Standardized Postoperative Handoff Tool to Improve Handoff Quality

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Standardized Postoperative Handoff Tool to Improve Handoff Quality

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Doctor of Nursing Practice in
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ABSTRACT

Standardized Postoperative Handoff Tool to Improve Handoff Quality

Haley Durkacz

Effective communication between healthcare providers is an essential element in the delivery of safe patient care. Loss of relevant information can occur during all phases of patient care but is most inclined to occur during the handoff from the operating room to the postoperative anesthesia care unit (PACU). Evidence has indicated that the transfer of patients by anesthesia providers remains informal and brief despite practice guidelines. When pertinent details are omitted during the anesthesia handoff there is a potential increase for medical errors, delayed treatment, and patient harm. The purpose of this project was to analyze the use of a standardized handoff tool in the postoperative setting to improve anesthesia handoff accuracy and completeness at a community hospital. Results showed that the use of a standardized handoff tool improved the adequacy and completeness of the anesthesia report and improved staff satisfaction. However, a with small sample was utilized indicating potential weak internal validity of results. Therefore, further research is needed to foster a better understanding of handoff accuracy of the anesthesia care provider.
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Standardized Postoperative Handoff Tool to Improve Handoff Quality

Interprofessional communication is an essential component of quality healthcare delivery, particularly when vital information and knowledge must be exchanged between an anesthesia provider and the post-anesthesia care unit (PACU) registered nurses (RNs). When relevant information is not effectively communicated from clinician to clinician during the transition of care or handoff, there is a potential increase in medical errors, delayed treatment, and provider dissatisfaction. The handoff plays a key role in ensuring the continuity, quality, and safety of patient care. The purpose of a handoff is to accurately transfer information about a patient’s medical state and care plan to ensure a seamless continuity of care between interprofessional providers (Petrovic et al., 2015, p. 112, section 1). Anesthesia providers participate in numerous handoffs for each patient under their care throughout the entire perioperative period. Evidence has shown that despite practice standards, handoffs by anesthesia providers remain short and inconsistent (Canale, 2016, p. 137). In particular, information loss and miscommunication most often occurs when the care of patients is transferred from anesthesia providers to PACU RNs postoperatively (Lambert & Adams, 2018, p. 361). Once a patient arrives to the PACU after surgery, the anesthesia provider must communicate all pertinent patient information to the PACU RN. During this time, the patient’s physiology is rapidly changing requiring timely and adequate handoff communication between providers. Lambert & Adams (2018) propose that the postoperative handoff is inadequate due to variation in the consistency and quality among provider communication. The lack of a standardized handoff, along with diverse communication practices, increases the result of an inaccurate anesthesia handoff (Robins & Dai, 2015, p. 264).

Background with Significance

Handoff between providers must be organized, accurate and thorough to increase the quality of handoff communication (Lambert & Adams, 2018, p. 361). In 2007, The Joint Commission National Patient Safety Goals outlined efficient handoff communications between
healthcare providers which included using a standardized process for handoff (The Joint Commission, 2007). This led to the United States Department of Defense and Patient Safety Program to release a toolkit for regulating safe handoff communication between providers (Canale, 2016). However, the transfer of patients and their handoffs of care remain inconsistent and incomplete (Canale, 2016).

A study in 2018 found that implementation of a standardized handoff tool between anesthesia providers and nurses postoperatively increased satisfaction among interprofessional providers (Lambert & Adams, 2018). Additionally, a study by Petrovic et al (2015), found that the implementation of a standardized handoff improved reliability of handoff and improved interprofessional provider satisfaction. A need for improved interprofessional communication with a standardized approach for conducting patient handoff has been identified as a Joint Commission National Patient Safety Goal (Petrovic et al., 2015). Improved interprofessional communication with a standardized approach is particularly important when anesthesia providers are transferring care to PACU RNs due to the safety risks of miscommunication and medical errors as well as provider dissatisfaction.

**Problem Statement**

A small community hospital located in southwestern Pennsylvania has an average of twenty surgical cases a day requiring multiple postoperative anesthesia handoffs. A lack of a standardized handoff has been identified as a concern by the interprofessional providers. By standardizing postoperative handoff, overall patient safety can be improved, a smooth transition can occur, errors can decrease, and handoff satisfaction can improve among providers.

**PICO Questions**

The following clinical question in PICO format (i.e., population, intervention, comparison, and outcomes) guided the literature search for this quality improvement initiative:
“For anesthesia providers and PACU RNs, does the utilization of a standardized handoff tool, compared to unstructured reporting, impact patient safety and provider satisfaction?”

**Synopsis of Literature Review**

To uncover pertinent evidence-based practice, a systematic search was completed from the year 2012 until 2018 of the Cumulative Index of Nursing and Allied Health Literature (CINAHL), Health and Psychosocial Instruments, Health Source: Nursing/Academic Edition, MEDLINE, Cochrane library, and PubMed. Filters were applied to include peer-reviewed articles and English as the primary language. Keywords used in the search included “standardized handoff protocols”, “post anesthesia handovers”, “standardized anesthesia handoffs”, “anesthesia handoff checklists”, and “PACU handoff”. Abstracts were reviewed for inclusion criteria which included studies investigating anesthesia handoff, standardized handoff protocols, anesthesia handover, or quality of handoffs. These searches yielded forty-five articles. Articles were excluded if they were conducted outside of the United States or in an intensive care unit. After a thorough review of these articles, a total of four articles were chosen for further analysis regarding quality and continuity of postoperative patient handoff. See Appendix A for full literature synthesis.

**Critical Appraisals of Literature**

Lambert & Adams (2018) sought to detect limitations, miscommunication errors and provider satisfaction in postoperative handoff among anesthesia providers and PACU nurses. A quantitative pre-and post-intervention approach was utilized to test the Written Handoff Anesthesia Tool (WHAT). Surveys were administered to the certified registered nurse anesthetists (CRNAs) and PACU RNs prior to and after the implementation of the handoff tool. The surveys evaluated satisfaction with handoff, how the CRNA and RN perceived handoff and if patient details were communicated. A statistically significant increase in satisfaction was
observed after implementation of the WHAT for both anesthesia providers (P < .001) and PACU RNs (P = .001) (Lambert & Adams, 2018). In addition, the X2 and Fisher exact test displayed a statistically significant improvement for both CRNAs and PACU RNs opinion of the quality of anesthesia report after the application of the handoff tool (Lambert & Adams, 2018). Limitations of this study included sampling by convenience, the use of one facility to conduct the research and the potential Hawthorne effect from participant being aware of evaluation (Lambert & Adams, 2018).

