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

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Abstract

The handoff report represents a pivotal point in patient care, during which vital information is communicated between providers. Incomplete handoffs can result in negative consequences, such as patient harm, compromised safety, and dissatisfaction across the healthcare team. This quality improvement project focused on the perceptions of the adequacy of the 'PATIENT' mnemonic to facilitate standardized handoffs of anesthetized patients. A pre-intervention survey was distributed to participating CRNAs at a partnering facility and then a standardized handoff tool was introduced that was to be used for two weeks. After the implementation period was completed, the CRNAs were sent a post-intervention survey addressing their perceptions of the handoff tool. Overall, there were differing levels of satisfaction with the handoff tool, and concern of time consumption may have contributed to levels of satisfaction. Limitations were a low number of participants and a short implementation period. A future suggestion is to create a customized handoff tool that is tailored to CRNAs' specific needs in order to streamline reports and prevent lengthy documentation.

Keywords: handoff, CRNA, report, standardized

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Section I. Introduction

Background

Handoffs are the process of transferring responsibility from one healthcare provider to another. During anesthesia, the majority of transitions happen during the intraoperative phase when a certified registered nurse anesthetist (CRNA) takes a break or concludes their shift and transfers care of a surgical patient to another CRNA. Miscommunications during provider handoff can contribute to significant patient morbidity and mortality during the perioperative period.

According to Burden et al. (2021), challenges with handoffs and miscommunications accounted for 75% to 89% of all patient sentinel events from 2014 to 2015. Thus, it is essential that nurse anesthetists understand the importance of complete handoffs and their role in the prevention of potentially harmful sequelae to their patients. In their role, CRNAs face many barriers when giving patient handoff reports. They often have to make quick, complex decisions in order to ensure the utmost safety of their patients. CRNAs also work in a setting that can be loud and chaotic, making it difficult to concentrate at times. These distractions and interruptions can play a role in diminishing the completeness of an intraoperative handoff.

At this time, no standardized patient handoff tool has been endorsed by any national anesthesia professional associations. However, the American Association of Nurse Anesthetists (AANA, 2019) has developed 14 standards of care intended to support the delivery of patient-centered, consistent, high-quality, and safe anesthesia care. Standard 11 requires safe transfer of care with accurate information, including all essential information about patients. The AANA also recommends and highlights the value of checklists and mnemonics to improve the quality of handoffs. The Joint Commission (2017) published a statement that identified inadequate hand-off

communication as a cause for sentinel and adverse events. The implementation of handoff forms and checklists was proposed to minimize risks and future occurrences.

The PATIENT mnemonic is a tool developed by CRNA researchers that consists of seven key points: patient identification, assessment of current status, treatment plan, identification of safety concerns, evaluation of patient response, noting new concerns, and providing a timeline of events (Wright, 2013). A standardized handoff tool, such as the PATIENT mnemonic, can be very helpful in ensuring that no information is omitted despite what is going on in the operating room (OR).

Organizational Needs Statement

The partnering facility for this quality improvement project is a level I trauma center that has approximately 25 ORs. Each OR has at least two to three surgical cases per day that all require anesthesia providers. Currently, this facility has not established formal policies outlining the process of CRNA-to-CRNA handoffs. As it stands, these handoffs tend to be variable and depend on the personal preferences of the providers involved. Establishing a standardized handoff report by using the PATIENT mnemonic aligns with the recommendations set forth by the AANA and can offer numerous advantages in terms of improved patient care, provider satisfaction, and communication.

Problem Statement

The Joint Commission reported that 70% of reported sentinel events are caused by communication problems, with half of those breakdowns occurring during patient handoff reports (Canale, 2018). 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 standardized 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 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. 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 the literature search is as follows: With CRNAs working in the operating room, does the implementation of a PATIENT handoff tool during handoffs from one CRNA to another, compared to not using any handoff tool, result in improved provider satisfaction? Three main concepts were used to conduct the search. These concepts include anesthesia, communication, and handoff. See Appendix A for a list of concepts and MeSH headings. Searches for pertinent literature were performed in PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Google Scholar. With PubMed, anesthesia, and communication were the MeSH terms utilized. For PubMed and Google Scholar, ((anesthesia) AND (handover)) AND (communication) was used as an initial search strategy. The CINAHL search used was (MH "Hand Off (Patient Safety)") AND (MH "Certified Registered Nurse Anesthetists") OR (MH "Anesthetists") AND (MH "Communication") OR (MH "Communication Protocols"). The searches were limited to articles from the past 5-10 years (2013-2024). A literature search log is provided in Appendix B.

The PubMed database yielded 62 articles, out of which only eight were selected for further review. Similarly, the CINAHL database provided 234 articles, but only three were deemed relevant for review. Moreover, a comprehensive assessment of 15 pages of publications was carried out using Google Scholar results. The articles selected for inclusion were those that specifically addressed intraoperative handoffs between CRNA providers. Articles not selected addressed postoperative handoffs from CRNAs to post-anesthesia care unit (PACU) nurses and intensive care unit (ICU) nurses.

In total, eight articles were selected for full-text review and classified using Melnyk and Fineout Overholt's (2019) levels of evidence, beginning with Level 1, which represented the highest level of evidence, systemic reviews/meta-analyses of randomized controlled trials, through Level 7, which represented expert opinion. Upon full-text review, two systemic reviews (Level I), one prospective study (Level III), one retrospective cohort study and one evidenced-based practice improvement project (Level V), one interventional cohort study, and two exploratory studies (Level VI) were identified as pertinent to this project. See Appendix C for a complete literature matrix.

Selected Literature Synthesis

The effective transfer of critical information during intraoperative handoff is essential to ensuring patient safety and continuity of care. As evident from the compilation of diverse studies, adopting standardized handoff tools among CRNAs has been a subject of substantial research interest. This literature synthesis aims to provide a comprehensive review of the existing body of literature concerning the usage of standardized handoff tools, barriers to their implementation, and their impact on the quality of intraoperative handoff communication.

Examining Barriers to Implementing Standardized Handoff Tools

Research conducted by Allen et al. (2023) and Jullia et al. (2017) identified barriers to the implementation of anesthesia handoff tools. Allen et al. (2023) identified three barriers, including the lack of institutional emphasis on standardized handoffs as a standard of care, increased time consumption during the handoff process, and resistance from the receiving anesthesia provider. Despite the challenges, over half of the 197 surveyed CRNAs acknowledged the necessity of utilizing standardized tools, underscoring the awareness of their potential benefits. Jullia et al. (2017) found that only 30% of the 204 total anesthesia providers

implemented a checklist in their practice due to various barriers such as “providers felt that the checklist design did not correspond with their mental model of giving a report, that they were not part of the project's design and implementation, and that using the checklist was time-consuming and too complicated for healthy patients having minor surgery” (p. 474). A study conducted by Lane et al. (2022), including 67 anesthesia providers such as anesthesia consultants, fellows, and residents working in the elective operating rooms, also identified interruptions by the surgical team to be a barrier to complete handoffs.

