

Perioperative Patient Safety Handoff Guideline

Karen Wolaridge

Touro Nevada University

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DNP Project Chair: Dr. Denise Zabriskie

DNP Project Members: Dr. Jessica Grimm

Dr. Bryan Tune

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**Abstract**

Effective perioperative patient handoff communication in the ambulatory surgery arena is vital to patient safety. Communication errors are the most common cause of medical errors and are essentially preventable. The purpose of this performance improvement project was to design and implement an ambulatory surgery center specific perioperative patient safety communication guideline to follow the patient through all phases of care. The guideline will improve handoff accuracy and completeness, improve outcomes, and reduce errors. The theoretical framework this project was based on was Rosswurm and Larrabee's Model for Change to Evidenced-Based Practice. This model provides a systematic process for change with evidenced-based practice. Pre and post implementation medication and surgical site errors were measured as well as nurses' compliance and attitudes regarding the use of the patient safely guideline. There were no medication errors or surgical site errors noted during the implementation of this project. The pre-operative nurses used the guideline 81% of the time and transferred an average of three critical elements out of four. The circulating nurses used the guideline 26% of the time and transferred an average of five out of seven critical elements. The certified registered nurse anesthetists (CRNA)s used the guideline 70% of the time transferring an average of six out of seven elements.

## Introduction

Verbal and written communication is the hallmark of how humans exchange information.

Humans have the ability to learn and communicate with their peers. But what happens when there is ineffective or missed communication in our interactions? Healthcare providers are continually interacting with patients and other members of the team in their respective environments. The perioperative arena is no exception. Whether a patient has surgery in a hospital operating room or an ambulatory surgery center, the patient will traverse through many phases of care, and be cared for by multiple practitioners. The providers interacting with the patient all have a specific role, and it is incumbent upon each of them to communicate effectively with the other team members when transferring the patient to each phase of care.

The project site described herein as an ambulatory surgery center (ASC) performing neurosurgical and pain management procedures. The patient handoffs at this facility are casual and do not follow any specific protocol. The current practice at this project site is verbal handoff between the nursing staff and the anesthesia providers without any guideline, and it is provider dependent. Each nurse and certified registered nurse anesthetist (CRNA) give the information they think is important to pass along, which is different depending on the provider. The patients' past medical history is often overlooked when handoff occurs in the post-operative area, and the information is often incomplete. The Joint Commission reports patient harm of all severity can happen when the receiver of the handoff receives incomplete, inaccurate, misinterpreted or unnecessary information (The Joint Commission, 2017). Patient handoffs are intended for the transfer of care and responsibility of a patient from one provider to the next, and the exchange of information pertinent to the patient (Hughes, 2008). Because there is inconsistency in the

transfer of care between providers, because there is no guideline, the potential for error and patient harm exists (The Joint Commission, 2017).

McCook (2011), reports improved outcomes in patients when a handoff protocol is used and all members of the perioperative team participate in the process. Miscommunication and failures in communication during patient handoff are a major cause of medical errors and adverse events in the United States (Starmer et al., 2014). Implementation of a handoff protocol was associated with a decrease in medical errors and a decrease in failed communication, without a negative impact on the workflow process (Starmer et al., 2014). An ASC handoff protocol will be developed and utilized throughout all phases of the perioperative course in an effort to reduce preventable medical errors.

### **Background**

ASCs came into existence in the 1970's. Many ASC are physician-owned as is the case at this project site. ASCs are often recognized for being more efficient, as they perform more surgical procedures in the same amount of time when compared with hospital-based outpatient operating rooms (Gottschalk et al., 2016). The turnover times for the surgical suites are much faster, and the surgeon owners have direct control of their time by not being subject to hospital rules of scheduling (Ambulatory Surgical Center Association, 2012). Healthcare costs are also potentially decreased because insurances typically pay less money for the facility fee for an ASC compared to a hospital (Ambulatory Surgical Center Association, 2012). The majority of surgery centers focus on a limited number of procedures, which adds to their efficiency, as is the case with the project site ASC. ASCs are often thought of as more desired, cheaper and faster as compared to hospital outpatient departments because they can be focused on very specific surgeries and procedures and move a large volume of patients with equal or improved outcomes

(Munnich, Parente, 2018). The project implementation site is primary focused on outpatient neurosurgery and pain management procedures, operating at a high volume and a very efficient pace.

Patient handoff occurs when the care of a patient is being transferred from one care provider or team of providers to another individual or team. Errors and omissions in communication have been linked to multiple medical errors and sentinel events (Stewart, 2017 September-October ). The Joint Commission attributes 80% of medical errors to miscommunication or omissions in communication during handoff (Joint Commission [TJC], 2012). Handoffs in the perioperative setting are designed to communicate vital patient information for continuity of care. Goldman and Catchpole (2012), describe a case where a patient was transferred to surgery from a medical-surgical unit and critical information was not relayed to the anesthesiologist. The patient subsequently suffered a negative event as a result of the missing information. These authors report the most frequent cause of medical errors is failed communication (Goldman, & Catchpole, 2012).

Massachusetts General Hospital conducted a survey that identified 59% of the resident physicians that responded reported harm to a patient as a result of ineffective handoff, with 12% of those being significant harm (Kitch, et al., 2008). The goal of patient handoff, regardless of the setting, is to transfer patient care and provide accurate information for safe continuity of care. When observers followed handoff communication in the perioperative arena, they noted many inconsistencies and omissions. These items could be critical to patient care, to include: allergies, significant medical history, and intraoperative complications (Manser, Foster, Flin & Patey, 2012). Surgery can be a particularly vulnerable time for patients. There is a need for all members of the healthcare team to work together to achieve optimal patient outcomes. Surgical

handovers occur a minimum of three times throughout the peri-surgical phase: preoperative, intraoperative and postoperative. All of these periods require the anesthesia provider, CRNAs or anesthesiologist (MDA), and registered nurses (RNs) to pass critical patient information for the safe and optimal care of the patient (Crosson, 2015).

