

**Standardizing Operating Room to Post Anesthesia Care Unit Patient Handover with
SBAR: A Quality Improvement Project**

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Notes from the Author

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Abstract

Miscommunication between health care providers has been linked to adverse patient outcomes. The implementation of a standardized patient handover tool is supported by regulatory standards of care and promotes improved communication during the patient handover process. The purpose of this quality improvement project was to assess anesthesia providers' and post-anesthesia care unit nurses' perceptions of adequacy of a standardized anesthesia SBAR tool during patient handover from the operating room to post-anesthesia care unit at a partnering facility using confidential pre- and post-intervention surveys. A review of pre-implementation and post-implementation data showed that the participants in the project were satisfied with the standardized patient handover tool. The results demonstrated that the SBAR tool was found to be both efficient and comprehensive by the post-anesthesia care unit nurses and anesthesia providers. The post-anesthesia care unit registered nurses who assessed patient handovers using the standardized patient handover process reported that the SBAR tool allowed critical communication aspects to be addressed. Standardizing anesthesia patient handover from the operating room to post-anesthesia care unit has the potential to provide a more thorough patient handover process which can lead to enhanced patient safety.

Keywords: anesthesia, handoffs, handovers, post-anesthesia care unit

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Section I. Introduction

Background

Miscommunication is one of the most important yet simple components in healthcare that can lead to patient harm. An area where effective communication is critical to patient safety is the patient handover. In fact, in 2006, the Joint Commission's *National Patient Safety Goals* first addressed this key component of patient safety by recommending that all healthcare systems utilize standardized handover procedures to improve communication between providers to increase patient safety (The Joint Commission, 2017). According to the Joint Commission, some of the main factors that lead to communication breakdown during patient handover processes are lack of pertinent information, interruptions, rushed report, and lack of standardization. Standardizing the patient handover process promotes a culture of safety and helps set clear roles and responsibilities during patient transfers, which allows for clearer, more effective communication (Padgett, 2018). Moreover, studies that examined the changes that have occurred after a standardized patient handover tool has been implemented have found that the newer process correlated not only with an improved perception of patient safety but also improved quality of handover and higher staff satisfaction (Moon et al., 2016).

The American Association of Nurse Anesthetists (AANA) addresses patient handover in their standards for practice with their 11th standard (2019), thereby reinforcing the importance of communication during patient handovers. This standard requires nurse anesthetists to communicate the patient's essential information to the healthcare provider receiving the patient to allow continuity of care. While not yet a requirement, standardizing patient handover processes may help anesthesia providers adhere to their professional published practice standards. The Anesthesia Patient Safety Foundation (APSF) has made it their goal to improve

patient safety and prevent harm related to miscommunication during patient handover by promoting the standardization of the patient handover process (Potestio et al., 2015). With more organizations supporting the use of a standardized tool or process for patient handover, more research and quality improvement projects addressing the impact of specific tools and processes on patient handover in the perioperative period can be conducted.

Additionally, a standardized patient handover tool intersects with the Triple Aim by improving the three aspects that must be optimized: quality of patient care, health of populations, and the cost of health care (Institute for Healthcare Improvement, 2020). Preventing miscommunication from occurring during patient handover can help reduce errors that may lead to patient harm, thereby saving the patient and hospital costs from additional fees related to a complicated hospital stay. Despite the operating room not directly contributing to the health of the population on a macro level, by properly and safely communicating pertinent information during handover and avoiding miscommunication complications, the patient may be more likely to adhere to post-operative instructions after a successful surgery once they are discharged and back in the community, thus avoiding further health issues from developing (Grocott, et al., 2019).

Organizational Needs Statement

The Joint Commission (2017) has analyzed data for decades and discovered that breakdowns in communication contribute to the occurrence of sentinel events. Even at high performing academic hospital systems, policies adequately addressing operating room (OR) to post anesthesia care unit (PACU) standardized patient handover processes may not exist. This partnering hospital system has established policies covering patient handovers involving respiratory therapists at change of shift and nurses at change of shift in the behavioral health

setting but does not currently have a written policy regarding patient handovers in the perioperative setting. Currently in practice, the majority of the anesthesia team utilize the SBAR method to guide their patient handover during OR to PACU patient transfers of care. However, lack of standardization in the perioperative area is an issue because this can lead to variability in patient handovers and increase the chance for miscommunication to take place. Therefore, implementation of a standardized handover tool by anesthesia staff has the potential to improve outcomes for patients transitioning from the OR to the PACU as well as improve staff satisfaction regarding the patient handover process.

Problem Statement

Quality communication is vital to patient safety, especially for surgical patients in the immediate post-operative period. Despite this fact, many patient handovers from anesthesia to the PACU can be described as unstandardized, informal, and rushed, which may lead to staff dissatisfaction and increase the risk for patient harm at the partnering facility (Canale, 2018).

Purpose Statement

By implementing a standardized tool for OR to PACU patient handover, the communication between the anesthesia providers and PACU staff may be enhanced and lead to an improvement in the quality of patient information exchange as well as higher staff satisfaction regarding patient handover. The purpose of this project was to assess anesthesia providers' and PACU nurses' perceptions of adequacy of the SBAR for anesthesia checklist during patient handover from the operating room to PACU.

Section II. Evidence

Literature Review

The purpose of this literature review was to examine current studies and recommendations addressing the standardization of patient handover processes, especially those related to post-operative patient handover delivered by anesthesia providers. Searches were conducted using the databases Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and ProQuest Search as well as the search engine Google Scholar. The Boolean operators AND and OR were used to combine various keywords, MeSH terms in PubMed, and subject headings in CINAHL and ProQuest Search. Searches were limited to publication in the most recent five years (2015-2020) and English language. Keywords included patient handover, patient handoff, anesthesia handoff, operating room, post anesthesia care unit, and communication. See Appendix A for a list of the keywords, MeSH terms, and subject terms utilized in searches.

The literature search identified multiple articles pertinent to post-surgical patient handover. See Appendix B for search strategy and number of articles found and kept. Based on Melnyk and Fineout-Overholt's (2015) levels of evidence hierarchy, the evidence identified was primarily level 3 (nonrandomized quasi-experimental studies), level 5 (systematic reviews of studies), and level 6 (qualitative/descriptive studies), respectively. Other sources, such as the AANA organization and personal communication were used to retrieve information regarding current and evidence-based practices as well. These would be considered level 7 (expert opinion) on the evidence hierarchy.

Current State of Knowledge

The literature search revealed that while there are guidelines suggested by the Joint Commission (2017) and the AANA (2014) about implementing a standardized patient handover in the perioperative setting, there is no consensus on the best tool or checklist to use. Overall, studies have found that successful standardization of a patient handover process should be based on the input from staff and key stakeholders in the area in which the process is to be implemented and that any tool/checklist chosen should be modified to fit the needs of those involved in the patient handover (Canale, 2018; Rose et al., 2019). However, even with successful standardization of patient handover, these studies and the findings are limited, and the majority suggest that more research is needed to assess long-term benefits and changes as a result of standardized patient handover (Moon et al., 2016; Müller et al., 2018). Ultimately, when patient handover incorporated a standardized process, there were strong correlations with improved staff satisfaction, quality of patient handover, and improved communication; nevertheless, more research is needed to conclude which method of standardized patient handover is the most beneficial.

Current Approaches to Solving Population Problem

The identified literature varied in the methods and protocols used to standardize the patient handover process. Consistently recurring standardized approaches included the following: cognitive aids, mnemonics, and/or checklists (Rose et al., 2019). Many studies incorporated different tools or developed a completely new tool based on the input from their pre-intervention assessment of the currently unstandardized patient handover process (Canale, 2018; Robinson, 2016; Rose et al., 2019).

For cognitive aids and mnemonics, the aids generally included visual reminders of the new standardized mnemonic in the PACU bays so that both the receiver and sender of information could quickly refer to the cognitive aid at any given time during the patient handover. Moon et al. (2016) incorporated a bundled intervention that included a cognitive aid as well as an “I PUT PATIENTS FIRST” mnemonic and was successful with improving staff satisfaction and effectiveness of patient handover after utilizing the standardized process for the OR to intensive care unit transfers in a large teaching hospital.