Canale (2016) also examined the application of a standardized handoff tool to determine if improved provider communication occurred. A pre-intervention/post-intervention survey was utilized and administered to twenty CRNAs at a regional hospital (Canale, 2016). Survey questions were aimed to address thoughts on quality of the transfer of information, provider and staff approval and their perception of patient safety (Canale, 2016). A descriptive analysis was completed to summarize the results of the study. Results showed that there was a 50% increase with handoff satisfaction after the implementation of the handoff tool (Canale, 2016). Providers also reported that postoperative handoff was more comprehensive and accurate after the utilization of the handoff tool. Lastly, the continuity of patient report had a statistically significant increase (p=0.0003) post implementation. The limitations to the study were a small sample size and limited generalizability due to it being executed at an 800-bed regional medical center and only collecting data from CRNAs (Canale, 2016).

Robins & Dai (2015) conducted a randomized control trial to determine if the utilization of a checklist during postoperative report decreased loss of information and miscommunication and improved adequacy of the anesthesia handoff. Prior to implementation, all anesthesia providers were informed on the use of the standardized tool but were blinded to the content of
the handoff tool that would be implemented (Robins & Dai, 2015). Randomization was used for participant division on the day of surgery and split into two groups with a 1:1 ratio (Robins & Dai, 2015). In group one, the anesthesia provider utilized the checklist during report while the providers in group two did not (Robins & Dai, 2015). After handoff was completed, a questionnaire was administered to the PACU nurse to recall parts from the handoff, their opinion on the adequacy of communication, and if clarification was needed after the handoff (Robins & Dai, 2015). Among the nurses in the protocol checklist group, 92% successfully recalled all elements of the anesthesia handoff (Robins & Dai, 2015). A statistically significant improvement (p=0.0042), more specifically a decrease in the occurrence of miscommunication was observed (Robins & Dai, 2015). The limitations associated with this study included a small sample size and a short implementation period (Robins & Dai, 2015).

Lastly, Keebler et al. (2016) used a meta-analytic method to understand the results of handoff procedures. The authors focused on information being transferred during handoff, along with patient, provider, and hospital outcomes (Keebler et al., 2016). Thirty-six articles were chosen for review, all of which were a pre-intervention/post-intervention design (Keebler et al., 2016). Twenty-seven of the thirty-six articles were included in the analysis of handoff information being passed by providers. They showed a noteworthy significant increase in the amount of patient information being passed during handoff when protocols were used (Keebler et al., 2016). The study also discovered an average improvement in patient and provider results and a small improvement in organization outcomes with the use of a protocol (Keebler et al., 2016). The studies ranged from interventions effecting organizational outcomes to effecting patient outcomes (Keebler et al., 2016). This validates that handoff protocols have a variety of effects on different types of measurements being studied, such as provider, patient, and
organizational outcomes (Keebler et al., 2016). Limitations to this study include the significant heterogeneity among the articles reviewed (Keebler et al., 2016). Publication bias was indicated across the analysis from the lack of studies being published with insignificant results (Keebler et al., 2016). The “file drawer effect” or the underreporting of important qualifying negative studies was found potentially skewing results (Keebler et al., 2016).

**Synthesis of Evidence**

The four articles meeting inclusion criteria consisted of two quasi-experimental studies, a randomized control trial, and a meta-analysis. All four studies either implemented or analyzed a pre-intervention/post-intervention design method. The randomized control trial was implemented to analyze if the utilization of a checklist during postoperative handoff decreased the loss of information, increased communication, and improved adequacy of the anesthesia handoff (Robins & Dai, 2015). The two quasi-experimental studies aimed to improve the continuity of the transfer of information, perceptions of patient safety, and healthcare worker satisfaction with anesthesia provider handoff (Canale, 2016; Lambert & Adams, 2018). The last study appraised used a meta-analytic approach to understand the results of anesthesia handoff focusing on patient safety, handoff quality, and hospital outcomes (Keebler et al., 2016).

All four articles reported an improvement in the quality and continuity of handoff after utilization of a standardized handoff tool by anesthesia providers during postoperative report. Additionally, using a standardized handoff tool was cost-effective, easy to modify, simple to use, and improved collaboration among all providers (Canale, 2016). Keebler (2016) noted that by applying a standardized handoff tool provider bias of what information is considered “important” is decreased which can improve the quality of handoffs. Lastly, Canal (2016) found that implementing a handoff tool exhibited a significantly positive change in performance and attitude surrounding the transfer of patient care. Conclusively, all results revealed that the use of
a handoff protocol improves safety by reducing information loss and can provide a satisfactory patient handoff. This further signifies the need for implementing a standardized handoff tool to increase the adequacy and quality of anesthesia provider handoff. See Appendix B for complete evaluation table.

**Theoretical Framework**

**Kurt Lewin Change Theory**

Kurt Lewin is widely considered the founding father of change management (Cummings et al., 2016). Lewin proposed a theory involving three steps for change: unfreeze–change–refreeze (Cummings et al., 2016). In the first step to his theory, he believed that in order to change, the individual must formulate a plan of action to determine the “forces” that can facilitate or impede the change process (Burnes & Bargal, 2017). These are the driving forces that foster change, the restraining forces that obstruct change and the status quo representing the state of equilibrium of the group or individual (Buonocore, 2004). Lewin believed individuals must overcome the restraining forces by strengthening the driving forces to facilitate change (Burnes & Bargal, 2017). In the second stage of Lewin’s theory, individuals must implement the change process by changing their thoughts, feelings, and behavior to accomplish the change (Burnes & Bargal, 2017). Upon completion of each step, the new behavior becomes sustained in the individual’s life and becomes their new status quo (Burnes & Bargal, 2017). Lewin’s theory is easy to follow, versatile and group focused (Freudenberg, et al., 1995). Group dynamics and decisions are essential to the pre-intervention/post-intervention studies which were utilized with the implementation of this project (Salzwedel et al., 2013).

