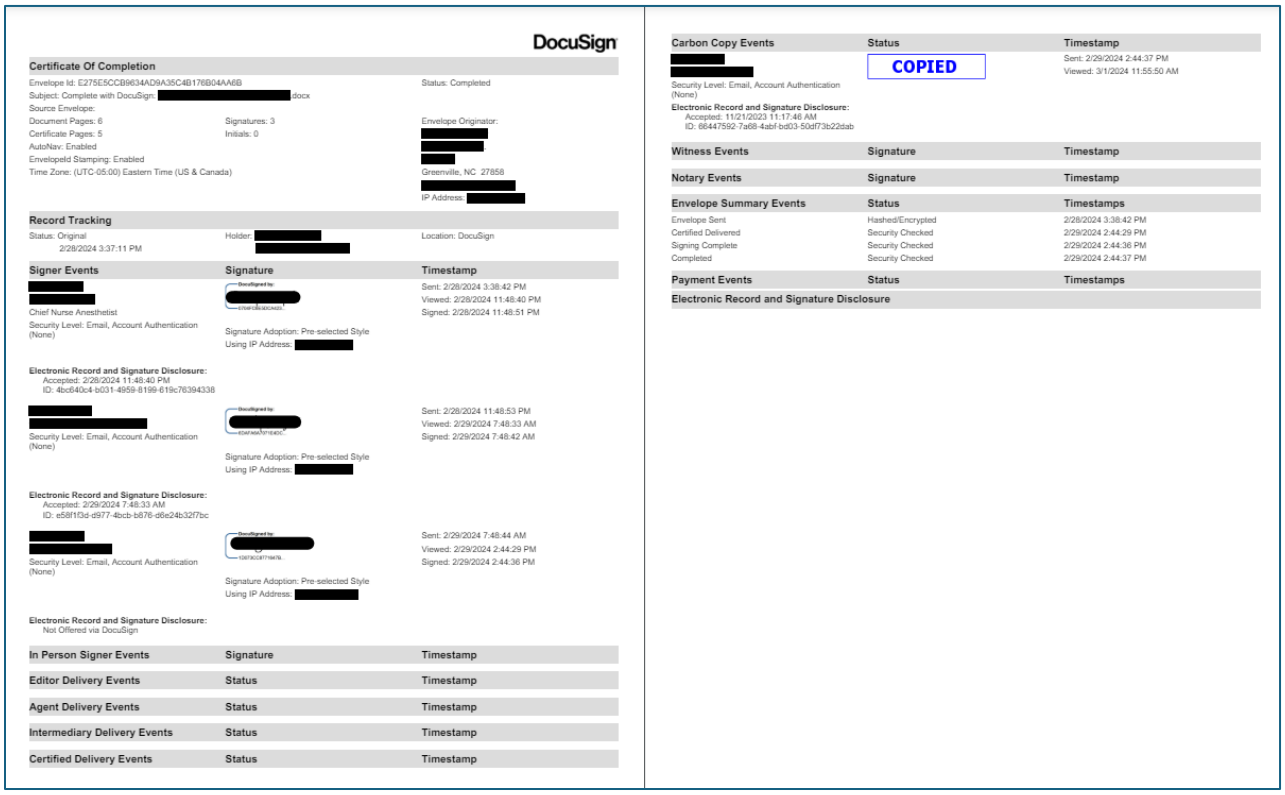
☐ **Not Human Subjects Research:** The UMCIRB office has determined that based on the description of the project, approval by the IRB is not necessary. Any changes or modifications to this project may be discussed with the UMCIRB office at that time to ensure those changes do not elevate the project to human research that would need IRB approval.

☐ **Human Subjects Research:** This project requires review by the IRB prior to initiation. An application in the electronic IRB submission system should be submitted.