In comparison to the bundled intervention approach, Segall et al. (2016) conducted a successful study utilizing a human-centered design approach and adjusting the patient handover process based on multiple interviews with the staff involved, focus groups, survey comments, and observational data. The researchers then took this information and incorporated it into a cognitive aid for the nurse receiving the patient to make notes on, and created large posters displaying reminders of key components for the sending providers to discuss for every post-operative patient (Segall et al., 2016). It has been shown that PACU RNs are typically multitasking while receiving patient handover and can forget important patient details after report is finished. This opportunity for error can be at least somewhat alleviated by utilizing a cognitive aid tool, allowing the PACU RN to have something to refer back to after report is finished (Randmaa et al., 2015).

Throughout the identified literature, it was noted that checklists were often incorporated with cognitive aids in many nonrandomized quasi-experimental and qualitative studies, as well as utilized alone (Rose et al., 2019). By using checklists to standardize patient handover, critical patient information was more consistently addressed during the handover process and studies found that the number of interruptions and distractions was also limited-- putting more attention

on the information being exchanged and improving the quality of information exchange (Lopez-Parra et al., 2020; Potestio et al., 2015). In conclusion, cognitive aids, mnemonics, and checklists have been shown to increase efficiency and remind both the sender and receiver participating in the patient handover process of the important patient details.

A key element that varied between studies standardizing patient handover was the approach to implementation of the standardized tool. Prior to execution of the new standardized process, investigators in many of the studies discussed the patient handover process with staff members and key stakeholders to ensure the tool being used was adequate and concise for their perioperative area (Canale, 2018; Robinson, 2016; Rose et al., 2019). Many of the quality improvement projects and quasi-experimental studies implemented specific patient handover tools based on feedback from the staff and organizational needs, see Appendix C for literature matrix. A number of studies included staff education on the significant value of standardizing patient handover to help reinforce the importance of evidence-based practice (Rose et al., 2019). Some studies, such as Segall et al. (2016), then adjusted the standardized handover process further, based upon feedback from the staff, and continued to improve upon the handover procedure as needed. Overall, the approach and tools used to successfully standardize the patient handover process varied somewhat with each study.

Evidence to Support the Intervention

The SBAR (Situation, Background, Assessment, Recommendation) mnemonic was selected for implementation in the OR to PACU patient handovers within the partnering organization as part of this quality improvement project. Studies have shown that using SBAR for OR to PACU patient handovers correlates with improved communication, perception of a safer environment for the patient, and a more logical process of handover (Leondardsen et al.,

2019; Randmaa et al., 2015). The specific SBAR for anesthesia checklist utilized was created with input based on an interdisciplinary committee that established the SBAR handoff checklist and implemented in a quality improvement project by Halterman et al. (2019) in which it was found to reduce vital patient information omission during OR to PACU patient handover.

In 2018, Müller et al. conducted a systematic review on SBAR being used in patient handovers and found moderate evidence to support patient safety. While patient safety and outcomes were not analyzed during the implementation of this quality improvement project, it is always a goal for healthcare providers and the hospital system to prioritize patient safety and ultimately provide the safest care possible. Additionally, both the AANA (2014) and the Institute for Healthcare Improvement (2020) suggest using the SBAR mnemonic tool to improve communication during patient handover. The SBAR mnemonic is simple and can be easily adjusted for each patient if more or less information should be provided during patient handover. By using this adaptable tool, critical patient information is communicated without extraneous details and staff receiving the information are better able to process and remember the information since it is in a consistent order for each patient (Robinson, 2016).

Evidence-Based Practice Framework

Identification of the Framework

Lewin's planned change theory was used to inform this quality improvement project and utilized to effectively incorporate standardized patient handovers from the anesthesia team to the PACU. This theory involves three phases: unfreezing, implementing the changes and moving to a new state, and refreezing with the change implemented (Lewin, 1951).

In the unfreezing phase of Lewin's planned change theory, organizational members and those utilizing the standardized handoff tool needed to augment the driving forces to help offset

the restraining forces. The unfreezing phase included providing education to involved staff about the evidence regarding standardized handover tools and communication, promoting teamwork, and motivating the staff to keep the focus on improving patient safety. The movement phase consisted of the implementation of the new handover policy and process. Finally, the refreezing phase would be when the standardized handover was officially assimilated into the healthcare organization. After the refreezing time period, the planned change should be analyzed for areas of improvement. In the end, while change may be uncomfortable and difficult at times, the results can lead to better outcomes and goal attainment for the organization as a whole.

Ethical Consideration & Protection of Human Subjects

This quality improvement project involved no patients or collection of patient data. It involved only data collected confidentially from the Certified Registered Nurse Anesthetist (CRNA) volunteers that viewed the informational PowerPoint and utilized the standardized tool. There was no more than minimal risk to participants associated with this project as the information and processes fell within usual practice in the hospital organization. Identified risk included the potential for slight additional stress due to change in process and possibly extra time needed for patient handover.

This quality improvement project, deemed exempt from full review, was approved through a process created in conjunction with the East Carolina University and Medical Center Institutional Review Board (IRB) and the partnering organization (See Appendix D). Additionally, as the project leader, I prepared for the formal approval process by completing the Collaborative Institutional Training Initiative (CITI Program) educational modules on research ethics and compliance in August of 2020 prior to beginning this project.

Section III. Project Design

Project Site and Population

Description of the Setting

The site for this quality improvement project was a small hospital in North Carolina with approximately 100 beds that serves a community of 40,000 residents. The site has a total of seven rooms designated for anesthesia and surgical procedures. The project took place in the post anesthesia care unit during the perioperative patient handover from the operating room.

Description of the Population

The study population was composed of CRNAs and PACU nurses. The population of anesthesia providers at the partnering facility is small, which led to just four anesthesia providers available to volunteer to participate in the project. The global pandemic of COVID-19 was an unanticipated barrier to recruiting and interacting in person with the project participants. Individual resistance to change from those that chose not to participate was a potential barrier to the success of this project. Furthermore, a busy environment with loud alarms and staff being distracted and rushed during patient handover may have led to difficulty in embracing a process change due to lack of time and pressure from the operating schedule. This may, however, also have facilitated and increased willingness of staff to embrace a new streamlined approach to patient handovers that sets clear roles and responsibilities which may be less prone to human error. Additionally, the staff understanding the importance of quality communication during report after receiving education from the PowerPoint presentation may have greatly motivated the participants to utilize a standardized patient handover tool. Another aspect that facilitated the project was the participants at the site being familiar with the SBAR mnemonic.

Project Team

The project team consisted of the student registered nurse anesthetist (SRNA) acting in the role of team leader, a CRNA clinical faculty member who provided support in the clinical area and helped recruit participants, a CRNA faculty member who is the program director and served as project chair, and a CRNA from the facility who served as the site representative. An additional registered nurse faculty member supported project development and implementation processes. Initial development of the project was performed with three other students investigating the same issue but with different locations and different participants.

Project Goals and Outcome Measures

The goal of the project was to assess the anesthesia providers' and PACU nurses' perceptions regarding the adequacy of the SBAR for anesthesia standardized checklist. The outcome measures included participant perceptions of, and satisfaction with, the patient handover process and the quality of information exchange during patient handover from the operating room to the post-anesthesia care unit. Changes in perceptions from pre-intervention surveys to post-intervention surveys were used to evaluate perceived adequacy of the standardized patient handover tool in the perioperative area of the partnering facility.