The Institute of Medicine (IOM) released its study *To Err is Human: Building a Safer Health System, in 1999*, their intent was not to place blame but to bring attention to the safety of care, “in which specific attention is given to ensuring that well-designed processes of care prevent, recognize, and quickly recover from errors so that patients are not harmed (Hughes, 2008, c. 3, p.1).” The IOM recognized preventing medical errors which harm patients required a system-wide shift which integrated three significant strategies: prevent, identify and abate harm (Hughes, 2008). The IOM defined basic concepts in patient safety, one of which was to avoid relying on memory. The IOM was referring to standardization of equipment and processes and developing protocols. The report noted that checklist and protocols when implemented wisely, can improve safety (Hughes, 2008).

Procedural checklist is not a new concept. The airline industry began using checklist in the 1930’s and precipitously dropped its’ accident rate (Bruno, Guimond, 2017). The healthcare industry has utilized this checklist process from the aviation industry to prevent omissions which could lead to patient harm (Bruno, Guimond, 2017). Presently at the project site ASC, there is no checklist or formal reporting tool in place for handoff and transition of patients from one area of care to another.

### **Problem Statement**

Due to the lack of a standardized handoff process for transferring the care of patients through the perioperative arena at this ambulatory surgery center, there has been missed and

omitted information, which has led to medication errors and patients being discharge from the surgery center inappropriately. Additionally, patient medication allergies have been neglected to be passed on during patient handoffs. A standardized communication handoff guideline with all necessary critical information listed will address these issues and help to decrease future miscommunications and/or errors in patient care.

### **Project Question**

Will the implementation of an ASC handoff guideline improve communication in the perioperative arena, resulting in decreased medical errors and increased understanding by the pre-operative, inter-operative and post-operative RNs and anesthesia providers as reported by survey results?

Population: Nursing and Anesthesia Staff at ASC

Intervention: Create and Implement a standardized Perioperative ASC Handoff Communication Guideline

Comparison: Pre-implementation No Tool

Outcomes: Accurate and complete handoff communication between pre-operative (Pre-op), intra-operative (Intra-op), post-operative (Post-op) RNs and the anesthesia providers

Time: Within the timeframe of the DNP project

### **Project Purpose**

The goal of this project is to develop an ASC specific perioperative patient safety communication instrument, which will follow the patient through all phases of care from the pre-operative area, through the intra-operative arena, and ending in the post anesthesia care unit (PACU). It will improve handoff completeness, accuracy, and improve patient outcomes through reduced error incidence related to communication breakdown at the project site. It will

be utilized by nursing staff and the anesthesia providers. All staff will be educated on the necessity of the instrument and how to use it. With the implementation of the instrument, there will be no surgical site errors, no medication errors, and all defined information will be clearly passed on between all anesthesia providers and RNs.

### **Project Objectives**

By the end of this DNP Project the ASC will:

1. Implement an evidenced-based perioperative ASC Handoff Guideline.
2. Educate anesthesia and perioperative staff on the use of the handoff tool.
3. Administer a pre and post implementation survey with the perioperative RNs and anesthesia staff on the effectiveness of the anesthesia handoffs.
4. The ASC handoff guideline will be utilized greater than 90% of the time by the anesthesia providers and nursing staff.
5. There will be no surgical site errors and no medication errors.

### **Review Coverage and Justification**

A literature review was performed identifying current research on patient handoff in the perioperative setting to explore the following clinical question. Will the implementation of a perioperative patient handoff guideline improve communication in the perioperative arena resulting in decreased medical errors and decrease loss of information? The databases utilized were Cumulative Index to Nursing & Allied Health Literature (CINAHL), PubMed, Agency for Healthcare Research and Quality (AHRQ)and the Cochran Review. The keywords and phrases searched included the terms utilized in the PICOt question such as; nursing handoff in ASCs, anesthesia handoffs in ASCs, standardized ASC handoff, perioperative handoff, perioperative staff communication, perioperative standardized handoff tools. Additional terms and phrases

used were, standardized patient hand off, perioperative patient hand off, transfer of care and patient safety, patient hand over, hand off safety checklist, ambulatory surgery center patient handoff, nurse anesthetist patient hand off, post anesthesia care unit (PACU) hand off, and patient communication hand off. The search criteria utilized was specific to peer reviewed research and evidence published within the last five years. Studies which examined developing and implementing standardized handoff guidelines, checklist or tools in surgery or the perioperative setting, and handoffs within in inpatient acute care setting between physicians as well as operating room (OR) to intensive care unit (ICU) were included. Meta-analysis and reviews of studies were excluded as were individual case reports. The search was also limited to English language. A total of 43 articles were returned. Twenty articles which relate to the research question and met the inclusion criteria and were reviewed. The first few articles describe general operating room communication and handoff. The next set of reviewed literature describe handoff communication between anesthesia providers only. The last group of articles illustrate communication handoff between anesthesia providers and the PACU RN.

### **Review Synthesis**

#### **Impact of the problem**

The purpose of patient handoffs is to transfer the care of the patient from one care provider or team of providers to another along with critical information necessary to care for the patient (Robinson, 2016). The Joint Commission reports 80% of preventable negative patient events were caused by miscommunication or lost communication between caregivers during patient hand offs (Hawthorne et al., 2016). Research has demonstrated that deficits in handoff communication have led to medication errors, wrong site surgeries, gaps in care and even patient injury and death (Bruno, G., Guimond, M., 2017). What is currently understood is,

“standardized handover protocols have been employed to improve teamwork and reduce medical errors in the perioperative arena. In addition, safety checklist have also been used in the operating room to improve team communication and consistency of care while reducing surgical complication and death rates (Boat & Spaeth, 2013, p. 647).” The issues which are still under investigation and not fully understood is which handoff tools are the best for which situation or area of care.

