

**Implementing the PATIENT Mnemonic During Intraoperative Hand-Offs Between CRNAs:
A Quality Improvement Project**

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Note from the Author

This achievement would not have been possible without the efforts and guidance of Dr. Maura McAuliffe, Dr. Travis Chabo, Dr. Nikki Roebuck, and Dr. Gina Firnhaber.

Thank you.

Abstract

Patient hand-offs, the exchange of information during the transfer of patient care, are essential in anesthesia practice, particularly during the intraoperative period when provider changes occur due to breaks or shift changes. In 2017, the Joint Commission identified ineffective communication as a persistent issue among healthcare providers, which increases the risk of adverse outcomes and sentinel events. For Certified Registered Nurse Anesthetists (CRNAs), the ability to communicate effectively during intraoperative patient hand-off is often hindered by interruptions and time constraints, underscoring the urgent need for improved hand-off protocols to enhance patient safety and continuity of care.

This quality improvement project completed a single Plan, Do, Study, Act cycle to assess anesthesia providers' perceptions of adequacy of the PATIENT Mnemonic to facilitate standardized hand-offs of anesthetized patients. Implementation of the project took place at a level 1 trauma center and teaching hospital in the southeastern United States. Data was collected from eight CRNA volunteer participants using pre- and post-implementation surveys created and accessed via Qualtrics™. Following implementation, eighty-six percent (6/7) of responding participants reported they have received hand-off reports that could have been more comprehensive, and all (7/7) reported that implementing a standardized hand-off tool could improve completeness of anesthesia provider reports.

Keywords: anesthesia providers, intraoperative period, patient care transfer, communication

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Section I. Introduction

Background

A patient hand-off is the exchange of information during the transfer of patient care between anesthesia providers in the operating room. For example, between two Certified Registered Nurse Anesthetists (CRNAs). During the intraoperative period, when a surgical procedure is ongoing, all patients must be under the continuous supervision of an anesthesia provider. As a result, patient hand-offs are a routine aspect of anesthesia care and take place whenever one anesthesia provider is being relieved by another. The transfer of patient care may be temporary if the current anesthesia provider is being relieved for a break that they will return from or complete if the current provider is being relieved due to a change in assignment or if it is the end of their shift. For surgical cases lasting several hours or more, it is not uncommon for more than one patient hand-off to take place between two or more anesthesia providers.

Communication is ineffective if the information exchanged between providers is incomplete or inaccurate. In September of 2017, the Joint Commission released a Sentinel Event Alert describing ineffective communication during patient hand-offs as a “longstanding, [and] common problem in health care” that has the potential to lead to adverse outcomes and Sentinel Events (p.1). Additionally, a cross-sectional study performed by Janagama et al. (2020) found that among 786 cases of pregnant women, whose care was transferred at least once during their treatment, roughly 80% of medical errors were due to ineffective communication during the patient hand-offs. For anesthesia providers, such as CRNAs, ineffective communication during patient hand-offs can be attributed to unexpected and often unavoidable distractions, interruptions, time, and staffing limitations.

Susanne M. Wright developed and introduced the PATIENT mnemonic in 2013 to standardize and enhance the effectiveness of communication between CRNAs during intraoperative patient hand-offs. In a 2016 meta-analysis investigating the effects of hand-off protocol interventions, Keebler et al. concluded that using standardized communication tools had the potential to improve hand-off communication as well as patient outcomes. The Joint Commission (2017), the American Association of Nurse Anesthetists (AANA, 2014), the Anesthesia Patient Safety Foundation (APSF, 2020), and the Institute for Healthcare Improvement (IHI, 2020) have each conveyed support for standardized hand-off communication.

Organizational Needs Statement

The partnering organization for this quality improvement (QI) project is a large teaching hospital and level 1 trauma center in the southeastern United States. At teaching hospitals, upwards of 4,000 patient hand-offs can take place each day (The Joint Commission, 2017). While certain areas and specialties within the hospital incorporate standardized communication during patient hand-off into their policies and standards of practice, CRNAs employed by the partnering organization do not currently use a standardized method of communication during patient hand-off. Incorporation of the PATIENT mnemonic in the intraoperative setting has the potential to improve patient outcomes and reduce the occurrence of adverse outcomes, including sentinel events.

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 hand-off reports (Canale, 2018). In response to these large numbers of reported events, the Joint Commission recommended implementing standardized processes in patient hand-off

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 will assess anesthesia providers' perceptions of adequacy of the PATIENT Mnemonic to facilitate standardized hand-offs 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 hand-off 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 hand-off process at this facility.

Section II. Evidence

Description of Search Strategies

The literature search for this QI project was guided by the Population, Intervention, Comparison, Outcome, Time, and Setting (PICOT) question: What effect does the implementation of the PATIENT mnemonic during intraoperative patient hand-off between Certified Registered Nurse Anesthetists have on provider satisfaction and the perception of patient safety (Appendix A)? The search was performed using the PubMed and Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases as well as the Google Scholar search engine. Main concepts used include intraoperative care, communication, and CRNA. Search limits were set to include peer-reviewed articles published between 2013 and 2023, either written in or translated into English. To be considered for inclusion, the articles needed to focus on the concept of intraoperative communication between CRNAs, either with or without the use of a standardized communication tool.

The search strategy for PubMed was (Intraoperative OR Perioperative) AND (Hand Off OR Communication OR Report) AND (CRNA OR Nurse Anesthetist) and was associated with the MeSH Terms “communication,” “research report,” and “nurse anesthetists.” This search yielded 239 articles, of which eight were selected for inclusion. The search strategy for CINAHL included the subject headings “intraoperative care or intraoperative period,” “hand off (patient safety),” and “certified registered nurse anesthetist.” This search yielded 35 articles, of which four were selected for inclusion. The search strategy for Google Scholar included the key terms “intraoperative,” “hand off,” and “CRNA or anesthetist.” Search limits for Google Scholar were set to include articles published between 2018 and 2023. This search yielded 252 articles, of which 11 were selected for inclusion (Appendix B).

Of the 526 articles yielded during the initial search, seven were selected for full-text review. Articles selected for inclusion are itemized in Appendix C. Additional resources, including articles, webpages, and guidelines published by professional organizations and governing bodies, were also reviewed to clarify and contextualize findings within the selected articles (AANA, 2014; APSF, 2020; IHI, 2020; The Joint Commission, 2017).

Levels of evidence were assigned to each of the articles selected for inclusion according to Melnyk & Fineout-Overholt's (2019) Hierarchy of Evidence (Appendix D), with Level I indicating highest level of evidence. Among these articles were two systematic reviews (Level I), one randomized control trial (Level II), three cohort studies (Level IV), and one review of literature (Level VII). There was a notable lack of high-level evidence available that focuses specifically on intraoperative patient hand-offs between CRNAs. There is a need for further data collection via randomized clinical trials to support the efficacy of standardized communication tools like the PATIENT mnemonic.

Literature Synthesis

A number of studies have attempted to demonstrate a correlation between intraoperative patient hand-off communication and patient safety, with varying results. A randomized clinical trial conducted by Meersch et al. (2022) found that no significant difference in rates of post-operative complication, readmission, or mortality between patient groups based on the presence or absence of an intraoperative hand-off. While a systematic review and meta-analysis performed by Boet et al. (2020) found that adverse patient outcomes were 40% more likely to occur when an intraoperative patient hand-off between anesthesia providers took place. Although the conflicting results of these two studies leads one to question if communication between providers in the Meersch et al. (2022) study was somehow more effective than that in the Boet et al. (2020)

study. Lending support to this inference, a review of literature conducted by Canale (2018), as well as a systematic review performed by Abraham et al. (2021), found that communication was more effective and adverse outcomes were less likely to occur when a standardized hand-off process was implemented. However, a lack of detail regarding the processes implemented in the Meersch et al. (2022) and Boet et al. (2020) studies limits their usefulness in establishing a correlation between process standardization and the effectiveness of communication.

The findings of the Canale (2018) and Abraham et al. (2021) studies are strengthened by evidence gathered by a series of cohort studies performed by Lambert & Adams (2018), Jullia et al. (2017) and Wright (2013). Each of these studies investigated the correlation between process standardization and the effectiveness of communication by assessing patient outcomes prior to and following implementation of standardized communication tools. Wright (2013) demonstrated significant improvement in effectiveness of patient hand-off communication by implementing the PATIENT mnemonic. Jullia et al. (2017) also demonstrated improvement in effectiveness of patient hand-off communication following training and the implementation of a similar standardized checklist. Lambert & Adams (2018) found that implementation of the WHAT hand-off tool reduced rates of defective hand-off communication by nearly 50% across 21 measured categories. Extrapolation of these findings supports the usefulness of this QI project and suggests that implementation of the PATIENT mnemonic may enhance provider satisfaction and the perception of patient safety among CRNAs.

