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**QUALITY OF CARE IMPROVEMENT: A PROCESS TO STANDARDIZE
HANDOFF COMMUNICATION BETWEEN ANESTHESIA PROVIDERS AND
POST-ANESTHESIA CARE UNIT NURSES**

A Doctor of Nursing Practice Scholarly Project Proposal

Presented to the Faculty of the

School of Health Sciences

La Salle University

In Fulfillment

Of the Requirements for the Degree

Doctor of Nursing Practice

By

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Doctor of Nursing Practice Program

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Title of Doctor of Nursing Practice Project:

QUALITY OF CARE IMPROVEMENT: A PROCESS TO STANDARDIZE
HANDOFF COMMUNICATION BETWEEN ANESTHESIA PROVIDERS AND
POST-ANESTHESIA CARE UNIT NURSES

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Abstract

Introduction: Transition of care is the process in which sending provider teams and receiving provider teams release the care of the patient from one provider team to the next utilizing a communication process. Review of the literature has identified several different protocols in place to systematize communication among providers, however, there is no standardized instrument or process that encompasses the post-anesthesia transfer of care process. Our project goal is to develop a standardized evidence-based handoff communication instrument to be utilized during the transition of care process between anesthesia care teams to the post-anesthesia care (PACU) teams to improve quality of care.

Methods: Literature review was conducted to search for handoff instruments or protocols utilized during the post-operative communication period between anesthesia providers and post anesthesia care nurses. Database searches included CINAHL, Medline, PubMed, Joanna Briggs Institute EBP database, HAPI, TRIP, ProQuest Dissertations and Theses Global and Cochrane Library. Seventeen studies met inclusion criteria. Directed content analysis was developed from the search, a potential handoff instrument was constructed and electronically sent to a panel of expert reviewers consisting of anesthesiologists, CRNAs, and PACU nurses. The expert reviewers were asked to rate each item of the handoff instrument using a 4-point rating scale. Two questions provided comment boxes for qualitative feedback. A standardized evidence-based handoff instrument to enhance the transfer of care process was reformulated based on expert provider feedback.

Sample and Setting: Survey was sent electronically via email to 22 anesthesia providers and 11 post anesthesia care nurses from a 175- bed hospital in southeastern Pennsylvania. Eleven anesthesia providers and six post anesthesia care nurses completed the survey.

Results: Content validity index was performed for each item in the survey. Content validity (I-CVI) greater than 0.79 was desirable for each item. Thirteen out of the 15 proposed items of the handoff instrument had I-CVIs greater than 0.79, with an S-CVI score of 0.88 indicating high content validity.

Conclusion: Content validity scores for instrument items were deemed valid which aligned with the themes and categories collected from the literature. Overall, the polled providers agree that standardizing the transfer of care process will minimize communication errors and improve patient's quality of care. Future cohorts can assist in the adoption of this handoff instrument as a standard of practice in this healthcare facility.

Key Words: handoff instrument, post-operative communication, transition of care, quality improvement, anesthesia, checklist

A Process to Standardize Handoff Communication Between Anesthesia Providers and Post-Anesthesia Care Unit Nurses

Ineffective communication during healthcare provider handoff and the transition of care process are major threats to patient safety that have led to medical errors and sentinel events including death, permanent or severe harm (The Joint Commission, 2017). The Joint Commission (2017) identified ineffective communication as a contributing factor severe to medical and surgical errors as well as patient death. TJC estimated that out of all preventable medical errors, approximately 80% of those can be attributed to communication failures during the handoff process (TJC, 2012).

Communication failures can occur during any stage in a patient's hospital stay; however, one of the most critical periods is the post-procedure transition of care. Transition of care is defined as the process in which sending providers, including anesthesia care teams, and receiving providers, and post anesthesia care teams, release the care of patients from one provider team to the next (Shah et al., 2019). During this period of transition, it is crucial for anesthesia and post-anesthesia care unit (PACU) providers to ensure accurate and seamless communication to facilitate safe patient care transfer.

Previous studies on transition of care have identified that use of non-evidence-based communication instruments have led to omission or inaccurate transmission of crucial information (Lane-Fall et al., 2018). The Anesthetic Incident Monitoring Study (AIMS) reviewed over 419 cases of events in the post anesthesia care unit (PACU); such events included respiratory problems, cardiovascular problems, and drug errors (Kluger & Bullock, 2002) . Of the 419 events, 14% were exclusively attributed to

communication failures between anesthesia care teams and PACU teams. The primary factor that contributed to these transition of care errors was the lack of a comprehensive and standardized tool to streamline reports between anesthesia care teams and PACU care teams.

The Institute of Medicine (IOM) reported that “it is due to inadequate handoffs that safety often fails first” (Wright, 2013, p. 225). Therefore, effective communication in the form of a standardization handoff instrument may be essential to ensure that pertinent information is exchanged between healthcare providers. In other areas of healthcare, the utilization of transition of care instruments to report patient conditions has led to decreased adverse patient outcomes, decreased medical errors, and increased staff satisfaction scores (Parent et al., 2017).

Problem Statement

Despite the wide use of handoff mnemonics in various healthcare settings a single evidence-based handoff communication process has not been standardized across healthcare organizations. The lack of a standardized handoff process remains despite numerous studies and quality improvement (QI) projects supporting its use in preventing communication errors.

Purpose

The purpose of this project is to develop an evidence-based standardized handoff communication instrument to be utilized in the perianesthesia setting. Instrument development aligning with the Joint Commission safety goals and American Association of PeriAnesthesia Nurses (ASPAN) communication guidelines will standardize this process (TJC, 2012). After validation through expert review of the developed instrument,

later student cohorts along with interdisciplinary teams will test the efficacy and outcomes associated with use of the instrument in clinical practice.

Project Question

This project aims to answer the following question: What are the essential, evidence-based items on a standardized communication hand-off instrument designed to improve patient safety during the transition process between anesthesia care teams and PACU care teams?

Conceptual Definition

A standardized handoff instrument is conceptually defined as an evidence-based, transition of care, post-procedural checklist that structures the communication process between or among providers to exchange pertinent patient and procedural information to promote uniformity and improve quality of care. Effective communication is conceptually defined as a means by which two individuals, or a group of people exchange information in a clear and concise manner without barriers. Transition of care is the process by which the care and responsibility of a patient is released from one care team to another.

Needs Assessment

After several weeks of clinical rotation in a 175-bed hospital in southeastern Pennsylvania, the project directors (PDs) noticed how informal the handoff communication process was between the sending anesthesia providers and the receiving post-anesthesia care (PACU) providers. The PDs observed during this time patient information was dictated on a case-by-case basis with no standardized instrument for the process. Each anesthesia provider reported different information based on what they felt

pertinent to patient care. Specifically, during a witnessed transfer of care event, an anesthesia provider only reported medications used and fluids given. During the time of report the PACU nurse was attaching monitors to the patient and not engaging in the handoff process. After the anesthesia provider released the patient from their care, minutes later the PDs observed the PACU nurse calling the anesthesia provider to answer additional questions to adequately provide safe care to the patient. The PDs have observed this type of transfer of care event on more than one occasion. Based on our findings, PDs spoke with anesthesia providers, education program administrators, and PACU nurses and verified inconsistencies in the handoff communication process identifying the need for standardization.

As discussed in the literature review, several standardized handoff instruments have been created and disseminated among various transfer of care settings, however, long-term use of these handoff instruments is seldom adopted. To summarize the research, current standardized handoff instruments are not user friendly, not intuitive, lend themselves to ambiguous responses and cannot be utilized across care disciplines. Benton, et al., (2020), assessed the usability of a pre-established electronic handoff tool as an initiative to standardize the transfer of care process. The authors found poor compliance of the staff was related to the binary format (yes/no), poor usability due to difficulty for providers to learn and use, as well as frequent system errors (Benton, et al., 2020). Gibney, et al., (2017) found that the utilization of available standardized tools, even those geared toward anesthesia handoff, included nonessential information for an ideal handoff that created confusion and error, which led to its lack of use.

Our DNP project focuses on creating an evidence-based, standardized handoff instrument to be utilized specifically by the anesthesia care teams and post-anesthesia care teams at Einstein Medical Center Montgomery. One of the barriers identified in the research as a reason for noncompliance is the one-sided nature of current handoff tools. These handoff tools are geared toward one discipline disregarding the sending or receiving providers, making the standardized handoff tool not applicable for all teams. Our standardized instrument aims to provide personalization of the post-operative care environment by maintaining the context-specific information exchanged between the anesthesia and post-anesthesia providers. The literature has shown that previous attempts to standardize transfer of care using a handoff instrument had poor uptake because of inadequate distribution and education initiatives. In a recent study from the University of Pennsylvania Hospital (2021), a task force was in charge of “improving hand-over communication and developing, designing, implementing, and sustaining a solution that would support their team members’ hand-over work flow” (Sclafani, 2021). Presently, this task force continues to audit and review data to foster continuous improvement as an ongoing quality control metric. As part of a multi-step initiative, future cohorts can promote long term utilization of our standardized handoff instrument through the creation of a task force as outlined in the aforementioned study.

The use of a formalized handoff communication tool is one essential part of an effective process. The project goal is to develop an evidence-based standardized communication handoff instrument guideline to formalize and standardize the handoff process at this critical point in transition of care. The structure of this plan is explained in detail in Appendix 1: Program Planning Matrix.

Collaboration with Organization’s Leaders

The purpose of our project aligns with the mission statement presented by Einstein Medical Center Montgomery “with humanity, humility, and honor, to heal by providing exceptionally intelligent and responsive healthcare and education for as many as we can reach” (Einstein Healthcare Network, 2021). Einstein Medical Center Montgomery defines exceptionally intelligent as “relentlessly reaching for the most comprehensive and incisive knowledge” (Einstein Healthcare Network, 2021). This aligns with our project goal to create a comprehensive standardized handoff communication instrument to impart knowledge and improve quality of care. A letter was obtained from Einstein Medical Center Montgomery’s administration in support of our project. This letter is included in Appendix K . The PDs identified the project problem initially at Einstein Medical Center Montgomery, however, this issue was witnessed at various clinical rotation sites.

Review of Literature

Search Strategy

The review of literature was conducted by using search terms including handoff tool, post-operative communication, quality improvement, anesthesia, checklist, handoff instrument, transition of care. The terms were utilized to search for articles in CINAHL, Medline, PubMed, as well as Cochrane databases. The search was conducted using literature from 2000 to 2021 to include the most current research. The articles were selected based on compatibility of search terms, relationship to research question, as well as compatible methodology. A narrative and matrix presentation of the literature will be

presented with appraisal of level and quality of evidence using the John Hopkins Nursing Evidence Based Practice Model.

Table of Evidence for Empirical Literature

See Table 1 and Table 2 in Appendix A and B.