The first step in Lewin’s theory is the unfreezing stage which is equivalent to the planning stage of this quality improvement project. During the planning stage, the project investigator needs to identify the barriers to accepting the practice change since the most
significant piece for a quality improvement project’s success is acceptance from those who will be participating in the change (Canale, 2016). Handoff communication is reliant on the human factor of compliance (Lambert & Adams, 2018). Lack of compliance or reluctance for change by anesthesia providers to apply a standardized handoff tool would impede the project’s success. Strategies for anesthesia provider acceptance of the practice change would be presenting the benefits of a standardized handoff tool including a timely and comprehensive handoff, less callbacks for clarification of information improving provider satisfaction, and the benefit of improved patient safety.

The second step in Lewin’s theory is the changing stage. Once barriers and resistance to change are overcome, the implementation of the quality improvement project can begin. Lead stakeholders at the project implementation site encouraged staff to utilize the handoff tool during postoperative handoff upon arrival to the PACU. Weekly communication between the project investigator and the lead stakeholder at the hospital will occurred in order to continually evaluate the project. The third and final stage of Lewin’s theory is the refreeze stage. This occurs when the change is endorsed by staff members. This would be indicated by a statistically significant increase in handoff satisfaction amongst staff members and continued utilization of handoff tool within this as hospital PACU.

Specific Aims
The purpose of this project was to implement a standardized handoff tool to be utilized during the postoperative handoff between the anesthesia provider and PACU RN. This handoff tool aimed to improve communication and ultimately, patient safety and provider satisfaction at a small community hospital located in southwestern Pennsylvania.

Methods

Context
The project was implemented at a community hospital located in southwestern Pennsylvania with the population of interest being anesthesia providers and PACU RNs. The fourteen bed PACU department receives a variety of surgical cases including general surgery, orthopedic, otorhinolaryngology, vascular, cardiac, urology, gynecology, podiatry, and spinal cases. The hospital averages twenty-five surgical cases per day. In total, there are 20 staff CRNAs employed by the hospital, working eight, twelve or twenty-four-hour shifts. There are five PACU nurses per day working eight- or twelve-hour shifts.

**Intervention**

*Project Design.* This quality improvement project attempted to standardize postoperative handoff between anesthesia providers and PACU RNs to increase communication and patient safety. The project investigator informed and educated staff about the DNP project initiatives via staff email and informative flyers posted in staff lounges. The project investigator researched and developed a postoperative handoff tool for utilization during handoff between anesthesia provider and PACU RN. The tool was based upon handoff tools found in the literature adapted to compliment the needs of the anesthesia and PACU departments. The handoff tool was completed by anesthesia providers prior to transferring the patient to PACU. The handoff tool helped guide verbal postoperative handoff from the anesthesia provider to PACU RN. Once handoff was completed, the tool would remain with the PACU RNs to refer to as needed. See Appendix C for the standardized handoff tool design. In attempt to determine if increased communication, patient safety, and satisfaction have occurred with the utilization of the handoff tool, a preintervention-intervention/post-intervention study design was applied. A pre-intervention questionnaire utilizing a Likert Scale was emailed to all anesthesia providers and PACU RNs to evaluate current handoff practices. After four weeks of implementation, a post-intervention questionnaire in the same format was emailed to all anesthesia providers and PACU RNs to evaluate handoff
tool and its effectiveness. See Appendix D for pre-intervention/post-intervention survey design. Statistical analysis of results was done was all data was collected. Interpretation of results was completed by the project investigator.

**Project Timeline.** The project began in Spring 2021 with an eight-week implementation timeline. This timeline included intervention, data analysis and interpretation of results. Weekly contact occurred between the project investigator and lead stakeholders at the hospital for continuous evaluation of the project. Appendix E contains a detailed timeline in the SMART Workplan including all proposal strategies and interventions.

**Gaps in Evidence and Benchmarks**

The Joint Commission outline the importance of a structured handoff to increase patient safety. The Agency for Healthcare Research and Quality developed Team Strategies & Tools to Enhance Performance and Patient safety (TeamSTEPPS) to improve patient safety, communication, and teamwork among health care providers (Agency for Healthcare Research and Quality). However, there are no benchmarks currently in place regarding handoff tools specific for anesthesia providers to utilize during postoperative handoff. Previous studies have been implemented with a similar design to assess the quality and continuity of anesthesia handoff; however, none of the studies utilized the same handoff tool or practice guidelines for development of a handoff tool. This project implemented a handoff tool based on the literature and the specific needs of the hospital site serving as the site of implementation.

**Feasibility Analysis**

A feasibility analysis was conducted for this quality improvement project. The implementation of a standardized handoff tool can facilitate and increase interprofessional communication at a low cost and with minimal additional resources. Moreover, this does not affect anesthesia or PACU RN workflow since postoperative handoff is an essential component
of healthcare delivery. Additionally, the sustainability of this project was very high since it is easy to revise and implement in practice.

**Needs Assessment.** A community hospital located in Western Pennsylvania has not yet established a standardized approach for anesthesia provider to PACU RN handoff. The goal of this project was to increase communication, patient safety, and the overall quality of anesthesia handoff at this facility. The project investigator and the faculty of record provided guidance during project development and implementation. The primary stakeholders include the anesthesia department, PACU staff nurses, the PACU supervisor and manager, the Director of Critical Care and Anesthesia, and the Assistant Director of Surgical Services. To determine the perception of the quality of handoff, a pre-intervention/post-intervention survey was administered to all anesthesia providers and PACU RNs. No technical equipment was needed for this project, only paper and printing resources for use of the handoff tool. The handoff tool was guided by the evidence and tailored specifically to fit the need of anesthesia and PACU departments.

**SWOT Analysis.** A strengths, weaknesses, opportunities, and threats (SWOT) analysis was completed with input from the literature, personal experience, and stakeholder input.