Although many barriers exist, it has been demonstrated that some barriers to implementation, such as the length of time giving report and the scope of information, were decreased in most instances when using Wright's (2013) PATIENT mnemonic. An evidence-based practice project by Canale (2018) reports that the most significant improvements were seen in increased standardized handoffs and reduced potential for mistakes after the implementation of the PATIENT mnemonic. These findings highlight the effectiveness of employing mnemonic strategies to streamline communication and enhance patient care processes.

Effect of Handoff Tools on Intraoperative Handover Quality and CRNA Satisfaction

The studies conducted by Lane et al. (2022) and Abraham et al. (2021) both found that the completeness of intraoperative handoffs improved after the implementation of handoff checklists. The findings of Lane et al. (2022) demonstrated that after an educational intervention, completeness of handovers increased from a mean of 72% to 79%. Abraham et al. (2021) conducted a systematic review demonstrating that implementation of handoff tools resulted in heightened provider satisfaction, improved completeness of handoff interactions, and increased perceived effectiveness of the handoff process. CRNAs reported increased satisfaction with the

transfer process, underscoring the positive impact of mnemonic checklists and educational interventions on enhancing communication and overall satisfaction during the handoff.

Improving Handoff Communication

Several studies, including the work of Jullia et al. (2017), Davis et al. (2017), and Wright (2013), examined the impact of training interventions, feedback, and the display of checklists on enhancing communication during intraoperative handoffs. Jullia et al. (2017) conducted an interventional cohort study that included 204 anesthesia providers. The study included two weeks of baseline observations of intraoperative handoffs. After training, intraoperative laminated checklists were made available, and they again observed the handoffs. At the completion of the study, anonymous satisfaction surveys were sent to all participants. Davis et al. (2017) conducted a systemic review of 26 articles looking at various handoff tools and comparing them to see what impact they had on intraoperative handoffs. Wright (2013) conducted a two-phase nonexperimental study including 1000 CRNAs. In Phase I, the authors sent out a survey to determine what the current handoff practices were and what they thought were the most important aspects of handoffs. Phase II included the development and evaluation of the PATIENT checklist tool. In this phase, a 10-item survey was administered, after the implementation of the PATIENT handoff tool, to evaluate its use and the CRNAs' perspective.

Although each of these research interventions improved handoff quality, the authors found challenges in designing and implementing the checklists. They suggest creating user-friendly tools that match CRNAs' understanding of the handoff process, along with providing continuous feedback to maintain high-quality handoffs.

Enhancing Patient Outcomes through Standardized Handoff Practices

Although the focus of this project is to examine the level of provider satisfaction with the PATIENT mnemonic tool, it is important to note that improved patient outcomes are associated with the addition of intraoperative checklists. Boet et al. (2020) and Canale (2018) underscored the critical role of standardized handoffs in influencing patient outcomes during surgery. Both studies emphasized the correlation between comprehensive handoffs and reduced adverse patient outcomes such as extended ventilation time, postoperative delirium, and ICU admissions. They also highlighted the urgency of implementing standardized handoff procedures to mitigate the potential risks associated with incomplete or inefficient handoff communication.

Summary

Overall, the synthesis of literature supports the importance of standardized handoff tools in promoting effective communication and enhancing CRNA satisfaction in intraoperative settings. Despite the persistent challenges in implementation, existing research presents a promising avenue for enhancing handoff practices. Jullia et al. (2017) advocate for educational training interventions, while Wright (2013) and Canale (2018) endorse the adoption of standardized protocols. Additionally, Lane et al. (2022) underscore the efficacy of incorporating user-friendly checklists. Information from this literature review was used in the design, implementation, and evaluation of this quality improvement project.

Project Framework

This project was conducted using the Institute for Healthcare Improvement's (2023) model for improvement by implementing a plan-do-study-act (PDSA) cycle of quality improvement. The plan phase includes identifying key stakeholders, planning out tools that will be used, providing education for said tools, as well as reviewing current literature. In this project,

the key stakeholders were the CRNAs working in the OR setting. The PATIENT mnemonic was the tool distributed to the CRNA participants virtually and as laminated cards to be attached to their hospital badges for easy access. Information about the mnemonic was provided via PowerPoint to the CRNAs prior to implementation. In the "do" phase of this project, the pre-implementation survey, PATIENT mnemonic, and educational PowerPoint were shared with the CRNAs, with the survey to be taken prior to viewing the PowerPoint and utilizing the mnemonic. After the utilization of the mnemonic for a two-week time period, the post-implementation survey was completed. The "study" phase of this project occurred after pre- and post-implementation survey results were collected from the CRNAs. The data was analyzed to gain a better understanding of CRNA perceptions of the PATIENT mnemonic method in order to assess its usefulness as a handoff checklist in the transfer of care. During this phase, barriers and challenges to implementation were studied. In the final phase of the cycle, the "act" phase, recommendations for refinement of the PATIENT mnemonic were obtained, along with recommendations for future cycles in the quality improvement process.

Ethical Considerations and Protection of Human Subjects

The target population of this project consisted of current CRNAs working in the OR. No patients were directly involved in the implementation of this project, as it focused on the participation of CRNAs during handoffs. There was minimal to no risk to the participants other than a potentially slight increase in workload and the consequent stress associated with that.

Before the start of this project, Collaborative Institutional Training Initiative (CITI) modules were completed by the project lead (https://about.citiprogram.org/courses/?reset=true). A quality improvement screening process through East Carolina College of Nursing and the University and Medical Center Institutional Review Board (UMCIRB) determined the project

met the criteria as a quality improvement project. Projects determined to be quality improvement are exempt from the full IRB approval process. A copy of this process is provided in Appendix D.

Section III. Project Design

Project Setting

This quality improvement project took place in the ORs of a level 1 trauma center located in eastern North Carolina with 23 main ORs, six cardiovascular ORs, and eight outpatient surgery center rooms. This healthcare system offers a wide variety of surgical interventions, including cardiothoracic, neurosurgical, orthopedic, trauma, and robotic surgeries. Implementation of the PATIENT handoff tool was used mostly within the main ORs where the majority of handoffs occurred. This allowed for a high likelihood of utilization due to the high volume of surgical cases.