UMCIRB Office Staff Signature: _____ **Date:** _____

The UMCIRB office will contact you if any further information is needed to make this determination. Please note that if the UMCIRB office determines the activity is not human subjects research, then any presentation, publication, etc. should not refer to the activity as such.

ECU & ECUH Human Subjects Research Determination Worksheet
Version 08/01/2023 6 of 6



DocuSign

Certificate Of Completion

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Certificate Pages: 5
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Signatures: 3
Initials: 0

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Greenville, NC 27858
IP Address: [redacted]

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Editor Delivery Events	**Status**	**Timestamp**
Agent Delivery Events	**Status**	**Timestamp**
Intermediary Delivery Events	**Status**	**Timestamp**
Certified Delivery Events	**Status**	**Timestamp**

Carbon Copy Events	Status	Timestamp
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Notary Events	**Signature**	**Timestamp**
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Signing Complete	Security Checked	2/29/2024 2:44:36 PM
Completed	Security Checked	2/29/2024 2:44:37 PM
Payment Events	**Status**	**Timestamps**
Electronic Record and Signature Disclosure		

Appendix E
Emails to Participants (4)

Initial Pre-Survey and Video Email to Participants (1)

Dear [redacted] Medical Center CRNAs,

Thank you for considering participation in a quality improvement project titled "Implementation of a Standardized Handoff Report for Nurse Anesthetists in the Intra-Operative Setting: A Quality Improvement Project." The purpose of this project is to assess anesthesia providers' perceptions of adequacy of the PATIENT Mnemonic to facilitate standardized handoffs of anesthetized patients at [redacted] Medical Center.

Participation is voluntary and will involve completing a short pre-intervention survey, viewing a narrated PowerPoint, utilizing the PATIENT Mnemonic in your CRNA practice for two weeks (at your discretion), and completing a short post-intervention survey when the two-week implementation period is over.

Each survey and the PowerPoint should take less than 2-4 minutes to complete. The surveys were created and are completed using Qualtrics® survey software. The use of the PATIENT Mnemonic falls within currently accepted practice in your work area. Your participation is voluntary and confidential. We will share the results of this QI study with you upon completion.

First, complete the pre-intervention survey via this link:
https://ecu.az1.qualtrics.com/jfe/form/SV_3t3JJM4BHvblgfc

Following completion of the survey, view the narrated PowerPoint sent via email. In addition, a badge buddy will be supplied to you with the PATIENT Mnemonic printed on it.

Again, thank you for your participation in our quality improvement project. I will be at [redacted] Medical Center from April 8th to April 19th. If you have any questions, you may also reach out to me or Dr. McAuliffe by email at any time.

Sincerely,

Pierce Do, SRNA, dop14@students.ecu.edu
Maura McAuliffe, PhD, CRNA, FAAN, Project Chair, mcauliffem@ecu.edu

Pre-Survey and Video Reminder Email to Participants (2)

Hello [redacted] Medical Center CRNAs,

I just wanted to send a quick reminder about the ongoing DNP Project on implementation of a standardized handoff report for nurse anesthetists in the intra-operative setting (original email below). If you've already filled out the pre-survey and viewed the narrated PowerPoint, thank you. If you haven't had a chance to do so yet, it's not too late and would be very helpful and much appreciated. There are still PATIENT Mnemonic badge buddies available if you haven't already received one. You may use these at your discretion. After the end of next week, I will begin sending out the post-surveys.

Links:
Pre-survey: https://ecu.az1.qualtrics.com/jfe/form/SV_3t3JJM4BHvblgfc

Please let me know if you have any questions and thank you again for your participation.

Sincerely,
Pierce Do, SRNA
ECU Nurse Anesthesia Program
Class of 2025

Post-Survey Email to Participants (3)

Dear [redacted] Medical Center CRNAs,

Thank you to everyone who has already completed my pre-survey and viewed the narrated PowerPoint. It's now time to complete the brief post-survey.