**Strengths and Opportunities.** The strengths associated with this quality improvement project were the use of a structured handoff tool in improving the adequacy and completeness of anesthesia handoff communication between CRNAs and RNs (Keebler et al., 2016). Likewise, it decreased the risk for miscommunication during handoffs and potential medical errors (Petrovic et al., 2015). A standardized handoff tool was easy to adopt, modify, and was simple for provider use (Canale, 2016). It was also cost effective due to little to no financial investment needed with a potentially saving in healthcare costs by preventing medical errors. A standardized handoff
could decrease provider bias of what information is considered “essential” and may lower the rate of callbacks for information clarification (Keebler et al., 2016; Robins & Dai, 2015). This also can facilitate better interprofessional communication among providers. Finally, utilization of a standardized handoff tool facilitates better outcomes across the clinical care spectrum and increases interprofessional communication and teamwork (Keebler et al., 2016).

**Weakness and Threats.** The weaknesses associated with this quality improvement project result from potential limitations of standardized handoff tools including unsuitability for all surgical cases, and a potential for an increase in the time incurred during handoff report (Salzwedel et al., 2013; Keebler et al., 2016). Other limitations include the elimination of valuable patient-related information during report that is not included in the standardized handoff tool and quality ratings being subjective (Keebler et al., 2016; Robins & Dai, 2015). Potential threats related to this project include hospital barriers for project implementation due to COVID-19 restrictions, and lack of compliance from the anesthesia team due to virus-related disruptions in normal routine.

**Budget and Financial Plan.** The cost of resources associated with this quality improvement project were minimal (see Appendix F). In-kind contributions were made for the paper and printing costs of flyers and tools. No organizational costs or sales/marketing were associated with this project. Pre-intervention/post-intervention surveys was administered through email and took less than two minutes to complete. Implementation of the handoff tool was utilized during normal postoperative report influencing little to no additional time for staff members. An investment can be achieved from decreasing sentinel events and length of patient stay from communication errors (Park et al., 2017). Ultimately, this provided an improvement in the quality and continuity of patient care.
**Sustainability of the Proposed Project.** Improving satisfaction of anesthesia handoff along with increasing patient safety and interprofessional communication encourages project sustainment. The handoff tool was easy to implement into practice and produced essentially no cost. This project could easily be duplicated and modified for use on all postoperative patients, increasing the chance of future projects. Sustainability of the project should result from support by stakeholders at the implementation site reinforcing adoption of the handoff tool into everyday practice. Project sustainability would indicate completion of the refreezing stage of Lewin’s change theory.

**Congruence with Organizations Strategic Plan.** This project aligns with the western Pennsylvania community hospitals mission of great patient care for their community (Washington Health System, 2020). They focus on efficient processes to improve interprofessional communication and coordination of patient care between hospitals, services, and providers (Washington Health System, 2020). They value strong communication practices for continuous improvement in the delivery of safe and quality care to their patient population (Washington Health System, 2020). The utilization of a standardized handoff tool increases interprofessional communication, patient safety, and the quality of patient care (Lambert & Adams, 2018). Showing that this quality improvement project supports the hospitals mission and goal to provide excellent patient care.

**Evidence of Key Site Support.** The main stakeholder associated with this project was both the Director of Critical Care and Anesthesia and Assistant Director of Surgical Services at the implementation site. See Appendix F for letter of support.

**Study of the Intervention**

A pre-intervention/post-implementation design was utilized for this project. The intervention was evaluated utilizing Likert scale surveys from Qualtrics developed by the project
investigator. The surveys were administered via email to all anesthesia providers and PACU RN employed by the hospital. The results evaluated staff perceptions of postoperative handoffs prior to and after implementation of the handoff tool. All responses to the surveys were anonymous as set up by Qualtrics. Comparing the pre-intervention/post-intervention survey results, was used to establish whether the project outcomes were due to the utilization of the handoff tool.

**Measurable Project Objectives**

The pre-intervention/post-intervention survey questions were utilized to evaluate (1) impact on overall patient safety (2) provider satisfaction of handoff, (3) the thoroughness of information passed during handoff (4) and the overall quality rating of the anesthesia handoff. Post-anesthesia care unit RNs answered survey questions utilizing the Likert scale mentioned previously. The surveys were delivered to staff emails via Qualtrics and survey responses were anonymous.

**Evaluation Plan**

In Spring 2021, a pre-intervention survey was administered to all anesthesia providers and PACU RNs employed by the hospital to determine the perception of the quality of postoperative handoff prior to implementing the handoff tool. The handoff tool was utilized by all anesthesia providers for one month prior to evaluation. At the end of four weeks, a post-intervention survey was provided to anesthesia providers and PACU RNs to rate their perceptions of the handoff when utilizing the tool. Both the pre-intervention/post-intervention surveys utilized a Likert scale of 1-5, where 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, and 5 = strongly disagree (Sullivan & Artino, 2013). The surveys were administered to staff by email, utilizing Qualtrics for convenience, with the goal of at least 25 pre-survey and post-survey responses. The first question on the post-survey asked the respondent if they
completed the pre-survey. Only those post-surveys with an answer of “yes” to this question were included for analysis. See Appendix D for pre-intervention/post-intervention surveys.

Lead stakeholders at the community hospital encouraged staff to utilize the handoff tool during postoperative handoff to the PACU. Weekly contact occurred between the project investigator and the lead stakeholder at the hospital for continuous evaluation of the project.

Analysis

Data analysis was first completed via Qualtrics with a concept testing report. Further descriptive statistical analysis of the pre-survey and post-survey results were completed utilizing the IMB statistical package or social science software program (SPSS). Descriptive statistical analysis will include mean and standard deviation for survey results. Lastly, a Mann-Whitney U test was conducted for each pre-intervention/post-intervention survey questions using IMB SPSS to determine if any findings are statistically significant.