Project Framework

The framework for this QI project is the Institute for Healthcare Improvement (IHI) (2020) model for improvement using their plan, do, study, act (PDSA) cycle (Appendix E). During the “Plan” Phase of the cycle, improvement goals are set, predictions are made, and

appropriate populations and data collection strategies are determined. The “Do” Phase of the cycle consists of carrying out the plan, gathering data, and documenting any pertinent observations or obstacles encountered. During the “Study” Phase of the cycle data is analyzed and compared to predictions to determine what has been learned. Finally, the “Act” Phase of the cycle allows for adoption, adaptation, or abandonment of the cycle.

Ethical Considerations for Human Subjects

This QI project was deemed to be exempt from full Institutional Review Board (IRB) review by the East Carolina University College of Nursing (ECUCON) and the East Carolina University (ECU) University Medical Center Institutional Review Board (UMCIRB) (Appendix F). Prior to implementation of this QI project, the author completed Collaborative Institute Training (CITI) Modules on research ethics and compliance in November of 2023 (<https://aboutcitiprogram.org/>).

The project does not include patient participation or the involvement of patient information. Participation was voluntary, and all participants were CRNAs employed by the partnering organization. As the processes implemented during this project did not stray from standard practices of the participants or partnering organization, no more than minimal risk was associated with this project. Identified risks included the potential for additional stress and time commitment associated with modification of current hand-off communication process.

Section III. Project Design

Project Setting

The project took place at a high-volume, Level 1 trauma center and teaching hospital in the southeastern U.S., where CRNAs deliver the majority of anesthesia for over 27,000 procedures annually. Complex and prolonged surgeries are performed routinely in the operating rooms and surgical suites of the hospital, which remain staffed at all hours. This environment facilitates implementation of the PATIENT mnemonic by presenting consistent opportunities for intraoperative hand-offs to take place.

Project Population

Eight CRNAs employed by the partnering facility volunteered to take part in this QI project. Voluntary participation facilitated the implementation of the PATIENT mnemonic during intraoperative patient hand-off. Resistance to a change in procedure was considered to be the most probable barrier to participation in this QI project. A perceived increase in time necessary to complete patient hand-off using the PATIENT Mnemonic, as well as apprehension from non-participating CRNAs involved in the transfer of patient care with the participating anesthesia providers, may be additional barriers.

Project Team

The team for this QI project includes the author, three student registered nurse anesthetist (SRNA) collaborators, one collegiate faculty member, one project chair, and one department chair. The collegiate faculty member was vital in guiding the research design, professional writing, and approach to implementation of this QI project. Additionally, the collegiate faculty member helped to facilitate the approval processes which allowed for this QI project to take place. The department chair provided access to the partnering organization via a long-standing

relationship with the staff members of the facility. The project chair assisted the author in goal formulation and appropriate tool selection. As a CRNA, the project chair offered valuable insight into how to communicate with and collect data from participants. Long-standing relationships between the department chair and employees of the partnering organization assisted in securing a setting and participants for the project.

Methods and Measurement

This QI project utilized the framework of the IHI (2020) model for improvement by completing one PDSA cycle. See Project Implementation Timeline (Appendix G). The “Plan” phase of the cycle began with a literature review in the Fall of 2023. This was followed by a series of meetings and discussions between the author and collaborators, under the guidance of the Project Chair. The PATIENT mnemonic was selected for implementation to assess (1) its effectiveness in guiding communication, (2) provider satisfaction, and (3) the perception of adequacy of the mnemonic with intraoperative patient hand-offs between anesthesia providers. To measure the efficacy of implementing the mnemonic, it was determined that data regarding each of the three categories would be collected and analyzed.

The “Do” phase of the cycle took place during the Spring of 2024. A non-randomized convenience sample of eight volunteer participants. Prior to implementation, participants were sent introduction and pre-survey reminder emails that included links to a confidential pre-implementation survey and a narrated PowerPoint presentation (Appendix H, Appendix I, Appendix J, Appendix K). Each participant was provided with a laminated “Badge Buddy” of the PATIENT mnemonic for convenient reference (Appendix L). On the third week of implementation, participants were sent a post-survey email that included a link to a confidential post-implementation survey (Appendix M, Appendix N).

Following implementation, participants were sent a final email (Appendix O). Data from the pre- and post-implementation surveys was then collected and the “Study” phase of the cycle began in the Summer of 2024. Data was compiled, analyzed, and compared to findings of the initial literature review. During the “Act” phase of the cycle, recommendations for refinement of the tool were made, along with recommendations for future PDSA cycles of the QI project.

Section IV. Results and Findings

Data Collection

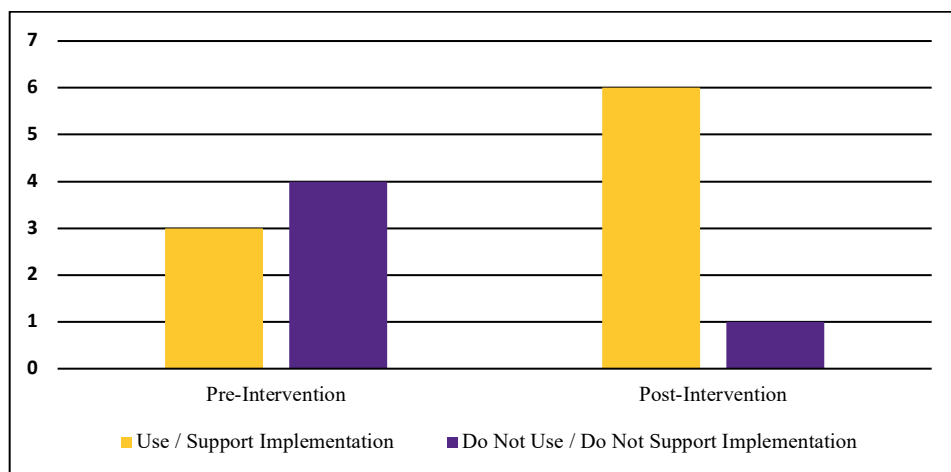
To assess (1) its effectiveness in guiding communication, (2) provider satisfaction, and (3) the perception of adequacy of the mnemonic with intraoperative patient hand-offs between anesthesia providers, data was collected from eight CRNA volunteer participants using pre- and post-implementation surveys created and accessed via Qualtrics™. Seven of eight initial volunteers participated in implementation and completed both the pre- and post-implementation surveys. One volunteer did not participate due to extraneous circumstances.

Data Presentation

The majority of responding participants (5/7) had been practicing as CRNAs for less than five years. Forty-three percent (3/7) of responding participants reported using a systematic means of providing report for lunch break or change of shift to receiving anesthesia provider prior to implementation of the PATIENT Mnemonic (Figure 1).

Figure 1

Use and Support for Implementation of a Standardized Hand-off (n=7)



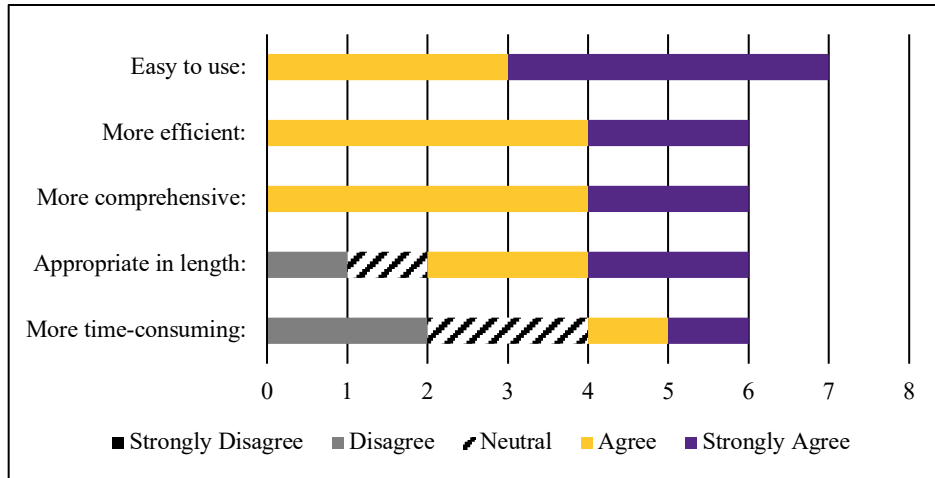
Note. Table includes data from 7 Pre- and Post-Implementation surveys completed by CRNAs.