### **Standardized Handoff Tools**

The purpose of this study was to examine the use of the Situation, Background, Assessment, Recommendation (SBAR) format for handoffs in the perioperative arena during personnel change either for breaks or end of shift change six years after implementation of SBAR handoffs. The researcher observed 119 hand offs in the operating room between all team members which include circulating nurses [CN], certified surgical technicians [CST], certified surgical assistants or first assistants (CSA) and anesthesia team members either certified registered nurse anesthetist [CRNA], anesthesia residents or anesthesiologist [ANES] (Hawthorne et al., 2016). The observer documented the presence or absence of SBAR during patient handoff with a paper tool which was later entered into and excel spreadsheet. “Inter-rater reliability, descriptive statistics, ANOVA, Kruskal-Wallis test and appropriate post hoc test was used for analysis (Hawthorne et al., 2016, p. 8).” Ninety percent of the observed handoffs included situational patient information (S), 58% included background information (B), 64% gave an assessment (A), and 55% gave recommendations (R) (Hawthorne et al., 2016). The study demonstrated that they type of information disseminated was dependent on the type of provider (Hawthorne et al., 2016). The limitation of this study is it assessed for the use of SBAR

but did not assess for accuracy or effect on patient outcomes or understanding of the receiver of information (Hawthorne et al., 2016).

The next area of the literature examined was handoffs between anesthesia providers caring for an anesthetized patient. It is quite common in large medical facilities and teaching hospitals for multiple anesthesia providers to transition in and out of a surgical case either for breaks or shift or assignment changes (Canale, 2018). Despite recommendations for standardization of patient handoffs, anesthesia handoff remain short and informal (Canale, 2018). Canale (2018) used a pretest/posttest quality improvement project to examine if a standardized handoff would improve the accuracy and quality of the handoff and continuity of care. She then implemented a standardized handoff procedure utilizing the Team Strategies to Enhanced Performance and Patient Safety (TeamSTEPPS) model. An analysis of paired t test demonstrated a statistically significant improvement in handoffs after the intervention (Canale, 2018).

A descriptive survey project was performed to assess the requirement for a standardized handoff tool and if so, which elements needed to be included (Gibney, Lee, Feczko, & Aquino, 2017). This study surveyed CRNAs, nurse anesthesia residents (NAR), anesthesiologist and anesthesia residents. The data from the survey was downloaded from Qualtrics and examined with descriptive statistics to determine means and frequencies. Of the respondents surveyed, 64.6% denied using a systematic process for patient handoffs (Gibney et al., 2017). Most providers believed that both themselves and their peers gave inadequate patient handoffs (Gibney et al., 2017). This author developed the TIME handoff using an observation, transaction and confirmation (OTC) communication conceptual framework based on feedback about what the providers thought was most important. T Transaction (Observations: surgery, positioning,

monitors, patient medical history). I Induction (Airway, lines, medication). M Maintenance (Case progress and events, medications and interventions). E Emergence (Plan, goals, medications) (Gibney et al., 2017). Limitations to this study included nonrandom sampling. The tool was developed but has yet to be widely utilized.

Wright (2013) used a questionnaire to determine current handoff practice and what information was important to the handoff between anesthesia providers. She developed and implemented the PATIENT Protocol. P = Patient (pre-operative assessment and current condition and positioning). A = Airway (management, difficulty, and antibiotics, allergies, type of anesthetic). T = Temperature (monitoring and any interventions). I = intravenous (access, infusions, blood products, input and output). E = End-tidal carbon dioxide (ventilation and respiratory parameters). N = Narcotics (including reconciliation) and T = Twitches (neuromuscular blockade and degree of paralysis). Descriptive statistics were used to examine the effectiveness of the PATIENT Protocol after implementation. Ninety percent of respondents agreed the scope of the tool was appropriate (Wright, 2013).

### **Barriers to Using a Standardized Handoff Tool**

A study was performed to examine the effect of interoperative latent conditions (distractions, increased production pressure, noninteractive communication and inappropriate timed handoff) and the quality of the handoff between anesthesia providers (Lowe & Goerge-Gay, 2017). This study examined handoff communication between anesthesia providers in an anesthesia crisis resource management training by videotaping the participants and evaluating them on ten criteria for handoff of the patient and the relationship with the latent conditions. The examiners used a Spearman correlation calculation to evaluate the relationship between the handoff score and the latent conditions. They discovered a statistically significant negative

relationship. Handoff scores decreased when latent conditions increased (Lowe & Goerge-Gay, 2017). It is not surprising that the presence of distractions and interruptions impacts safe handoffs negatively and latent conditions must be minimized during anesthesia handoffs (Lowe & Goerge-Gay, 2017).

An evaluation of a handoff tool between physicians from shift to shift documented effective use and critical information passed on to the oncoming provider. Interestingly, the external auditors consistently gave lower score on the handoffs verses peer evaluation which were also performed. This may show bias and the need for external audit (Horwitz et al., 2013)

### **Current Management**

A standard handoff tool which is commonly used between multiple areas in the inpatient setting is SBAR. In an integrated literature review examining the impact on patient safety since its inception in 2002, describes it as an effective intervention and tool for improving patient safety through improved communication (Stewart & Hand, 2017)

Outside of examining types of handoff instruments, a few articles addressed the safety of handoffs between anesthesia providers when caring for anesthetized patients. Char (2016) describes a retrospective study done at the Cleveland Clinic analyzing anesthesia records of approximately 140,000 patients. They reported an eight percent increase risk of morbidity or mortality with each anesthetic handover (Char, 2016). An observational study was done at the Mayo Clinic to examine any correlation between the number of anesthesia care providers in a case and the incidence of a major complication occurring within thirty days of the procedure. They looked at 927 patients having an elective colectomy. There were 105 complications in this population with 71 of them being major complications and 7 deaths. They found a positive

correlation between the number of anesthesia providers involved in each case and the rate of complications (Hyder et al., 2016). There was no standardized handoff tool used in this study.