Empirical Literature

The Burns' et al (2018) aimed to implement an institution specific OR to PACU patient handoff checklist and to assess its use in a tertiary care teaching hospital. The study design was a prospective, observational pre-post unblinded study that was conducted in a large tertiary center that performs on average 30,000 surgical procedures annually. Study participation was voluntary and only adult PACU handoffs were included. Handoff transfer was done utilizing a facility created checklist, which included; relevant medical history, prior anesthesia complications, allergies, cognitive function, functional status, medications/regional anesthesia provided preoperatively, type of anesthesia and medications used intraoperatively, airways management concerns, antibiotics, venous access, invasive monitoring, fluid totals, critical labs, airway/O2/ventilator settings, postoperative plan and disposition, and primary areas of concern. A three-phase design was utilized. The first phase was pre-intervention and included a 4-week period during which 40 handoff interactions were observed. The second phase was intervention, the educational component of the tool. During phase three sampling was conducted 2-weeks post introduction of the handoff. Sampling was conducted by a researcher that stood in close proximity observing and gathering data using a standardized collection form, which was based on a 10-item score that included identifying the patient, past medical history, allergies, preoperative medications given,

antibiotics, intake and output, estimated blood loss, IV access, pain management, and area(s) of concern. Nursing satisfaction was also assessed by the same observer by asking the PACU nurse whether the handoff was “adequate”. A total of 100 handoffs were observed; 50 in the pre-intervention phase and 50 in the post-intervention phase.

The average handoff score for the pre-intervention group was 50.8% which increased to 89% in the post-intervention group. The average length of time spent on the handoffs increased from 66 to 88.9 seconds. Nursing satisfaction by the ability to initiate patient care without the need to look up additional patient data, went up from 60% to 96%. The limitations of this study included research that was conducted in a single institution, small sample size of the pre- and post- intervention handoffs observed, awareness of the study participants being watched, assessment of nursing satisfaction by using only one question, and difficulty in identifying the utilization of a handoff instrument had a causative effect on outcomes. This research study enriches the current research conducted on OR to PACU handoff processes by assessing anesthesia providers including attending physicians, residents, and certified registered nurse anesthetists, it also adds to the current body of literature on improved outcomes with the implementation of a standardized handoff tool.

The purpose of the evidence-based practice (EBP) project conducted by Canale (2018) was to improve the quality and the consistency of transfer of information, improve patient safety, and increase satisfaction by implementing a standardized handoff procedure during the transfer of care of perioperative patients. Canale (2018) utilized a pre-and post-test quality improvement design that implemented the TeamSTEPPS framework to create a change team piloting the transfer of care project. The sample

included 20 CRNAs who participated in the transfer of care process in an 800-bed regional medical center. Wright's PATIENT mnemonic transfer of care tool was selected, with addition of items including "pacemaker" added under the P portion, and "medications" added to the Anesthetic portion of the tool. The CRNAs completed a pre-intervention survey and a post-intervention survey two weeks after implementation of the tool and educational program. Surveys were conducted using the pilot instrument published by Wright on Examining Transfer of Care Processes in Nurse Anesthesia Practice (2013).

Canale (2018) found that there was a statistically significant improvement post-implementation of the standardized handoff tool, in particular; the number of standardized handoffs performed, satisfaction with the transfer process, appropriateness of the handoff process, whether the handoff process led to fewer mistakes, comprehensiveness of the handoff process, and whether the handoff lends itself to providing effective transfer of important information. Seventy-two percent of CRNAs performed a standardized handoff at least 6 times, and as many as 15 times or more during the 2-week implementation period. Fifty percent of CRNAs reported being satisfied with the transfer process after using the intervention, whereas 67% of CRNAs felt the process was appropriate prior to the intervention. The majority of participants in the post-intervention group related positive aspects of quality, length, format, and satisfaction with the standardized handoff process. Limitations of this study included limited sample size and generalizability, difficulty of coordinating schedules for a large number of anesthesia personnel, limiting the dissemination process to email, and the short duration of time that the study was implemented for. This project demonstrated that

quality of transfer of information and perception of patient safety can be improved with the utilization of a standardized handoff communication tool.

Caruso et al (2015) examined whether the standardized I-PASS method augmented by additional evidence-based components would improve transfer of pertinent patient information and increase PACU nurse satisfaction. This study utilized a prospective cohort design, which was conducted in an academic pediatric hospital that houses 311 beds during the months of October 2012 to May 2013. The study was conducted in two phases; the pre-implementation phase, prior to implementation of I-PASS method, and the post-implementation phase, implementation of I-PASS method. Sampling was conducted by study personnel that observed handoffs and audited them for missing information based on the I-PASS tool in the PACU setting, utilizing either paper or electronic instruments. Forty-one audits were conducted during the pre-implementation phase and 45 during the post-implementation phase. The items that were assessed included; "Patient Information", "OR Nurse Information", "Surgical Information", and "Other Information" and were designated as "Yes", "No", or "N/A". Each member involved in the handoff transfer process was assigned a numerical position, implemented by utilization of colored role cards. PACU nurse satisfaction was assessed utilizing an anonymous paper-based Likert scale survey. Twenty-two PACU nurse satisfaction surveys were completed in the pre-implementation phase, of the 22; 14 surveys in the post-implementation phase were completed.

The Caruso et al (2015) study found that information transfer improved from 49% to 83% after the implementation of the I-PASS method. PACU nurse satisfaction scores also improved based on the sample; the paired mean total score increased from 36 to 44.

Additionally, surgeon presence during the handoff period was also noted to improve. The research team found that handoff time did not significantly increase. The study had multiple limitations including; potential inter-observer variability, utilization of patient information transfer scores in place of patient safety scores, and utilization of an unvalidated survey to assess PACU nurse satisfaction. The results may potentially have been skewed due to other interventions conducted at the same time. Lastly, the small sample size utilized in this study may not have been adequate to produce reliable statistical analysis. This research study supported findings of other research studies of the importance of standardizing the handoff process, however further research needs to be conducted.

A study by Halladay et al (2019) implemented a quality improvement project that used a standardized evidence based electronic handoff tool to improve transfer of information from anesthesia providers to PACU nurses. The handoff tool was introduced in a 186 inpatient bed community hospital in two PACU settings (designated as PACU 1 and PACU 2). In the study, PACU 1 was designated for patients who were admitted post-surgery, under 14 years old, or those who received general anesthesia. PACU 2 was designated for patients discharged after surgery, over 14 years old, and did not receive general anesthesia. One hundred handoffs were observed by the same observer pre-intervention, and 300 observations were performed after introduction of the EMR-based checklist at 3-week and 3-month intervals. Anesthesia providers included CRNAs, Student Registered Nurse Anesthetists (SRNAs), Anesthesiologists, and Anesthesia Assistants. The handoff tool utilized in this study by Halladay et al was a modified version of a PACU handoff checklist used by Potestio et al (2017); items that were

removed included time admitted to the PACU, the American Association of Anesthesiologists (ASA) (2019) physical status number, and patient surgical position. The handoff tool consisted of 21- items primarily based on patient specific and procedural information and included a “closed loop communication” to assess concerns; this tool was implemented into the hospital electronic medical record (EMR) system (Halladay et al., 2019). Nurse satisfaction was assessed using an iPad electronic survey, which contained eight questions using a 5-point Likert scale, following the anesthesia report.

Halladay et al (2019) found that a great percentage of the 21-items in the checklist were addressed in the 3-week and the 3-month time period as compared to the pre-implementation period. PACU 1 showed continued improvement in reporting 7 of 21 items (33.3%) at the 3-month mark as compared to the 3-week mark. Reports on patient’s preoperative activity level and intubation conditions (9.5%) were unchanged from 3-month to 3-weeks for PACU 2. The remaining items of the 21-point handoff tool decreased in reporting at the 3-month mark as compared to the 3-week mark, but remained above the pre-implementation period. Length of time for verbal report was significantly decreased from pre-implementation to 3-weeks post-implementation and 3-months post-implementation. Time for verbal report and EMR generation significantly increased the duration of report both at 3-weeks and 3-months as compared with pre-implementation baseline verbal report time. Scores of the nurse satisfaction survey showed that there was a strong increase in receiving information including who to follow up patient care with and a decrease in the occurrence of distractions interrupting the handoff. Limitations of this study included no “control” condition and the small size of

the convenience sample. The goal of this study is to converge the PACU handoff checklist with the EMR system allowing prepopulation of checklist items reducing time spent on information transfer between anesthesia providers and post-anesthesia care nurses.

The purpose of Lambert and Adams' (2018) study was to create a handoff tool to be used during the transfer of care process between anesthesia and post-anesthesia care providers. The authors designed and implemented the Written Handoff Anesthesia Tool (WHAT) with the goal of improving the quality of communication among these provider groups. The study was a quality improvement project that used a quantitative pre-intervention-post intervention design to test the WHAT. The study was conducted between September and November 2016 in a 350-bed hospital. The study population consisted of 22 CRNAs and 15 PACU RNs. The authors used two methods of data collection, the Anesthesia Handoff Communication (AHC), a survey which was designed by the authors. A second method was the Target Solutions Tool (TST) of Hand-off Communication, which is a tool offered by the Joint Commission Center for Transforming Healthcare. The AHC survey utilized the Qualtrics platform and tracked provider satisfaction. The TST for handoff communication was designed to "measure and analyze the current handoff process, pinpoint reasons for inadequate handoffs, identify methods for improving the handoff process, and reevaluate the handoff process after corrective measures were implemented". The TST was "used to identify the adequacy, barriers, contributing factors, and specific patient data omitted" before and after the implementation of the WHAT. The AHC and TST forms were completed by the study population before and after implementation of the WHAT.

The results of the AHC survey showed a statistically significant increase in satisfaction with handoff communication after the use of the WHAT for both provider groups with results, CRNAs ($P < .001$) and PACU RNs ($P = .001$). The TST program showed an improvement in the defective rate after handoff implementation. At baseline, 60.7% of the CRNA and PACU RN's rated the anesthesia handoff communication as inadequate. After implementation of the WHAT, only 36.4% of the handoffs were rated as inadequate. In addition, χ^2 and Fisher exact test analysis of the TST data was considered inadequate by sending and receiving providers showed a statistically significant improvement ($P < .0001$) of the perception of adequacy of anesthesia handoff communication after the implementation of the WHAT. Limitations of the study included "a sample of convenience, the use of one facility and a possible Hawthorne effect from participants' awareness of being evaluated". Implications for practice include improved provider satisfaction after the implementation of a standardized handoff communication instrument and improved adequacy and accuracy of the information exchanged during the transfer of care process. In accordance with the Joint Commission national patient safety goals for communication and ASPANs guidelines for a transfer of care checklist, this study shows promising data that supports the design and goals of our DNP project.