They all (3/3) reported to be satisfied with the effectiveness and comprehensiveness of their current hand-off processes. It was confirmed by all responding participants (7/7) that their department does not currently utilize a standardized tool for providing patient hand-off and none of the responding participants were familiar with Wright's PATIENT Mnemonic prior to initiation of this quality improvement project. When providing hand-off report, all responding participants (7/7) considered the length and type of case and the majority (5/7) considered the receiving anesthesia provider's level of experience. Eighty-six percent (6/7) of responding participants reported they have received hand-off reports that could have been more comprehensive, and all (7/7) reported that implementing a standardized hand-off tool could improve completeness of anesthesia provider reports (Appendix P).

Of the 71% (5/7) of responding participants that utilized the PATIENT Mnemonic, during the implementation period, each reported using the hand-off tool approximately eight times. All responding participants reported the PATIENT Mnemonic to be an easy to use, efficient, and comprehensive way of organizing the material they were communicating. The majority of responding participants (4/6) reported the PATIENT Mnemonic to be appropriate in length (Figure 2). Nearly all responding participants (5/6) were satisfied with the hand-off tool and reported that they would be willing to adopt the PATIENT Mnemonic into their personal anesthesia practice. Resistance to change was the primary barrier to adoption identified by 34% (2/6) of responding participants.

Figure 2

Post-Implementation CRNA Perceptions of PATIENT Mnemonic Hand-off Tool (n=7)



Note. Not all respondents answered all parts of this question.

Data Analysis

The data suggests that the PATIENT Mnemonic is concise, easy to use, and effective for standardizing communication during intraoperative patient hand-offs between anesthesia providers without increasing errors or taking more time. Before its implementation, participants confirmed that their department lacked a standardized hand-off tool, and none were familiar with Wright’s PATIENT Mnemonic. When providing hand-offs, all participants consider the length and type of the case, with most (5/7) also considering the receiving provider’s experience level. Additionally, 86% (6/7) of participants noted that some hand-off reports could have been more thorough, and all agreed that a standardized tool could improve report completeness.

While only 43% (3/7) of participants reported using a systematic means of providing report for lunch break or change of shift to receiving anesthesia provider, prior to implementation of the PATIENT Mnemonic, they all reported to be satisfied with the

effectiveness and comprehensiveness of their current hand-off processes. Following implementation of the PATIENT Mnemonic, nearly all participants (5/6) were satisfied with the hand-off tool and reported that they would be willing to adopt it into their personal anesthesia practice. Participants reported the mnemonic is “helpful for complex procedures and patients” and “incorporates all aspects of anesthesia hand-off” (Appendix Q). All participants found the PATIENT Mnemonic to be an easy to use, efficient, and comprehensive way of organizing the material they were communicating, and the majority (4/6) found it to be appropriate in length.

Resistance to change was the primary barrier to adoption identified by 34% (2/6) of participants. Survey responses from participants were confidential, but the number of participants that identified barriers to adoption and who reported that use of the PATIENT Mnemonic was more time consuming than their current hand-off practice roughly correlates with the number of participants (2/7) with 11-15 years of experience working as a CRNA. The remaining participants (5/7) have less than 5 years of experience. From this, one can speculate that the more experienced anesthesia providers may have developed their own comprehensive and concise methods of providing hand-off report and may be less willing to change their established practice, while less experienced anesthesia providers may be more open to change in providing hand-off communication.

Section V. Implications

Financial and Nonfinancial Analysis

There would be minimal financial risk associated with continued implementation of this project. Financial costs of an initial 30-day organization-wide implementation period at the partnering facility, which employs approximately 80 anesthesia providers, would include creation of 80 laminated PATIENT Mnemonic “Badge Buddies” for a cost of approximately \$120 (US) from a professional printing service and payroll adjustments. It can be estimated that during the first month of implementation anesthesia providers may dedicate an additional 1.5-2 hours of productive time to adopting the new practice. At an average hourly rate of \$102 (US), according to the U.S. Bureau of Labor Statistics (2023), for each of the 80 anesthesia providers on staff at the partnering facility, it can be estimated that this will result in an increase in payroll of approximately \$14,680 (US).

The initial costs associated with an organization-wide implementation would be offset and recouped by potential savings associated with a potential decreased incidence of adverse patient outcomes associated with ineffective hand-off communication. Costs associated with ineffective hand-off communication, resulting in incidence of adverse patient outcomes are difficult to calculate. Assessment of cost/benefit could be conducted by retrospectively collecting data to determine if perioperative patient outcomes and patient-centered facility expenses change over time while using the handoff protocol.

Implications of Project

The goal for this QI project was to assess anesthesia providers' perceptions of adequacy of the PATIENT Mnemonic to facilitate standardized hand-offs of anesthetized patients. They reported it to be useful, efficient, comprehensive, and appropriate in length. Thus, using the

PATIENT Mnemonic, or a similar standardized means of communication, during intraoperative hand-off between anesthesia providers may potentially reduce incidence of ineffective communication and subsequent adverse patient outcomes, including sentinel events. Anesthesia providers who participated in the implementation of this QI project as well The Joint Commission (2017), the American Association of Nurse Anesthetists (AANA, 2014), the Anesthesia Patient Safety Foundation (APSF, 2020), and the Institute for Healthcare Improvement (IHI, 2020) all support the use of standardized hand-off communication.

Sustainability

This QI project used the framework of the IHI (2020) model for improvement by completing one PDSA cycle and included approximately 10% (8/80) of anesthesia providers employed by the partnering facility, a large teaching hospital, and level 1 trauma center in the southeastern United States. Participation was voluntary. Use of Qualtrics™ services was at no cost due to a license provided to students by East Carolina University, and no fees were charged by the IRB or partnering facility for project approval. The only cost associated with implementation of this QI project was creation of 10 PATIENT Mnemonic “Badge Buddies” for approximately \$25 (US).

Considering the low cost of implementation and availability of potential participants, another PDSA cycle could be completed on a larger scale to demonstrate the efficacy of using the PATIENT Mnemonic or to tailor the mnemonic to better fit the needs of providers at the partnering facility. An estimated financial cost is less than \$15,000 (US) for an initial 30-day organization-wide implementation period for the partnering facility that employs approximately 80 anesthesia providers. In this pilot project, provider perception of the PATIENT Mnemonic

hand-off tool as an effective means of guiding communication was established. This would be essential for sustaining its future use.

Dissemination Plan

A poster summarizing the QI project and its findings was used as a visual aid during a presentation by the author on Wednesday, November 27th, 2024, at the East Carolina University College of Nursing. Each of the project's participants and collaborators were provided with advanced notice of the date and time of this presentation and were invited, but not required, to attend. Findings of this QI project, in the form of a finalized paper are accessible to the community at large via The Scholarship, the East Carolina University digital repository.

Section VI. Conclusion

Limitations

The two main limitations to this QI project were small sample size and limited time for implementation. Repetition of the PDSA cycle with a larger sample size could allow for greater classification and identification of outlying data for more precise extrapolation. A lengthier implementation period could allow for more abundant applications and the potential for participants to propose revisions to the PATIENT Mnemonic to better suit their needs.

Recommendations for Future Implementation or Additional Studies

This QI project used the framework of the IHI (2020) model for improvement by completing one PDSA cycle. Repetition of this cycle could benefit from a larger sample size and a lengthier implementation period. It could be beneficial to stratify participants, identifying a core group as “Superusers” or “Point People”. These individuals could begin working with project facilitators during the “Plan” phase of the PDSA cycle and intermittently collaborate to guide decision making in later phases. The mnemonic could then be modified to reflect the needs of the local facility and anesthesia provider preferences, which would likely facilitate adoption by the group.