Description of Methods and Measurement

This quality improvement project utilized a pre-/post-survey methodology to complete a single Plan-Do-Study-Act (PDSA) quality improvement cycle (Langley et al., 2009) to assess staff perceptions of the SBAR for anesthesia checklist for OR to PACU patient handover. A pre-intervention Qualtrics survey (see Appendix E) was used to gather participant perceptions of their existing process. After the implementation process of the new standardized patient handover SBAR for anesthesia checklist, a post-intervention Qualtrics survey was used to gather

the staff perceptions of adequacy of this tool. By utilizing Likert-type scales, the CRNA Qualtrics surveys were used to assess staff perceptions of efficiency, comprehensiveness, length, time, and communication errors related to the patient handover process; aspects to help determine adequacy of the handover tool. Additionally, recurring themes were identified from the anesthesia members' open-response answers to "Why would you/would you not like to adopt this tool in your personal anesthesia practice?"; "Please describe anything you would like to see changed in the handover tool"; and "Are there any barriers that would prevent you from adopting a standardized handover tool?"

To assess the adequacy of the SBAR for anesthesia checklist, the PACU nurse post-intervention surveys asked whether or not the anesthesia provider addressed important aspects of the patient's information, including: the patient's identification, allergies, antibiotics, intake/output, estimated blood loss, pain management, nausea management, and any concerns that might affect PACU care. Moreover, the PACU nurse post-intervention assessment also included perception of efficiency and comprehensiveness of the SBAR for anesthesia checklist using yes/no questions as well as questions about the need to clarify information after the transfer of the patient and if they-- as a PACU staff member-- would like to see the SBAR for anesthesia checklist in the future (See Appendix F).

Discussion of the Data Collection Process

The data collection process utilized the previously discussed confidential pre-intervention and post-intervention surveys completed by the CRNA participants using Qualtrics survey software. The anesthesia provider participants were provided electronic links to the Qualtrics surveys by email and the-PACU nurse participants were provided print surveys by the anesthesia provider participants upon patient transfer. Surveys for the PACU nurses were printed on the

back of cards containing the SBAR patient handover tool. These cards were given to the PACU nurses by the participating anesthesia providers when they delivered report using the tool. If the PACU nurse chose to participate in the project, they completed the form and placed it in a locked box located in the PACU. These completed survey cards were collected at the end of the project implementation period.

Implementation Plan

The pre-intervention data were collected from Qualtrics surveys distributed through email to the participating CRNA volunteers. Along with the survey link, the emails contained a video explaining the purpose for the quality improvement project and presenting evidence-based information on the importance of a standardized patient handover tool. Lastly, the email provided information on the SBAR for anesthesia checklist and SBAR checklist itself so that while providing report during patient handover the user had a convenient reference (See Appendix G for SBAR for anesthesia checklist). The implementation occurred over a two-week time period. Each anesthesia provider participating in the project utilized the SBAR for anesthesia checklist to provide patient information during handover from OR to PACU. The PACU nurse receiving the patient was asked to complete a short survey after each handover that used the SBAR for anesthesia checklist. After the two-week time period, the anesthesia providers participating in the quality improvement project received another email containing a link to the post-intervention survey and were asked to complete this survey to conclude their portion of the project.

Timeline

The timeline of the project extended over the course of a year (see Appendix H). In the fall of 2020, a review of existing literature was conducted. Based on findings from this review, a

tool with strong evidentiary support and a good fit with the partnering hospital's existing handover process was selected. In the spring of 2021, the design of the project was finalized, surveys created, and approval obtained from the partnering organization without full IRB required. In June of 2021, the CRNA participants were emailed and invited to take the pre-intervention survey. Approximately 3 days later, the project was implemented for ten days. During implementation, data collection for PACU RNs was conducted after every report that utilized the SBAR for anesthesia checklist. After implementation, CRNA participants were emailed with a link to the post-intervention survey. The pre- and post-intervention CRNA surveys were available for a week following the end of project implementation, and then data analysis was conducted. After data was analyzed, results were displayed on a project poster and presented in November of 2021.

Section IV. Results and Findings

Results

After the pre-intervention Qualtrics survey was provided via email, data collection began. Data collection was conducted throughout the ten-day implementation period, after which the post-intervention Qualtrics survey sent out through a link via email to the CRNA participants and available for up to a week after the project implementation was completed. Three out of four CRNA participants completed the pre-intervention Qualtrics survey, three out of four CRNA participants completed the post-intervention Qualtrics survey, and there were 20 completed PACU RN surveys assessing patient handovers delivered by the CRNA participants utilizing the SBAR tool.

Analysis

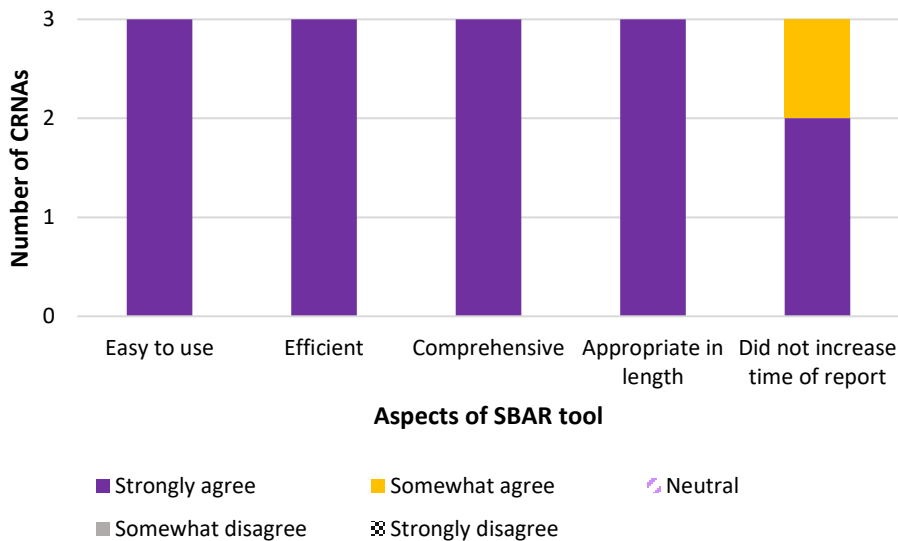
The pre-intervention Qualtrics survey results demonstrated that while two out of three anesthesia providers use a systematic way of providing report during post-operative patient handover, all providers in the department do not utilize a standardized tool. The CRNAs participating in the study all agreed that their current handoff was efficient (two strongly agreed, one somewhat agreed), comprehensive (two strongly agreed, one somewhat agreed), and that they were satisfied with their current transfer of patient care process (two strongly agreed, one somewhat agreed). In regard to the current handoff process lending itself to communication errors, the CRNA answers varied: one strongly disagreed, one neither agreed/disagreed, and one somewhat disagreed.

The CRNA providers participating in the study utilized the SBAR for anesthesia checklist during patient handover between 10-30 times (average of 18 times) during the ten days that the project was implemented. In the post-intervention survey sent after the project implementation

period, the CRNAs in the study reported finding the tool easy to use, efficient, comprehensive, appropriate in length, and did not appreciably increase the time needed to give PACU report (see Figure 1). In addition, the post-intervention Qualtrics survey assessed CRNA satisfaction with the SBAR for anesthesia checklist and level of enthusiasm for future use. The CRNA participants responded that they were “very satisfied” or “somewhat satisfied,” and that they were “very enthused,” “somewhat enthused,” or “neutral”. One CRNA agreed that the tool lends itself to communication errors, but the other CRNAs strongly disagreed with the statement. The open response question asking if there are any barriers that would prevent the CRNA from adopting the standardized handoff tool only had one response and the answer was “no.”

Figure 1

CRNA Post-Intervention Assessment of SBAR for Anesthesia Checklist



Note. $N = 3$.