Ethical Considerations

The project begins implementation in Spring 2021. The ethical considerations for this project included anesthesia providers, PACU RNs and patients. The pre-intervention/post-intervention survey results were anonymous as set up in Qualtrics and no identifying data questions was collected. Only the project investigator had access to results on a password protected computer. Staff participation was voluntary, and they were able to discontinue participation at any time without penalty. There was no direct patient care involved with this project, and no consents were necessary. Also, no patient identifying information was collected. Since postoperative handoff occurs on all surgical patients at the implementation site no delay in patient care was associated with this project.

Results
Twenty-seven voluntary participants completed the pre-intervention/post-intervention survey. The sample consisted of anesthesia providers and post-anesthesia care unit nurses. Two post-intervention surveys were removed from analysis due to not completing the pre-intervention survey.

The results demonstrated that after the implementation of the handoff tool, 84.6% of participants thought the handoff process was comprehensive, compared to 37% prior to implementation. Also, 88.8% of participants believed that implementation of the standardized handoff tool promoted patient safety in contrast to 40.7% prior to implementation. Satisfaction of the handoff process drastically increased from a 44.4% to 88.8% post-implementation of the handoff tool. When asked if the quality of the handoff process being satisfactory prior to implementation of the handoff tool, only 11.1% strongly agreed, 33.3% agreed, 25.9% were neutral and 29.6% disagreed. However, post-implementation 14.8% strongly agreed, 81.4% agreed, 3.7 were neutral and no one disagreed that the handoff process being satisfactory. Results are illustrated in figure 1 through figure 4. According to the data collected, staff believed that utilization of a standardized handoff tool created a more comprehensive handoff report, supported patient safety, and overall improved staff satisfaction. The statistical significance of the results can be seen in Figure 5. Even though the goal was met to attain at least 25 pre-intervention/post-intervention surveys, lack of participation by staff was a barrier that inhibited us from gaining more results to further evaluate the validity of the study.
Figure 1.

The Handoff Process is Comprehensive

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<thead>
<tr>
<th>Category</th>
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<th>Post</th>
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<tbody>
<tr>
<td>Strongly Agree</td>
<td>14.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Agree</td>
<td>37</td>
<td>84.6</td>
</tr>
<tr>
<td>Neutral</td>
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<td>11.5</td>
</tr>
<tr>
<td>Disagree</td>
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<td>0</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Figure 2.

The Handoff Process Promotes Patient Safety

- **Strongly Agree**
  - Pre: 7.41%
  - Post: 11.1%

- **Agree**
  - Pre: 88.8%
  - Post: 40.7%

- **Neutral**
  - Pre: 0%
  - Post: 25.9%

- **Disagree**
  - Pre: 25.9%
  - Post: 0%

- **Strongly Disagree**
  - Pre: 0%
  - Post: 0%
Figure 3.

Figure 4.
A Mann–Whitney U test was ran utilizing IBM SPSS Statistics. Each question was paired for analysis. The findings were statistically significant if the p value is less than 0.05.

<table>
<thead>
<tr>
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<th>P Value</th>
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<tbody>
<tr>
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<td>Question 2</td>
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<td>Question 4</td>
<td>&lt;0.001</td>
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<td>Question 5</td>
<td>&lt;0.001</td>
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</table>
Discussion

Summary and Interpretation

Interprofessional communication is an important part of quality healthcare delivery, particularly when patient information must be exchanged between an anesthesia provider and the PACU RNs. When important information is not competently communicated, there is a possible increase in medical errors, delayed treatment, and provider dissatisfaction. There was an overall increase in provider satisfaction with handoff after implementation of the standardized handoff tool. Prior research found that utilization of a standardized handoff tool could promote improved outcomes across the clinical care spectrum (Keebler et al., 2016). Also, participants agreed that the use of the standardized handoff tool promoted patient safety and a comprehensive postoperative handoff. These results further justify that utilization of a handoff tool, decreases the risk for miscommunication during handoffs and potential medical errors (Petrovic et al., 2015). Meeting the desired outcomes for this project that a standardized handoff is an important part in continuing continuity, quality, and safe patient care.

Like other studies, results showed that the use of a standardized handoff tool improved the adequacy and completeness of the anesthesia report and improved staff satisfaction. However, a with small sample was utilized for this project indicating potential weak internal validity of results. These limitations were also seen in prior research regarding anesthesia handoff. Therefore, further research is needed to foster a better understanding of handoff accuracy of the anesthesia care provider

Limitations

Limitations of this project included a small sample size of participants. A small sample size can skew results, reduce the overall power of the study, and imply weak internal validity of
results. Indicating the results obtained could be potentially inconclusive. Additionally, the four-week timeline was a second limitation to this project. A longer implementation timeline could decrease the lack of participation by allowing more staff members to utilize the handoff tool and partake in the pre-intervention/post-intervention survey.

Conclusion

Communication among healthcare providers is vital to the delivery of safe patient care. Loss of relevant information, medical errors and provider dissatisfaction can occur during every aspect of patient care. This potential for miscommunication can occur during the critical patient transfer from the operating room to the PACU (Lambert & Adams, 2018). Implementing a standardized handoff for anesthesia providers to utilize can increase patient safety and provider satisfaction. This project aligned with the essentials of doctoral education for advance nursing practice. It supported Essential I, II, and VII by utilizing scientific underpinnings and evidence-based research for designing and implementing a practice change. Implementation of this project met essential III, IV, and V by indicating a need for a new policy of postoperative patient handoff to provide safe, effective, and patient centered care. Furthermore, it met essential VI and VII by improving interprofessional collaboration and communication to facilitate optimal care and patient population outcomes. The project site had not previously utilized a standardized handoff tool. Successful implementation of a practice change is dependent on the support of participants. Due to the ease of implementation and low cost associated with this project, it could be reimplemented at the project site. A longer implementation timeline could help facilitate a practice change in anesthesia handoff at this site and support the strategic plan for the hospital to provide great patient care their community.
References


# Appendix A

## Literature Search

<table>
<thead>
<tr>
<th>Date</th>
<th>Database</th>
<th>Search Terms (key words)</th>
<th>Number of hits</th>
<th>Limits applied</th>
<th>Number of relevant articles/ Scholarly evidence</th>
</tr>
</thead>
</table>
## Appendix B