The purpose of Leonardsen et al., (2019) study was threefold; first, to investigate the experience and quality of patient handovers between the operating room and PACU providers before and after the implementation of the Identity, Situation, Background, Assessment, Recommendation (ISBAR) communication tool. Second, to investigate the difference if any of the quality of handover between the sending and receiving providers. Lastly, to investigate whether factors such as "gender, age, professional background and

years of experience were associated with these experiences". The study was a cross-sectional, quantitative design. The study took place in April 2017, at a hospital in Norway conducting 8000 surgical procedures each year. All the nurse anesthetists (NA), anesthesiologists, surgical nurses (SN), PACU registered nurses (RN), and critical care nurses (CCN) involved in patient handover were invited to participate in the study. The points of measurement were based on the data from two questionnaires. One questionnaire collected data based on the demographics and professional background of the provider. The other questionnaire was distributed post-intervention and asked questions about the implementation for the ISBAR tool. Summative statistics were used to present characteristics of the sample. T-tests were used to identify differences in pre- and post-implementation and between personnel. A generalized linear regression model was used to analyze dependent and independent variables. A significance of $P < 0.05$ was assumed.

Studying findings included significantly improved quality in handovers after the implementation of the ISBAR tool ($P=0.001$). Providers' experience with the handover process was improved after the implementation of a logical and organized structure in the form of the ISBAR tool ($P < 0.001$). In addition, providers felt it easier to initiate handover, ambiguities were resolved, and the communication and documentation processes were more complete ($P=0.001$). An estimated 91% of providers used the ISBAR tool during the handover process, and 92.1% of those providers felt that utilizing the tool led to a better and safer patient handover. Limitations included not all the same providers were included in the pre- and post-implementation phases. Some providers did not follow through or left the clinical area, however, their responses were still included in

the data. In addition, the sample size was relatively small and contained mostly women. The study only took place in one hospital. The post-implementation questionnaires were administered only six months after the initial implementation of the ISBAR tool and do not account for compliance. Implications for practice/research include identifying the importance of utilizing an evidence-based, standardized handoff tool during transfer of care. Doing so improves provider satisfaction and accountability, patient safety, and quality and accuracy of the information being reported.

The purpose of Robins and Dai's (2015) research was to determine if the utilization of a formulated checklist utilized during the handoff from the operating room to the PACU decreased information loss, the need for clarification, and the anesthesia providers' time spent during transfer of care. The study was a quality improvement project analyzing pre- and post-implementation data based on the following metrics: information score, handoff adequacy, information clarification and time. Sample size was justified based on an a priori power analysis, 30 providers per group would yield an estimated 80% power and a 95% success rate. Using the specified metrics, a 2-sided *P* value of 5% was used to test for statistical significance. Descriptive statistics (median, interquartile range, number and percentage) were calculated for all available outcomes. The checklist group and non-checklist group were compared using the Fischer exact test. The numerical rating score for recall and providers' time in the PACU were compared between both groups using the Wilcoxon rank sum test.

The study findings were as follows, of those providers' utilizing the checklist for handoff, 92% were able to recall the information after report (median score=6, interquartile range=6-6), whereas those providers' not utilizing the checklist, only 54%

were able to recall the 6 key elements of report (median score=6; interquartile range= 5-6) yielding $P = .0039$. Providers' utilizing the checklist for handoff lowered the callback rate for information clarification from 69% to 0% generating a statistically significant $P = .0042$. There was no statistically significant data surrounding the time spent in the PACU for those providers' who used the checklist and those who did not. There were several limitations to this study, no anesthesia residents were included in the study; this may have affected the scores based on experience and comfortability with giving a report. The adequacy on the checklist was based on the subjective rating of the PACU nurses. Lastly, there was a large variability in "time in" based on when the anesthesia providers' documented the anesthesia end time. In practice, utilizing a standardized checklist format can improve patient safety through information recall and quality and adequacy of reporting.

Wright (2013) reported a 2-phase study that (1) examined the current transfer of care practices utilized by CRNAs during the intraoperative period and (2) developed, implemented, and evaluated a standardized checklist tool to improve self-awareness (SA) during anesthesia transfer of care. Phase 1 was conducted by mailing 1,000 questionnaires asking current CRNAs, who attended regional continuing education conferences by Nurse Anesthesiology Faculty Associates, part of the Virginia Commonwealth University, about their transfer of care practices. The 10-item questionnaire was formulated with the assistance of an expert panel. Phase 2 was developed from the results of the phase 1 survey which was then used to formulate a mnemonic checklist, PATIENT tool. During this phase a pilot study was conducted with a sample of 74 CRNAs, utilizing the PATIENT tool, in two large community hospitals

and one large teaching hospital for a 2-week period at each facility. The study subjects evaluated the checklist after the implementation phase using an electronic questionnaire developed by the expert panel.

During phase 1 of the study 302 CRNAs (30.2% response rate) responded to the questionnaire based on their current handoff practice. 72.8% of responses indicated that those CRNAs did not have a systematic process in place. Critical elements that participants indicated should be reported during the transfer of care process including: medical/surgical history was important to include in the handoff process, 89.1% allergies, 83.4% the difficulty of intubation/ventilation. Improvement of patient safety 77.4% was the characteristic identified as the most likely to lead to change and 82.1% of responses indicated that there would be no barriers to implementation if it improved practice and promoted patient safety. During phase 2 of the study the PATIENT checklist tool was implemented in CRNA practice. Application of this tool was assessed using a 10-item mixed methods survey questionnaire. The survey questionnaire was completed by 40.5% of the 74 subjects.

The survey results indicated that the checklist was used 1 to 5 times by 17 CRNAs (56.7%), 6 to 10 times by 5 CRNAs (16.7%), 11 to 15 times by 1 CRNA (3.3%), and 3 CRNAs (10%) used the checklist more than 15 times (Wright, 2013). Thirty (87%) respondents agreed that utilization of a standardized checklist was beneficial in their practice. All of the respondents (100%) agreed or strongly agreed that the PATIENT tool was an effective way to organize transfer of care information. The limitations of this study include CRNA self-reporting of utilization of the PATIENT tool, small sample size, and the lack of standardized teaching program to educate participating CRNA's in

utilization of PATIENT tool. The authors propose solutions to issues of inadequate transfer of care practices through standardization of protocols and tools. The study identifies vital parameters that are required to communicate when transferring care of patients from one provider to another.

Related Literature

Muller et al (2018) outlined the impact on patient safety after the implementation of the SBAR (Situation, Background, Assessment, Recommendation) handoff instrument. A systematic review of articles published in January 2017 was performed and those meeting the following inclusion criteria were reviewed; (1) SBAR was implemented into clinical routine, (2) the investigation of SBAR was the primary objective and (3) at least one patient outcome was reported (Muller et al., 2018). Eleven studies were analyzed, eight were before-after intervention design, two were a non-RCT design and one was a RCT design. Clinical settings for the studies included rehabilitation centers and nursing homes. The time frame spanned 2 to 24 months and was facility specific based on length of time patient outcomes needed to be analyzed.

Of the eleven studies analyzed, eight documented statistically significant evidence of improvement, four studies described evidence of improvement but no statistical test was reported as being used to analyze data. Four studies showed no significant evidence of change and one study documented a reduction in patient safety. Limitations of the studies included short study periods, lack of power calculation in all studies, and in almost half of the reported outcomes, no statistical tests were performed. Furthermore, the studies investigating the patient outcomes utilizing the SBAR handoff instrument are limited in quality and one-sided. Implications for research include the need for higher

quality studies to be performed on such a well-known and utilized handoff instrument. However, more than half of the studies analyzed had favorable outcomes supporting the adoption of the SBAR tool in multiple healthcare settings.

Theoretical Literature

According to The Joint Commission there are eight tips to be followed to ensure a high-quality hand-off:

(1) identify the critical information that needs to be communicated during the face-to-face transfer of care (2) a standardized template or instrument to communicate pertinent information to the receiving providers (3) attempt to engage in a face-to-face exchange during patient transfer, allowing for time to ask questions (4) communicate all data categorically and succinctly to avoid confusion (5) the receiving provider should obtain the following information, at a minimum from the sending provider: sender contact information, illness assessment, patient summary, to-do action list, contingency plans, allergy list, code status, medication list, lab tests, and vital signs (6) try to conduct transfer of care in a relatively quiet, non-emergent environment with minimal interruptions (7) make sure all pertinent providers are present during hand-off, including patient and families if warranted (8) use electronic health records to enhance hand-off but do not rely solely on technology for transfer of care (TJC, 2017).

According to the ASPAN (2000) nursing standards for the 2021-2022 year, the utilization of an appropriate process for communicating handoff reports must be in place to assure safe patient transfer. In addition, the format should be “consistent, predictable,

and have a tailored structure” (ASPAN, 2000). ASPAN recommends that the handoff tool should include the following information: (1) name and age of patient (2) patient history including allergies, precautions, surgeries, hospitalizations, medical history, and any limitations (3) name of surgeon and procedure (4) anesthesia provided and tolerance (5) unusual events during procedure (6) blood loss and fluid replacement and (7) clinical history and assessment.

The AANA perianesthesia guidelines recommend the transfer of care of patients in the form of a standardized and structured checklist (2014). Based on Standard VII of the *Standards for Nurse Anesthesia Practice* CRNAs are responsible for accurately reporting patient conditions and all pertinent information including: patient identifiers, procedure, health history and anesthesia, upon transfer of care to a qualified healthcare provider in order to ensure continuity of care and safety of the patient (Standards for Nurse Anesthesia Practice, 2013). AANA (2014) states that the environment during the transfer of care must be free of distractions, communication must be conducted face-to-face, and that a non-hierarchical culture of open communication be implemented.

Critical Summary

The transfer of care period is highly susceptible to communication errors, including misinformation transferred and/or omission of important patient details. The findings of the articles reviewed support the utilization of a standardized handoff instrument, however a standardized best practice method has not been identified. The development of an evidence-based, standardized handoff communication instrument would address the gaps in communication by reducing probability of error during a limited window of communication in the post-anesthesia care setting and promoting

uniformity during the transfer of care process. A standardized process would improve continuity of care reducing adverse patient events while improving quality of care and patient safety.

Most studies reviewed utilized a pre- and post-implementation design to collect and analyze data. Unanimously, after implementation of a standardized hand-off process provider satisfaction significantly improved. The findings of the articles showed an increase in the quality of the hand-off process related to the following factors: an improved, organized format, minimal increase in length of time needed for a standardized handoff, increased perception of adequacy and a safer method for transferring care. In addition, receiving providers felt that after the implementation of a standardized format for transfer of care, all pertinent information was provided by sending providers and no additional time was needed to seek out omitted patient information. Limitations identified across the studies included limited sample size, single center studies, and a lack of true double-blind research studies.

After extensive review of the literature, no best practice method has been identified to standardize the transfer of care process. The lack of consistency in the transfer of care process continues to lead to misinformation and omission of pertinent patient data resulting in a breach of patient safety. Healthcare governing bodies have also identified transfer of care as a crucial period during which patient safety errors can occur. The Joint Commission, ASPAN, and the AANA have set forth recommendations to achieve the use of a best practice method, however, one has not yet been developed. The goal of our scholarly DNP project is to formulate an evidence-based, standardized

handoff instrument to be disseminated and accepted as a best practice model during the transfer of care process between anesthesia and PACU care teams.