Project Population

The target population for this project was the CRNAs involved in the transfer of care during a procedure. The CRNAs' were to only use the tool if they were not returning to the case. Each of the CRNAs' had varying levels of experience and years of practice.

Project Team

This quality improvement initiative was executed by a specialized team consisting of a student registered nurse anesthetist (SRNA), a clinical CRNA faculty member, and a CRNA faculty member who assumed the role of project chair and subject matter expert. In addition, a non-CRNA faculty member oversaw the coordination of the project's development and implementation. Collaboration with an organizational liaison, the unit manager, facilitated communication with the participants. Furthermore, the project's initial stages were a product of collaborative efforts involving three additional students investigating and working together to plan the design of this project. The leading SRNA played a pivotal role in independently

implementing the educational tool, distributing participant surveys, and analyzing the survey data.

Methods and Measurement

The goal of this quality improvement project was to gain a better understanding of CRNA perceptions of the PATIENT mnemonic to assess its usefulness as a handoff checklist in the transfer of care.

A clinical faculty member from East Carolina University recruited CRNA participants for this project as they had established relationships with the staff at the facility. The project was implemented by sending an email containing a PowerPoint presentation introducing the project as well as a link to the pre-implementation survey to be completed using Qualtrics. See Appendix E for a copy of the emails sent to participants. A pretest/post-test methodology was used to compare a single plan-do-study-act (PDSA) cycle of quality improvement (Langley et al., 2009). Types of questions in the surveys included Likert type, yes or no, and open responses. The styles of questions allowed for the collection of nominal and ordinal data for analysis. Once completed, the results of the pre-implementation surveys were immediately available through Qualtrics. The data were analyzed to assess the CRNAs' perceptions of adequacy of the PATIENT mnemonic. The pre- and post-implementation survey questions are outlined in Appendix F.

After completing the survey, participants were prompted to view the educational material that introduced the PATIENT mnemonic tool. The educational material was delivered in a video introducing the topic and explaining the tool. Participants were given a laminated copy of the mnemonic to be kept on their badges to use during intraoperative handoffs. Additionally, the

CRNAs were given the PATIENT mnemonic tool electronically via email to access on a handheld device if preferred. The PATIENT mnemonic tool is provided in Appendix G.

The CRNAs used the PATIENT mnemonic tool for two weeks, then completed a post-implementation survey also using Qualtrics. The results of both the pre- and post-implementation surveys were kept confidential. The pre-and post-implementation surveys allowed for the evaluation of the perceived effectiveness and completeness of handoff report while using the PATIENT mnemonic as compared to the perceived effectiveness and completeness of handoffs prior to implementation. CRNAs perceptions of the usefulness of the handoff tool were also assessed using the surveys.

Timeline

Work on this project began in the fall of 2023 with a thorough review of pertinent literature, selection and adaptation of the selected tool, and initial planning for approval through the IRB process. The project was implemented, and data collection occurred in the spring of 2024. Data analysis and dissemination of findings occurred in the summer/fall of 2024.

Section IV. Results and Findings

Results

To gain a better understanding of the perceptions of adequacy of the PATIENT mnemonic, anesthesia providers completed pre- and post-implementation questionnaires using Qualtrics. The questionnaires addressed the anesthesia providers perceptions about the PATIENT handoff tool regarding the length of time for handoff, ease of, and potential barriers to use. Data from the questionnaires were collected after two weeks of implementation and analyzed using Excel.

Pre-Implementation Data

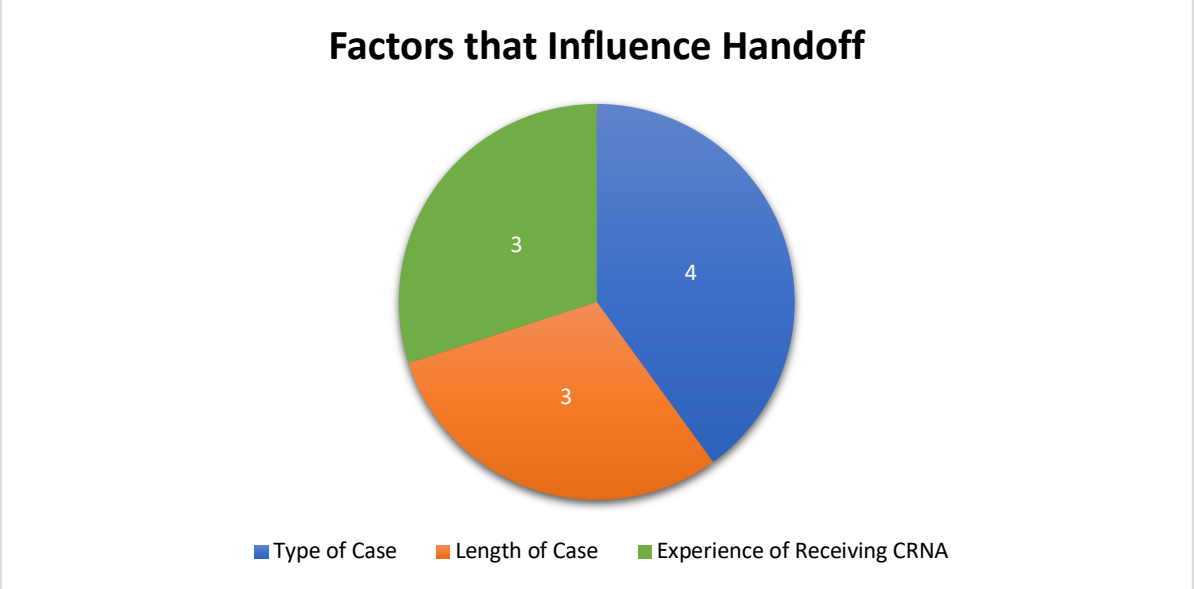
Before implementation, anesthesia providers completed a pre-implementation survey. See Appendix F. Four respondents completed the pre-implementation survey. Of the four responses received, three of the participants had been practicing for less than five years, and one had been practicing for 11-15 years. While none of the respondents reported that all CRNAs in the department use a common standardized handoff/tool, three respondents reported they had their own systematic way of providing reports. Participants were then asked if their current handoff provides an efficient way of transferring information. One participant responded 'strongly agree,' one 'strongly disagree,' and two responded 'agree.' Participants were also asked if they perceived their current handoff practice was a comprehensive way of transferring information. One participant responded 'neutral,' one 'agree,' one 'strongly agree,' and one 'strongly disagree.'