References

- Abraham, J., Pfeifer, E., Doering, M., Avidan, M. S., & Kannampallil, T. (2021). Systematic review of intraoperative anesthesia handoffs and handoff tools. *Anesthesia & Analgesia* 132(6), 1563-1575. <https://doi.org/10.1213/ANE.0000000000005367>.
- American Association of Nurse Anesthetist. (2014). *Patient-centered perianesthesia communication: Practice considerations*. [https://www.aana.com/docs/default-source/practice-aana-com-web-documents-\(all\)/patient-centered-perianesthesia-communication.pdf?sfvrsn=7a0049b1_4](https://www.aana.com/docs/default-source/practice-aana-com-web-documents-(all)/patient-centered-perianesthesia-communication.pdf?sfvrsn=7a0049b1_4).
- Anesthesia Patient Safety Foundation. (2020). *Perioperative multi-center handoff collaborative*. <https://www.apsf.org/patient-safety-resources/perioperative-multi-center-handoff-collaborative/>.
- 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>.
- Canale, M. (2018). Implementation of a standardized handoff of anesthetized patients. *AANA Journal*, 86(2), 137-145.
- Institute for Healthcare Improvement. (2020). *Patient safety essentials toolkit*. <http://www.ihl.org/resources/Pages/Tools/Patient-Safety-Essentials-Toolkit.aspx>
- Janagama, S. R., Strehlow, M., Gimkala, A., Rao, G. V. R., Matheson, L., Mahadevan, S., & Newberry, J. A. (2020). Critical communication: a cross-sectional study of signout at the prehospital and hospital interface. *Cureus*, 12(2), e7114. <https://doi.org/10.7759/cureus.7114>.

The Joint Commission. (2017). Sentinel event alert 58: Inadequate hand-off communication.

Sentinel Event Alert Newsletters, 58, 1-6.

<https://www.jointcommission.org/resources/sentinel-event/sentinel-event-alert-newsletters/sentinel-event-alert-58-inadequate-hand-off-communication/>

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>.

Keebler, J. R., Lazzara, E. H., Patzer, B. S., Palmer, E. M., Plummer, J. P., Smith, D. C., Lew, V., Fouguet, S., Chan, Y.R., & Riss, R. (2016). Meta-analyses of the effects of standardized handoff protocols on patient, provider, and organizational outcomes. *Human Factors: The Journal of Human Factors and Ergonomics Society*, 58(8), 1187-1205. <https://doi.org/10.1177/001872081667230>.

Lambert, L. & Adams, J. (2018). Improved anesthesia handoff after implementation of the written handoff anesthesia tool (WHAT). *AANA Journal*, 86(5), 361-370.

Meersch, M., Weiss, R., Küllmar, M., Bergman, L., Thompson, A., Griep, L., Kusmierz, D., Buchholz, A., Wolf, A., Nowak, H., Rahmel, T., Adamzik, M., Gerrit Haaker, J., Goettker, C., Gruendel, M., Hemping-Bovenkerk, A., Goebel, U., Braumann, J., Wisudanto, I., et al. (2022). Effect of intraoperative handovers of anesthesia care on mortality, readmission, or postoperative complications among adults: The HandiCAP randomized clinical trial. *JAMA*, 327(24), 2403-2412. <https://doi.org/10.1001/jama.2022.9451>.

- Umberfield, E., Ghaferi, A. A., Krein, S. L., & Manojlovich, M. (2019). Using incident reports to assess communication failures and patient outcomes. *Joint Commission Journal on Quality and Patient Safety*, 45(6), 406–413. <https://doi.org/10.1016/j.jcjq.2019.02.006>.
- U.S. Bureau of Labor Statistics (2023). Occupational employment and wage statistics: National estimates for nurse anesthetists. <https://www.bls.gov/oes/current/oes291151.htm>
- Wright S. M. (2013). Examining transfer of care processes in nurse anesthesia practice: Introducing the PATIENT protocol. *AANA Journal*, 81(3), 225–232.

Appendix A: PICOT Question and Concept Chart

Concepts	Intraoperative	Handoff	CRNA
Keywords	Intraoperative Care OR Intraoperative Period	Hand Off OR Communication OR Report	CRNA OR Certified Registered Nurse Anesthetists OR Nurse Anesthetists
PubMed MeSH Terms	“Intraoperative Care” [MeSH Terms] OR “Intraoperative Period” [MeSH Terms]	“Communication” [MeSH Terms]	“Nurse Anesthetists” [MeSH]
CINAHL Subject Headings	“Intraoperative Care” [MH] OR “Intraoperative Period” [MH]	“Hand Off (Patient Safety)” [MH]	“Certified Registered Nurse Anesthetists” [MH]
Google Scholar	N/A	N/A	N/A

PICO(T/S)

Population: CRNAs

Intervention: Standardized Communication Tool

Comparison: N/A

Outcome: Provider Satisfaction and Perception of Patient Safety

Time: During Intraoperative Handoff

Setting: Operating Room

PICO(T/S) Statement

What effect does the implementation of the PATIENT mnemonic during intraoperative patient hand-off between Certified Registered Nurse Anesthetists have on provider satisfaction and the perception of patient safety?

Initial Search Strategy

PubMed

(Intraoperative Care OR Intraoperative Period) AND (Hand Off OR Communication OR Report) AND (CRNA OR Nurse Anesthetist)

Limited to results published between 2013-2023.

CINAHL

(Intraoperative Care OR Intraoperative Period) AND (Hand Off (Patient Safety)) AND (Certified Registered Nurse Anesthetist)

Limited to results published between 2013-2023.

Appendix B: Search Strategy

Search date	Database/ search engine	Search strategy	Limits applied	# of citations found/kept	Rationale for inclusion/exclusion of items
09/24/2023	PubMed	<p>(Intraoperative OR Perioperative) AND (Hand Off OR Communication OR Report) AND (CRNA OR Nurse Anesthetist)</p> <p>("intraop"[All Fields] OR "intraoperative"[All Fields] OR "intraoperatively"[All Fields] OR ("perioperative"[All Fields] OR "perioperatively"[All Fields])) AND (((("hand"[MeSH Terms] OR "hand"[All Fields]) AND "Off"[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]))</p>	<p>10 years (2013-2023) English</p>	<p>239 found 8 kept</p>	<p>Inclusion: Focus on transfer of care. Focus on communication between CRNAs.</p> <p>Exclusion: Focus on clinical process. Focus on interdisciplinary communication. Duplicate result from previous search. Language other than English.</p>

<p>9/24/2023</p>	<p>CINAHL</p>	<p>(Intraoperative Care OR Intraoperative Period) AND (Hand Off (Patient Safety)) AND (Certified Registered Nurse Anesthetist)</p>	<p>10 years (2013-2023) English</p>	<p>35 found 4 kept</p>	<p>Inclusion: Focus on transfer of care. Focus on communication between CRNAs. Peer reviewed.</p> <p>Exclusion: Focus on clinical process. Focus on interdisciplinary communication. Duplicate result from previous search. Language other than English.</p>
<p>09/24/2023</p>	<p>Google Scholar</p>	<p>(Intraoperative) AND (Hand Off) AND (CRNA OR Anesthetist)</p>	<p>5 years (2018-2023) English</p>	<p>252 found 11 kept</p>	<p>Inclusion: Focus on transfer of care. Focus on communication between CRNAs.</p> <p>Exclusion: Focus on clinical process. Focus on interdisciplinary communication. Duplicate result from previous search. Language other than English.</p>