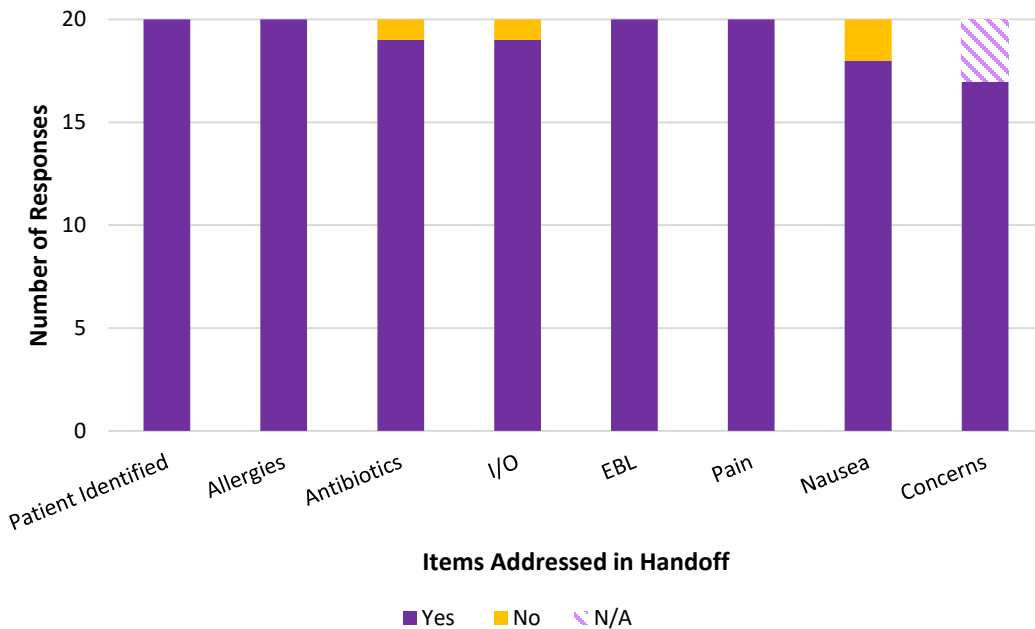
Moreover, the CRNAs (2) that completed the open-response question asking for comments regarding why they would/would not adopt the SBAR for anesthesia checklist in their

personal anesthesia practice responded that they already utilize SBAR in their practice for patient handovers to PACU.

The PACU nurses' post-intervention survey (they were not provided with a pre-intervention survey) addressed whether or not various items from the SBAR for anesthesia checklist had been included in the report they received from the CRNA in a single patient handoff report (See Figure 2). The results demonstrated that while using the SBAR for anesthesia checklist the patient was identified every time and that allergies, antibiotics, intake and output, estimated blood loss, pain management, nausea management, and concerns were addressed majority of the time (see Figure 2). In addition, the PACU nurse post-intervention survey assessed whether or not essential information was missing from report when the SBAR for anesthesia checklist was used. All PACU surveys reported no essential information was missing. Additionally, all PACU nurse responses (20) were "yes" they would like to see the SBAR for anesthesia checklist used in the future.

Figure 2

PACU Nurses Assessment of Items Addressed in Handoff Using SBAR for Anesthesia Checklist



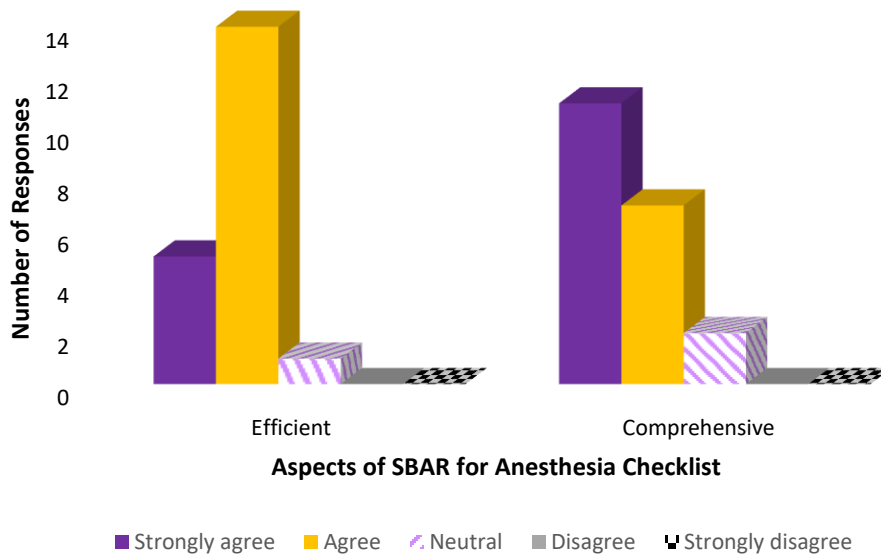
Note. $N = 20$ surveys completed. I/O= intake and output; EBL= estimated blood loss; Pain = pain management; Nausea = nausea management; Concerns = any major concerns that might affect PACU care addressed.

The PACU nurse survey also assessed the nurses' perceptions of the SBAR for anesthesia checklist in regard to efficiency and comprehensiveness, in which majority of the time the nurses found the SBAR for anesthesia checklist efficient and comprehensive (see Figure 3). The PACU nurses were also asked to share their level of enthusiasm for future use of the SBAR for anesthesia checklist by CRNAs for patient handover on a scale ranging from strongly enthused to strongly not enthused. Half of completed surveys (10) reported being enthused or strongly enthused, while the other half (10) chose neutral to rate their level of enthusiasm regarding future use of this tool. Responses were mixed regarding whether or not PACU RN participants felt the

SBAR tool increased time needed to receive report, although the majority of responses (14) reported being neutral or in agreement with the statement that “The SBAR tool did not increase time needed to receive report.”

Figure 3

PACU Nurses Assessment of SBAR for Anesthesia Checklist



Note. $N = 20$ surveys completed. Answered in response to “Using this tool contributed to an efficient handoff” and “Using this tool contributed to a comprehensive handoff.”

Comparing pre-intervention and post-intervention data for the CRNAs shows that there was not significant change between the satisfaction levels prior to and during implementation of the SBAR for anesthesia checklist; however, the survey responses demonstrate that the CRNAs were satisfied overall with the SBAR for anesthesia checklist. Based on the responses from both the CRNAs and PACU nurses, the majority had the opinion that the SBAR for anesthesia checklist was efficient and comprehensive. Additionally, there may be potential for future use of

the SBAR for anesthesia checklist based on the level of enthusiasm from the CRNAs and PACU nurses.

Section V. Interpretation and Implications

Cost Benefit Analysis

As standardized patient handover processes and tools are being researched more, a larger number of healthcare organizations are standardizing patient report and handoff processes. The benefits from standardizing the patient handover process can be substantial, and include improved communication, increased patient safety and outcomes, enhanced information exchange, and improved staff satisfaction for those involved in handover (Keebler et al., 2016). In comparison, the cost of standardizing patient handover exists only in the initial stages of the project's application into policy and procedure.

Reporters that have examined malpractice claims in the United States have found that a substantial number of cases were related to lack of communication in patient handover and that 80% of major adverse events were directly related to patient handover miscommunication (Joint Commission, 2017). Additionally, CRICO Strategies (2019) found that the average cost for defending a malpractice case is approximately \$40,000. With improved communication, patient outcomes can be optimized, and the hospital organization has a large potential to save money from a decrease in adverse patient events.

The cost of completing this quality improvement project involved the cost of purchasing the lock box for PACU nurses to place their completed confidential surveys in a secure location, printing paper for the PACU surveys, and printing the SBAR for anesthesia checklists for the CRNAs to utilize. Total costs were approximately \$40. However, the major costs of implementing the SBAR for anesthesia checklist into practice would involve producing educational posters, visual aids in the PACU to remind staff of the key components of the new process, and salary for those in leadership roles for the hours that they were auditing reports in

the initial roll out of the new handover process. One could estimate the cost of this system wide implementation to be approximately \$1,000. Overall, the cost is minimal compared to the substantial benefits that can be obtained from the utilization of a standardized patient handover tool. Furthermore, the cost of lives lost is unquantifiable, but one life saved by preventing a communication error is obviously worth more than the relatively minor costs of this safety project.