Overall, three participants strongly agreed they were satisfied with the transfer of care process they currently use with only one participant strongly disagreeing. Two participants 'strongly disagreed' their current handoff process lends itself to errors. However, one participant

'agreed,' and another responded 'neutral' to the same question. Participants were asked if they had received a handoff that could have been more comprehensive. Two participants 'agreed,' one 'strongly agreed,' and another 'strongly disagreed.' When asked if using a standardized anesthesia handoff tool could improve completeness of handoff reports, two participants 'agreed,' one participant 'strongly disagreed,' and one participant 'strongly agreed.' Participants were then asked what factors influence their current handoff practices. See Figure 1. All four participants included the type of case as a factor. Three participants also listed the experience of the receiving CRNA and length of the case as factors.

Figure 1

Pre-Implementation: What factors influence your current handoff practice? (n=4)



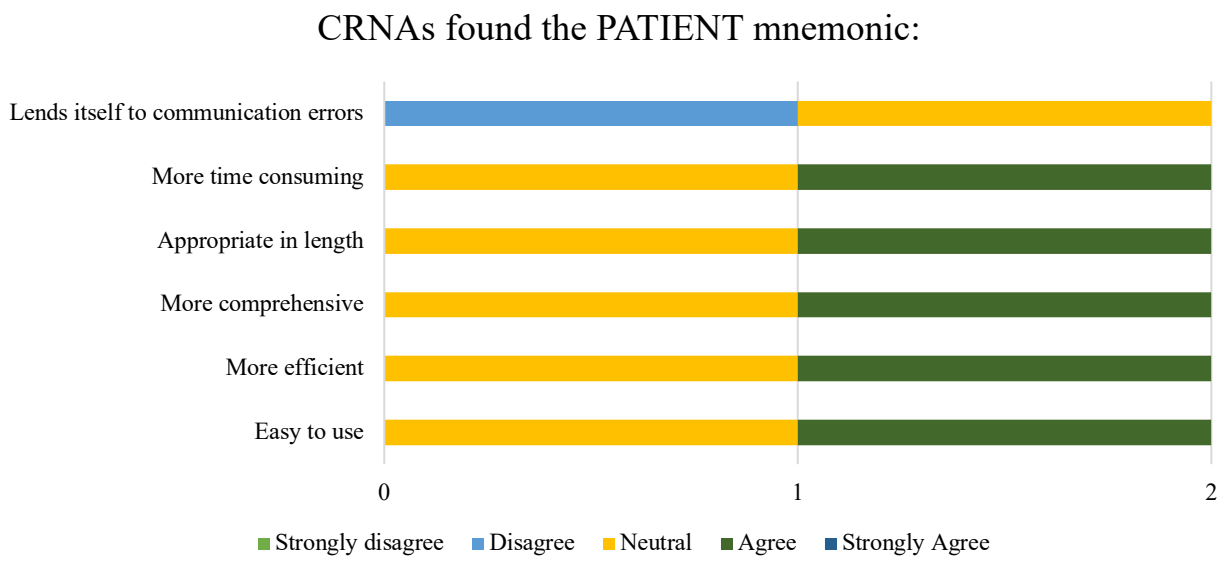
Post-Implementation Data

After the implementation of the PATIENT mnemonic, participants were sent a post-implementation survey. There were two total responses received from this survey. During the two-week implementation period, one participant reportedly used the PATIENT mnemonic five times while the other participant did not use it at all. One participant 'agreed,' and the other participant was 'neutral' in believing the mnemonic was easy to use, a more efficient way of working, more comprehensive, and appropriate in length. See Figure 2. One participant 'disagreed,' and the other participant responded 'neutral' when asked if they found that the PATIENT mnemonic lends itself to communication errors. There was one 'neutral' response and one 'agree' response regarding the PATIENT mnemonic being more time-consuming than previous methods of handoff.

Overall, one participant reported being neutral about their experience using the mnemonic, while the other participant reported being satisfied. There was one 'yes' and 'no' response when asked if it would be helpful if the department created additional support for its use in the future. One participant indicated that there were no barriers preventing its adoption. As far as the level of support for future use of the PATIENT mnemonic, one respondent had a medium level of support for future use, while the other had a low level of support.

Figure 2

Post-Implementation: Perceptions of the PATIENT Mnemonic



Analysis

Data from the pre-implementation survey (n=4) revealed diverse experiences and opinions among anesthesia providers regarding their current handoff practices. Results demonstrated that most participants had their own methods for providing reports, with no common standardized tool used within the department. Opinions about efficiency and comprehensiveness of current handoffs varied widely, with some providers satisfied and others expressing dissatisfaction. Notably, there was a lack of consensus on whether current practices led to errors and mixed perceptions about the potential benefits of adopting a standardized handoff tool. The survey also identified that type of case, experience of the receiving CRNA, and length of the case were key factors influencing current handoff practices. This data suggests there may be a need for a standardized approach to handoffs to address the variability in practices and perceptions. This could potentially enhance the consistency and quality of patient care during transitions.

The post-implementation survey data for the PATIENT mnemonic demonstrated a mixed picture of its effectiveness and acceptance among the two participants. One participant used the mnemonic five times, while the other did not use it at all, indicating varying levels of engagement. Regarding ease of use and efficiency, one participant agreed that the mnemonic was easy to use and more efficient, whereas the other remained neutral. Similar responses were observed for the mnemonic's comprehensiveness and appropriate length, suggesting a generally adequate perception by one participant, while the other had no strong opinions.

In terms of communication errors, one participant disagreed that the mnemonic led to errors, and the other was neutral, indicating a positive outcome in this regard. However, one participant found the mnemonic more time-consuming than previous methods, while the other was neutral, pointing to potential concerns about its time efficiency. Overall, one participant reported being neutral about their experience, while the other reported being satisfied. Future support for the mnemonic showed a split, with one participant indicating a need for more departmental support and the other seeing no need, and varying levels of support for future use, with one participant reporting medium support and the other demonstrating low support.

These results imply significant disparities in engagement and perceived benefits, suggesting the need for additional training or support to increase use among all staff members. While the mnemonic shows promise in improving certain aspects of patient handoff, concerns about time consumption and mixed feelings about future support highlight the necessity for further refinement and adjustments. A cautious approach to wider implementation, incorporating more feedback and enhancing the mnemonic's integration into existing workflows, may be required to achieve broader acceptance and consistent use. However, with only two participants it is difficult to draw meaningful conclusions.