Theoretical Framework

The conceptual model that most aligns with the safety threat and our conceptual definitions is Duffy's, Quality-Caring Model (2007). Duffy's model focuses on human relationships, relationship-centered professional encounters, and practice improvement (Chinn, 2018). Duffy et al. (2007) stated that, "readily accessible and accurate information is integral to practicing with the Quality-Caring framework" (p. 550).

The provision of quality of care of patients is dependent on the collaborative relationships among providers (Duffy & Hoskins, 2003). The Quality-Caring Model aims to unite evidence-based ideologies of the current healthcare environment with the nursing process of providing caring and patient relationship-based care ; the model is deeply rooted in the idea of nursing relationships (Duffy, 2005).

In this project, effective communication, and the establishment of a standardized transition of care instrument are imperative to building relationship-centered professional encounters and practice improvements. Using the structure-process-outcome components of the Quality-Caring Model as a framework, the development of an evidence-based provider handoff instrument might contribute to positive provider and patient relationships and promote patient safety and improve quality (Duffy & Hoskins, 2003).

Synthesis of Handoff Instrument

The handoff instrument was developed based on the review of the current literature and the commonalities found among the authors. Additionally, the PDs used

their current clinical experience with the handoff process to formulate an instrument that coincided with the evidence-based methods discussed in the literature as well as accommodating the perceived needs of their sample subjects. The content analysis detailing the categories, themes and the supporting literature is presented in Appendix C.

Content Validity Analysis

All items utilized in the handoff instrument were supported by TJC, ASPAN, and AANA and identified as vital points to be included during the transfer of care process.

Provider Readiness: Rose and Newman (2016) discussed the consequences of the lack of provider readiness during the handoff process between anesthesia providers and post-anesthesia care nurses. They identified that inattentiveness during the handoff process can lead to medical errors and gaps in patient care. The author's stressed the time to exchange patient information should be agreed upon by both sending and receiving providers. The designated time should be when the sending provider feels the patient is stable enough to relinquish care and the receiving provider is ready to assume care and free of distractions. Provider readiness is highlighted by the ASA (2019) mandating the importance of the anesthesia team to remain at bedside until the post-anesthesia care provider is able to accept responsibility for patient care.

Patient Identifiers: This category was further subdivided into name, age, and gender. Yum (2015) in alignment with the International Patient Safety Goals and the TJC recognized patient identification errors as one of the most serious healthcare quality issues in patient safety. Improper patient identification can lead to adverse events, such as wrong person or wrong surgery performed. Patient identification errors have been reduced through the standardization of the patient identification process using at least two

patient identifiers; name and date of birth. The patient's response is checked for accuracy in accordance with their medical identification bracelet.

Allergies: According to Nagelhout and Elisha (2018) a patient's drug history should include information regarding allergic reactions. Antibiotics are the most common cause of drug hypersensitivity reactions during anesthesia. It is crucial for the anesthesia provider to differentiate between an allergy and an adverse reaction, because a true allergy to a drug represents a contraindication for its use. In addition, identifying a true drug allergy will aid in recognition of cross-reactivity to other medications within the same classification. Anesthesia providers and post-anesthesia care providers should be aware of these allergies and be conscientious of the potential drug interactions and cross-sensitivities during the perioperative period.

Type of Surgery/Surgeon: Nagelhout and Elisha (2018) included surgical procedure, name of surgeon, name of anesthesia providers, and type of procedure under the general information category that should be relayed during anesthesia admission report, this is in accordance with the American Association of Nurse Anesthetists (AANA) guideline from the *AANA Scope of Standards for the Nurse Anesthesia Practice: Standard V*.

Pertinent Past-Medical/Surgical History: Nagelhout and Elisha (2018) included patient history both acute and chronic as one of the categories discussed during anesthesia admission report, this is in accordance with the AANA guideline from the *AANA Scope of Standards for the Nurse Anesthesia Practice: Standard V*.

Pre-operative Findings: Malley et al. (2015) stated that the pre-operative setting is the first transition in patient care and should be considered as critical. During the

perioperative period the primary patient assessment is conducted, and any patient risk factors and/or vulnerabilities are identified. The AANA *Standards for Nurse Anesthesia Practice* Standard II mandates that a CRNA must conduct a thorough pre-operative assessment and evaluation prior to administering any anesthetic. Identifiable risk factors in the pre-operative assessment have the potential to create challenges throughout the perioperative period.

Airway Concern and Type of Anesthesia: Respiratory complications during the postoperative period can be identified as the leading cause of mortality and morbidity (Karcz & Papadakos, 2013). Karcz and Papadakos (2013) identified ventilatory problems, including hypoxemia, hypoventilation, or upper airway obstruction as primary factors that have the potential to lead to unanticipated need for airway management in the PACU setting. Intraoperative complications including surgical management, type of anesthetic, or patient related all have the potential to influence patient airway status post-operatively. It is especially important to convey information about intraoperative anesthetic interventions including utilization of opioids which can lead to hypoventilation and/or the use of neuromuscular blocking agents with the potential for residual paralysis. A thorough report between sending anesthesia care teams and receiving post anesthesia care nurses, as identified in accordance with the AANA *Standards for Nurse Anesthesia Practice*, can attenuate unanticipated airway issues.

List of Pertinent Intra-Operative Medications: Nagelhout and Elisha (2018) included time of last opioid administration, administration of reversal agents, and intraoperative medications, such as antibiotics, antiemetics, and vasopressors as important intraoperative management categories that should be discussed during

anesthesia admission report, this is in accordance with the AANA guideline from the *AANA Scope of Standards for the Nurse Anesthesia Practice: Standard V*.

Fluids: Postoperative fluid management relies on intraoperative fluid administration, hemodynamics, and patient's postoperative status (Kayilioglu et al., 2015). Intraoperative fluid management depends on a multitude of factors including anesthesia provider's preferred fluid management strategy, intraoperative bleeding, type of surgery and potential surgical fluid loss. Kayiluoglu et al. (2015) state that the use of postoperative fluid administration should consider the type of surgery, changes in body fluid composition, vascular integrity, and hemodynamic instability. Overall, fluid management must be performed based on the patient's body fluid status, therefore, it is important to report accurate intraoperative fluid administration to the post-operative provider to reduce the risk of under or overhydration which can lead to hemodynamic instability.

Estimated Blood Loss: Intraoperative blood loss continues to be grossly underestimated and inaccurately determined (Ghattas, 2015). Current practice methods reveal no clear concise method of measuring intraoperative blood loss and is often determined by the anesthesia and surgical teams based on objective observation. Quantitative blood loss protocols have been adopted in the obstetric setting but have yet to be in other surgical areas. Underestimation of blood loss can lead to adverse patient outcomes including, increased length of stay, hemodynamic instability, organ hypoperfusion and death. It is imperative for surgical and anesthesia teams to best accurately report intraoperative blood loss to receiving providers during the transfer of care process to ensure timely transfusion measures to improve patient safety outcomes.

Baseline Neurological Status: There are several types of neurologic changes that can happen with administration of anesthesia. These include transient ischemic attack, stroke, emergence delirium (ED), postoperative delirium (POD) and post-operative cognitive dysfunction (POCD). The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) and the American Geriatrics Society (AGS) developed Best Practice Guidelines for Optimal Preoperative Assessment which includes categories to be assessed with their respective screening tool prior to the administration of anesthesia in the geriatric population. Nagelhout and Elisha (2018) stress the importance of a thorough baseline neurological assessment by the anesthesia provider prior to the administration of anesthesia to aid in the quick recognition of minute to severe changes in a patient's neurologic status post anesthesia.

IV Lines/Invasive Monitors/Drains: Nagelhout and Elisha (2018) included intravenous lines, invasive monitors and drains as important intraoperative management categories that should be discussed during anesthesia admission report, this is in accordance with the AANA guideline from the *AANA Scope of Standards for the Nurse Anesthesia Practice: Standard V*.

Receiving Provider Questions or Concerns & Future Plans/Orders: Rose and Newman (2016) discussed the importance of assessing the need for questions from the receiving provider following the transfer of care exchange. This time allows for clarification of any intraoperative reports to reduce callbacks to providers and patient care communication errors (Rose & Newman, 2016). In addition, this article suggested that in person discussion of future plans and orders, decreased patient time in the postanesthesia care area, and improved continuity of care.

Methods

Project Design

The design of this project is a provider reminder quality improvement plan. This project is subdivided into a two-phase plan that encompasses short term and long-term objectives, designated as Phase 1 and Phase 2 respectively. Phase 1 was twofold: first content analysis of literature using a directed approach to identify evidence-based codes and categories for the checklist was conducted, followed by the formulation of a standardized communication process between anesthesia care providers and PACU provider teams. The second part of Phase 1 was the expert review for validation of the checklist. Both aspects of Phase 1 were completed by the PDs. Phase 2 of this project will test the standardized process in a clinical setting. This phase of the project will be conducted by a future cohort.

Sample and Setting

The sample included a literature directed content analysis of scholarly articles (n=1450) that provided evidence and support of the themes and categories, and content for the handoff process instrument.

Phase 1 of this project was conducted in a 175-bed community-based healthcare agency with 6 operating rooms and 10 PACU beds. The expert reviewer panel included anesthesiologists (n = 2), certified registered nurses anesthetist (CRNAs) (n = 9) and post-anesthesia care unit (PACU) nurses (n = 6). The panel was selected through a purposive sample.

Ethical Considerations

The project was presented to the Einstein Health Network Institutional Review Board for exempt status due to the omission of human subjects. Our DNP scholarly project fulfills the IRB exemption category; “research conducted in established or commonly accepted educational settings, involving normal educational practices, such as: (a) research on regular or special education instructional strategies or (b) research on the effectiveness of or comparisons among instructional techniques” (IRB, 2017). A subset of this exemption category is “the school or other institution grants written approval for the research to be conducted” (IRB, 2017). The copy of the IRB exemption letter can be found in Appendix J. The PDs have obtained a letter of approval from Dr. Michael Kost DNP, CRNA, CHSE, FAAN in support of the proposal DNP scholarly project. The copy of the letter can be found in Appendix K. Complete waivers of consent involve studies in which there are minimal risks to subjects. Waivers of informed consent are primarily requested for projects involving the secondary analysis of existing data.

Matrix Model Overview

Details of the standardized evidence-based handoff communication instrument quality improvement program are presented in a program plan matrix in Appendix D. This matrix provides an overall project structure with detailed processes for meeting scheduled project objectives. The matrix offers the plan for activities, resources, and evaluation methods to meet the short-term, intermediate-term, and long-term project objectives. The overall goal of our DNP scholarly project is to develop a standardized, evidence-based handoff communication instrument as an educational tool to streamline the transfer of case processes between sending anesthesia care providers and receiving

post-anesthesia care (PACU) teams. After the development of this handoff communication process instrument and the data analysis to provide expert validity for the tool, the PDs intend the overall impact of the project will be to decrease communication errors and improve the quality of care at the critical transition point between anesthesia providers and post-anesthesia unit providers.