While any change in a hospital organization can be met with resistance from staff, standardizing the patient handover process will not require a substantial amount of effort or cost from the hospital. The reimbursement that will result from standardizing handover is worth the minimal financial burden of the SBAR for anesthesia checklist implementation. If only implementing the project for the OR to PACU patient handovers, it is uncertain what the financial benefit of the improved communication will be; however, estimating just a 5% decrease in malpractice claims for the healthcare organization we can conclude that the standardized handover would lead to saving at least \$10,000 a year after this process is standard. With this estimation, the benefit-cost ratio would be nine-- assuming five claims filed a year-- indicating this safety project would be financially advantageous for the healthcare organization (See Appendix I for cost benefit analysis).

Resource Management

During implementation of the SBAR for anesthesia checklist, few physical resources are needed. However, there is a time aspect that must be examined regarding the initial implementation of the SBAR for anesthesia checklist. Considering that in the beginning of implementing any change in processes/protocol there may be additional time required as the participants involved in patient handover adjust to the new SBAR for anesthesia checklist. This

potential time barrier could be mitigated by incorporating the SBAR for anesthesia checklist into the electronic healthcare record, making it easier for staff to use the tool with it embedded into their familiar electronic charting process. This could further improve the patient handover process as well as time management.

Implications of Findings

The findings from this quality improvement project regarding the standardization of postoperative patient handover from the OR to the PACU setting has many implications for future practice. The use of the SBAR tool in this area helps meet the Joint Commission's *National Patient Safety Goals* (2006) addressed by their recommendation that healthcare systems utilize a standardized handover as well as the APSF goal of standardizing patient handover to improve patient safety (Potestio et al., 2015). By using the SBAR for anesthesia checklist for postoperative to PACU patient handovers, there was efficient and comprehensive communication. The results from the quality improvement project were consistent with previous studies that demonstrated that using the SBAR for anesthesia checklist leads to increased quality of communication and a thorough report during patient handover (Müller et al., 2018; Padgett, 2018).

Implications for Patients

Using a standardized patient handover tool in OR to PACU handovers, in this case SBAR, has been found to improve the quality of communication and key information exchange leading to improved patient safety and overall patient outcomes (Joint Commission, 2017). Patient safety is of utmost important, and by establishing a standardized patient handover process miscommunication can potentially be reduced and patient harm prevented.

Implications for Nursing Practice

The results from this quality improvement project demonstrate that participants were overall satisfied with the SBAR for anesthesia checklist. Studies have shown that standardizing patient handover leads to decreased ambiguity regarding staff roles and expectations, allowing for increased staff satisfaction and improved teamwork (Canale, 2018; Segall et al., 2016). Additionally, Randmaa et al. (2015) found that using SBAR actually led to a psychological empowerment for staff involved in the patient handover process; moreover, Leondarsen et al. (2019) found that a standardized tool resulted in improved staff experience for those participating in the OR to PACU patient handover. Continued use of a standardized handover using the SBAR for anesthesia checklist in OR to PACU patient handovers may lead to similar effects for the staff at this facility, possibly leading to improved staff retention related to increased satisfaction and teamwork. Another important aspect in nursing practice may be decreased patient handover time as the participants become accustomed to the new standardized handover process.

Impact for Healthcare System

Utilizing Lewin's planned change theory (1951) to guide this quality improvement project, the project was conducted in three phases: unfreezing, implementing the changes, and refreezing. Once the project implementation period was completed, the refreezing phase of Lewin's theory began. During and after the time of the refreezing phase, the changes made can be analyzed and adjusted to meet the needs of the healthcare system. In particular, the partnering facility can use the results and feedback from staff to adjust the SBAR for anesthesia checklist and handover process as needed. Lewin's planned change theory (1951) can be applied continuously as the standardized handover process is re-analyzed after each change and

implementation made. The healthcare system, and its patients, will benefit from this quality improvement by having a standardized tool that the CRNA and PACU staff are now familiar and comfortable using in the OR to PACU patient handover. Moreover, the benefit of decreasing costs from preventing adverse events related to communication errors is an added reason for the healthcare organization to continue the use of standardized patient handovers.

Sustainability

The potential for sustaining use of the SBAR for anesthesia checklist in practice at this partnering facility is high. The satisfaction with the tool and level of enthusiasm for future use suggest that the participants in the project would be likely to continue use of the SBAR for anesthesia checklist for handover process. However, additional quality improvement projects would be necessary for long-term sustainability as the tool can be refined as needed to meet the needs of this particular partnering facility based on further feedback from the CRNAs and PACU nurses. Additionally, further feedback from the PACU nurses after using the SBAR for anesthesia checklist in routine practice could be useful for improving the patient handover process.

Dissemination Plan

The dissemination plan for this qualitative improvement project involved a public presentation and upload to an electronic repository. A live poster presentation with a limited audience was hosted at East Carolina University and simultaneously delivered electronically via Zoom. Participants of the study as well as faculty and students in the Nurse Anesthesia Program at East Carolina University were invited to attend. Additionally, this paper is to be posted in The Scholarship, East Carolina University's digital archive for scholarly work which will assure it remains discoverable and available for viewing by others.

Section VI. Conclusion

Limitations

Throughout the different phases of the quality improvement project, there were a variety of limitations encountered. During the planning phase, the COVID-19 pandemic prevented face-to-face interaction with the volunteering participants and prevented the assessment of current handover processes (to analyze change in adequacy of information exchange pre- and post-intervention) at the partnering facility. Being at a smaller facility with limited participants, the sample size was small. Implementation time was also limited to only a ten-day period which prevented acquisition of adequate data for higher level statistical analysis. Additionally, as no pre-intervention data was gathered from PACU nurses, there was no comparison between their perceptions of the usual handover process with the SBAR for anesthesia checklist. There was also no validity testing of the survey questions used in this project.

Recommendations for Others

One recommendation for others interested in this topic would be to assess staff perceptions of the current patient handover process prior to implementing the SBAR for anesthesia checklist to standardize patient handover. By assessing the current patient handover process, the specific organization and staff needs could be analyzed and the appropriate standardized patient handover tool utilized based on these particular communication needs. An additional recommendation would be to extend the project implementation period so that the participants can become more comfortable using the SBAR for anesthesia checklist.

Recommendations for Further Study

Recommendations for further study include utilizing a standardized patient handover tool, such as the SBAR tool, to enhance communication during other anesthesia patient handover

processes such as patient transfer from the OR to the intensive care unit. Overall, the project intensified the awareness of the importance of adequate communication during patient handover but further studies could evaluate the long-term change in utilization of a standardized process for patient handover processes and comparing different standardized patient handover tools to assess for improved communication.

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Appendix A

Keywords, PubMed MeSH, and CINAHL Subject Headings Used for Literature Searches

	Concept		
	Patient handoff	Operating room/Post anesthesia care unit	Communication
Keywords	Patient handover Patient handoff Anesthesia handoff	Operating room Post anesthesia care unit	Communication
PubMed MeSH	Patient handoff	Anesthesia Operating rooms	Communication
CINAHL Subject Headings	Hand off (patient safety)	Post anesthesia care units	Communication skills

Note. Various combinations of the provided keywords, PubMed MeSH terms, and CINAHL subject headings were used to conduct literature searches in PubMed, CINAHL, ProQuest Search, and Google Scholar. Boolean operators were used in different combinations to yield reported search results.