The information passed from the anesthesia provider to the PACU nurse directly impacts the care of the patients and omission of information can lead to errors and potential for patient harm (Bruno & Guimond, 2017). In a study which implemented a Handoff Accuracy Scoring Tool to test pre and post checklist intervention for accuracy of handoff information. The unpaired sample t test showed a statistically significant improvement post implementation (Bruno & Guimond, 2017). In a prospective observational study conducted by Nagpal et al the researchers demonstrated that new handover protocols led to fewer omissions of information. The authors used the Mann-Whitney U test, and the chi-squared test and demonstrated a statistically significant decrease in the omission of information (Nagpal et al., 2013).

Checklist have also been used to improve handoff communication. A study involving a work group of CRNAs and PACU RNs developed a checklist of all the necessary information for handoff. The CRNAs in the study were randomized into groups to either receive the checklist or not receive the checklist. The clinicians were then evaluated for the completeness of handoff in the PACU. A two-sided P value statistical analysis was performed to evaluate for six elements. The use of the checklist lead to a statistical difference in the accuracy of the exchange of information of all six key elements. There was also less need for further clarification (Robins & Dai, 2015). Another study which examined the effects of a checklist on the accuracy of anesthesia handoffs in the PACU by recording 120 handoffs. Forty handoffs were recorded before the implementation of the instrument and 80 after implementation, with 40 in each group either using a checklist or not using a checklist. The researchers used a Mann-Whitney test for comparison between the groups on the percentage of items being handed over. They found a

significant increase in the amount of information handed off when the checklist was used but the amount of time to do the handoff increased (Salzwedel et al., 2013).

## Controversies

Robinson (2016) also developed a handoff instrument using the Iowa Model of Evidenced-Based Practice as a framework. They developed perioperative PEARLS where each letter correlated with specific information which needed to be relayed. Pre and post implementation evaluations were done. There was a statistically significant difference between the hand off evaluation and audit criteria post implementation (Robinson, 2016). A study done in Australia also examined the effectiveness of SBAR in the PACU. A pre and posttest audit was used to measure compliance with the SBAR intervention. The SBAR tool was developed and the staff was educated on the use of the tool. The researchers reported a statistical difference in one hospital they implemented the change in, however mixed results were identified in the second hospital (Kitney et al., 2016). A quality improvement team using the plan-do-study-act cycle in a large intercity pediatric hospital also developed a safety checklist to aid in patient handoffs and increased the reliability of their handoff process from 59% to 90% over a five-month period (Boat & Spaeth, 2013). An unblinded study which did a pre and post intervention observation of postoperative handoffs where a standardized handoff tool was implemented found a decrease in missing information from 7.57 to 1.2 items per handoff during the post intervention phase although handoff times increased (Petrovic, M., et al., 2015).

A randomized controlled study performed in a large, high volume, internal medicine inpatient setting examined physician to physician turnover between day time providers and night time providers. The control group performed their current method of handover and the intervention group was educated on a handoff tool and then used it for handoffs during the study

period. There was no statistical difference in medical errors between the groups or need for increased level of care and it did not improve patient safety (Tam et al., 2018)

### **Issues still under investigation**

There is an abundance of literature enforcing the need for a standardization in handoffs, yet the limitation in the literature seems to be a lack of consensus on which tool is best in which environment. Important information which is neglected to be passed on can lead to medical errors. The PACU in particular is a busy unit where multiple things are taking place at the same time. Patients are being admitted and handoff from the OR nurse and anesthesia provider are occurring simultaneously, all the while the PACU nurse is assessing their patient and attempting to listening to a report which can lead to loss of information (Robinson, 2016). There is also little evidence demonstrating a retention of information even when using a handoff instrument. A prospective interventional study done in the PACU of two hospitals was unable to demonstrate an improvement in the retention of information with using a handoff tool or not using a handoff instrument (Randmaa, Swenne, Martensson, Hogberg, & Engstrom, 2017)

### **Benefits of Current Recommendations**

The use of a checklist as a means to transfer information, or to address safety concerns is not new. It has been demonstrated and documented that pilots were able to log 1.8 million miles of flying time without a single accident once they began using checklist, which ultimately lead to the identification of the value of checklist in healthcare. (Bruno, G., Guimond, M., 2017, p. 125). Checklist can help the individual remember critical information or steps in a process or communicate effectually which can lead to safer care to the patients (Agarwala, Nurudeen, & Haynes, 2015). The use of checklist to keep information organized and assist with improved and complete communication. Preventing medical errors is the goal in using the checklist.

### **Issues not yet addressed**

There is no universal guideline for patient handoff but The Joint Commission, the United States Department of Defense Patient Safety Program (DoD PSP) and the Association of perioperative Registered Nurses (AORN) all recommend a standardization in handoff procedures to improve patient safety and decrease medical errors (Canale, 2018). This synthesis of the current literature describes many perioperative handoff tools but there is not one that fits all areas or one which is recommended for use in an ASC. Further study is needed to determine which handoff tool is best suited for use in the outpatient ambulatory perioperative setting.