Instrumentation

For our project a method of content analysis was conducted reviewing existing evidence-based literature to identify key concepts within our topic. These concepts were organized into major categories and used in structuring our evidence-based standardized handoff instrument. A directed content analysis was used to identify themes for formulation of our handoff instrument (Hsieh & Shannon, 2005). An example of a theme would be patient identifiers which were subdivided into categories; name, date of birth, and age, with each category being supported by relevant data sources. Development of the checklist and its content validation was implemented in Phase 1; Phase 2 will test the efficacy of the checklist by a future cohort.

Procedure for Data Collection

Phase I of our scholarly DNP project relied on the review of literature and content analysis to structure our handoff instrument. The review of literature was conducted across several databases using the search terms; handoff tool, post-operative communication, quality improvement, anesthesia, checklist, handoff instrument and transition of care. The articles were selected based on compatibility of search terms and relationship to our research question. From there a directed content analysis was

performed to identify major themes and categories for the structuring of a comprehensive, evidence-based standardized handoff instrument.

The PDs developed an online based Qualtrics survey to assist in the organization and collection of data. Qualtrics is an online based survey system provided to the PDs by LaSalle University to distribute the questionnaire to the expert review panel and provide anonymous data analysis. The Qualtrics survey was distributed to the identified key stakeholders via a list of email addresses provided by the Chief CRNA at Einstein Medical Center Montgomery. The formal email sent to the key stakeholders is outlined in Appendix I. The Qualtrics survey contained ten questions. Questions 1 and 2 are demographic based, identifying licensed professions and years of clinical experience. Questions 3-6 and 9 addressed the usefulness of standardizing the transfer of care process with the utilization of a handoff instrument using a four-point Likert Scale. Question 7 details the PDs proposed 15-point handoff instrument. The providers were asked to assess the relevancy of each item using a four-point Likert scale. Questions 8 and 10 allowed the stakeholders to provide comments in a free text format. The Qualtrics survey received by key stakeholders is reproduced in Appendix E. The comments provided by key stakeholders will be further discussed in the results section.

Data Analysis

The first part of Phase 1 was the development of Table 2 Appendix B which differentiated coding of the relevant literature from the literature review. The literature review guided the formulation of the pertinent categories to be included in the handoff instrument. The second part of Phase 1 included data analysis based on the responses from the Qualtrics survey by the expert panel. Quantitative and qualitative data was

analyzed using item and scale content validity calculations to validate the PDs instrument. Based on survey data, any revisions to be made to the final instrument will be decided from the expert panel reviewers' comments and scores after discussion by a future cohort with their committee chair.

Results

The expert panel consisted of CRNAs, PACU nurses, and anesthesiologists. Of the 17, 9 (52.9%) were CRNAs, 6 (35.3%) were PACU nurses, and 2 (11.7%) were anesthesiologists. Experience of expert panel providers ranged from less than 5 years to greater than 26 years of practice. One provider (6%) had less than 5 years of experience, one provider (6%) had 5 to 10 years, six providers (35.3%) had 10 to 15 years, five providers (29.4%) had 16 to 20 years, one provider (6%) had 21-25 years, and three providers (17.6%) had greater than 26 years.

Significant findings from the expert panel's survey responses included the following:

Question 3: *Do you as the provider think there needs to be standardization to the transition of care process with the utilization of a handoff instrument?* Fifteen out of 17 (88.2%) of providers “*strongly agree*” and “*agree*” that there needs to be standardization. Question 4: *Do you as a provider think that utilization of a standardized transition of care handoff instrument will help to minimize communication errors between anesthesia and PACU providers?* Fifteen out of 17 (88.2%) of providers “*strongly agree*” and “*agree*” that a standardized instrument will minimize communication errors. Question 5: *Do you think standardizing the transfer of care process with the utilization of a handoff instrument will increase provider satisfaction?*

Fifteen out of 17 (88.2%) of providers “*strongly agree*” and “*agree*” that use of a standardized instrument will increase provider satisfaction. Question 6: *Did you think standardizing the transfer of care process with the utilization of a handoff instrument will improve patient quality of care?* Fifteen out of 17 (88.2%) of providers “*strongly agree*” and “*agree*” that standardizing the transfer of care process will improve patient’s quality of care. Question 9: *Based on your review of the provided 15-point purpose handoff instrument, do you think that its use will increase the time of handoff between anesthesia providers and receiving PACU providers?* Eight out of 17 (47%) of providers “*strongly agree*” and “*agree*” conversely, eight out of 17 (47%) of providers “*disagree*” that the utilization of a standardized handoff instrument will increase the time of transfer of care process.

The PDs analyzed the survey results of the 15- point handoff instrument using item (I-CVI) and scale (S-CVI/Ave) content validity index calculations to validate the instrument. The I-CVI was calculated using the responses “*highly relevant*” and “*quite relevant*” for each item divided by the total number of experts (17). A I-CVI > 0.79 for the item is considered relevant, between 0.70 and 0.79, the item needs revision, and if the value is below 0.70, the item is eliminated (Rodrigues, et al., 2017). Thirteen out of 15 (86.6%) of items are considered relevant. Two out of the 15 (0.13%) items did not meet greater than 0.79 relevancy criteria. Assessing the readiness of the PACU nurse item received a I-CVI score of 0.76 indicating this item needs revision. Future plans/orders item received an I-CVI score of 0.73 indicating that this item should be eliminated from the finalized instrument. An S-CVI/Ave was calculated by taking the sum of the I-CVIs

divided by the total number of items yielding a value of 0.90 indicating high content validity. Refer to Appendix F for a complete overview of data analysis.

Question 8: *After reviewing the 15-point purposed handoff instrument, are there any items that are missing you think should be included?* This question allowed the expert panel to comment using a free text format. One provider stated that a more detailed description of how the intraoperative hemodynamic treatment for hypo- or hypertension was managed and the anticipated continued needs in PACU. The same provider suggested the discussion of analgesic plan of care including opioid vs. opioid-free management strategies for the post-operative phase. Additionally, another provider emphasized the importance of disclosing any intraoperative problems by the anesthesia provider and how they were resolved.

Question 10: *Would you utilize this instrument as part of your long-term practice, if not please provide a reason.* This question allowed the expert panel to comment using a free text format. Ten out of 17 (58.8%) of providers agreed that they would utilize the instrument as part of their long-term practice. One provider commented that the utilization of the instrument when used for minor cases would create an extra task. Two providers mention the benefit of the handoff tool if the facility started utilizing electronic medical records instead of paper records that are currently in use at Einstein Medical Center Montgomery.

Discussion

Our extensive literature review supported the common themes and categories used to construct the handoff instrument. The healthcare facility where this handoff instrument is intended for use currently has no standardized way to conduct the transfer of care

process from anesthesia provider to post-anesthesia care provider. This project offers a means to improve the transfer of care process between anesthesia providers and post-anesthesia care nurses can be improved.

Overall, each item of the proposed 15- point standardized handoff instrument carried a CVI-I score greater than 0.79 except for two. The two items that need revision are those that refer to assessing readiness of the PACU provider and discussing future plans of the patient. These two categories may have received low scores due to the disproportionate response of anesthesia providers to PACU providers. In addition, it seemed as though most providers answered based on their profession. For example, one anesthesiologist felt airway concerns and neurologic baseline were highly relevant while the other items were quite relevant or somewhat relevant. However, each item's significance is supported by the CVI-I score as being pertinent in the overall transfer of care process.

Limitations

The PDs identified several limitations regarding the design and instrumentation of the project. The most significant limitation was sample size. The PDs received email contacts from the Chief CRNA. These contacts included 11 PACU providers, 17 CRNA's and five out of 22 anesthesiologists employed within the network. The responses received were from six PACU providers, nine CRNAs and only two anesthesiologists. The PDs sent reminder emails to all providers a week after the initial invitation email to complete the Qualtrics survey was sent. Additionally, the PDs spoke to multiple providers in person about completing their survey. This poor response rate could have been attributed

to the recent Einstein-Jefferson merger and the provider's change of email address.

Another limitation was the use of a single medical center for data collection and analysis.

Recommendations

This DNP project is one part of a multi-part QI project that will be completed by a future cohort(s). Recommendations for the progression of this DNP scholarly project based on expert review and panel feedback include (1) reassessment of the items that received an I-CVI score of less than 0.79 (2) develop a comprehensive way to disseminate the standardized handoff instrument to ensure use during the transfer of care process (3) institute a method to achieve compliance from provider staff to ensure the continued use of the standardized handoff instrument.

Conclusions

Ineffective communication during the transition of care process can lead to medical errors and sentinel events (TJC, 2017). The review of literature identified multiple limitations to the transfer of care process. One limitation is the lack of a standardized handoff instrument. Another is failure to adopt a standardized handoff instrument due to provider resistance. The PDs are attempting to remedy these limitations with the development of an evidence-based handoff instrument.

The study found that the majority of providers agree that standardizing the transfer of care process will minimize communication errors and improve patient's quality of care. The overall impact of the quality improvement project was achieved by the development of an instrument with the potential to reduce adverse patient outcomes during the anesthesia provider to post-anesthesia provider transfer of care process.

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Appendix A

Table 1-*Search Process Review of Literature*

| N | | | | | |
|--|----------------|---------------------------------------|--|---------------------------------|--------------------------------------|
| Database | Total Articles | Articles Remaining After Title Review | Articles Remaining After Abstract Review | Articles Retrieved and Examined | Articles that fit Inclusion Criteria |
| Cochrane Library | 1 | 0 | 0 | 0 | 0 |
| Joanna Briggs Institute EBP Database | 0 | 0 | 0 | 0 | 0 |
| CINAHL | 9 | 5 | 4 | 3 | 2 |
| Medline | 29 | 16 | 12 | 10 | 9 |
| PubMed | 1238 | 200 | 25 | 20 | 3 |
| HAPI | 0 | 0 | 0 | 0 | 0 |
| TRIP | 83 | 13 | 4 | 2 | 1 |
| ProQuest Dissertations & Theses Global | 90 | 16 | 9 | 5 | 2 |

Note. Number of duplicate articles removed

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Appendix B

Table 2-Review of Literature Matrix Systematized Review

| Database # Article First Author, Year (full citation in References) | Purpose of Study Major Variables (IV, DV) or Phenomenon | Theory or Conceptual Framework | Design | Measurement Major Variables (Instrument) | Data Analysis (Name of Statistics, descriptive, Inferential and Results) | Findings | Evidence Level of Research & Quality Johns Hopkins Nursing Evidence- Based Practice |
|--|--|--|-------------------|--|---|--|--|
| Boat, A. C. (2013) | Two quality improvement projects were initiated and two standardized checklists were developed. The overall goal of the study was to reduce medical errors from miscommunication | Donabedian, Structure, Process, Design | Reliability Study | Reliability run chart based on directed observation analysis | Reliability run chart | Project One: The specialists reported only 20% of handoff reporting included both objectives. Using this baseline data, a standardized handoff tool was designed and the team developed a <i>Smart Aim</i> to “improve the quality and reliability of attending intraoperative handoffs from 20%-95%” Reliability was measured as use of a standardized handoff tool and a handoff where both anesthesiologists were present in the operating room. After two months, 100% compliance was reported and sustained for the duration of the 6-month project. Project Two: The Smart Aim developed was to “increase the reliability of an appropriate handoff between anesthesia and PACU nursing from 56% to 95% . Over a 5- | Level II |