Appendix B

Search Strategy

Search date	Database or search engine	Search strategy	Limits applied	Number of results found	Number of results kept
09/2020	CINAHL	(MH “Hand off (patient safety)”) AND (MH “post anesthesia care units” OR “post anesthesia care”) AND (MH “communication skills”)	5 years (2015-2020) English	200	3
09/2020	PubMed	("patient handoff"[MeSH Terms] OR "patient"[All Fields] AND "handoff"[All Fields]) OR "patient handoff"[All Fields] AND ("operating rooms"[MeSH Terms] OR ("operating"[All Fields] AND "rooms"[All Fields]) OR "operating rooms"[All Fields] OR ("operating"[All Fields] AND "room"[All Fields]) OR "operating room"[All Fields] OR ("anesthesia"[MeSH Terms] OR "anesthesia"[All Fields]) AND ("communication"[MeSH Terms])	5 years (2015-2020) English	122	6
09/2020	Google Scholar	(patient handover OR patient handoff OR anesthesia handoff) AND (operating room OR post anesthesia care unit) AND (communication OR miscommunication)	5 years (2015-2020) English	791 (first ten pages of results reviewed)	6
09/2020	ProQuest Search	(patient handover OR patient handoff OR anesthesia handoff OR anesthesia handover) AND (operating room OR post anesthesia care unit OR PACU) AND (communication OR miscommunication)	5 years (2015-2020) English	2,109 (first ten pages of results reviewed)	7

Appendix C

Literature Matrix of Articles That Addressed Standardized Patient Handover During the Perioperative Period

APA Citation	Level of Evidence (Melnyk and Fineout-Overholt's)	Data/Evidence Findings	Conclusion	Use of Evidence in EBP Project Plan
Canale, M.L. (2018). Implementation of a standardized handoff of anesthetized patients. <i>AANA Journal</i> , 86(2), 137-145. Retrieved from http://search.proquest.com.jproxy.lib.ecu.edu/docview/2028119569?accountid=10639	Level III: Quasi-experimental	P < 0.001-0.003 Statistically significant increases in quality of communication, continuity of information transfer, patient safety perceptions, and staff satisfaction	A standardized handoff of perioperative patients leads to improved quality of handover, increased perception of patient safety, and higher staff satisfaction. While these findings correlate with safe patient care, more studies are needed to measure this specifically	Standardizing handover can lead to improvements in quality of communication, perception of patient safety, and staff satisfaction
Haltermann, R. S., Gaber, M., Janjua, M.S., Hogan, G. T., & Cartwright, S. (2019). Use of a Checklist for the Postanesthesia Care Unit Patient Handoff. <i>Journal of Perianesthesia Nursing</i> , 34(4), 834-841.	Level III: Quasi-experimental	Omitted patient information that decreased with the checklist included: procedure (19% to 2%), allergies (23% to 4%), I&O (16% to 0%), antiemetics used (21% to 4%),	The standardized checklist during PACU handover led to decreased omission of important patient information	Standardizing patient handover with the SBAR handoff checklist can lead to decreased omission of patient information and improved safety

		and IV lines (19% to 11%); Completed handoffs increased from 13% to 82%		
Leondardsen, A., Moen, E. K., Karlsoen, G., and Hovland, T. (2019). A quantitative study on personnel's experiences with patient handovers between the operating room and the postoperative anesthesia care unit before and after the implementation of a structured communication tool. <i>Nursing Reports</i> , 9(1). doi:10.4081/nursrep.2019.8041	Level III: Quasi-experimental	Handover quality perception increased from 82.6% to 93.3%. Perception of quality in handovers improved significantly after implementation of the ISBAR (P=0.001). Personnel's experiences were improved in relation to that handovers followed a logical structure, available documentation was used and all relevant information was communicated (P<0.001). Moreover, personnel found it easier to establish contact at the beginning of the handover, ambiguities were resolved and documentation was more complete (P=0.001).	Structured tools, in this case the ISBAR tool, may increase quality and safety for handovers from the OR to the PACU; more research is needed to conclude effect of handover quality on patient outcomes	Structured patient handovers using tools for OR to PACU is supported by this study; correlating structured handover tools with quality of patient handover and improved staff experience

<p>López-Parra, M., Porcar-Andreu, L., Arizu-Puigvert, M., & Pujol-Caballé, G. (2020). Cohort study on the implementation of a surgical checklist from the operating room to the postanesthesia care unit. <i>Journal of Perianesthesia Nursing</i>, 35(2), 155-159. doi: 10.1016/j.jopan.2019.08.015</p>	<p>Level IV: Prospective cohort study</p>	<p>In the pre-intervention stage, 59 transfers were collected; with an average time of 68.5 seconds, 41.7% of the transfers encountered interruptions, and only 8.5% of the reports were complete with all data. After implementing the checklist, 63 transfers were analyzed with an average time of 96.4 seconds, no interruptions occurred in 71.3% of the transfers, and all the items were transmitted in 92.1% of the cases. Number of interferences decreased. Transfer time increased significantly, but 80.3% of staff found the checklist useful.</p>	<p>A structured and written checklist decreased the loss of important patient information, which can lead to improved patient safety</p>	<p>Evidence supports using standardized patient handovers to help improve communication and decrease loss of valuable patient information</p>
<p>Moon, T. S., Gonzales, M. X., Woods, A. P., & Fox, P. E. (2016). Improving the quality of the operating room to intensive care unit handover at an urban teaching hospital through a bundled</p>	<p>Level III: Prospective interventional study</p>	<p>Anesthesia and ICU staff satisfaction and perceived effectiveness of patient handover showed a significant increase; The nursing</p>	<p>The increase in OR and ICU satisfaction and efficacy after implementation of bundle correlates with an improved process.</p>	<p>Supports project by providing evidence that standardized patient handover can improve quality of handover, lead to improved patient</p>

<p>intervention. <i>Journal of Clinical Anesthesia</i>, 31, 5-12. doi:http://dx.doi.org.jproxy.lib.ecu.edu/10.1016/j.jclinane.2016.01.001</p>		<p>satisfaction with phone report received from anesthesia staff directly improved significantly; The mean level of satisfaction with OR to ICU note was not significant.</p>	<p>While an improved quality of handover process can contribute to improved patient outcomes, more research is needed to assess this aspect.</p>	<p>outcomes, and increase staff satisfaction</p>
<p>Müller, M., Jürgens, J., Redaelli, M., Klingberg, K., Hautz, W. E., & Stock, S. (2018). Impact of the communication and patient hand-off tool SBAR on patient safety: a systematic review. <i>BMJ Open</i>, 8(8). doi: 10.1136/bmjopen-2018-022202</p>	<p>Level I: Systematic review</p>	<p>26 different patient outcomes were measured, of which 8 were reported to be significantly improved. 11 were described as improved but no further statistical tests were reported, and 6 outcomes did not change significantly. Only 1 study reported a descriptive reduction in patient outcomes.</p>	<p>Review found moderate evidence for improved patient safety through SBAR implementation, especially when used to structure communication over the phone. However, there is a lack of high-quality research on this widely used communication tool.</p>	<p>Using SBAR correlates with improving patient safety</p>
<p>Padgett, T. M. (2018). Improving nurses' communication during patient transfer: A pilot study. <i>Journal of Continuing Education in Nursing</i>, 49(8), 378-384. doi:10.3928/00220124-20180718-09</p>	<p>Level III: Quasi-experimental pretest–posttest design</p>	<p>“Good” communication increased from 48% on presurvey to 85% on postsurvey. Theme of not receiving a thorough report and not using, SBAR poor communication decreased from 40% to 29%.</p>	<p>Uses SBAR during patient handover potential to increase patient safety and decrease poor quality of communication; improve patient safety can lead to decrease in hospital cost</p>	<p>SBAR correlates with an increase in quality of communication and thorough reports during patient handover</p>