Section V. Implications

Financial and Nonfinancial Analysis

The costs involved in sustaining this project would be minimal. Aside from viewing educational resources given to anesthesia providers, a short presentation could be made during monthly anesthesia meetings about the implementation of the PATIENT mnemonic into handoff practice. This could prevent the hospital from having to pay extra money to providers for training. The costs for printing and laminating PATIENT mnemonic badge buddies for each CRNA would be approximately $112. The cost of printing the PATIENT mnemonic is $0.12 per page, with an estimate of 50 copies to print. The cost of lamination would be $106, as the cost of lamination per page is $2.12. According to Weiss & Jiang (2021), the main adverse patient outcomes resulting from incomplete handoffs include longer hospital stays, postoperative admissions to the intensive care unit, other major complications, and potentially higher mortality rates. The median cost of readmission to the hospital is $15,200 per patient, and they have a negative impact on the hospital's revenue. In comparison to the cost of the PATIENT mnemonic resource, the cost of readmission resulting from handoffs is more than 135 times higher and would result in the hospital losing money.

The non-financial resources for the project include several existing assets that contribute to its success. The experienced anesthesia staff were able to quickly learn and apply the mnemonic into their practice, and strong support from hospital leadership helped champion the project. Incorporation into existing anesthesia meetings could also help streamline the learning process.

Insufficient time allocated for training and practice may have contributed to rushed or incomplete surveys, varied levels of staff engagement, and resistance to change. Additionally, a

lack of ongoing support and follow-up after initial training may have contributed to a potential drop-off in usage of the mnemonic. Despite these barriers, the project brought many benefits, including improved quality assurance with enhanced consistency and accuracy in anesthesia handoffs, increased efficiency through streamlined processes, better communication among anesthesia staff, and an enhanced reputation for the organization due to its commitment to quality improvement.

Implications of Project

Using the PATIENT handoff mnemonic aligns with AANA's Practice Standard 11, which focuses on the transfer of care, and Standard 12, which emphasizes the quality improvement process. This mnemonic addresses the necessity for clear communication during care transitions to ensure continuity of care and encourages participation in quality improvement initiatives.

Unlike previous published studies, the results from this quality improvement project found the PATIENT mnemonic to be more time consuming than previous methods of handoff. Overall, the two participants reported different levels of satisfaction using the mnemonic; one reported "satisfied" and the other "neutral." In previous studies with larger sample sizes, anesthesia providers expressed greater satisfaction with the use of the PATIENT mnemonic.

Implementing a standardized handoff tool offers potential benefits for patients by reducing the likelihood of missing or inaccurately reported information during handoff reports. This improvement supports continuity of care and helps mitigate adverse events, which are often linked to communication errors. Based on the findings from this quality improvement initiative and existing research, adopting a standardized handoff tool could enhance the continuity of patient care. Such tools can decrease the inadvertent omission of critical details, providing nurse

anesthetists with confidence in delivering or receiving comprehensive handoff reports. While some standardized tools may require additional time to complete, they may assist in providing a clear and comprehensive clinical picture during patient transfers, thereby safeguarding patient well-being.

Sustainability

Due to the low cost of implementing a standardized handoff tool, the organization can likely afford to continue this project. Aside from educating staff members about the use of the tool and printing out resources, there would be no financial cost to continue to use the PATIENT mnemonic handoff tool for intraoperative handoffs. The sustainability of this study would mainly be influenced by the level of support provided by anesthesia leadership. Without incentives to maintain the use of the PATIENT mnemonic as a standardized handoff, anesthesia providers may continue to use their own methods for transferring the care of patients.

Dissemination Plan

The dissemination of project findings involved a poster and oral presentation to the nurse anesthesia department members as well as other CRNA students. Project participants were also invited to attend although their participation was not required. This project paper will also be available via The Scholarship, East Carolina University's digital repository.

Section VI. Conclusion

Limitations

A notable limitation of this quality improvement project was the small sample size. The reasons for the low response rate are not clear. It is possible participants perceived the initiative as lacking value or that the two-week timeframe was considered burdensome. With only two participants responding to the post-implementation survey, it is challenging to draw conclusions about anesthetists' perceptions of adequacy of the PATIENT mnemonic.

Recommendations for Future Implementation and/or Additional Study

Future research on this topic should use a larger sample size to facilitate more robust analysis. Expanding the participant pool beyond the initial eight CRNAs could enhance participation rates. Providing educational materials and resources in person may also increase participant engagement, allowing for discussions and addressing potential implementation barriers. Additionally, the option to mark "neutral" caused some confusion and complicated result interpretation. Aligning pre- and post-implementation questions with a large sample could allow collections to be made with more robust evaluation of the data.

Looking ahead, the department may consider further quality improvement studies addressing the length of handoffs and also develop a customized handoff tool tailored to the project site’s CRNAs’ specific needs in order to streamline reports and prevent lengthy documentation. Further studies could also be conducted exploring factors that influence the CRNAs’ current handoff practices and how they vary. Another recommendation is integrating a checklist within Epic's handoff section to facilitate adherence to standardized practices.

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Weiss, A. & Jiang, J. (2021). *Overview of clinical conditions with frequent and costly hospital readmissions by payer, 2018*. Healthcare Cost and Utilization Project. https://www.hcup-us.ahrq.gov/reports/statbriefs/sb278-Conditions-Frequent-Readmissions-By-Payer-2018.jsp

Wright, S. M. (2013). Examining transfer of care processes in nurse anesthesia practice: introducing the PATIENT protocol. *AANA Journal, 81*(3), 225-32.

Appendix A

Literature Search Concept Table

(PubMed, CINAHL, Google Scholar)

	Concept 1 Handoff	Concept 2 Anesthesia	Concept 3 Communication
Keywords	Handoff OR handover	Anesthesia OR CRNA OR anesthetist	Communication
PubMed MeSH	N/A	"anesthesia"[MeSH Terms]	N/A
CINAHL Subject Headings	(MH "Hand Off (Patient Safety)")	(MH "Certified Registered Nurse Anesthetists") OR (MH "Anesthetists")	(MH "Communication") OR (MH "Communication Protocols")
Google Scholar	Handoff OR handover	Anesthesia OR anesthetists OR CRNA	Communication

PubMed: ((anesthesia) AND (handover)) AND (communication)
Will use a 10 year limit.

CINAHL: (MH "Hand Off (Patient Safety)") AND (MH "Certified Registered Nurse Anesthetists") OR (MH "Anesthetists") AND (MH "Communication") OR (MH "Communication Protocols")
Limited search to 2013-2024 and peer-reviewed.