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
2022	Meersch, M., Weiss, R., Küllmar, M., Bergman, L., Thompson, A., Griep, L., Kusmierz, D., Buchholz, A., Wolf, A., Nowak, H., Rahmel, T., Adamzik, M., Gerrit Haaker, J., Goettker, C., Gruendel, M., Hemping-Bovenkerk, A., Goebel, U., Braumann, J., Wisudanto, I., et al. (2022). Effect of intraoperative handovers of anesthesia care on mortality, readmission, or postoperative complications among adults: The HandiCAP randomized clinical trial. <i>JAMA</i> , 327(24), 2403-2412. https://doi.org/10.1001/jama.2022.9451 .	Investigate the effect of intraoperative handoff between anesthesia providers on patient mortality, readmission, and/or postoperative complications. No framework or model noted.	Level II: Randomized Clinical Trial	Hospital OR	1772 Patients	PASS v.14 software for sample size SAS v.9.4 for calculations Fisher exact test 2-sided Cochran-Mantel-Haenszel test Multivariable logistic regression	50.3% of patients were randomly assigned to a group in which an intraoperative handoff between anesthesia providers would take place. 49.7% of patients were randomly assigned to a control group in which no intraoperative handoff between anesthesia providers would take place. The HandiCAP study found no significant difference in rates of mortality, readmission, and/or postoperative complication among patients from both groups.
2021	Abraham, J., Pfeifer, E., Doering, M., Avidan, M. S., & Kannampallil, T. (2021). Systematic review of intraoperative anesthesia handoffs and handoff tools. <i>Anesthesia & Analgesia</i> 132(6), 1563-1575. https://doi.org/10.1213/ANE.00000000000005367 .	Assess the impact of handoff tools for communication between anesthesia providers on clinical and process outcomes. No framework or model noted.	Level I: Systematic Review	Hospital OR	6 Non-randomized prospective studies	Newcastle Ottawa Scale GraphPad Prism v.7 software for calculations	All studies demonstrated improvement in clinical and process outcomes following implementation of handoff tools for communication between anesthesia providers. Limitations that prohibit extrapolation of results include heterogeneity among sampled studies as well as homogeneity among participating locations.
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. <i>British Journal of Anaesthesia</i> , 125(4), 605-613. https://doi.org/10.1016/j.bja.2020.05.062 .	Investigate the association between intraoperative handoff between anesthesia providers and patient morbidity, mortality, and/or postoperative complications. No framework or model noted.	Level I: Systematic Review and Meta-Analysis	Hospital OR	8 Studies	PRISMA PRESS DistillerSR NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies Random-effects model	83% of studies included in the systematic review demonstrated association between intraoperative anesthesia handoff and adverse patient outcomes. Meta-analysis of the evaluated studies found that adverse patient outcomes were 40% more likely to occur when an intraoperative handoff between anesthesia providers took place. This systematic review and meta-analysis conveys a need for further investigation and hypothesizes that quality improvement of intraoperative handoff between anesthesia providers may reduce occurrence of adverse outcomes and potentially enhance outcomes for surgical patients.
2018	Canale, M. (2018). Implementation of a standardized handoff of anesthetized patients. <i>AANA Journal</i> , 86(2), 137-145.	Assess the impact of a standardized handoff procedure on guideline adherence, quality of information transfer,	Level VII: Review of Literature	Hospital OR	6 Articles	Paired t Test Descriptive Analysis Thematic Analysis	Communication breakdown during transfer of care significantly contributes to medical and surgical errors, as well as patient morbidity. Implementation of standardized handoff procedures has been shown to improve guideline adherence, quality of

		perceived patient safety, and worker satisfaction. No framework or model noted.				TeamSTEPPS Project Approach	information transfer, perceived patient safety, and worker satisfaction.
2018	Lambert, L. & Adams, J. (2018). Improved anesthesia handoff after implementation of the written handoff anesthesia tool (WHAT). <i>AANA Journal</i> , 86(5), 361-370.	Assess the effectiveness of standardization and the use of the WHAT handoff tool on improving the adequacy of anesthesia handoff communication. No framework or model noted.	Level IV: Unblinded Cohort Study	Hospital OR	22 CRNAs 70 Sender-observed handoffs 70 Receiver-observed handoffs	AHC Survey TST Defective Rate WHAT Handoff Tool Pre & Post Survey	Statistically significant improvement was appreciated after implementation of the WHAT handoff tool. Rates of defective reporting between CRNAs decreased from 59.5% to 10%. Of 21 categories in which handoff communication was found to be incomplete, improved completeness of communication was seen in 17 categories following implementation of the WHAT handoff tool. Satisfaction surveys following implementation showed positive response from staff.
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. <i>European Journal of Anaesthesiology</i> , 34(7), 471–476. https://doi.org/10.1097/EJA.0000000000000636 .	Assess the effectiveness of intraoperative handover training and the display of a checklist on improving communication during anesthesia care transitions. No framework or model noted.	Level IV: Single-Blind Cohort Study	Hospital OR	204 random observations of handover between anesthesia providers.	Interventional cohort given handover training with checklists displayed on workstation. Control cohort no intervention. Both cohorts observed during handover and scored using 22-item-checklist created and validated by a modified Delphi Method. Upon completion of the study, a satisfaction survey was given to participants from the interventional cohort.	Interventional cohort and control cohort scored similarly on checklist prior to implementation of handover training and display of checklist. Following implementation, scores from the interventional cohort improved by 43%. Scores from the control group did not improve.
2013	Wright S. M. (2013). Examining transfer of care processes in nurse anesthesia practice: Introducing the PATIENT protocol. <i>AANA Journal</i> , 81(3), 225–232.	Assess the effectiveness of standardization and the use of the PATIENT checklist on improving the adequacy of anesthesia handoff communication. No framework or model noted.	Level IV: Unblinded Cohort Study	Hospital OR	27 CRNAs	Pre-implementation questionnaire. Descriptive statistics. PATIENT checklist. Post-implementation survey.	The PATIENT checklist was designed in collaboration with CRNAs to mitigate factors contributing to incomplete patient handoff and the subsequent impact on patient safety. While incorporation of the PATIENT checklist demonstrates improvement in the completeness of patient handoff, post-implementation surveys convey an apprehension towards standardized implementation of the checklist.

Appendix D: Levels of Evidence

<u>Level</u>	<u>Description</u>
I.	Evidence from a clinical practice guideline based on systematic reviews or meta-analyses of randomized controlled trials. If this is not available, then evidence from a systematic review or meta-analysis of random controlled trials.
II.	Evidence from randomized controlled studies with good design.
III.	Evidence from controlled trials that have good design but are not randomized.
IV.	Evidence from case-control and cohort studies with good design.
V.	Evidence from systematic reviews of qualitative and descriptive studies.
VI.	Evidence from qualitative and descriptive studies.
VII.	Evidence from the opinion of authorities and/or the reports of expert committees.