<p>Randmaa, M., Martensson, G., Swenne, C.L., and Engstrom, M. (2015). An observational study of postoperative handover in anesthetic clinics: the content of verbal information and factors influencing receiver memory. <i>Journal of Perianesthesia Nursing</i>, 30(2), 105-115. doi: 10.1016/j.jopan.2014.01.012</p>	<p>Level III: Prospective interventional study</p>	<p>In the intervention group, there were statistically significant improvements in the factors 'Between-group communication accuracy' (p=0.039) and 'Safety climate' (p=0.011). The proportion of incident reports due to communication errors decreased significantly (p<0.0001) in the intervention group, from 31% to 11%.</p>	<p>Using SBAR was associated with improvement in staff member's perception of communication between professionals and their perception of a safe environment. Also found that there was psychological empowerment for staff. In addition, decreased proportion of incident reports related to communication errors.</p>	<p>SBAR correlates with an increase in perception of improved safety, improved communication, and decreased communication errors</p>
<p>Robinson, N.L. (2016). Promoting patient safety with perioperative hand-off communication. <i>Journal of Perianesthesia Nursing</i>, 31(3), 245-253. doi: 10.1016/j.jopan.2014.08.144</p>	<p>Level III: Quasi-experimental</p>	<p>Increases in interactive handoff, opportunity for questions during report, patient ID verification, important patient information review, medical history review, and intraoperative position post-intervention. The results of this evidence-based practice change demonstrated a statistically significant difference between the hand-off observation and/or audit criteria</p>	<p>Evidence-based perioperative hand-off communication facilitates expedited patient evaluation, rapid interventions, reduction in adverse events, and a safer perioperative environment</p>	<p>Standardizing the patient handover process is supported by this study, showing improvements in a number of factors that can lead improved patient safety</p>

		pre-implementation and post-implementation. A substantially higher post-implementation hand-off criterion was achieved. This finding indicated that the standardized hand-off process and the use of Perioperative PEARLS improved the effective transfer of essential patient information and compliance with regulatory hand-off communication standards		
Rose, M. W., Newman, S., and Brown, C. (2019). Postoperative information transfers: an integrative review. <i>Journal of perianesthesia nursing : official journal of the American Society of PeriAnesthesia Nurses</i> , 34(2), 403–424.e3. https://doi.org/10.1016/j.jopan.2018.06.096	Level V: Review of literature	Seventeen articles were identified. Instruments described in the articles were tabled and synthesized based on a priori categories described by the Donabedian conceptual model.	Developing an instrument to improve postoperative handover should integrate recommendations from key stakeholders, include evidence-based practices, and reference information from existing instruments.	Results were considered during development of quality improvement project; the SBAR patient handover tool was chosen based on recommendations from key stakeholders and is supported by evidence-based practice
Segall, N., Bonifacio, A. S., Barbeito, A., Schroeder, R. A., Perfect, S. R., Wright, M. C., . . . Mark, J. B. (2016). Operating room-to-ICU patient handovers: a	Level III: Prospective study	The new handover process was successful in improving perceived teamwork, decreasing workload on staff, and	Human-centered design approach incorporated in the patient handover process may improve	Standardized patient handover correlates with improved perception of teamwork, decreased workload on staff, and

multidisciplinary human-centered design approach. <i>The Joint Commission Journal on Quality and Patient Safety</i> , 42(9), 400–414. doi: 10.1016/s1553-7250(16)42081-7		increasing staff satisfaction with patient handover. The study did not find significant change in information transfer or number of interruptions during handover despite new process	quality of OR to ICU handovers	increased staff satisfaction
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Note. Levels of Evidence from *Evidence-based practice in nursing & healthcare: A guide to best practice* (3rd ed.) by B. M. Melnyk and E. Fineout-Overholt. Copyright 2015 by Wolters Kluwer Health.

Appendix D

Project Approval Forms

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**Quality Assurance/Quality Improvement Project vs. Human Research Study
(Requiring IRB approval) Determination Form**

This worksheet is a guide to help the submitter to determine if a project or study is a quality assurance/quality improvement (QA/QI) project or research study and is involving human subjects or their individually identifiable information and requires IRB approval as defined by the Health and Human Services (HHS) or Food and Drug Administration (FDA). Once completed, please email the form to the [redacted] Center for Research and Grants [redacted]. A CRG team member will contact you with the results of their review and may request additional information to assist with their determination. The determination will be made in conjunction with the UMCIRB office.

Please contact the [redacted] with any questions at [redacted]

For more guidance about whether the activity meets the definition of Human Subjects Research see <https://rede.ecu.edu/umc/irb/irb-fans/definitions/> or <https://www.hhs.gov/ohrp/regulations-and-policy/decision-charts-2016/index.html#fc1>

Project Title: Assessing anesthesia providers' perceptions of adequacy of postoperative PACU patient handoff communication		
Funding Source: None		
Project Leader Name: Mary-Belle Mikesell/Maura McAuliffe	<input type="checkbox"/> Ed.D. <input type="checkbox"/> J.D. <input type="checkbox"/> M.D. <input type="checkbox"/> Ph.D. <input type="checkbox"/> Pharm.D. <input checked="" type="checkbox"/> R.N. <input type="checkbox"/> Other (specify):	
Job Title: ECU SRNA/ECU CRNA Faculty	Phone: [redacted]	Email: mcauliffem@ecu.edu
Primary Contact (if different from Project Leader): Mary-Belle Mikesell		
	Phone: [redacted]	Email: mikesellm11@students.ecu.edu

Key Personnel/ Project Team members:

Name and Degree:	Department: (Affiliation if other than Vidant)	Email:
Maura McAuliffe, PhD, CRNA, FAAN	ECU Nurse Anesthesia Program	mcauliffem@ecu.edu
Travis Chabo, CRNA	ECU Nurse Anesthesia Program	chabot14@ecu.edu
Mary-Belle Mikesell, SRNA	ECU Nurse Anesthesia Program	mikesellm11@students.ecu.edu

QI/QA Assessment Checklist:

Consideration	Question	Yes	No
PURPOSE	Is the PRIMARY purpose of the project/study to: <ul style="list-style-type: none"> • IMPROVE care right now for the next patient? OR • IMPROVE operations outcomes, efficiency, cost, patient/staff satisfaction, etc.? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RATIONALE 1	The project/study falls under well-accepted care practices/guidelines or is there sufficient evidence for this mode or approach to support implementing this activity or to create practice change, based on: <ul style="list-style-type: none"> • literature • consensus statements, or consensus among clinician team 	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RATIONALE 2	The project/study would be carried out even if there was no possibility of publication in a journal or presentation at an academic meeting. (**Please note that answering "Yes" to this statement does not preclude publication of a quality activity.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
METHODS 1	Are the proposed methods flexible and customizable, and do they incorporate rapid evaluation, feedback and incremental changes?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
METHODS 2	Are patients/subjects randomized into different intervention groups in order to enhance confidence in differences that might be obscured by nonrandom selection? (Control group, Randomization, Fixed protocol Methods)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
METHODS 3	Will there be delayed or ineffective feedback of data from monitoring the implementation of changes? (For example to avoid biasing the interpretation of data)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
METHODS 4	Is the Protocol fixed with fixed goal, methodology, population, and time period?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
RISK	The project/study involves no more than minimal risk procedures meaning 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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PARTICIPANTS	Will the project/study only involve patients/subjects who are ordinarily seen, cared for, or work in the setting where the activity will take place?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FUNDING	Is the project/study funded by any of the following? <ul style="list-style-type: none"> • An outside organization with an interest in the results • A manufacturer with an interest in the outcome of the project relevant to its products • A non-profit foundation that typically funds research, or by internal research accounts 	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If all of the check marks are inside the shaded gray boxes, then the project/study is very likely QI and not human subject research. Projects that are not human subject research do not need review by the IRB.

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In order to assess whether your project meets the definition of human subject research requiring IRB review or may qualify as a quality improvement/assurance activity, please provide the following information:

1. **Project or Study Summary:**

As a separate attachment, please provide a summary of the purpose and procedures as well address all of the following:

- a) The project question/hypothesis.
- b) The project design.
- c) Any interaction or intervention with humans.
- d) A description of the methods that will be used and if they are standard or untested.
- e) Specify where the data will come from and your methods for obtaining this data -please specify who/where (i.e. CRG will provide you with the data, or someone from a specific department will provide you with the data, or you will pull it yourself).
- f) Specify what data will be used and any dates associated with when that data was originally collected (i.e. Patient Name, Diagnosis, Age, Sex), *if applicable, please attach your data collection sheet.*
- g) Where will the data (paper and electronic) for your project be stored? Please specify how it will be secured to protect privacy and maintain confidentiality. For paper data, please provide physical location such as building name and room number and that it will be kept behind double lock and key. For electronic data, please provide the file path and folder name network drive where data will be stored and specify that it is secure/encrypted/password protected. If using other storage location, please provide specific details.
- h) Please specify how long data will be stored after the study is complete? (Keep in mind that data collected/generated during the course of the project that includes protected health information (PHI) should have identifiers removed at the earliest opportunity.)
- i) Please specify how the collected data will be used (internal/external reports, publishing, posters, etc.).