Google Scholar: ((anesthesia) AND (handover)) AND (communication)
Limited search to 2020-2024.

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
09/24/2023	PubMed	((anesthesia) AND (handover)) AND (communication) PubMed strategy ("anaesthesia"[All Fields] OR "anesthesia"[MeSH Terms] OR "anesthesia"[All Fields] OR "anaesthesias"[All Fields] OR "anesthesias"[All Fields]) AND ("handover"[All Fields] OR "handovers"[All Fields]) AND ("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])	10 years (actual years 2013-2024)	62/8 kept	The citations that were not kept pertained to handoffs between anesthesia providers and nurses on other floors, such as the PACU or ICU.

09/24/2023	CINAHL	(MH "Hand Off (Patient Safety)") AND (MH "Certified Registered Nurse Anesthetists") OR (MH "Anesthetists") AND (MH "Communication") OR (MH "Communication Protocols")	10 years (actual years 2013-2024)	234/3	The citations not saved were not focused of intraoperative handoff and more focused on postoperative handoff. There were also quite a few articles that didn't relate to the topic at all.
09/24/2023	Google Scholar	((anesthesia) AND (handover)) AND (communication)	5 years (actual years 2020-2024)	--/15 pages	Articles that were excluded are for the same reasons as the other websites.

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
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.	Purpose: Explore the usage of standardized handoff tools among certified registered nurse anesthetists, as well as the barriers to implementation during temporary intraoperative handoff. No framework or model noted	Exploratory, Quantitative Descriptive Design. Level VI	Hospital operating rooms	Active CRNAs within the U.S. that held current AANA membership. 2,852 CRNAs were randomly selected out of a list of 46,683 CRNAs. The survey was completed by 180 CRNAs that responded of the 2,852. There were 17 partially completed surveys as well. A total of 197 surveys were included	A SurveyMonkey-formatted collection tool was electronically delivered to the sample of 2,852 CRNAs with 4 weeks given to complete the survey.	-Top 3 barriers to implementation of a standardized handoff tool included: “a facility did not make standardized handoffs a standard of care, standardized handoffs increased the time spent giving a handoff, and lack of reception/interest/noncompliance from the receiving anesthesia provider” (p. 132). -Even though majority of the CRNAs reported that they do not use standardized tools, over half of the participants believe that tools should be used.

2022	Lane, S., Gross, M., Arzola, C., Malavade, A., Szadkowski, L., Huszti, E., & Friedman, Z. (2022). What are we missing? the quality of intraoperative handover before and after introduction of a checklist. *Canadian Journal of Anesthesia, 69*(7), 832-840. https://doi.org/10.1007/s12630-022-02238-9	Purpose: This study shows the effect of using checklists for intraoperative handoff No framework or model noted	Prospective Study Level III	A single-center study at Sinai Health System in Toronto, Canada. This study was conducted in elective operating rooms	67 anesthesia providers participated in the study. This included anesthesia consultants, fellows, and residents working in the elective operating rooms	Handoffs were observed and videotaped for 3 months before checklists were introduced, once checklists were introduced, handoffs were observed and videotaped for 3 more months. The checklist that was introduced was 40 items long.	-The mean completeness of handovers increased from 72% to 79% after the checklist was introduced. -Only 25% of handovers in the baseline group were interrupted versus 45% in the intervention group.

2021	Abraham, J., Pfeifer, E., Doering, M., Avidan, M. S., & Kannampallil, T. (2021). Systematic review of intraoperative anesthesia handoffs and handoff tools. *Anesthesia and Analgesia, 132*(6), 1563-1575. https://doi.org/10.1213/ANE.0000000000005367	Purpose: To synthesize the evidence on effects of intraoperative handoffs on outcomes and effect of intraoperative handoff tools on outcomes No framework of model noted	Systemic Review Level I	Studies were obtained from searches using: Ovid Medline, EMBASE, CINAHL, Scopus, CENTRAL, Cochrane Database of Systematic Reviews, and Clinicaltrials.gov.	All studies on intraoperative handoffs and handoff tools published until September 2019, in any study setting and population were included. There was no specific criteria on the outcomes and comparisons. 14 studies which totaled 680,055 surgeries	Comparisons and contrasts were made between the 14 studies.	-"All studies reported an increase in provider satisfaction with the quality of handoff communication, the usefulness and completeness of handoff interactions, and perceived effectiveness of the handoff tools" (p. 1570). -"CRNAs reported increased satisfaction with the transfer process with a mnemonic checklist and education process, with more clinicians (n = 9; 50%) "strongly agreeing" that they were happy with handoffs" (p. 1570). -"All studies demonstrated that the use of handoff tools led to significant improvements in process outcomes related to effectiveness (information retention, bilateral communication), efficiency (handoff duration), adoption, and handoff satisfaction" (p. 1570).

2020	Boet, S., Djokhdem, H., Leir, S. A., Théberge, I., Mansour, F., & Etherington, C. (2020). Association of intraoperative anaesthesia handovers with patient morbidity and mortality: A systematic review and meta-analysis. *British Journal of Anaesthesia, 125*(4), 605-613. https://doi.org/10.1016/j.bja.2020.05.062	Purpose: To assess the impact of anesthesia handover during surgery on patient outcomes No framework or model noted	Retrospective Population-Based Cohort Study Level V	Searches were conducted from inception to April 24, 2019 in Medline, Medline in Process, CINAHL, and EMBASE.	Adult patients (≥18 years) were identified who underwent major surgeries expected to have duration of at least 2 hours and require postoperative admission to hospital for at least 1 night between April 1, 2009, and March 31, 2015 8 studies met the inclusion criteria, with an analysis of 605,678 patients and 307 anesthesia providers.	A meta-analysis was conducted using studies that investigated the association of anesthesia care between providers in the OR with patient mortality and morbidity.	This study emphasizes the need for standardized handoff and some of the effects of not having one. -This study includes a large patient sample from a wide variety of hospitals -This study looks at the relationship between complete handovers and adverse patient outcomes such as: extended ventilation time, bleeding, postoperative delirium, and admission to the ICU.

2018	Canale, M. L. (2018). Implementation of a standardized handoff of anesthetized patients. *AANA Journal, 86*(2), 137-145.	Purpose: The purpose of this project is to implement a standardized handoff to improve the quality and continuity of the transfer of information, perceptions of patient safety, and healthcare worker satisfaction Model: Johns Hopkins EBP model	Evidence-Based Practice Improvement Project Level V	800-bed regional medical center in West Central Florida	20 CRNAs involved in the transfer of care of anesthetized patients in the perioperative department of an 800-bed medical center	The PATIENT mnemonic was modified, and education was provided to the participants. Surveys were given pre- and post-intervention.	-50% of the CRNAs reported being happy with the handoff process postintervention. -After this project, the standardized handoff become the policy of the anesthesia department in the study hospital. -The most significant improvements were seen in increased standardized handoffs and reduced potential for mistakes. These results indicate better compliance with The Joint Commission requirements and AORN guidelines, showing improved handoff communication.