### Evaluation Table

<table>
<thead>
<tr>
<th>Year</th>
<th>Citation: Author, Title, Country</th>
<th>Purpose of the Study</th>
<th>Sample Description</th>
<th>Design / Methods / Measures</th>
<th>Dependent/Independent Variables</th>
<th>Findings</th>
<th>Appraisal/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>Lambert, L., &amp; Adams, J.A. Improved Anesthesia Handoff After Implementation of the Written Handoff Anesthesia Tool (WHAT). <em>AANA Journal</em>, 86 5, 361-370. United States of America</td>
<td>- To identify barriers and omissions in anesthesia handoffs between certified registered nurse anesthetists (CRNAs) and post anesthesia care unit (PACU) registered nurses (RNs) and between CRNAs before and after implementation of a standardized format, the Written Handoff Anesthesia Tool (WHAT). - A secondary aim: to improve CRNAs’ and PACU RNs’ perception and satisfaction with anesthesia handoff communication.</td>
<td>- The study population consisted of 22 CRNAs and 15 PACU RNs. - Sampling was done by convenience. - All CRNAs and PACU RNs were included in the implementation of the WHAT as well as the pre- and post- data collection</td>
<td>- A quantitative preintervention-postintervention design was used - Two separate tools were used both before and after implementation: The Anesthesia Handoff Communication (AHC) survey, and the Targeted Solutions Tool (TST) for Handoff Communications. - The AHC and TST forms were completed by CRNAs and PACU RNs before and after implementation of the WHAT - The AHC was used to evaluate CRNA and PACU RN satisfaction with anesthesia handoff</td>
<td>- DV: quality of anesthesia handoff - IV: standardized handoff tool (WHAT)</td>
<td>- AHC results post implementation of the WHAT: statistically significant increase in satisfaction for both CRNAs (P &lt; .001) and PACU RNs (P = .001). - The TST program results: The CRNA-to-PACU RN handoff communication preintervention defective rate was 60.7% and the postintervention defective rate was 36.4% - χ2 and Fisher exact test analysis of the TST: a statistically significant (P &lt; .0001)</td>
<td>- Due to the risk for miscommunication during handoffs and information missed it is essential to identify the obstacles in handoffs. - The limitations: sample of convenience, the use of one facility, and a possible Hawthorne effect from participants’ awareness of being evaluated - The process of handoff communication is still dependent on the human factor of compliance - Group dynamics and group decision were integral to this study and the relationship between these factors and individual compliance is an area for future study.</td>
</tr>
</tbody>
</table>
### 2018

Canale, M.L.  

- United States of America

**-TST** was used to determine whether anesthesia handoffs were perceived as adequate and to identify the factors contributing to inadequate handoffs and patient details omitted.

**DV:** quality and continuity of the transfer of information

**IV:** standardized handoff procedure; the TeamSTEPPS MODEL

- Preintervention and postintervention survey paired t test range of P < .0001 to .0003 showing statistically significant improvements.

- No CRNAs strongly agreed with being satisfied with the handoff process before the intervention; however, 50% (n = 9) strongly agreed with being

- One of the most important pieces contributing to the success of a quality improvement project is buy-in from those who will be required to make a change.

- The standardized handoff tool was easy to modify and adopt, and simple to use

- A sample size of 20 is considered relatively small in statistical analyses.

---

- **2018** Canale, M.L.
- **Implementation of a Standardized Handoff of Anesthetized Patients. AANA Journal, 86 (2), 137-145.**
- **-United States of America**

- **-TST** was used to determine whether anesthesia handoffs were perceived as adequate and to identify the factors contributing to inadequate handoffs and patient details omitted.

- **DV:** quality and continuity of the transfer of information

- **IV:** standardized handoff procedure; the TeamSTEPPS MODEL

- Preintervention and postintervention survey paired t test range of P < .0001 to .0003 showing statistically significant improvements.

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- One of the most important pieces contributing to the success of a quality improvement project is buy-in from those who will be required to make a change.

- The standardized handoff tool was easy to modify and adopt, and simple to use

- A sample size of 20 is considered relatively small in statistical analyses.
- The anonymous postintervention survey was given within a 72-hour window after the standardized handoff was implemented for a period of 2 weeks.

- 67% (n = 12) of CRNAs reported that they disagreed or strongly disagreed with the handoff process being appropriate before the intervention, just 6% (n = 1) reported disagreeing or strongly disagreeing that the handoff process was appropriate following the implementation of the standardized process.

- Ninety-five percent of CRNAs surveyed (n = 17) agreed or strongly agreed that the preintervention handoff process lent itself to mistakes, whereas

- Due to the small sample size, a X² test was limited to a narrative description of the survey results.
only 11% of CRNAs surveyed (n = 2) agreed or strongly agreed that the standardized handoff process lent itself to mistakes.

-78% (n = 14) of CRNAs disagreed or strongly disagreed that the handoff process was comprehensive before the intervention, 6% (n = 1) disagreed or strongly disagreed that the standardized handoff process was comprehensive.

-67% (n= 12) disagreed or strongly disagreed that the preintervention handoff process was effective for transferring important
To understand the effects of handoff protocols using meta-analytic approaches. Focused on the care process of handoffs and how performance of this process is altered based on the implementation of handoff standardization.

Medline, SAGE, Embase, and PsycINFO databases were searched from the earliest date available until March 2015. There were no restrictions on study dates.

Keywords searched: patient handoffs and handoff protocols and included the following terms: Hand-off, Handoff, or Hand; sign-out, sign out, or sign-out; shift report, inter-shift report, or

Articles were chosen for inclusion if they met all three of the following criteria: The article described an empirical investigation that examined the implementation of a handoff protocol; the data were collected in the field as opposed to in a simulation-based study, and the articles reported the statistics required to calculate effect sizes for each study comparison.

Final set of 36 articles, all of which were pre-/postintervention designs implemented in live

There was a medium and significant increase in the amount of information passed after handoff protocol implementation, $g = .71$ (95% CI [.63, .79]), with a high level of heterogeneity ($I^2 = 82.5\%$).