### **Theoretical Framework**

#### **Theory identification and Development**

The framework chosen for this is Rosswurm and Larrabee's Model for Change to Evidenced-Based Practice. This model was developed to provide all healthcare professionals including nurses a systematic process for change with evidenced-based practice (Rosswurm & Larrabee, 1999). The creators of this model both had backgrounds in quality and evidenced-based research prior to their collaboration. Doctor Larrabee developed the Emerging Model of Quality, which was based on value, prudence, justice and beneficence, with all parties (patients, families and healthcare providers) being equal partners (Larrabee, 1996). Quality as described in this theory is a desired characteristic (value, prudence, justice, and beneficence) which can be measured. The characteristic also involves the right criteria meaning the right person, amount, and reason (Larrabee, 1996). All of the characteristics have different meanings and applications to the individual, which is influenced by their personal circumstances at the time. The model is holistic and can be used as a framework to research quality outcomes and patient perception (Larrabee, 1996). Dr. Rosswurm was a pioneer in the creation of evidenced-based research and practice. Dr. Rosswurm worked to advocate for nursing research and development departments

within hospitals. She believed nurses must be involved in research to improve quality and outcomes (Rosswurm, 1992). These two nurse researchers came together to formulate a model to assist nurses and all healthcare providers to interpret and synthesize both empirical data and contextual signs to implement evidenced based change into practice (Rosswurm & Larrabee, 1999). They believed nurses must learn to obtain and interpret the best research evidence and integrate it into practice.

### **Applicability of Theory to Current Practice**

An example of how this model can be used is described in a case study where the nurses used the most relevant evidenced-based research to develop a protocol for hypothermic coma after cardiac arrest in their intensive care unit (Schnautz & Rowley, 2008). A group of nurse practitioners at the Mayo Clinic in Scottsdale, Arizona used evidenced-based research operationalized through Rosswurm and Larrabee's model to create a self-management strategy for their chronic obstructive pulmonary disease (COPD) patients (Facchiano, Snyder, & Nunez, 2011). An evidenced-based practice committee in the Hamilton Health Sciences (HHS) hospital in Hamilton, Ontario, Canada used the Rosswurm and Larrabee EBP change model in part to create their own model for implementing evidenced-based practice in their hospital (Mohide & King, 2003). Reavy and Taverier (2008) utilized Rosswurm and Larrabee's model along with the staff nurses at their hospital to implement an evidenced-based practice model.

Nurses are often reluctant to incorporate evidence into practice. It is projected that it takes nine years for interventions, which are considered evidenced-based practice, to be fully accepted (Johnson, 2014). Many nurses state their reason for not implementing the evidence is multifaceted but included, not trusting the evidence, not having been trained in that manner, and it's the way they've always done it (Johnson, 2014). Evidenced-based practice (EBP) has been

proven to improve patient outcomes but it is not the standard of care in the United States many healthcare systems due to tenacious barriers (Melnyk, 2016). Even when change is considered a positive event, it can be viewed as a loss of stability (Velmurugan, 2017). A nurse leader must be aware of, and obtain input from, the people who will be affected by the change in order to avert problems related to implementation (Velmurugan, 2017). Outdated policies, lack of support from colleagues and managers for EBP, and limited resources and tools for direct care providers are some of the barriers described (Melnyk, 2016). This project will involve design and implementation of a patient handoff guideline in an ambulatory surgery center where one does not exist. This model for EBP utilizes practice research along with change theory to create a process by which to integrate an evidenced based protocol (Rosswurm & Larrabee, 1999).

### **Major Tenets of the Model**

The tenets of a Model Change to Evidenced Based Practice by Rosswurm and Larrabee (1999) will be described. This model directs health care providers through the course of changing to EBP, beginning with the assessment of the need for change and ending with the integration of the EBP guideline (Rosswurm & Larrabee, 1999). Gawlinski and Rutledge (2008) describe the process of using evidence-based practice models to implement practice changes. They present the six-step process which is to assess for the need for change, comparing internal data to outside standards; link it to standard interventions and outcomes; research the evidence; design the protocol; implement and evaluate; and finally, integrate and maintain the change (Gawlinski & Rutledge, 2008).

#### **Assess**

The first step in the model is to assess for need for change. Practitioners collect information about the current state of the practice and compare it to outside data. It is important

to include stakeholders from practitioners to administrators in identifying the problem which requires change. The practitioner and the stakeholder will need to meet and discuss the issues in question and compare their internal data to external quality improvement and risk management data (Rosswurm & Larrabee, 1999).

### **Link**

Step two is to link the problem identified to interventions and outcomes. The practitioner will define the problem using standardized classifications and link or connect the problem with classification of interventions and outcomes (Rosswurm & Larrabee, 1999). This is also a time to provide standards by which the effectiveness of the intervention will be measures and identify if resources are needed (Rosswurm & Larrabee, 1999).

### **Synthesize**

Step three is synthesize the best evidence which is done by a comprehensive literature review. The topic must be clearly defined. Once defines, the best research evidence is examined with the potential intervention and desired outcomes being major variables in the search. The evidence is combined and an assessment of the feasibility of the system, risks and benefits of the protocol (Rosswurm & Larrabee, 1999). The main purpose of synthesizing the research is to determine the stoutness of the evidence and if it promotes a change in practice (Rosswurm & Larrabee, 1999).

### **Design**

The forth step is to design a change in practice. Once the best evidence is synthesized a protocol or guideline is designed based on the established evidence as well as tools for measuring outcomes. Feedback from the stakeholders must be considered when planning the

protocol or change process. When the protocol is developed the, all staff involved in the evidence-based change protocol is educated on the new protocol (Gawlinski & Rutledge, 2008).