2017	Davis, J., Roach, C., Elliott, C., Mardis, M., Justice, E. M., & Riesenberg, L. A. (2017). Feedback and assessment tools for handoffs: A systematic review. *Journal of Graduate Medical Education, 9*(1), 18-32. https://doi.org/10.4300/JGME-D-16-00168.1	Purpose: To identify and assess published research on handoff feedback and assessment tools No framework or model noted	Systemic Review Level I	Studies were obtained from searches using: Ovid MEDLINE, Ovid MEDLINE In- Process & Other Non-Indexed Citations, Journals-@Ovid, CINAHL (EBSCOhost), and ‘‘ePub ahead of print’’ in PubMed	A total of 26 articles with 32 tools met inclusion criteria, including 3 focused on feedback, 8 on assessment, and 15 on both feedback and assessment	Comparisons and contrasts were made between 26 studies.	-This study looked at various handoff tools and compared them to see what impact they had on intraoperative handoffs. -This study identified ongoing feedback as a major component for improving handoffs.

2017	Jullia, M., Tronet, A., Fraumar, F., Minville, V., Fourcade, O., Alacoque, X., LeManach, Y., & Kurrek, M. M. (2017). Training in intraoperative handover and display of a checklist improve communication during transfer of care: An interventional cohort study of anaesthesia residents and nurse anaesthetists. *European Journal of Anaesthesiology, 34*(7), 471-476. https://doi.org/10.1097/EJA.0000000000000636	Purpose: To see if intraoperative handover training and display No framework or model noted	Interventional Cohort Study Level IV	Single-center tertiary care university hospital	A sample of 204 anesthesia providers (residents and nurse anesthetists)	Intraoperative handoffs were observed over 2 weeks for a baseline. After training and a display of intraoperative laminated checklists were put out, they observed the handoffs again. At the end of the study, an anonymous satisfaction survey was sent to all of the participants.	-The study showed handover times of "2-3 minutes and were not prolonged by the implementation of the checklist" (p. 474). -Only 30% of the anesthesia providers actually implemented the checklist in their practice due to various obstacles such as: "providers felt that the checklist design did not correspond with their mental model of giving a report, that they were not part of the project's design and implementation, and that using the checklist was time-consuming and too complicated for healthy patients having minor surgery" (p. 474).
2013	Wright, S. M. (2013). Examining Transfer of Care Processes in Nurse Anesthesia Practice: Introducing the PATIENT Protocol. *AANA Journal, 81*(3), 225-32.	Purpose: To examine current transfer of care practices of CRNAs during the intraoperative period and develop, implement, and evaluate a communication checklist tool designed to improve situation awareness	A 2-phase Nonexperimental Exploratory Study Level VI	CRNA staff working in the OR in Central Virginia	A sample of 1,000 CRNAs from across the United States, drawn from active members of the Virginia Association of Nurse Anesthetists in Richmond and attendees of	In Phase I, the authors sent out a survey to determine what the current handoff practices were and what they thought were the most important aspects of handoffs. Phase II included the development and evaluation of the PATIENT checklist	-"87% of participants liked the idea of adopting a standardized transfer of care process for use when giving and/or receiving report of an anesthetized patient" (p. 229). -"90% of the participants believed that the length and scope of the PATIENT handoff tool was appropriate" (p. 229).

		No framework or model noted			recent regional continuing education conferences (within 5 years) by Virginia Commonwealth University's Nurse Anesthesiology Faculty Associates	tool. In this phase, a 10 item survey was given after the implementation of the PATIENT handoff tool in order to evaluate its use and the CRNAs prospective.	

Note: Abbreviation Key: Certified Registered Nurse Anesthetist (CRNA), Excerpta Medica database (EMBASE), Cumulative Index of Nursing and Allied Health Literature (CINAHL), Cochrane Central Register of Controlled Trials (CENTRAL), operating room (OR), Association of periOperative Registered Nurses (AORN). 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. Copyright 2019 by Wolters Kluwer.

Appendix D

Project Approval

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	Implementation of a Standardized Handoff Report for Nurse Anesthetists in the Intraoperative Setting: A Quality Improvement Project
Project Leader	Courtney Warner, BSN, SRNA
Project Leader Contact E-mail	Warnerc15@students.ecu.edu
Department or Unit Affiliation	ECU Nurse Anesthesia Program - Anesthesiology
Project Advisor (if applicable)[1]	Dr. Maura McAuliffe, PhD, CRNA, FAAN

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.
Travis Chabo, CRNA, MSN, PhD	ECU Nurse Anesthesia Program	Program Director	☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐

[1] All student, resident, and fellow projects must have a faculty or unit leader designated as the advisor for the project.

[redacted]

			☐
			☐
			☐

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:

The purpose of this quality improvement project is to assess anesthesia providers' perceptions of adequacy of a quick-reference guide addressing the PATIENT mnemonic for intraoperative handoffs. The quick-reference guide addressing the PATIENT mnemonic, will be developed based upon accepted national guidelines. Anesthesia providers at ECU Health will be administered a pre-survey asking about their familiarity with the/their current practice with the PATIENT mnemonic including perceptions of adequacy and frequency of use. Then, a quick-reference guide addressing the PATIENT mnemonic will be made available to them, and they will be asked to use the guide for two weeks. Upon completion of the two-week utilization period, they will be asked to complete a post-survey about their perceptions of the adequacy of the guide. Qualtrics survey software will be used to gather data. No patient information will be recorded or maintained during this project.

Methodology / Intervention:

The project will consist of a single Plan, Do, Study, Act cycle using a pre- and post-intervention survey design. The intervention for this project will be an informational tool/quick reference guide focused on the PATIENT mnemonic, which 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/quick reference guide based on current evidence that aligns with practices currently accepted within the facility to support their practice regarding intraoperative handoffs. After two weeks they will then be asked to complete a post-survey addressing their perceptions of the intervention and their own practice. The project lead 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 Qualtrics pre- and post-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 Qualtrics survey software and 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 spreadsheet and 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..