There was a medium level of improvement in patient outcomes after handoff protocol implementation, $g = .53$ (95% CI [.41, .65]). With a high level of heterogeneity ($I^2 = 97\%$).

The results indicate that there is publication bias across the metanlyses, due to insufficient studies being published with null findings.

The gray literature could not be meta-analyzed.

Instilling a protocol in some circumstances can significantly lengthen the amount of time it takes to conduct handovers.

Instilling a protocol can sometimes lead individuals to pass only information in the protocol and therefore miss other valuable patient-related information, such as the patient’s level of

<table>
<thead>
<tr>
<th>Year</th>
<th>Authors</th>
<th>Methods/Approaches</th>
<th>Results</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>Keebler JR, Lazzara EH, Patzer BS, et al.</td>
<td>Meta-Analyses of the Effects of Standardized Handoff Protocols on Patient, Provider, and Organizational Outcomes.</td>
<td>There was a medium and significant increase in the amount of information passed after handoff protocol implementation, $g = .71$ (95% CI [.63, .79]), with a high level of heterogeneity ($I^2 = 82.5%$).</td>
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<td></td>
<td></td>
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<td></td>
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<td>-The results indicate that there is publication bias across the metanlyses, due to insufficient studies being published with null findings.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>-Medline, SAGE, Embase, and PsycINFO databases were searched from the earliest date available until March 2015.</td>
<td>-The gray literature could not be meta-analyzed.</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>-There were no restrictions on study dates.</td>
<td>-Instilling a protocol in some circumstances can significantly lengthen the amount of time it takes to conduct handovers.</td>
<td></td>
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<td></td>
<td></td>
<td>Keywords searched: patient handoffs and handoff protocols and included the following terms: Hand-off, Handoff, or Hand; sign-out, sign out, or sign-out; shift report, inter-shift report, or</td>
<td>-Instilling a protocol can sometimes lead individuals to pass only information in the protocol and therefore miss other valuable patient-related information, such as the patient’s level of</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Final set of 36 articles, all of which were pre-/postintervention designs implemented in live</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
inter-shift report; Bedside shift; Handover, hand-over, or hand over; sign over, sign-over, or sign over; Nursing report; patient transfer; checkout, check out, or check-out; and protocol.

To evaluate these data, variables were analyzed using independent-samples techniques. The data were analyzed using a random effect model to summarize the results.

-There was a medium and significant increase in provider outcomes after handoff protocol implementation, g = .51 (95% CI [.41, .60]), with a moderate level of heterogeneity (I² = 66%)

Eggers Test
Outcomes:
Handoff: t statistic = 11.08, p = <.001
Provider: t statistic = 7.54, p = <.001
Patient: t statistic = 9.05, p = <.001
Organizational: t statistic = 11.10; p = <.001

-Longer protocols significantly increased the amount of handoff information transmitted (mean effect = .75) compared with the use of shorter protocols (mean

-Standardized handoff may serve as visual aids or prompts as to what information needs to be passed between providers.

-Standardized handoff may work by reducing individual biases as to what information is “important.”

-Structured communication facilitates better outcomes across the clinical care spectrum and apparently affects outcomes at the organizational level.
<table>
<thead>
<tr>
<th>Year</th>
<th>Authors</th>
<th>Title</th>
<th>Methodology</th>
<th>Results</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>Robins, H., &amp; Dai, F.</td>
<td>Handoffs in the Postoperative Anesthesia Care Unit: Use of a Checklist for Transfer of Care. AANA Journal, 83(4), 264-8. United States of America</td>
<td>- The 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 anesthesia providers’ time spent in transfer of care, with improved adequacy of the handoff. &lt;br&gt;- The use of a standardized and formulated checklist during handoff would improve communication between the anesthesia provider and the receiver, resulting in reduced information loss during report, higher adequacy. &lt;br&gt;- A computer-generated list of random numbers was used for participant allocation in a 1:1 ratio on the day of surgery to 2 groups. &lt;br&gt;- In group 1, the anesthesia provider performed the PACU handoff using the formulated checklist. &lt;br&gt;- In group 2, the anesthesia provider performed the PACU handoff without using the checklist. &lt;br&gt;- Randomized 60 anesthesia providers (30 per group) into the study. &lt;br&gt;- A checklist was created by a workgroup that included input from the PACU RNs, a team of Certified Registered Nurse Anesthetists (CRNAs), and members of the patient safety committee. &lt;br&gt;- All anesthesia providers were instructed on how to use a checklist but were blinded to the content of the real checklist. &lt;br&gt;- Depending on group assignment, the anesthesia provider delivered a verbal report either with a checklist or without a checklist after the patient arrived at the PACU.</td>
<td>- 24 of 26 RNs (92%) in the checklist group (median score = 6; interquartile range = 6-6) successfully recalled all 6 key elements. &lt;br&gt;- 14 of 26 RNs (54%) in the no checklist group (median score = 6; interquartile range = 5-6) successfully recalled all the elements (P = .0039) &lt;br&gt;- Use of the checklist by an anesthesia provider showed lowered rate of callbacks for information clarification: 0% vs 69%, P = .0042 &lt;br&gt;- Use of the checklist led to</td>
<td>- Larger scale studies need to be implemented for further research. &lt;br&gt;- Implementation of the study at multiple sites could provide more accurate results &lt;br&gt;- A larger sample size could provide more accurate results &lt;br&gt;- Limitation that the anesthesia residents did not participate in the study &lt;br&gt;- The RNs ratings were subjective</td>
</tr>
</tbody>
</table>
of report, lower rate of callbacks for information clarification, and reduced time in the PACU for the anesthesia provider.

-After the handoff was completed, a sealed data collection sheet was given to the PACU RN.