### **Implement and Evaluate**

Step five is to implement and evaluate the practice change. This is the step where data is collected and analyzed on the implementation; revisions and recommendations are made based on the analysis. The practitioner leading the change process needs to be very involved during this phase, monitoring the implementation of the change protocol and offering guidance and reinforcement as needed (Rosswurm & Larrabee, 1999). The decision to either adopt, revise, or reject the change is based on the evaluation of the data and feedback and recommendations from the stakeholders (Rosswurm & Larrabee, 1999).

### **Integrate and Maintain**

Step six is to integrate and maintain the practice change. If the results of the data evaluation and stakeholder feedback support accepting the change, the new policy is finalized and the change is integrated into practice. All stakeholders are again brought in to review revisions and further educate the staff about the evidenced based protocol and plan for ongoing monitoring (Rosswurm & Larrabee, 1999). The importance of including the participants and stakeholder helps to improve the climate and decrease barriers to change (Rosswurm & Larrabee, 1999).

### **Application of Model to DNP Project**

Healthcare providers and people in general are often resistant to change and need a dedicated process to develop and implement a change process (Johnson, 2014). The Rosswurm and Larrabee Model for Change to Evidenced-Based Practice has all the components necessary to design and implement an evidenced-based handoff guideline at the practice site.

**Assess**

Handoffs and communication resulting in medical errors has been identified as an area that requires change at the practice site. A needs assessment was performed to determine if the practice is aligned with the current literature. Meetings were held with the practitioners and stakeholders at the practice site. The initial meeting with administration was for permission to use this ASC as a practice site and to discuss the feasibility of implementing this project at the ASC. Later meetings were held with staff at the center for input on the project, and explanation of roles and the overall goals of the project. Handoffs between practitioners were observed as part of the needs assessment resulting in a large gap between practice and current evidence.

**Link**

The problem of miscommunication during handoffs was identified at the project site. Interventions are being considered by site administration, as are standards to determine effectiveness of the interventions. The Joint Commission has identified a large majority of serious but preventable medical errors are a result of miscommunication during hand-offs (Hawthorne et al., 2017). Without a standardized handoff process the potential for error is increased at this facility (Robinson, 2016).

**Synthesize**

A comprehensive literature review was performed and the evidence examined to determine best practice to be implemented into this practice site. The literature is clear that the lack of a standardized handoff protocol can lead to miss information and loss of information which can lead to potential medical errors (Salzwedel et al., 2013). There are many handoff tools in existence which were reviewed including TeamSTEPPS, (Canale, 2018), PATIENT

Protocol, (Wright, 2013), ISBAR, (Kitney et al., 2016), and SBAR (Hawthorne et al., 2017).

These tools will be used to base a guideline specific to the project site.

### **Design**

A perioperative patient safety handoff guideline will be developed specific to this practice site and designed for overall quality improvement. Tools will be designed to assist in measuring the effectiveness of the tool. Education will be provided to all participants in this quality improvement guideline. Data will be collected, outcomes measured, and impact identified.

### **Implement and Evaluate**

The handoff guideline will be implemented for a four-week time period. The participants will be monitored through observations to measure the compliance with this new evidence - based guideline for handoff communication during the implementation phase. There will also be a post implementation survey given to the staff to measure knowledge, skills, and attitudes regarding standardized handoff communication in the peri-operative arena.

### **Integrate and Maintain**

After the guideline has been implemented and the data evaluated there will be a meeting with the stakeholders and staff to disseminate the information and to decide whether to make revisions, accept the guideline, or not to accept the guideline. The hope is the guideline will improve communication and will be integrated into practice. Ongoing monitoring, education, and policy development will follow if this practice change is accepted.

### **Project Design**

The perioperative safety handoff guideline project is categorized as a quality improvement project. Quality improvement describes the need for a change in the healthcare

setting and is essential for implementing efficient transformation, which will improve patient safety (Hall & Roussel, 2017). The emphasis of this project is to improve communication among the perioperative staff and decrease medical errors in an ASC. This will be achieved by developing a perioperative patient safety communication instrument, which will follow the patient through all phases of the peri anesthetic care delivery. A standardized handoff procedure is strongly recommended by the Joint Commission, which is the major accrediting body within the healthcare industry. Being accredited by the Joint Commission is synonymous with quality. This facility meets all Centers for Medicare and Medicaid Services (CMS) guidelines and will accreditation through Accreditation Association for Ambulatory Health Care, Inc. (AAAHC). These accreditation processes require the facility to undergo external audit to review their internal processes, policies, procedures and outcomes, and compare them to national standards to ensure high quality care (Accreditation Association for Ambulatory Health Care, Inc [AAAHC], 2018).

This project design is applicable to this project, which will explore if the intervention improves handoff communication and reduces medical errors. Data collection will consist of chart review and information from surveys. The surgical site errors will also be monitored via a weekly report that is obtained from the facility's adverse event reporting program. The project variables consist of the nurses' non-adherence to the protocol as it is written, another variable is the nurses' interpretation of what information is considered pertinent for the situation. Each nurse tends to interpret pertinent patient information differently; therefore, a standardized tool will ensure all pertinent patient information is shared appropriately. Prior to the intervention, all RNs and anesthesia staff will take a pre-intervention survey to measure their attitude regarding the use of a structured handoff tool. They will also receive education about the use of the

handoff tool (Appendix A). The perioperative handoff tool (See Appendix B) will be used by all providers. They will be evaluated based on adherence to the guidelines with each patient care handoff.