If you have not filled out a pre-survey, I would really and truly appreciate your participation (it's just surveys and a narrated PowerPoint!). The link to the pre-survey is https://ecu.az1.qualtrics.com/jfe/form/SV_3t3JJM4BHvblgfc, and you can follow it up by viewing the introductory narrated PowerPoint sent via email. PATIENT Mnemonic badge buddies are available for your use if you would like them, but their use is not mandatory for participation in this project.

If you've already completed the first survey, please complete the post-survey at https://ecu.az1.qualtrics.com/jfe/form/SV_0VZpAhwJ9sZxuR0 It should take less than 2 minutes.

If anyone has questions or issues with any of these links please let me know. Again, thank you to everyone for your help and for being excellent preceptors. I look forward to coming back to [redacted] Medical Center soon.

Sincerely,
Pierce Do, SRNA
ECU Nurse Anesthesia Program
Class of 2025

Final Thank You Email to Participants (4)

Dear [redacted] Medical Center CRNAs,

I just wanted to say thank you so much to everyone for helping me out with my DNP Project! I have collected all of the data I need to proceed with data analysis and will then be finishing my paper. Once it's complete you all will be able to read it if you'd like. And if you liked the PATIENT Mnemonic and found it useful, you can continue applying it in your clinical practice during your intraoperative handoffs.

Thank you again! I hope to work with you more in the future.

Take care,
Pierce Do, SRNA
ECU Nurse Anesthesia Program
Class of 2025

Appendix F

Transcript of Narrated PowerPoint

Slide 1 Hello, my name is Pierce Do and I am Student Registered Nurse Anesthetist in the Nurse Anesthesia Program at East Carolina University obtaining my Doctor of Nursing Practice Degree. I would like to begin by thanking you in advance for agreeing to participate in this study.

Slide 2 To build the foundation for this DNP project, we examined current literature and found that most anesthesia handoffs are often brief and informal, which may provide an opportunity for error related to omitted or unclear information.

According to Michelle Canale's article "implementation of a standardized handoff of anesthetized patients" published in the American Association of Nurse Anesthesiology Journal, 70% of sentinel events are caused by incomplete communication, with approximately half of those breakdowns occurring during patient handoff reports.

Literature also suggests that adverse outcomes of inadequate handover include increased length of hospital stay, increased morbidity, and potential mortality (Hu et al, 2020).

Slide 3 Numerous research studies have consistently demonstrated elevated provider satisfaction, enhanced completeness of handoff interactions, and increased perceived effectiveness of the handoff process through the incorporation of mnemonic checklists in intraoperative handoffs. Supporting this, the American Association of Nurse Anesthetists (AANA) published an article reporting an exploratory study involving 1000 anesthesia providers who utilized the PATIENT mnemonic tool. Remarkably, 87% of the participants expressed a favorable inclination towards the adoption of a standardized transfer of care process when giving or receiving reports for anesthetized patients (Wright, 2013).

This quality improvement project seeks to better understand [redacted] Medical Center CRNAs perceptions of the adequacy of the PATIENT mnemonic in facilitating standardized handoffs of anesthetized patients.

Slide 4 The PATIENT Mnemonic was developed by a PhD and CRNA Suzanne Wright to help facilitate effective communication between anesthesia providers during patient hand-off.

A comprehensive and cohesive report detailing the Patient, Procedure, Allergies, Antibiotics, Anesthetic Technique, Airway Management, Temperature Regulation, IV Access and Invasive Lines, End Tidal Carbon Dioxide, Narcotics the patient has received, and Twitches if the patient is receiving muscle relaxants, can the receiving anesthesia provider with the necessary information to deliver outstanding care.

If you wish to utilize the PATIENT Mnemonic, laminated "Badge Buddies" are available to attach to your Employee ID badge reel for convenient access reference. One will be left in your Anesthesia Workroom Mailbox.