- A chart review was completed for data collection regarding “Time In” to PACU and “Anesthesia End,” from which each provider’s time in the PACU was computed.

higher adequacy rating of the handoff by RNs. But the difference was not statistically significant: 100% vs 85%, P = .11

**Legend:**

- Written handoff anesthesia tool (WHAT)
- Post Anesthesia Care Unit (PACU)
- Certified Registered Nurse Anesthetist (CRNA)
- Registered Nurse (RN)
- Anesthesia Handoff Communication (AHC) survey
- Targeted Solutions Tool (TST)
- Team Strategies to Enhance Performance and Patient Safety (TeamSTEPPS)
# Appendix C

## Handoff Tool

<table>
<thead>
<tr>
<th>Patient ID</th>
<th>Allergies:</th>
<th>Ht/Wt:</th>
</tr>
</thead>
</table>

**Family Contact Information:**

**Pre-Op Vitals / Information**

<table>
<thead>
<tr>
<th>HR:</th>
<th>BP:</th>
<th>RR:</th>
<th>SpO2:</th>
<th>Temp:</th>
<th>Glucose:</th>
</tr>
</thead>
</table>

**NPO status:**

TF Stopped @ ______

**O2 Requirements:**

**Medications/Drips:**

Anticoagulants:

**Pertinent Labs:**

Other:

<table>
<thead>
<tr>
<th>Case:</th>
<th>ASA:</th>
<th>Surgeon:</th>
</tr>
</thead>
</table>

**HPI**

PMH/PSH

**Airway:**

Difficult yes/no  GA  RSI  ETT Oral/Nasal  LMA  MASK  FOB  MAC  Other

**Lines/Drains**

Medications

Abx__________ @_____

**I/O:**

<table>
<thead>
<tr>
<th>Crystal:</th>
<th>Colloid:</th>
<th>UO:</th>
<th>EBL:</th>
<th>Products:</th>
<th>Other:</th>
</tr>
</thead>
</table>

**Events/Labs:**

Unit/Bed:

Report to:
Appendix D

Pre-intervention and Post-intervention Survey Questions

Pre-Intervention Survey Questions:
1. I am satisfied with the current transfer of care process when giving/receiving post-operative report
2. The current handoff process is comprehensive
3. The current handoff process provides an effective way of transferring important information
4. The current handoff process promotes patient safety
5. I would rate the quality of the current handoff process as satisfactory

Post-Intervention Survey Questions:
1. Did you complete the pre-intervention survey?
2. I am satisfied with the transfer of care process when giving/receiving post-operative report when utilizing the standardized handoff process
3. The standardized handoff process is comprehensive
4. The standardized handoff process provides an effective way of transferring important information
5. The standardized handoff process promotes patient safety
6. I would rate the quality of the standardized handoff process as satisfactory
# Appendix E

## SMART Work Plan

**Project Goals:** The overall goal is:
The overall goal of this project is to improve the quality of anesthesia handoff to PACU RNs with the utilization of a standardized handoff tool at The Washington Hospital.

<table>
<thead>
<tr>
<th>*SMART Objective</th>
<th>Activities</th>
<th>Projected Completion Date</th>
<th>Projected Number of People Reached</th>
<th>Organization(s)/Partner(s) collaborating with to conduct activity</th>
<th>Evaluation Plan (Describe measures used to assess satisfaction, project outcomes, benefits of activities, etc.)</th>
</tr>
</thead>
</table>
| Obtain approval by the Education department and written evidence of stakeholder support | 1. Virtual meeting with stakeholders  
2. Letter of support | July 31, 2020 |  | Washington Hospital | 1. Meeting fulfilled  
2. Letter received |
<p>| Establish survey design | 1. Meet with stakeholders and collaborate on the question to be utilized for the pre and post survey | Summer 2020 |  | Washington Hospital | 1. Survey design established |
| Establish Standardized handoff tool | 1. Meet with stakeholders and develop tool | Fall 2020 |  | Washington Hospital | 1. Standardized handoff tool established |
| IRB approval | 1. Submit proposal to df IRB | Winter 2020 |  | IRB | 1. Approval Received |
| Administration of pre-intervention survey | 1. Administer pre-intervention survey to PACU RN | Spring 2021 |  | Washington Hospital | 1. Pre-intervention surveys completed |
| Educate staff on the use of the standardized handoff tool | 1. Educate staff via email | Spring 2021 |  | Washington Hospital | 1. Emails sent |</p>
<table>
<thead>
<tr>
<th>Implementation of handoff tool</th>
<th>1. Implement handoff tool to be utilized during postoperative anesthesia handoff to PACU</th>
<th>Spring 2021</th>
<th>Washington Hospital</th>
<th>1. 4-week implementation completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistical Analysis of results</td>
<td>1. Meet with statistician to analyze results</td>
<td>Spring 2021</td>
<td>West Virginia University</td>
<td>1. Analysis Completed</td>
</tr>
</tbody>
</table>
## Appendix F

### Budget Plan Form and Justification

<table>
<thead>
<tr>
<th>Budget Categories</th>
<th>Personal Funds</th>
<th>Organizational Contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ADMINISTRATIVE COSTS</strong></td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Administrative Justification: N/A</td>
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</tr>
<tr>
<td><strong>MARKETING</strong></td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Marketing Justification: N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EDUCATIONAL MATERIALS/INCENTIVES</strong></td>
<td>$50</td>
<td>$</td>
</tr>
<tr>
<td>Educational Materials/Incentives Justification: Standardized handoff tool paper and printing</td>
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<td></td>
</tr>
<tr>
<td><strong>HOSPITALITY</strong> (food, room rentals, etc.)</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Hospitality Justification: N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PROJECT SUPPLIES</strong> (office supplies, postage, printing, etc.)</td>
<td>$50</td>
<td>$</td>
</tr>
<tr>
<td>Project Supplies Justification: Pre/Post intervention survey paper and printing will be an in-kind contribution</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TRAVEL EXPENSES</strong></td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Travel Expenses Justification: N/A</td>
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</tr>
<tr>
<td><strong>OTHER</strong></td>
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<td>$</td>
</tr>
<tr>
<td>Other Justification:</td>
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<td></td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>$100</td>
<td>$0</td>
</tr>
</tbody>
</table>
Appendix G

Key Site Support

To whom it may concern,

I hereby give my support to Haley Durkacz to proceed with planning her project to develop and implement a standardized handoff tool for anesthesia providers to utilize at The Washington Hospital.

Signature

Date 7/28/2020