### **Population of Interest**

The population of interest are the RNs, preoperative nurses, circulation nurses, postoperative recovery nurses and all the CRNAs at the ambulatory surgery center. There are approximately 15 RNs at this facility including full-time, part-time and per-diem staff. On average there are two nurses in the pre-op area, two in the post op area and one float nurse which covers in either area depending on the need. There are two to three circulating nurses on any given day depending on the number of cases and the number of rooms being utilized. There is also a nurse manager who will give the nurses the appropriate breaks. Several nurses at this facility have earned a bachelor's of science (BSN) degree and the others have an associate's degree in nursing (ADN). Two of the BSN prepared nurses are in school pursuing masters' degrees to obtain their nurse practitioner licensure. The CRNAs at this facility are independent contractors, and are part of a CRNA owned group which performs anesthesia services at several out-patient ASCs in the greater California Central Valley. This anesthesia group is comprised of 22 CRNAs and six anesthesiologists. All group members rotate through the ambulatory surgery centers and hospitals where the group is contracted. All involved anesthesia staff members are independent practitioners, and responsible for their own malpractice insurance and personal benefits. The group members are paid an hourly rate and collect payment from the patients' medical insurance. It is hypothesized the group will benefit from this intervention as the members work at several practice sites, and this will help to standardize the process across all facilities the anesthesia staff are employed.

## **Setting**

The setting for this study is an ambulatory surgery center in Central California. The ASC has two operative suites, one procedure room, three pre-operative bays, three post-operative bays and two flexible bays, which are used both pre and post operatively depending on the need. An example of some of the surgical procedures performed at this ASC include neuro-surgical spine procedures, such as anterior cervical discectomy and fusion, thoracic (T) and lumbar (L) spine discectomy, T and L spine fusions, interspinous device placement, spinal cord stimulator placement and microdiscectomies. Pain management injection procedures include epidural steroid injections, facet joint injections cervical (C), T and L spine and sacral-iliac joint injections to name a few. The other surgical procedures include orthopedic, podiatry and general surgery. This ASC is in a growth phase, but at this time does approximately 60 cases a week. The patients are adults with a minority population of teenagers, the youngest patients which can be seen at this facility is 13. The majority of the patients are between 35-70 years of age with outliers in patient ages being 80 and 90 years. The clients' ethnicities are consistent with that of the Central California Valley, Caucasian, Hispanic, Asian, and African American. There are approximately 15 ASCs in a three-mile radius of this center. Several of these provide pain management and two of these offer spine procedures. The other ASCs in the area perform a variety of surgical procedures including ophthalmic, endoscopic and colonoscopies, hand and upper-extremity surgery, plastic surgery and general surgery.

## **Stakeholders**

The stakeholders are the ASC owners, the medical director, ASC administrators, the surgeons, the surgical technicians, nurses and CRNAs. Also included would be the office staff and the surgical patients. Stakeholder buy-in is important as the goal of this intervention is a

practice change within the facility, this can only occur if there is engagement of the key stakeholders at all levels of the organization (McGahee, 2016). The project lead and developer of this project has a long-standing working relationship with the stakeholders. This relationship continues to be respectful and friendly. This rapport will continue throughout the project.

### **Recruitment Methods**

Participation in this quality improvement project will be mandatory as it is a systemic practice change. Inclusion criteria is: all registered nurses employed at the ASC, full-time, part-time and per-diem. All CRNAs who are contracted to provide anesthesia services at this ASC. Licensed staff working within the facility who perform patient handoffs will all be considered mandated to participate, this includes contracted staff. Exclusion criteria is any RN or CRNA off work for medical or family leave. This will be a convenience sample of the professionals (RNs and CRNAs) already working at this site. Because the participants will be working their normal jobs during the implementation of this project they will receive their normal pay from their respective employer. There is no monetary compensation for participation. Participation is not a condition of employment or contracted services.

Patient charts will be recruited based on participant providing care during implementation period. Once the observatory checklist is completed the project lead will audit the chart of the patient being discussed for accuracy and completeness of handoff. Inclusion criteria is patient receiving care during the implementation period. Exclusion criteria is patients receiving care before or after the implementation period.

### **Tools and Instrumentation**

The standardized handoff tool was developed to incorporate all aspects of the interoperative period to decrease loss of information and improve communication. This tool is

designed specifically for the ASC project site and is based on the situation, background, assessment and recommendations (SBAR) tool. It will be approved by the project team prior to implementation. Guidelines and a checklist have been used in handoff or transfer of patient care to help healthcare providers exchange correct and complete information, decrease loss of information, decrease the need for clarification and overall improve communication (Robins & Dai, 2015). The pre and post implementation survey (appendix C) will also be approved by the project team, project mentor (PM) and content expert (CE) prior to implementation. The educational power point (Appendix D) will be disseminated by the author to all RNs and CRNAs after the pre-test and before the data collection. This tool will also be approved by the project team, PM and CE prior to use. The chart audit tool (Appendix E) will be used to demonstrate at least 90% compliance with using the tool and to document any surgical site errors or medication errors.

### **Standardized Handoff Tool**

The standardized handoff tool will be used by all members of the perioperative team. The tool will be used when transferring care of all patients during the implementation period and will start with the preoperative nurse and be passed through the entire perioperative unit to finally end with the PACU nurse. It will be filled in by the appropriate providers as the patient traverses through the perioperative arena. It requires short comments and check boxes. This handoff tool will give written information for the nurses and CRNAs to reference and confirm all pertinent information is passed to the next provider. It will be obtained by the project lead at the end of the patient's stay for the purpose of data collection.

### **Pre and Post Handoff Opinion Survey**

A pre and post intervention survey will be given and compared for any change in attitude regarding the use of a structured hand off tool. The survey will be administered electronically on Google Survey. It will be the same survey pre and post implementation to assess for changes in opinions and attitudes. It is a 15-question qualitative survey utilizing Likert style answers to gather the staffs' opinions regarding the effectiveness of the handoff tool.

### **Audit Tool**

The audit tool (See Appendix E) will be completed by the project lead. It will identify the key elements such as, current medications, allergies, and pertinent medical history, which need to be communicated in the handoff report. The handoffs will be observed by the project lead and data collected. There are also specific interview questions for the receiving nurse after the handoff is completed. The audit tool will document the elements of information that are passed during the handoff. The audit tool will document any adverse effects such as medical errors that may occur during the project timeline.