Please attach a summary and/or any other additional documentation describing your project

2. If the Primary purpose of your project/study is for QA/QI, have you obtained approval from the operational leader within your department or health system:

- Yes [Please specify here whom and obtain their signature in the signature section below]: [REDACTED]
- No [Contact the appropriate operational leader for approval.]

Please note:

- By submitting your proposed project/study for QA/QI determination you are certifying that if the project/study is established to qualify as QA/QI project, you and your Department would be comfortable with the following statement in any publications regarding this project: "This project was reviewed and determined to qualify as quality improvement by the [REDACTED] Center for Research and Grants."
- If you are submitting a Poster to Media Services for printing, you will need to also submit this Quality Improvement Worksheet or proof of your IRB Application and IRB Approval.
- If the [REDACTED] determines the activity is not human subject research, then any presentation, publication, etc. should not refer to the activity as "human subject research," "exempt research," or "expedited research."
- If you would like the [REDACTED] to verify that a project/study is not human subject research, please provide this form completed with the summary of your activity and any additional information to the [REDACTED] IRG at CRG [REDACTED] and the following will be completed and returned to you for your records.

Mar/9/2021 10:36:47 AM



5/9

NHSR vs. HSR Determination:

- Not Human Subject Research:** The [redacted] has determined that based on the description of the project/study, approval by the IRB is not necessary. Any changes or modifications to this project may be discussed with the [redacted] at that time to ensure those changes do not elevate the project to human research that would need IRB approval.
- Human Subject Research:** This project/study requires review by the IRB prior to initiation. An application in the electronic IRB submission system should be submitted.

Approval Signatures:

Department (Site) Manager: [redacted]

Date: 3/1/2021

[redacted]

Date: _____

UMCIRB Office Staff Review: [redacted]

Date: 3-10-21

Appendix E

Qualtrics Surveys

Figure E1. *Pre-Intervention CRNA Survey*

Pre-Intervention CRNA Survey

Do you currently use a systematic way (something you do for all cases) of providing report to the PACU nurses?

- Yes
- No

Do all anesthesia providers in your department use the same standardized handoff tool/checklist/mnemonic to provide report to the PACU?

- Yes
- No

Please mark the answer that best describes the extent to which you agree or disagree with the following statements regarding the transfer of patient care from the OR to the PACU.

	Strongly Agree	Somewhat Agree	Neither Agree/Disagree	Somewhat Disagree	Strongly Disagree
My current handoff process provides an efficient way of transferring information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My current handoff process provides a comprehensive way of transferring information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with the transfer of care process I currently use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The handoff process I currently use lends itself to communication errors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure E2. *Post-Intervention CRNA Survey*

Post-Intervention CRNA Survey

Please estimate how many times over the past two week that you used the SBAR handoff tool when transferring care to the PACU?

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 the OR to the PACU.

I found the SBAR tool to be:

	Strongly Agree	Somewhat Agree	Neither Agree/Disagree	Somewhat Disagree	Strongly Disagree
Easy to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An efficient way of organizing the material to communicate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A comprehensive way of organizing the material to communicate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appropriate in length	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Did NOT appreciably increase time needed to give my PACU report	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lends itself to communication errors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Overall, how satisfied were you with the SBAR handoff tool

- Very Satisfied
- Somewhat Satisfied
- Neither Satisfied/Unsatisfied
- Somewhat Unsatisfied
- Very Unsatisfied

Please comment on why you would/would not like to adopt this tool in your personal anesthesia practice.

Please describe anything you would change about the handoff tool.

If there are any barriers that would prevent you from adopting a standardized handoff tool, please list them here.

What is your level of enthusiasm for future use of this tool?

- Very enthused
- Somewhat enthused
- Neutral
- Somewhat unenthused
- Very unenthused

Appendix F

PACU RN Survey

PACU RN Survey

Were the following areas addressed in the handoff?			
	Yes	No	N/A
Was the patient identified			
Allergies			
Antibiotics			
Intake/Output			
EBL			
Pain management			
Nausea management			
Any major concerns that might affect PACU care addressed			

1) Using this tool contributed to an efficient handoff. (circle one)

Strongly Agree Agree Neutral Disagree Strongly Disagree

2) Using this tool contributed to a comprehensive handoff.

Strongly Agree Agree Neutral Disagree Strongly Disagree

3) Using this tool did not increase time needed to receive PACU report.

Strongly Agree Agree Neutral Disagree Strongly Disagree

4) After the transfer was finished, did you find there was essential information missing from the report?

Yes

No

5) Would you like to see **this** particular handoff checklist used in the future?

Yes

No

6) What is your level of **enthusiasm** for future use of **this** tool?

Strongly Enthused Enthused Neutral Not Enthused Strongly Not Enthused

Appendix G

SBAR for Anesthesia Handoff Checklist

S Situation	<input type="checkbox"/> Patient Name <input type="checkbox"/> Procedure and Diagnosis <input type="checkbox"/> Allergies
B Background	<input type="checkbox"/> PMH <input type="checkbox"/> Significant Labs <input type="checkbox"/> Notable Baseline VS <input type="checkbox"/> • Baseline Neuro Status
A Assessment	<input type="checkbox"/> Anesthesia Type (GETA, LMA, MAC, Regional) <input type="checkbox"/> Medications Given <input type="checkbox"/> Opioids <input type="checkbox"/> Benzos <input type="checkbox"/> Antiemetic <input type="checkbox"/> Antibiotics <input type="checkbox"/> Vasopressors <input type="checkbox"/> Other <input type="checkbox"/> Pain Management Plan <input type="checkbox"/> IVs/Catheters <input type="checkbox"/> I & O <input type="checkbox"/> Surgical or Anesthetic Issues & Concerns
R Recommendation	<input type="checkbox"/> Additional Questions/Comments <input type="checkbox"/> Abnormal Results <input type="checkbox"/> • Pt Destination

Note. PMH = past medical history; VS = vital signs; GETA = general endotracheal anesthesia; LMA = laryngeal mask airway; MAC = monitored anesthesia care; IV = intravenous catheter; I&O = input and output. From “Use of a Checklist for the Postanesthesia Care Unit Patient Handoff,” by R. S. Halterman, M. Gaber, M. S. Janjua, G. T. Hogan, & Cartwright, 2019, *Journal of Perianesthesia Nursing*, 34(4), p. 837 (<https://doi.org/10.1016/j.jopan.2018.10.007>).
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Appendix H**Timeline for Doctor of Nursing Practice Scholarly Project**

Date	Task
August 2020	Topic search for standardized patient handover; standardized tool assigned by topic expert
September 2020	Literature search for evidence to support tool
November 2020	Develop participant surveys
February 2021	Develop educational PowerPoint
March 2021	Recruit participants for the project
June 2021	Project implementation
July 2021	Data analysis
November 2021	Dissemination of findings and poster presentation

Appendix I

Cost Benefit Analysis of Standardizing Patient Handover

	Standardized Handover	Current Practice
Costs		
Employee wages	\$450.00	\$-
Educational posters (paper)	\$300.00	\$-
Handouts (laminated paper)	\$200.00	\$-
Printing and writing ink	\$50.00	\$-
Effort to implement change	\$-	
Malpractice claims	\$200,000.00	\$200,000.00
Benefits		
Direct		
Malpractice claims cost (decrease by 5%)	\$10,000.00	\$-
Indirect		
Staff retention	+	-
Increased reimbursement	+	-
Decreased LOS	+	-
Total	\$(191,000.00)	\$(200,000.00)
BCR	9	0

Note. BCR = benefit-cost ratio. *assuming 5 claims filed per year.