Slide 5 This slide provides a little more background on the author of the PATIENT mnemonic

Suzanne Wright is a CRNA who graduated with her PhD in Health Related Sciences from Virginia Commonwealth University, and as of 2021 is a Fellow of the American Association of Nurse Anesthetists. She is also a Certified Professional in Patient Safety through the Institute of Healthcare Improvement and a Certified Healthcare Simulation Educator through the Society for Simulation in Healthcare.

She has published three articles from 2011 to 2015 on the topics of patient safety, transfer of care, and situational awareness in student registered nurse anesthetists and has co-authored many more articles since then.

She previously served as the director of doctoral education for the department of nurse anesthesia at Virginia Commonwealth University and is currently serving as the dean for the school of nursing at Old Dominion University

Slide 6 The first step as a volunteer will be completing the pre-implementation assessment via Qualitrics. This pre-implementation assessment will have you answer 10 questions to gather information regarding your personal experience with intraoperative handoffs. This assessment consists of 4 yes/no questions, 5 Likert scale questions, and 1 “select all that apply” question. The entire pre-implementation assessment should take less than 10 minutes to complete.

The second step in this project is actually implementing the use of the PATIENT mnemonic in your intraoperative handoffs to other anesthesia providers. You should strive to utilize the PATIENT mneumonic whenever giving handoff report for a break that is at least 15 minutes. The implementation period for the PATIENT mneumonic will last 2 weeks.

The final step in this project is collecting post-implementation data via completion of a Qualitrics survey. This survey consists of 13 questions that evaluate your personal experience with the PATIENT mnemonic and any recommendations you have to improve upon the handoff tool or project itself.

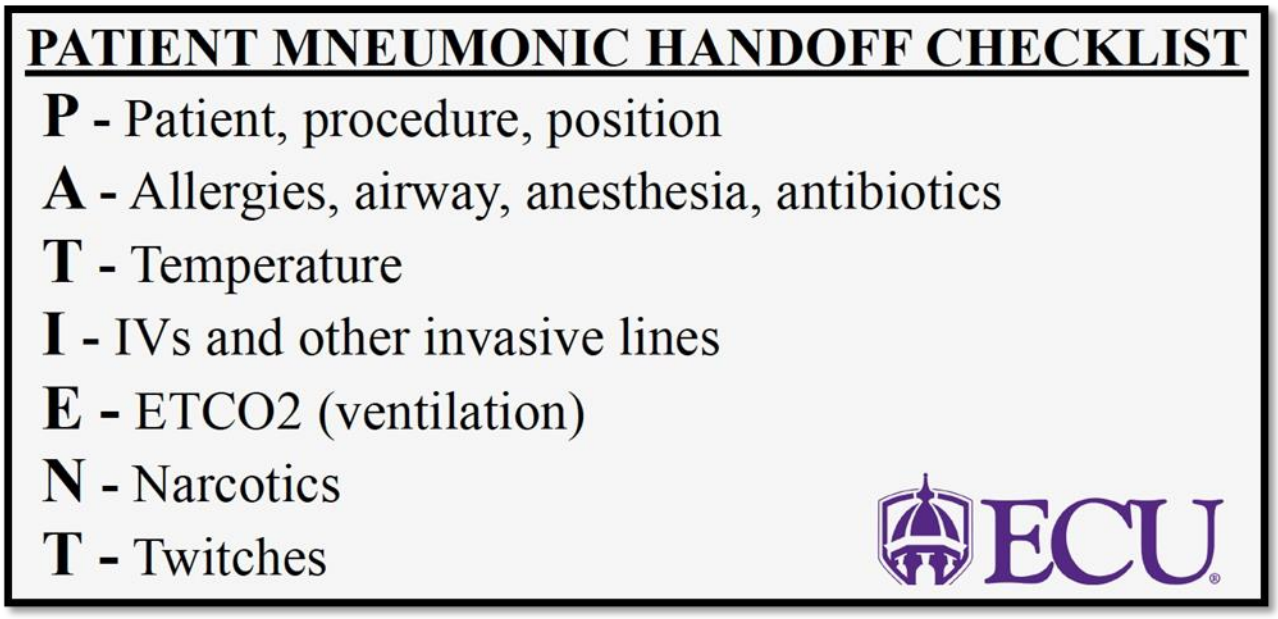
Slide 7 My project chair is Dr. Maura McAuliffe. If at any point you have questions or concerns about the mechanics of the project, or about how to utilize this tool, please do not hesitate to contact us.