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| | | | | | | month period, reliability improved from 59% to 90%. | |
| Burns, S. (2018) | To implement an institution specific OR to PACU patient handoff checklist and to assess its use in a tertiary care teaching hospital. IV- standardized perioperative patient handoff checklist DV- handoff score based on a 10-item of critical information transfer, nursing satisfaction, time spent on handoff. | Donabedian, Structure, Process, Design | Prospective, observational pre-post unblinded study. | Structured study personnel observer instrument utilizing a 10-item handoff score based on critical information transfer using an institutional standardized perioperative patient handoff checklist. PACU nurse satisfaction score using one question format "adequate" or not. | Independent sample two tailed <i>t</i> -test to compare the handoff scores and time spent on the handoff process pre-and post- intervention. | Average score for the pre-intervention group 50.8% (95%, CI 48.4-53.2). Average score for the post-intervention group 89% (95%, CI 86.5 - 91.5). Time spent on handoff pre-intervention 66s (95% CI 59.7 -72.3) in the post - intervention 88.9 s (95% CI 83.7 - 94.0). | Level II |
| Canale, M.L. (2018) | To improve the quality and the continuity of the transfer of information, improve patient safety, and increase satisfaction by implementing a standardized handoff procedure during the transfer of care of perioperative patients IV: Modified PATIENT tool. DV: | Donabedian, Structure, Process, Design | Pre- and posttest quality improvement design. Purposive, nonprobability, snowball sampling. | Utilized the TeamSTEPPS framework, pre- and post-intervention surveys conducted using pilot instrument published by Wright on Examining Transfer of Care Processes in Nurse Anesthesia Practice, modified PATIENT tool. | Paired <i>t</i> -test, descriptive analysis of surveys, thematic analysis of free text responses in the survey. | Fifty percent of CRNAs agreed with being satisfied with the transfer process after the implementation of the intervention, 67% of CRNAs disagreed or strongly disagreed with the process being appropriate before the intervention. Majority of participants in the post-intervention group related positive aspects of quality, length, format, and satisfaction with the standardized handoff process. | Level II |

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| Caruso, T.J, (2015) | To assess the utilization of the I-PASS method with additional components from previous literature improve transfer of pertinent patient information by 25% and increase PACU nurse satisfaction; IV- I-PASS method DV- Improved data transfer, nursing satisfaction | Donabedian, Structure, Process, Design | Prospective cohort study utilizing a pre-implementation and a post-implementation design. | Structured study personnel observer instrument, physical and electronic, utilized in the pre- and post-implementation, measured the percent of identified elements during audits of I-PASS, PACU nursing satisfaction. | Two-sample <i>t</i> -test, Mann-Whitney U test, Fisher's exact test, paired <i>t</i> -test. | Transfer score mean increase 49% (SD 9.8%; median 49%) to 83 % (15%, median, 88%). Paired mean total satisfaction scores for PACU nurses served increased from 36 (SD, 6.8) to 44 (SD, 4.8) (p=.004). Presence of surgeon increased after implementation (31.7% to 100%; p<.0001), Fisher's exact test). | Level II |
| Halladay, M.L. (2019) | To implement a quality improvement project that utilizes a standardized evidence-based electronic handoff tool in order to improve transfer on information from anesthesia providers to PACU nurses. IV: Modified Potestio et al. (2017) checklist. DV: checklist items addressed, report time | Donabedian, Structure, Process, Design | Prospective cohort study utilizing a pre-implementation and a post-implementation design. | Structured study personnel observer instrument, physical and electronic, utilized in the pre- and post-implementation, Modified Potestio et al. (2017) checklist | Levene's test, Welch adjusted F ratio, Post hoc tests, χ^2 | PACU 1 showed continued improvement in the reporting of 7 of 21 items (33.3%) at the 3-month mark as compared to the 3-week mark. Patient's preoperative activity level and intubation conditions (9.5%) were unchanged from 3 month to 3 weeks for PACU 2. The remaining items of the 21-point handoff tool decreased at the 3-month mark as compared to the 3-week mark, but remained above the pre-implementation period. Time for verbal report was significantly decreased from pre-implementation to 3 weeks post-implementation and 3 months post-implementation. Time for verbal report and EMR generation significantly increased the duration of report both at 3 weeks and 3 | Level II |

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| | | | | | | months as compared with pre-implementation baseline verbal report time. | |
| Lambert, L. H, 2018 | Identify barriers and omissions in anesthesia handoffs between CRNAs and PACU RNs before and after implementation of a standardized format, the WHAT. Improve CRNAs' and PACU RNs' perception and satisfaction with anesthesia handoff communication | Donabedian, Structure, Process, Design | Quantitative pre intervention-post intervention design | Provider satisfaction. Adequacy of handoff communication pre-and-post implementation of WHAT | χ^2 and Fisher exact test <i>P</i> values | AHC survey showed a statistically significant increase in satisfaction with handoff communication after the use of the WHAT for both provider groups, CRNAs ($P < .001$) and PACU RNs ($P = .001$). The TST program showed an improvement in the defective rate after handoff implementation. At baseline, 60.7%, after implementation of the WHAT, only 36.4% were rated as defective. χ^2 and Fisher exact test analysis of the TST data marked as inadequate by sending and receiving providers showed a statistically significant improvement ($P < .0001$) of the perception of adequacy of anesthesia handoff communication after the implementation of the WHAT | Level I |
| Leonardsen, A. C., 2019 | The purpose of study was three-fold. First, to investigate the experience and quality of patient handovers between the operating room and PACU providers before and after the implementation of the ISBAR communication tool. | Donabedian, Structure, Process, Design | Cross-sectional, quantitative design | The points of measurement were based on the data from two questionnaires. One questionnaire was filled out back on the demographics and professional background of the provider. The | Summative statistics, T-tests, generalized linear regression model. Significance was assumed at $P < 0.05$. | Studying findings included significantly improved quality in handovers after the implementation of the ISBAR tool ($P = 0.001$). Providers' experience with the handover process was improved after the implementation of a logical and organized structure in the form of the ISBAR tool ($P < 0.001$). In addition, providers felt it | |

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| | Second, to investigate the difference if any of the quality of handover between the sending and receiving providers. Lastly, to investigate whether factors such as “gender, age, professional background and years of experience were associated with these experiences” | | | other questionnaire was distributed post-intervention regarding the implementation for the ISBAR tool | | easier to initiate handover, ambiguities were resolved, and the communication and documentation process was more complete (P=0.001). Estimated 91% of providers used the ISBAR tool during the handover process, and 92.1% of those providers felt that utilizing the tool led to a better and safer patient handover | |
| Robins, H. M. (2015) | The research purpose was to determine if the utilization of a formulated checklist with objective measures during the handoff from the operating room to the PACU decreased information loss, the need for information clarification, and the anesthesia providers’ time spent in transfer of care, with improved adequacy of the handoff. | Donabedian, Structure, Process, Design | A Quantitative, Quality improvement project analyzing pre and post-implementation data based on following metrics; information score, handoff adequacy, information clarification and time | All available outcomes, checklist users versus non checklist users, numerical rating score for recall and providers’ time in PACU | Descriptive statistics (median, interquartile range, number, and percentage), 2-sided P value of 5%, Fischer exact test, and Wilcoxon rank sum test. | The study findings were as follows, of those providers’ utilizing the checklist for handoff, 92% were able to recall the information after report (median score=6, interquartile range=6-6), whereas those providers’ not utilizing the checklist, only 54% were able to recall the 6 key elements of report (median score=6; interquartile range= 5-6) yielding P = .0039. Those providers’ utilizing the checklist for handoff lowered the callback rate for information clarification from 69% to 0% generating a statistically significant P = .0042. There was no statistically significant data surrounding the time spent in the PACU for those providers’ who used the checklist and those who did not. | Level I |

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| <p>Wright, S.M. (2013)</p> | <p>2 -phase study the purpose of which is to (1) examine the current transfer of care practices implemented by certified registered nurse anesthetists (CRNAs) during the intraoperative period and (2) develop, implement, and evaluate a standardized checklist tool to improve self-awareness (SA) during anesthesia transfer of care.</p> <p>IV: PATIENT handoff tool DV: Utilization of tool in practice, barriers to implementation</p> | <p>Donabedian, Structure, Process, Design</p> | <p>Quality improvement study, pre- and post-design.</p> | <p>Self-administered 10 item electronic and mailed questionnaire developed by an expert panel.</p> | <p>Calculated percent of responses.</p> | <p>The survey questionnaire was completed by 40.5% of the 74 subjects. The survey results indicated that the checklist was used the most 1 to 5 times by 17 CRNAs (56.7%), 6 to 10 times by 5 CRNAs (16.7%), 11 to 15 times by 1 CRNA (3.3%), and 3 CRNAs (10%) used the checklist more than 15 times. 30 (87%) of respondents agreed that utilization of a standardized checklist was beneficial in their practice. All of the respondents (100%) agreed or strongly agreed that the PATIENT tool was an effective way to organize transfer of care information. the checklist was beneficial in their practice.</p> | <p>Level III</p> |
|----------------------------|---|---|---|--|---|---|------------------|

Appendix C

Table 3-Themes Identified Using Conventional Content Analysis for Handoff Communication Instrument

| Themes | Categories | Data Sources |
|---------------------|--------------------------------------|---|
| Provider Readiness | | <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>American Society of Anesthesiologists (ASA) (2019) <i>Standards for Postanesthesia Care</i></p> <p>Rose, M., & Newman, S. D. (2016).</p> |
| Patient Identifiers | <p>Name</p> <p>Age</p> <p>Gender</p> | <p>American Society of PeriAnesthesia Nurses (ASPAN) (2020) <i>2021-2022 Perianesthesia Nursing Standards, Practice Recommendations and Interpretative Statements</i></p> <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Yum, H. (2015). Concepts and importance of patient identification for patient safety. <i>Journal of the Korean Medical Association</i>, 58(2), 93-99. http://dx.doi.org/10.5124/jkma.2015.58.2.93</p> |
| Allergies | | <p>American Society of PeriAnesthesia Nurses (ASPAN) (2020) <i>2021-2022 Perianesthesia Nursing Standards, Practice Recommendations and Interpretative Statements</i></p> <p>The Joint Commission (2017) <i>Sentinel event report - Inadequate hand-off</i></p> |