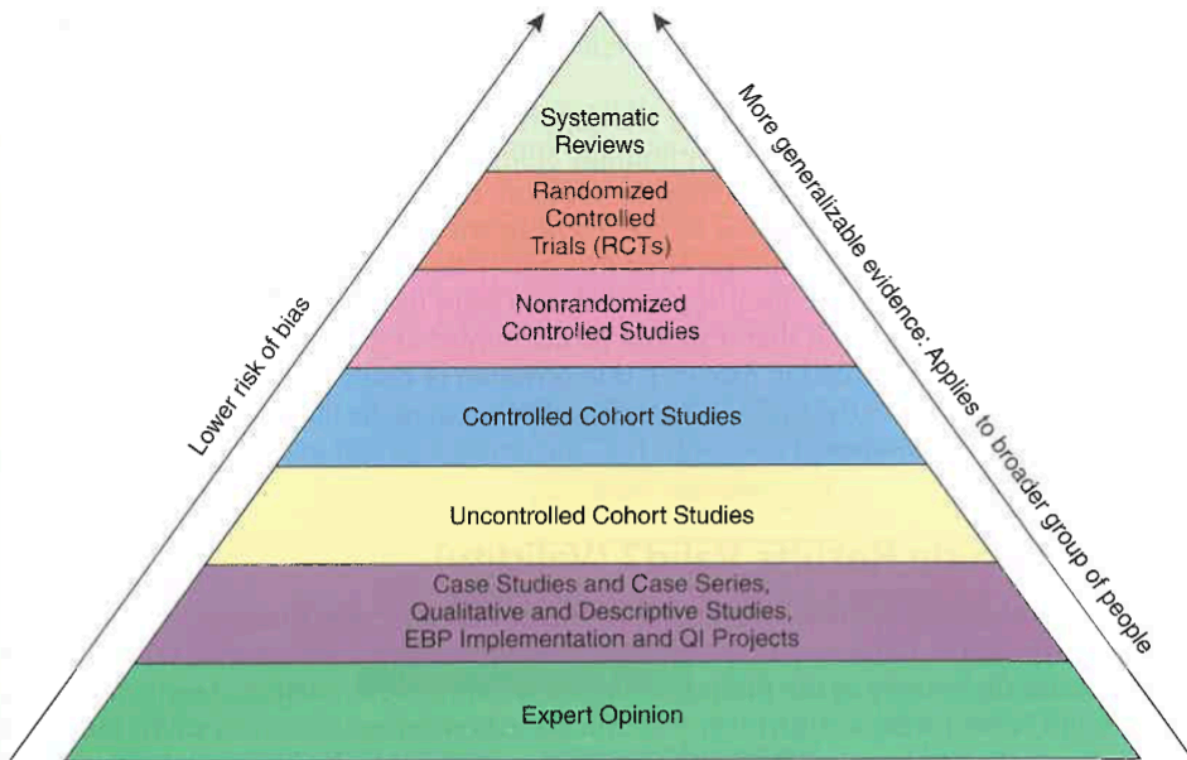
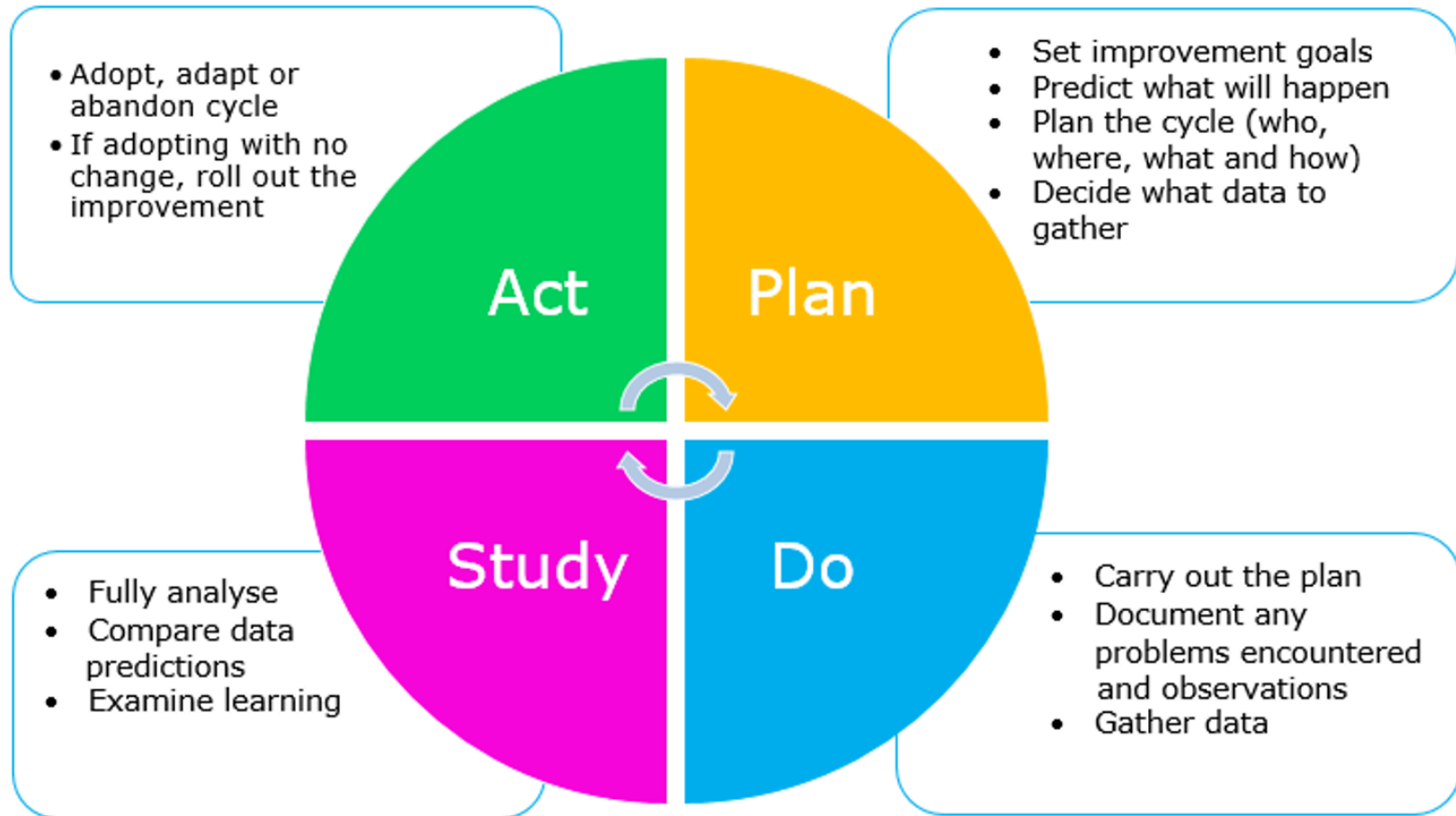


Figure 5.2: Hierarchy of evidence for intervention questions. EBP, evidence-based practice; QI, quality improvement.

(Melnyk & Fineout-Overholt, 2019)

Appendix E: PDSA Cycle



(IHI, 2020)

Appendix F: Project Approvals

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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 eForms.

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

Table with 2 columns: Field (Project Title, Project Leader, Project Leader Contact E-mail, Department or Unit Affiliation, Project Advisor) and Value.

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

Table with 4 columns: Name, Department or Unit, Role, and Check this box if this team member will access PHI or PII for the purposes of this project.

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

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.

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.

Data to be collected:

Data will be gathered directly from participants through completion of Qualtrics™ pre-implementation and post-implementation surveys delivered and completed electronically.

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

Table with 3 columns: Question, True, False. Contains five questions regarding project purpose, publication, care practices, risk, and supervision.

Please submit this form to your supervisor (or designee) for review and approval. Signature on this form certifies 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 signature block including fields for Name, Signature, and Date (2/28/2024 | 11:48 PM EST).

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 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.

SIGNATORY table with columns: SERVICE LINE (Heart & Vascular, Cancer, Neuro Sciences, Orthopedics, Behavioral Health, Primary Care) and SIGNATORY (signature lines).

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Children's Health
(Pediatric Surgery, General Pediatrics, Well-Children, Neonatal & Pediatric Critical Care, Pediatric Bone Onc, Rheumatology, Pediatric Oncology, Pediatric Subspecialties, Hospital Subspecialties)

Women's Health
(Gynecology, Obstetrics, & Maternal Fetal Medicine)

Emergency Services
(Emergency Preparedness, Emergency Management, & Emergency Services)

Physical Medicine & Rehab
(Baksh, Therapy (OT, PT, SLP), Pain, Wound Care, & Autobiography)

Adult Surgical Service
(Anesthesiology, Trauma, ENT, Breast, Urology, Plastic, Ophthalmology, Transplant Surgery, & Acute Care Surgery)

Adult Medicine
(Medical Critical Care, Infectious Disease, Hospital Medicine, Pulmonology, Gastroenterology, Allergy, Dermatology, & Nephrology)

Radiology

Pathology & Lab Services

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

5 of 6

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Optional Determinations:

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 UMCRRB office via email: umcrrb@ecu.edu.

Not Human Subjects Research: The UMCRRB 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 UMCRRB 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.

UMCRRB Office Staff Signature: _____ Date: _____

The UMCRRB office will contact you if any further information is needed to make this determination. Please note that if the UMCRRB 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

5 of 6



Certificate Of Completion

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Location: DocuSign

Signer Events

Chief Nurse Anesthetist
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Signed: 2/28/2024 11:48:51 PM

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2/28/2024 2:44:37 PM

Payment Events

Status

Timestamps

Electronic Record and Signature Disclosure

Appendix G: Project Implementation Timeline



Implementation of PATIENT Mnemonic During Intraoperative Handoff

Project Leader: Jordan Maxwell Price, BSN, SRNA

Project Chair: Maura McAuliffe, PhD, CRNA, FAAN

Location: East Carolina University Health Medical Center – Greenville, NC

Purpose: 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.

Implementation Period: Monday April 8th – Friday April 19th, 2024

Data Collection Period: Friday April 5th – Sunday June 2nd, 2024

Pre-Implementation Survey Opened: Friday April 5th, 2024

Pre-Implementation Survey Emails Sent: Friday April 5th, 2024

Follow Up Emails Sent: Monday April 8th, 2024

Post-Implementation Survey Opened: Friday April 19th, 2024

Post-Implementation Emails Sent: Friday April 19th, 2024

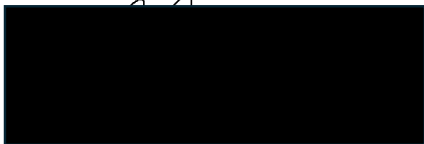
All Surveys Closed: Sunday June 2nd, 2024

Number of Participants Emailed: 8

Number of Pre-Implementation Survey Responses: 7

Number of Post-Implementation Survey Responses: 7

Prepared by,



Jordan Maxwell Price, BSN, SRNA
East Carolina University: College of Nursing



Appendix H: Introduction Email

Good afternoon [REDACTED],

Thank you for volunteering to participate in the SRNA DNP Project “Implementing the PATIENT Mnemonic During Intraoperative Hand-Offs Between CRNAs: A Quality Improvement Project.” The purpose of this project is to assess the use of a standardized communication tool during patient hand-off between CRNAs at ECU Health Medical Center.

Participation will involve completing a short pre-intervention survey, viewing a brief PowerPoint, utilizing the PATIENT mnemonic checklist during your CRNA practice during the weeks of **April 8-12** and **April 15-19**, and completing a short post-intervention survey after the two-week implementation period.