Slide 8 Thank you again for taking the time to help me with this quality improvement project to fulfill the requirements of my DNP. Your time and effort is greatly appreciated.

Slide 9 References

Appendix G

Intervention Tool (Badge Buddy)



Appendix H

Qualtrics Survey Questions

CRNA Pre-Implementation Survey

Demographics:

How many years have you been practicing as a CRNA?

≤ 5 years 6-10 years 11-15 years ≥16 years

1) Do **you** currently use a systematic way (something **you do** for all cases) of providing report for lunch break or change of shift to receiving CRNAs?

Yes No

2) Do all CRNAs in your department use a common "standardized handoff tool/checklist/mnemonic" to provide report to CRNAs?

Yes No

3) Were you familiar with Wright's PATIENT mnemonic as an intraoperative anesthesia handoff tool prior to this quality improvement project?

Yes No

Please select the answer that best describes the extent to which you agree or disagree with the following statements regarding the transfer of patient care from CRNA to CRNA:

3) My current handoff process provides an **efficient** way of transferring information:

Strongly Agree Agree Neutral Disagree Strongly Disagree

4) My current handoff process provides a **comprehensive** way of transferring information:

Strongly Agree Agree Neutral Disagree Strongly Disagree

5) **I am satisfied** with the transfer of care process I currently use:

Strongly Agree Agree Neutral Disagree Strongly Disagree

6) I have previously received a CRNA handoff report that could have been more comprehensive:

Strongly Agree Agree Neutral Disagree Strongly Disagree

7) Using a standardized anesthesia handoff tool could improve completeness of CRNA reports:

Strongly Agree Agree Neutral Disagree Strongly Disagree

8) What factors influence your current handoff practices? Choose all that apply:

☐ None ☐ Type of Case ☐ Length of Case ☐ Experience of receiving CRNA ☐ Other

Appendix I

CRNA Post-Implementation Survey

1) Please estimate how many times you used the PATIENT handoff tool when transferring care to the receiving CRNA (over the past two weeks)? _____

Please select the answer that best describes the extent to which you agree or disagree with the following statements regarding the transfer of patient care from CRNA to CRNA:

I found the PATIENT mnemonic:

2) Easy to use:

Strongly Agree Agree Neutral Disagree Strongly Disagree

3) An efficient way of organizing the material to communicate:

Strongly Agree Agree Neutral Disagree Strongly Disagree

4) A comprehensive way of organizing the material to communicate:

Strongly Agree Agree Neutral Disagree Strongly Disagree

5) Appropriate in length:

Strongly Agree Agree Neutral Disagree Strongly Disagree

6) More time consuming than my previous handoff method:

Strongly Agree Agree Neutral Disagree Strongly Disagree

7) Lends itself to communication errors:

Strongly Agree Agree Neutral Disagree Strongly Disagree

8) Overall, you were satisfied with this handoff tool:

Very Satisfied Satisfied Neutral Dissatisfied Very Dissatisfied

9) Please comment on why you **would** or **would not** like to adopt the PATIENT handoff tool into your personal anesthesia practice.

_____

10) Please describe anything you would change about the PATIENT handoff tool.

_____

11) Do you think it would be helpful if the department created a department specific handoff mnemonic?

Yes No

12) Are there any barriers that would prevent you from adopting a standardized handoff tool?

_____

13) What is your level of support for your future use of the PATIENT handoff tool?

Low Medium High