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| | | <p><i>communication.</i></p> <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Nagelhout, J. J., & Elisha, S. (2018). <i>Nurse Anesthesia</i>. St. Louis, MO: Elsevier.</p> |
| Type of Surgery/Surgeon | | <p>American Society of PeriAnesthesia Nurses (ASPAN) (2020)2021-2022 <i>Perianesthesia Nursing Standards, Practice Recommendations and Interpretative Statements</i></p> <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Nagelhout, J. J., & Elisha, S. (2018). <i>Nurse Anesthesia</i>. St. Louis, MO: Elsevier.</p> |
| Pertinent past-medical Past-surgical history | <p>Anesthesia Related Problems (ex. MH) CV (ex. HTN, Dysrhythmias, EF) Respiratory (ex. Asthma, COPD, CPAP Use)</p> | <p>American Society of PeriAnesthesia Nurses (ASPAN) (2020)2021-2022 <i>Perianesthesia Nursing Standards, Practice Recommendations and Interpretative Statements</i></p> <p>The Joint Commission (2017) <i>Sentinel event report - Inadequate hand-off communication.</i></p> <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Nagelhout, J. J., & Elisha, S. (2018). <i>Nurse Anesthesia</i>. St. Louis, MO: Elsevier.</p> |

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| Pre-op Findings | <p>Medications (ex. Multimodal, BB)</p> <p>Blood Sugar (ex. Insulin use, diabetic)</p> <p>Pertinent Labs (ex. Hgb, Need for repeat lab work)</p> <p>Pre-/Intra- operative Blocks</p> | <p>The Joint Commission (2017) <i>Sentinel event report - Inadequate hand-off communication.</i></p> <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Malley, A., Kenner, C., Kim, T., & Blakeney, B. (2015). The role of the nurse and the preoperative assessment in patient transitions. <i>AORN journal</i>, 102(2), 181.e1–181.e1819. https://doi.org/10.1016/j.aorn.2015.06.004</p> |
| Type of Anesthesia | | <p>American Society of PeriAnesthesia Nurses (ASPAN) (2020) <i>2021-2022 Perianesthesia Nursing Standards, Practice Recommendations and Interpretative Statements</i></p> <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>American Society of Anesthesiologists (ASA) (2019) <i>Standards for Postanesthesia Care</i></p> |
| Airway Concerns | | <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Karcz, M., & Papadacos, P. J. (2013). Respiratory complications in the postanesthesia care unit: A review of pathophysiological mechanisms. <i>Canadian journal of respiratory therapy : CJRT = Revue canadienne de la therapie respiratoire : RCTR</i>, 49(4), 21–29.</p> |

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| <p>Lists of Pertinent Intra-Op Medications (Quantity)</p> | <p>Induction Intraoperative (ex. Vasopressors, Vasodilators) NMBA/ Reversal Given Antiemetics Pain management Time of Last Dose of Med Antibiotics</p> | <p>American Society of PeriAnesthesia Nurses (ASPAN) (2020) <i>2021-2022 Perianesthesia Nursing Standards, Practice Recommendations and Interpretative Statements</i></p> <p>World Health Organization (WHO) (2019) <i>Medication Safety In Transition of Care Technical Report</i></p> <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Nagelhout, J. J., & Elisha, S. (2018). <i>Nurse Anesthesia</i>. St. Louis, MO: Elsevier.</p> |
| <p>Fluids</p> | | <p>American Society of PeriAnesthesia Nurses (ASPAN) (2020) <i>2021-2022 Perianesthesia Nursing Standards, Practice Recommendations and Interpretative Statements</i></p> <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Kayilioglu, S. I., Dinc, T., Sozen, I., Bostanoglu, A., Cete, M., & Coskun, F. (2015). Postoperative fluid management. <i>World journal of critical care medicine</i>, 4(3), 192–201. https://doi.org/10.5492/wjccm.v4.i3.192</p> |
| <p>EBL</p> | | <p>American Society of PeriAnesthesia Nurses (ASPAN) (2020) <i>2021-2022 Perianesthesia Nursing Standards, Practice Recommendations and Interpretative Statements</i></p> |

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|------------------------------------|---|--|
| | | <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Ghattas, P. J. (2015). Objective measures for estimating intraoperative blood loss. <i>Wellmont Orthopedic Residency Program. University of Texas Health Science Center.</i></p> |
| Baseline Neuro Status | | <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Nagelhout, J. J., & Elisha, S. (2018). <i>Nurse Anesthesia</i>. St. Louis, MO: Elsevier.</p> |
| IV /Lines/Invasive Monitors/Drains | | <p>American Society of PeriAnesthesia Nurses (ASPAN) (2020) <i>2021-2022 Perianesthesia Nursing Standards, Practice Recommendations and Interpretative Statements</i></p> <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Nagelhout, J. J., & Elisha, S. (2018). <i>Nurse Anesthesia</i>. St. Louis, MO: Elsevier.</p> |
| Future Plans/Orders | <p>Changed from Pre-Operative</p> <p>Language if Other than English</p> <p>Can patient make Own</p> | <p>American Society of PeriAnesthesia Nurses (ASPAN) (2020) <i>2021-2022 Perianesthesia Nursing Standards, Practice Recommendations and Interpretative Statements</i></p> <p>American Association of Nurse Anesthesiology (AANA) (2019) <i>Postanesthesia Care Practice Considerations</i></p> <p>Rose, M., & Newman, S. D. (2016).</p> |

| | | |
|--|---|---|
| | Decisions (If Designated in Pre-op) Neuromuscular Deficits/Impairments | |
| Receiving Provider Questions or Concerns | | The Joint Commission (2017) <i>Sentinel event report - Inadequate hand-off communication</i> . Rose, M., & Newman, S. D. (2016). |

Appendix D

Step by Step Program Development using the Matrix Model

| Overall Impact Goal: Decrease communication errors during the transfer of care process to improve quality of care. Project Goal: Develop an evidence-based process improvement instrument to standardize handoff communication between anesthesia providers and PACU nurses. | | | | |
|---|--|----------------------------|--|---|
| Objectives | Methods and Techniques | Timeline | Responsible Personnel | Outcomes/Evaluation Method |
| Short Term Objectives | | | | |
| Identify project problem. | Perform needs assessment at primary clinical site. | Spring 2020 | Courtney Posten Maria Chernyak Dr. Mike Kost DNP, CRNA,CHSE, FAAN | Final project problem approved by DNP committee based on results of needs assessment. |
| Search and locate related literature based on identified problem. | Extensive database search. Connelly Library online resources. Scott Memorial Library online resources. | Spring 2020 Summer 2021 | Courtney Posten Maria Chernyak | Compiled RefWorks Database. The search strategy is provided in the appendix. |

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|---|--|-------------|---|--|
| Critically appraised literature according to level and quality of evidence. | Evidence Level of Research & Quality Johns Hopkins Nursing Evidence-Based Practice Model | Summer 2021 | Courtney Posten Maria Chernyak | Completed literature matrix systematized review graded assignment. Identify the matrix appraised literature will be provided in Appendix. |
| Intermediate-term Objectives | | | | |
| Conducted a directed content analysis. | Conduct a qualitative content analysis. | Fall 2021 | Courtney Posten Maria Chernyak | Qualitative content analysis table. |
| Develop the handoff communication process instrument, including the tool. | Literature review, content analysis, and clinical expertise to aid in completion of handoff communication process, including tool to be used and other essential steps in process. | Spring 2022 | Courtney Posten Maria Chernyak | Initial review by project team and clinical experts; formal validity check by expert reviewers. |
| Collect and analyze data from sample of selected expert reviewers. | Primary clinical site anesthesia personnel and post-anesthesia care nurses. | Spring 2022 | Courtney Posten Maria Chernyak Dr. Mike Kost DNP, CRNA, CHSE, FAAN Dr. Barbara Hoerst, PhD, RN | Evaluation method utilizing a questionnaire to gain feedback on our handoff instrument. Copy of plan for expert review questionnaire is in appendix. Quantitative (i.e., rating scale frequencies and percentages) and |

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|---|--|----------------------------|---|--|
| | | | | qualitative data analysis of comments will be reported. |
| Long-term Objectives | | | | |
| Revise handoff communication instrument including tool. | Based on feedback from expert panel of stakeholders. | Spring 2022 Summer 2022 | Courtney Posten Maria Chernyak Dr. Mike Kost DNP, CRNA, CHSE, FAAN Dr. Barbara Hoerst, PhD, RN | Decisions by project directors and clinical experts to revise process based on review of data from experts |
| Provide handoff instrument to needs assessed clinical sites | To be determined by future cohorts. | Beyond Summer 2022 | Future Cohorts | To be determined by future cohorts. |

Appendix E

Standardized Handoff Communication Instrument Expert Evaluation Survey Form

| | | |
|---------------------|---|---|
| Question # 1 | Please select your profession: | <ul style="list-style-type: none"> ● Anesthesiologist ● Certified Registered Nurse Anesthetist ● Post-Anesthesia Care Unit (PACU) Nurse |
| Question # 2 | Years of clinical Experience in your field: | <ul style="list-style-type: none"> ● < 5 years ● 5-10 years ● 10-15 years ● 16-20 years ● 21-25 years ● >26 years |
| Question # 3 | Do you as the provider think there needs to be standardization to the transition of care process with the utilization of a handoff instrument? | <ul style="list-style-type: none"> ● Strongly Agree ● Agree ● Disagree ● Strongly Disagree |
| Question # 4 | Do you as a provider think that utilization of a standardized transition of care handoff instrument will help to minimize communication errors between anesthesia and PACU providers? | <ul style="list-style-type: none"> ● Strongly Agree ● Agree ● Disagree ● Strongly Disagree |
| Question # 5 | Do you think standardizing the transfer of care process with the utilization of a handoff instrument will increase provider satisfaction? | <ul style="list-style-type: none"> ● Strongly Agree ● Agree ● Disagree ● Strongly Disagree |
| Question # 6 | | <ul style="list-style-type: none"> ● Strongly Agree |

| | | |
|---------------------|---|--|
| | Did you think standardizing the transfer of care process with the utilization of a handoff instrument will improve patient quality of care? | <ul style="list-style-type: none"> ● Agree ● Disagree ● Strongly Disagree |
| Question # 7 | <p>Content Experts: Please critique all items. Please read each item and rank the items using the scale provided.</p> <ol style="list-style-type: none"> 1. Assess Readiness of PACU Nurse 2. Patient Identifiers (Age, Name, Gender) 3. Allergies 4. Type of Surgery/Surgeon 5. Pertinent PMH/PSH; Anesthesia Related Problems, CV, and Respiratory 6. Pre-operative Findings: Medications, Labs, Blocks 7. Airway Concerns 8. List of Intra-Operative Medications 9. Fluids 10. Estimated Blood Loss 11. Urine Output 12. Baseline Neuro Status if Changed from Baseline 13. IV Lines, Invasive Monitors/Drains 14. Future Plans/Orders 15. Receiving Provider Questions or Concerns | <p>Utilize the following scale for each item:</p> <ul style="list-style-type: none"> ● Not Relevant ● Somewhat Relevant ● Quite Relevant ● Highly Relevant |
| Question # 8 | After reviewing the 15-point purposed handoff instrument, are there any items that are missing you think should be included? | Please Comment Below: |
| Question # 9 | Based on your review of the provided 15-point purpose handoff instrument, do you think that its use will increase the time of handoff | <ul style="list-style-type: none"> ● Strongly Agree ● Agree ● Disagree |

| | | |
|-----------------------|---|-----------------------|
| | between anesthesia providers and receiving PACU providers? | ● Strongly Disagree |
| Questions # 10 | Would you utilize this instrument as part of your long-term practice, if not please provide a reason. | Please comment below: |