Each survey and the PowerPoint will only take about 5-10 minutes to complete. The surveys were created and will be completed using Qualtrics® survey software. Your participation is voluntary and completely confidential. The results of this QI study will be shared with you upon completion.

Use of the PATIENT mnemonic checklist falls within currently accepted practice in your work area.

Please complete the [Pre-Implementation Survey](#).

Please view the [Introductory Video](#).

A “Badge Buddy” of the Patient Mnemonic Checklist, for convenient reference, will be available in your Anesthesia Workroom Mailbox on Monday April 8th.

Thank you again for your participation in this quality improvement project. I will be at ECU Health Medical Center from April 8th until May 2nd if you have any questions. You may also reach out to me or [REDACTED] by email at any time.

Sincerely,

[REDACTED]
ECU Nurse Anesthesia Program Class of 2025

Email: [REDACTED]

Project Chair: [REDACTED]

Email: [REDACTED]

Appendix I: Pre-Survey Reminder Email

Hello [REDACTED] CRNAs,

I just wanted to send a quick reminder about the ongoing DNP Project on Implementing the PATIENT Mnemonic During Intraoperative Hand-Offs Between CRNAs (original email below). If you've already filled out the pre-implementation survey and viewed the 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. A physical "Badge Buddy" copy of the PATIENT Mnemonic Checklist, to attach to your ID-Badge, was placed in your Anesthesia Workroom Mailbox. You may use this at your discretion. After the end of next week, I will begin sending out the post-surveys.

Links:

[Pre-Implementation Survey](#)

[PowerPoint](#)

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

Sincerely,

[REDACTED]

ECU Nurse Anesthesia Program Class of 2025

Email: [REDACTED]

Appendix J: 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 hand-off 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 hand-off process provides an **efficient** way of transferring information:

Strongly Agree Agree Neutral Disagree Strongly Disagree

4) My current hand-off 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 hand-off report that could have been more comprehensive:

Strongly Agree Agree Neutral Disagree Strongly Disagree

7) Using a standardized anesthesia hand-off tool could improve completeness of CRNA reports:

Strongly Agree Agree Neutral Disagree Strongly Disagree

8) Are there factors that influence your current hand-off practices (i.e. experience of receiving CRNA, type of case, length of break, etc.)

Strongly Agree Agree Neutral Disagree Strongly Disagree

9) How many years have you been a CRNA?

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

Appendix K: Transcript of Narrated PowerPoint Presentation

- Slide 01:** Hi, my name is _____ 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 thank you in advance for agreeing to participate in this study.
- Slide 02:** To build the foundation for this DNP project, we examined current literature and found that most anesthesia hand-offs 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 hand-off 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 hand-off 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 03:** Numerous research studies have consistently demonstrated elevated provider satisfaction, enhanced completeness of hand-off interactions, and increased perceived effectiveness of the hand-off process through the incorporation of mnemonic checklists in intraoperative hand-offs. 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 ECU Health CRNAs perceptions of the adequacy of the PATIENT mnemonic in facilitating standardized hand-offs of anesthetized patients.

Slide 04: 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 05: 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 06: The first step as a volunteer will be completing the pre-implementation assessment via Qualtrics. This pre-implementation assessment will have you answer 10 questions to gather information regarding your personal experience with intraoperative hand-offs. 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 hand-offs to other anesthesia providers. You should strive to utilize the PATIENT mnemonic whenever giving hand-off report for a break that is at least 15 minutes. The implementation period for the PATIENT mnemonic will last 2 weeks. The final step in this project is collecting post-implementation data via completion of a Qualtrics 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 hand-off tool or project itself.

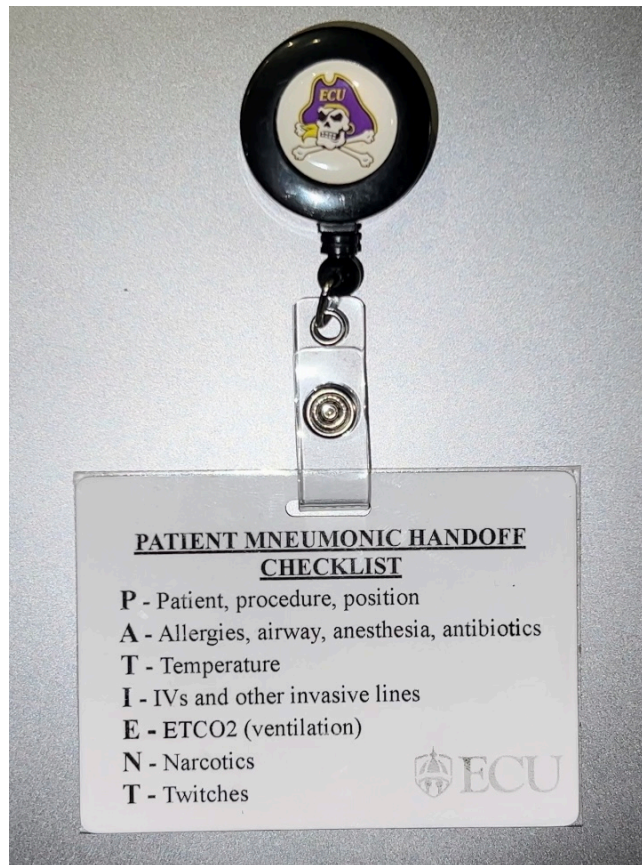
Slide 07: My project chair is _____. If at any point you have questions or concerns about the mechanics of the project, or about how to utilize this tool, please do not hesitate to contact us.

Slide 08: Thank you again for taking the time to help me with this quality improvement project to fulfill the requirements of my DNP.

Appendix L: PATIENT Mnemonic and “Badge Buddy”

P	Patient, Procedure, Position
A	Allergies, Airway, Anesthesia, Antibiotics
T	Temperature
I	IVs and Other Invasive Lines
E	End Tidal Carbon Dioxide (Ventilation)
N	Narcotics
T	Twitches (Neuromuscular Blockade)

(Wright, 2013)



Appendix M: Post-Survey Email

Dear [REDACTED] CRNAs,

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

If you have not filled out a pre-implementation survey, I would really and truly appreciate your participation. After completing the [Pre-Implementation Survey](#), you can follow it up by watching the introductory [PowerPoint](#). A physical "Badge Buddy" copy of the PATIENT Mnemonic Checklist, to attach to your ID-Badge, was placed in your Anesthesia Workroom Mailbox. This is available for your use, if you would like, but its use is not mandatory for participation in this project.

If you've already completed the first survey, please complete the [Post-Implementation Survey](#). It should take approximately 5-10 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,

[REDACTED]
ECU Nurse Anesthesia Program Class of 2025
Email: [REDACTED]

Appendix N: CRNA Post-Implementation Survey

1) During the last two weeks, approximately how many times did you use the PATIENT mnemonic during intraoperative patient hand-off?

0 1-5 6-10 11-15 > 15

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 hand-off 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 hand-off 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 hand-off tool.

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

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

13) What is your level of support for your future use of the PATIENT hand-off tool?

Strongly Agree

Agree

Neutral

Disagree

Strongly Disagree

Appendix O: Final Email

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. And if you enjoyed using the PATIENT Mnemonic Checklist during intraoperative hand-off and found it useful, you can the physical "Badge Buddy" copy of the PATIENT Mnemonic Checklist.

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

Take care,

[REDACTED]
ECU Nurse Anesthesia Program Class of 2025
Email: [REDACTED]

Appendix P: CRNA Pre-Implementation Survey Results

Pre-Implementation Survey Results (n=7)

1. How many years have you been practicing as a CRNA?
 - 7 responses
 - ≤ 5 years: 5 responses (71%)
 - 6-10 years: 0 responses (0%)
 - 11-15 years: 2 responses (29%)
 - ≥ 16 years: 0 responses (0%)
 - The majority of responding participants (5/7) have been practicing as CRNAs for less than 5 years.

2. 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 anesthesia providers?
 - 7 responses
 - Yes: 3 responses (43%)
 - No: 4 responses (57%)
 - Less than half of responding participants (3/4) reported using a systematic means of providing report for lunch break or change of shift to receiving anesthesia providers.

3. Do all CRNAs in your department use a common “standardized hand-off tool/checklist/mnemonic” to provide report to anesthesia providers?
 - 7 responses
 - Yes: 0 responses (0%)
 - No: 7 responses (100%)
 - All responding participants (7/7) reported that CRNAs in their department do not use a standardized hand-off tool to provide report to CRNAs.