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.	☒	☐
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.	☒	☐
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. Wright, S. M. (2013). Examining transfer of care processes in nurse anesthesia practice: introducing the PATIENT protocol. *AANA Journal, 81*(3), 225-32.	☒	☐
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).	☒	☐

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	Dewayne Byrd
Signature	DocuSigned by: Dewayne Byrd 0704FC6E5DCA423...
Date	2/28/2024 | 11:50 PM EST

[redacted]

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)	Mark D. Iannettoni, MD Brian Floyd
☐	Cancer (Breast cancer, Lung cancer, Gynecologic cancer, hematology, GI cancer, Urologic cancer, and Head & Neck cancer)	Emmanuel Zervos, MD Todd Hickey
☐	Neuro Sciences (Neurology, Neurosurgery, Neuro Degenerative Disease, Neuro Critical Care, Stroke, Neuro Radiology, & Spine)	Stuart Lee, MD Jay Briley
☐	Orthopedics (Joints, Orthopedic Surgery, Rheumatology, Sports medicine, Orthopedic medicine, & Orthopedic Trauma)	Deanna Boyette, MD Van Smith
☐	Behavioral Health (Child / Adolescent Psychiatry, Behavioral medicine, & Adult Psychiatry)	Michael Lang, MD Todd Hickey
☐	Primary Care (Family medicine, Med-Peds, General Internal Medicine, Palliative Care, Geriatrics, & Sleep Medicine)	Jonathon Firnhaber, MD Dan Drake, PhD

[redacted]

☐	Children's Health (Pediatric Surgery, General Pediatrics, Well Newborn, Newborn & Pediatric Critical Care, Pediatric Hem-Onc, Neonatology, Pediatric medicine, Medicine subspecialities, surgical subspecialties)	Matthew Ledoux, MD Kim Crickmore, PhD
☐	Women's Health (Gynecology, Obstetrics, & Maternal Fetal Medicine)	James Whiteside, MD Kim Crickmore, PhD
☐	Emergency Services (Emergency Preparedness, Emergency Management, & Emergency Services)	Leigh Patterson, MD Debra Hernandez
☐	Physical Medicine & Rehab (Rehab, Therapy (OT, PT, SLP), Pain, Wound Care, & Audiology)	Clint Faulk, MD Dave Harlow
☒	Adult Surgical Service (Anesthesiology, Trauma, ENT, Benign Urology, Plastics, Ophthalmology, Transplant Surgery, & Acute Care Surgery)	DocuSigned by: Eric J DeMaria 1D073CC8774847B... Eric DeMaria, MD DocuSigned by: Wendy Leutgens 8DAFA6A707E4DC... Wendy Leutgen
☐	Adult Medicine (Medical Critical Care, Infectious Disease, Hospital Medicine, Pulmonology, Endocrinology, Allergy, Dermatology, & Nephrology)	Paul Bolin, MD
☐	Radiology	Eric Martin, MD, PhD Dave Harlow
☐	Pathology & Lab Services	Jay Fallon, MD Dave Harlow

[redacted]

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:** 3/14/2024

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.

[redacted]

Appendix E

Emails to Participants

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

Dear [redacted] CRNAs,

Thank you for considering participating in a quality improvement project titled "Implementation of a Standardized Handoff Report for Nurse Anesthetists in the Intraoperative 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].

Participation is voluntary and will involve completing a short pre-intervention survey, viewing a brief video, utilizing the PATIENT mnemonic located of a badge buddy provided to you 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 video 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 provided
https://ecu.az1.qualtrics.com/jfe/form/SV_3yFth2mHO3Atzo2

Following completion of the survey, view the PowerPoint video containing the educational material that introduced the PATIENT mnemonic tool. Badge buddies with a copy of the PATIENT mnemonic written on it are available in the anesthesia break room.

Again, thank you for your participation in our quality improvement project. I will be available from January 29th-February 1st from 6:30 am to 3:30 pm if you have any questions, you may also reach out to me or Dr. Maura McAuliffe, CRNA, PhD, FAAN by email at any time.

Sincerely,

Courtney Warner, SRNA
ECU Nurse Anesthesia Program
Class of 2025
Email: warnerc15@students.ecu.edu

Maura S McAuliffe CRNA, PhD, FAAN
Professor Emeritus and Founding Director
Email: mcauliffem@ecu.edu

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

Hello [redacted] CRNAs,

I just wanted to send a quick reminder about the ongoing DNP Project on CRNA-to-CRNA Handoffs (original email below). If you've already filled out the pre-survey and viewed the video, 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 badge buddies with a copy of the PATIENT mnemonic written on it available in the anesthesia break room 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:
https://ecu.az1.qualtrics.com/jfe/form/SV_3yFth2mHO3Atzo2
PowerPoint Attached

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

Sincerely,
Courtney Warner, SRNA
ECU Nurse Anesthesia Program
Class of 2025

Post-Survey Email to Participants (3)
Dear [redacted] CRNAs,

Thank you to everyone who has already completed my pre-survey and viewed the video. 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 video!). The link to the pre-survey is
https://ecu.az1.qualtrics.com/jfe/form/SV_3yFth2mHO3Atzo2
and you can follow it up by watching the introductory PPT/video here. Badge buddies with a copy of the PATIENT mnemonic 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_e5IgjYv2Cm79p4i 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] soon.

Sincerely,
Courtney Warner, SRNA
ECU Nurse Anesthesia Program

Class of 2025

Final Thank You Email to Participants (4)
Dear [redacted] 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. Also, if you liked the PATIENT mnemonic badge buddy and found it useful, you can keep it and continue to use it throughout your practice.

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

Take care,
Courtney Warner, SRNA
ECU Nurse Anesthesia Program
Class of 2025

Appendix F

Pre- and Post-Implementation Survey Questions

Demographics:

How many years have you been practicing as a CRNA?

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

CRNA Pre-Implementation Survey

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

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 s 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) Are there factors that influence your current handoff practices (i.e. experience of receiving CRNA, type of case, length of break, etc.)

Strongly Agree Agree Neutral Disagree Strongly Disagree

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 to communication errors:

Strongly Agree Agree Neutral Disagree Strongly Disagree

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

Strongly Agree Agree Neutral Disagree Strongly Disagree

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?

_____

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?

Strongly Agree Agree Neutral Disagree Strongly Disagree

Appendix G

PATIENT Mnemonic Handoff Tool

PATIENT MNEUMONIC HANDOFF CHECKLIST

P-Patient, Procedure, Position
A- Allergies, Airway, Anesthesia, Antibiotics
T-Temperature
I -IVs and Other Invasive Lines
E- ETCO2 (ventilation)
N-Narcotics
T-Twitches