Appendix F

Results of Expert Evaluation Survey Form - Tool Assessment

| Items in Tool | Not Relevant | Somewhat Relevant | Quite Relevant | Highly Relevant | I-CVI | S-CVI/Ave |
|---|--------------|-------------------|----------------|-----------------|-------|-----------|
| Assess readiness of PACU nurse | | 4 | 6 | 7 | 0.76 | 0.90 |
| Patient identifiers | | 2 | 7 | 8 | 0.88 | |
| Allergies | | 1 | 5 | 11 | 0.94 | |
| Type of Surgery/surgeon | | 0 | 4 | 11 | 1 | |
| Pertinent PMH/PSH | | 0 | 3 | 13 | 1 | |
| Pre-op Findings | | 3 | 6 | 8 | 0.82 | |
| Airway Concerns | | 1 | 4 | 12 | 0.94 | |
| List of Intra-Op medications | 1 | 1 | 4 | 10 | 0.88 | |
| Fluids | | 0 | 9 | 8 | 1 | |
| EBL | | 2 | 5 | 10 | 0.88 | |
| UO | | 3 | 7 | 7 | 0.82 | |
| Baseline Neuro Status if changed | | 0 | 2 | 15 | 1 | |
| IV lines, Invasive monitors/drains | | 1 | 6 | 10 | 0.94 | |
| Future Plans/Orders | 1 | 3 | 5 | 6 | 0.73 | |
| Receiving providers questions or concerns | | 1 | 6 | 10 | 0.94 | |

Appendix G

Results of Expert Evaluation Survey Form - By Individual Response

| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 |
|----|------|-------|----|----|----|----|---|------|-----|-----------|
| 1 | PACU | 16-20 | SA | A | SA | D | All HR | | D | |
| 2 | PACU | 21-25 | A | A | A | A | 1,2,3,13,14 (QR)-4-12/15 (HR) | N/A | D | N/A |
| 3 | PACU | 10-15 | A | A | A | A | 1&11 (QR) 2-10/12-15 (HR) | N/A | A | N/A |
| 4 | ANA | 16-20 | SA | SA | SA | SA | 1-8/10-12/15 (HR); 9,13,14 (QR) | NO | A | Yes |
| 5 | CRNA | 5-10 | A | A | A | A | 2-9/12-15 (QR); 1, 10, 11 (SR) | N/A | D | N/A |
| 6 | PACU | >26 | A | A | A | A | 1-3;5;6; 9-11 (QR); 4;7-8;12-15 (HR) | N/A | A | Yes |
| 7 | PACU | <5 | SA | SA | A | SA | 1-6;8;10-15 (HR); 7/9 (QR) | N/A | D | N/A |
| 8 | CRNA | 16-20 | D | D | D | A | 3;14 (SR), 4,6,8,11,15 (QR); 1-2,5,7,9,10, 12,13 (HR) | None | D | Yes |
| 9 | CRNA | 10-15 | D | D | D | D | 1,2,6 (SR), 7,11,15 (QR), 3,5,9,10,12,13 (HR) | | N/A | No Idea |
| 10 | CRNA | 16-20 | A | A | A | A | 8,14 (NR); 1,6,13 (SR); | N/A | A | "Comment" |

| | | | | | | | | | | |
|----|------|-------|----|----|----|----|--|-----------|----|-----------|
| | | | | | | | 2,7,15 (QR); 3-5/9-12 (HR) | | | |
| 11 | CRNA | >26 | A | A | A | A | 2,6,8-11 (QR); 1, 3-5; 7,12,13,15 (HR) | "comment" | D | "Comment" |
| 12 | CRNA | 10-15 | A | A | A | A | 7,11,14 (SR); 6,9,10 (QR); 1-4, 8, 12,13,15 (HR) | "comment" | D | Yes |
| 13 | CRNA | 10-15 | SA | SA | A | SA | 6,8,10,11,14,1 5 (SR); 1-4, 9, 12,13 (QR); 5, 7, (HR) | N/A | SA | N/A |
| 14 | CRNA | 16-20 | SA | SA | SA | SA | 1-15 (HR) | "comment" | SA | Yes |
| 15 | CRNA | 10-15 | A | A | D | A | 1-2 (SW); 3-6; 8-11; 13-15 (QR); 7, 12 (HR) | N/A | SA | "Comment" |
| 16 | ANA | 10-15 | A | A | A | A | 1, 9-11, 13,15 (QR); 2- 8,12,14 (HR) | N/A | A | Yes |
| 17 | PACU | >26 | SA | SA | SA | SA | 1,2,14 (QR), 3-13, 15 (HR) | N/A | D | N/A |

Appendix H

Results of Expert Evaluation Survey Form- Additional Questions

| | Q3 | Q4 | Q5 | Q6 | Q9 |
|--------------------------|------|------|------|------|------|
| Strongly Agree | 6 | 5 | 4 | 5 | 3 |
| Agree | 9 | 10 | 11 | 10 | 5 |
| Disagree | 2 | 2 | 3 | 2 | 8 |
| Strongly Disagree | 0 | 0 | 0 | 0 | 0 |
| I-CVI | 0.88 | 0.88 | 0.88 | 0.88 | 0.47 |

Appendix I

Sample Email Submission Sent to Key Stakeholders

Dear Anesthesia and Post-Anesthesia Care Colleagues,

As fulfillment of the requirements for the DNP degree through Frank J. Tornetta School of Anesthesia at Einstein Medical Center Montgomery/La Salle University School of Nursing, Maria Chernyak, SRNA and Courtney Posten, SRNA have selected '*A Process to Standardize Handoff Communication Between Anesthesia Providers and Post-Anesthesia Care Unit Nurses*' as our scholarly topic. The overall goal of our work is to develop a standardized evidence-based handoff communication instrument, to be utilized during the transition of care between anesthesia providers to the post-anesthesia care unit (PACU) providers.

As anesthesia and post-anesthesia care providers, you are invaluable content experts in this field. We are requesting that you please complete a brief online survey to assist us in identifying critical components of a handoff communication instrument to be utilized during the post-operative transition of care.

Completion of this 10 question survey should take less than 5 minutes.

We greatly appreciate your time!

After answering two demographic questions, please read each item and provide your opinion on the relevance of these components to a comprehensive, post-operative handoff communication instrument. Please provide comments for any additional items or deletions which you think should be addressed.

**Please note that your participation in this survey is completely voluntary. You may stop at any time and/or choose not to respond to any question. All collected survey information is deidentified and stored in the Qualtrics survey software program. Access to Qualtrics data is limited to the individual DNP Project team members.

Thank you very much for participating in our survey and assisting us with our DNP scholarly project.

Respectfully,

Maria Chernyak & Courtney Posten

Appendix J

IRB Exemption Form



Human Subjects Research Determination

February 2, 2022

Type of Review: Initial

Project Title: A Process to Standardize Handoff Communication Between Anesthesia Providers and Post-Anesthesia Care Unit Nurses

Investigator: Michael Kost

IRB ID: IRB-2022-851

Dear Michael Kost,

The planned activity noted above was reviewed by a member of the EHN IRB and determined not to be human subjects research. This decision only applies to the planned activity described in the materials provided to the IRB. As the person accountable for the conduct of the activity, you are responsible for ensuring that it is conducted as described in the materials provided.

Before this project can be initiated, you **must** email Derrick Crump, the Chief Privacy Officer, the following to confirm all HIPAA regulations will be followed:

- The activity description
- The plan for data use
- The plan for data protection (limited access, when and how data is stored, password protection, etc.)
- Any materials submitted within this determination and that will be used to carry out your planned activity
- Any data collection and master/linking sheets
- Any surveys/questionnaires
- Description of recruitment activities including invitations (if applicable)

If any data that is being collected for this project will be used for student requirements to earn a degree for an external school or institution (i.e., doing the study and collecting data for your dissertation, Master's Degree, etc, you must contact Tahirah Harrigan to confirm that all student requirements have been met and Derrick Crump, the Chief Privacy Officer, to confirm that a data sharing agreement is needed and/or signed.

Please note that any data collected for this activity cannot be analyzed and presented for another purpose unless an updated project description and analysis plan is approved by the IRB. Although much can be learned from these types of activities and sharing your findings is strongly encouraged, this activity as currently described cannot be referred to as "human subject research" when discussed in publications and presentations. Innovative Programs (IP) and Quality Improvement (QI) projects should not be described or analyzed as a "study" or "research" in publications or presentations but should be clearly identified as a "program", "program evaluation" or "QI project". An acceptable statement that could be included in the manuscript would be, "This project was reviewed and determined not to meet the definition of human subject research by the EHN IRB."

If you wish to analyze and present the data collected for your project/program as part of a human subject research study, please call the IRB Office at 215-456-7217 to discuss whether a new application must be submitted to the IRB for review prior to initiating this activity.

Sincerely,
Beth Lynch, CIP
Senior IRB Analyst

Note: Derrick Crump, Chief Privacy Officer, was notified. All HIPAA regulations were followed as per request.

Appendix K
Einstein Medical Center Montgomery Letter of Support



Frank J. Tornetta School of Anesthesia
LaSalle University School of Nursing

Michael Kost, DNP, CRNA
Director

Cynthia Betron, DNP, CRNA
Associate Director

October 6, 2021

DNP Committee Members
(Chernyak & Posten)

Letter of Support for DNP Project

Dear LaSalle University Nurse Anesthesia Track DNP Project Committee Members,

This letter is in strong support of the DNP project currently proposed by Maria Chernyak and Courtney Posten. The Frank J. Tornetta School of Anesthesia at Einstein Medical Center Montgomery will provide clinical experts for Ms. Chernyak and Ms. Posten's project, while adjusting their anesthesia clinical and class schedule accordingly to allow for adequate time to complete their DNP project. Once Ms. Chernyak and Ms. Posten successfully defend their proposal, they will submit the project to Einstein's Institutional Review Board (IRB) for review. Since the project is without risk to human subjects, it is expected to be given IRB approval with exempt status. Any future work that involves use of this project's materials will be submitted for its own separate IRB review.

Please let me know if you have any questions or need any additional information. We remain in full support of Ms. Chernyak and Ms. Posten's DNP project and will make every effort to accommodate them so that their DNP project remains a scholarly priority while enrolled in our program.

Respectfully Submitted,

A handwritten signature in blue ink that reads 'Mike Kost'.

Mike Kost, DNP, CRNA, CHSE, FAAN
Program Director

MK/dmq

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1330 Powell Street, Suite 608 Norristown, PA 19401 P: 484-622-7280 F: 484-622-7290 Einstein.edu

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MoisRehab Willowcrest Einstein Physicians Einstein Outpatient Care