4. Were you familiar with Wright’s PATIENT mnemonic as an intraoperative anesthesia handoff tool prior to this quality improvement project?
 - 7 responses
 - Yes: 0 responses (0%)
 - No: 7 responses (100%)
 - All responding participants (7/7) reported that they were unfamiliar with Wright’s PATIENT mnemonic hand-off tool.

5. 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 between anesthesia providers:
 - a. My current hand-off process provides an efficient way of transferring information:
 - 7 responses
 - Strongly disagree: 0 responses (0%)
 - Disagree: 0 responses (0%)
 - Neutral: 0 responses (0%)
 - Agree: 5 responses (71%)
 - Strongly agree: 2 responses (29%)
 - Prior to implementation of the PATIENT Mnemonic, all responding participants (7/7) felt confident in the effectiveness of their current hand-off process.

- b. My current hand-off process provides a comprehensive way of transferring information:
- 7 responses
 - o Strongly disagree: 0 responses (0%)
 - o Disagree: 0 responses (0%)
 - o Neutral: 0 responses (0%)
 - o Agree: 5 responses (71%)
 - o Strongly agree: 2 responses (29%)
 - Prior to implementation of the PATIENT Mnemonic, all responding participants (7/7) felt confident that their current hand-off process was a comprehensive means of transferring information.
- c. I am satisfied with the transfer of care process I currently use:
- 7 responses
 - o Strongly disagree: 0 responses (0%)
 - o Disagree: 0 responses (0%)
 - o Neutral: 1 responses (14%)
 - o Agree: 4 responses (57%)
 - o Strongly agree: 2 responses (29%)
 - Prior to implementation of the PATIENT Mnemonic, the majority of responding participants (6/7) stated that they were satisfied with their current handoff process.
- d. I have previously received an anesthesia hand-off report that could have been more comprehensive:
- 7 responses
 - o Strongly disagree: 0 responses (0%)
 - o Disagree: 1 responses (14%)
 - o Neutral: 0 responses (0%)
 - o Agree: 5 responses (71%)
 - o Strongly agree: 1 responses (14%)
 - The majority of responding participants (6/7) claimed to have received hand-off reports that could have been more comprehensive.
- e. Using a standardized anesthesia hand-off tool could improve completeness of anesthesia provider reports:
- 7 responses
 - o Strongly disagree: 0 responses (0%)
 - o Disagree: 0 responses (0%)
 - o Neutral: 1 responses (14%)
 - o Agree: 2 responses (29%)
 - o Strongly agree: 4 responses (57%)
 - The majority of responding participants (6/7) agree that implementing a standardized hand-off tool could improve completeness of anesthesia provider reports.
6. Choose all that apply:
- a. What factors influence your current hand-off practices?
- 7 responses
 - o None: 0 responses (0%)
 - o Type of case: 7 responses (100%)
 - o Length of case: 7 responses (100%)
 - o Experience of receiving CRNA: 5 responses (71%)
 - o Other: 0 responses (0%)
 - When providing hand-off report, all responding participants (7/7) considered the length and type of case and the majority (5/7) considered the receiving anesthesia provider's level of experience.

Appendix Q: CRNA Post-Implementation Survey Results

Post-Implementation Survey Results (n=7)

1. Over the past two weeks, how many times did you use the PATIENT Mnemonic when transferring care to a receiving anesthesia provider?
 - 7 responses
 - o 0 times: 2 responses (29%)
 - o 5 times: 3 responses (43%)
 - o 8 times: 1 response (14%)
 - o 15 times: 1 response (14%)
 - Only 71% (5/7) of responding participants utilized the PATIENT Mnemonic during the implementation period. Of those who did, the hand-off tool was utilized by each approximately 8 times.

2. I found the PATIENT Mnemonic:
 - a. Easy to use:
 - 7 responses
 - o Strongly disagree: 0 responses (0%)
 - o Disagree: 0 responses (0%)
 - o Neutral: 0 responses (0%)
 - o Agree: 4 responses (57%)
 - o Strongly agree: 3 responses (43%)
 - All responding participants (7/7) found the PATIENT Mnemonic to be easy to use.

 - b. A more efficient way of organizing the material to communicate:
 - 6 responses
 - o Strongly disagree: 0 responses (0%)
 - o Disagree: 0 responses (0%)
 - o Neutral: 0 responses (0%)
 - o Agree: 4 responses (67%)
 - o Strongly agree: 2 responses (23%)
 - All responding participants (6/6) found the PATIENT Mnemonic to be an efficient way of organizing material they were communicating.

 - c. A more comprehensive way of organizing the material to communicate:
 - 6 responses
 - o Strongly disagree: 0 responses (0%)
 - o Disagree: 0 responses (0%)
 - o Neutral: 0 responses (0%)
 - o Agree: 4 responses (67%)
 - o Strongly agree: 2 responses (33%)
 - All responding participants (6/6) found the PATIENT Mnemonic to be a comprehensive way of organizing material they were communicating.

 - d. Appropriate in length:
 - 6 responses
 - o Strongly disagree: 0 responses (0%)
 - o Disagree: 1 responses (17%)
 - o Neutral: 1 responses (17%)
 - o Agree: 2 responses (33%)
 - o Strongly agree: 2 responses (33%)
 - The majority of participants (4/6) found the PATIENT Mnemonic to be appropriate in length.

- e. More time consuming than my previous hand-off method:
- 6 responses
 - o Strongly disagree: 0 responses (0%)
 - o Disagree: 2 responses (33%)
 - o Neutral: 2 responses (33%)
 - o Agree: 1 responses (17%)
 - o Strongly agree: 1 responses (17%)
 - The number of responding participants that found the PATIENT Mnemonic to be more time-consuming than their previous hand-off method (3/6) was equal to the number of participants that found it to be less time-consuming than their previous hand-off method (3/6).
3. Overall, I was ____ using the PATIENT Mnemonic:
- 6 responses
 - o Very dissatisfied: 0 responses (0%)
 - o Dissatisfied: 0 responses (0%)
 - o Neutral: 1 responses (17%)
 - o Satisfied: 4 responses (66%)
 - o Very satisfied: 1 responses (17%)
 - The majority of responding participants (5/6) were satisfied with using the PATIENT Mnemonic.
4. Please comment on why you would or would not like to adopt the PATIENT Mnemonic into your personal anesthesia practice.
- 6 responses
 - o “Would because it is comprehensive and covers important information.”
 - o “Wouldn’t because it’s not muscle memory and often forget to use the mnemonic.”
 - o “I plan to adopt this mnemonic because it is concise, organized, and incorporates all aspects of anesthesia hand-off.”
 - o “Lengthy overall, but helpful for complex procedures/patients.”
 - o “Organized way of transferring information about patient.”
 - o “I would use it but i forgot about it as soon as i had read about it. Needed reminders / reinforcement to adopt into practice.”
 - The majority of responding participants (5/6) stated that they would be willing to adopt the PATIENT Mnemonic into their personal anesthesia practice.
5. Please describe anything you would change about the PATIENT Mnemonic.
- 5 responses
 - o “Position” [remove]
 - o “Position is not necessary”
 - o “Add patient pertinent medical history”
 - o “Less words represented for each letter and more patient/procedure focused”
 - o “It’s a good mnemonic but several letters have multiple items, it’s more like a ppaatient mnemonic”
 - All responding participants (5/5) recommended that the number of words associated with each letter of the mnemonic be limited to one, that a medical history could be included, and that patient position would be evident and is therefore unnecessary.
6. Do you think it would be helpful if the department created a department specific hand-off mnemonic?
- 6 responses
 - o Yes: 3 responses (50%)
 - o No: 3 responses (50%)
 - Responding participants were split (3:3) on their support for the creation of a department specific hand-off mnemonic.

7. Are there any barriers that would prevent you from adopting a standardized hand-off mnemonic?
 - 5 responses
 - “No”
 - “No”
 - “None”
 - “Change is hard to overcome”
 - “Inertia and reluctance of staff to adopt it. Entrenched current practice.”
 - The majority of responding participants (3/5) denied barriers to adopting the PATIENT Mnemonic into their personal anesthesia practice, while the remaining responding participants endorsed a reluctance to change.

8. What is your level of support for future use of the PATIENT Mnemonic?
 - 6 responses
 - Low: 0 responses (0%)
 - Medium: 5 responses (83%)
 - High: 1 response (17%)
 - All responding participants (6/6) reported a medium-to-high support for future use of the PATIENT Mnemonic.