### **Educational Presentation**

The educational component is a power point presentation (See Appendix D). It will be administered by the project lead. The presentation will cover the critical elements that need to be addressed in the handoff. The educational presentation will describe the importance of the practice change, current evidence, and the potential problems that occur when there are ineffective handoffs. Other information to be included is the baseline audit which demonstrated lost communication. These lost or miss communication has and can lead to errors. This will be presented to the subjects and subjects will be encourage to ask questions for clarification. Pertinent information will be presented based on the patients' phase of care. The pertinent information is different depending on the phase of care. The guideline is the standardized tool

which defines the items of information which is important taking the subjectivity out of the equation. The handoff tool will be given to all participants as a reference.

### **Data Collection Procedures**

Data collection will consist of chart review and information from surveys and audit tool. Initial data will be obtained by administering a before and after educational intervention survey (See Appendix C) for the RNs and CRNAs employed by this ASC, to determine attitudes regarding structured handoff procedures for patient safety. The participants will be identified by randomly assigned alpha-numeric numbering. The anesthesia staff will be identified as participant 1A, 2A, 3A; the pre-operative nurses will be identified as 1B, 2B, 3B; the circulating nurses will be identified as 1C, 2C, 3C and the post-operative nurses will be identified as 1D, 2D, 3D and so forth. The identification of all participants will remain anonymous in the reporting of the project and will be reported as a group to protect the privacy of the individuals, patients, and all stakeholders.

The project lead will directly observe all participants and document it with the audit tool at least once or for as often as it takes to collect the necessary data. The project lead will then perform a chart audit to verify if the information passed was accurate and complete

A retrospective chart audit will also be conducted to determine adherence to the new handoff protocol as well as a data collection tool to measure the items transferred in the handoff. A handoff data collection tool will be utilized for all handoffs. All handoffs will be assessed by this data collection tool. Any charts that fall out due to either miscommunication, required further communication after the handoff or notes a medical error will undergo further auditing.

The surgical site errors and medication errors will also be monitored via a weekly report that is obtained from the facility's adverse event reporting program. The project time line is 15

days of pre-implementation for recruitment and education and survey, four weeks for process implementation and data collection and 15 days post-implementation for survey.

Additional data to be collected will be from the pre and post implementation survey.

This survey is designed to assess the opinion of the subjects on a standardized handoff tool. Additionally, it asks if the subject believe they give a complete handoff and what they believe about the current handoffs at this site. This survey will be implemented prior to the education presentation and again after the implementation phase.

### **Project Timeline**

The perioperative handoff guideline will begin with recruitment and education followed by implementation and data collection. The data will be collected and analyzed. When data analysis is complete, the project will be completed and disseminated.

Week/Date	Activity
Week 1 November 7-13, 2018	<ul style="list-style-type: none"><li>• Recruitment emails sent to participants notifying of education sessions dates and times.</li><li>• Pre-implementation data gathered</li></ul>
Week 2 November 14-20, 2018	<ul style="list-style-type: none"><li>• Pre-educational surveys administered and collected</li><li>• Check on room for educational session, ensure all AV equipment was in working order, and print and review all presentation materials and handouts.</li></ul>
Week 3 November 21-27, 2018	<ul style="list-style-type: none"><li>• Education of participants</li><li>• Disseminate handoff tool</li><li>• Pre-survey implementation</li></ul>
Week 4 through Week 8 November 28 – January 8, 2019	<ul style="list-style-type: none"><li>• Implementation of handoff tool</li><li>• Data collection (observational and chart audits?)</li><li>• Provide staff support</li></ul>

Week 9 January 9-15, 2019	<ul style="list-style-type: none"> <li>• Data analysis utilizing appropriate statistical tests</li> </ul>
Week 10 January 16-22, 2019	<ul style="list-style-type: none"> <li>• Complete project proposal</li> <li>• Prepare for dissemination</li> </ul>
Week 11 January 23-29, 2019	<ul style="list-style-type: none"> <li>• Email stakeholders to arrange a meeting</li> <li>• Begin to prepare a presentation of the project for dissemination</li> </ul>
Week 12 January 30-February 5, 2019	<ul style="list-style-type: none"> <li>• Meet with stakeholder at the project site to disseminate results</li> </ul>
Week 13 February 6-12, 2019	<ul style="list-style-type: none"> <li>• Prepare for dissemination to course instructors and student colleagues</li> </ul>
Week 14 February 13-19, 2019	<ul style="list-style-type: none"> <li>• Disseminate project</li> </ul>
Week 15-16 February 20-March 1, 2019	<ul style="list-style-type: none"> <li>• Plan to further disseminate at conference</li> </ul>

### **Ethics Human Subjects Protection**

This project is a QI project and does not involve direct patient care and will not require institutional review board (IRB) review. The practice site is an ambulatory surgery center and does not have an IRB at this time. The owners and management have given written permission for the project lead to conduct this QI project at their facility (See Appendix F). The project lead has completed and passed the collaborative institutional training initiative (CITI) program that provided education in protecting the rights, privacy, and safety of all participants. For the purpose of this project, the participants will come from a convenience sample consisting of the RNs and CRNAs who work at the practice site. Since this is a systems wide practice change participation is expected. No consent is necessary.

The participants will be coded by the project lead and remain anonymous. Patient charts will be numbered in the order they are seen and only the project lead will have access to this information. When the data is collected it will be placed in a locked file box, which only the project lead will have access. Potential benefits include improved communication and reduced medical error. Additionally, the participants have the potential for improved job satisfaction with the improvement of the patient handoff process.

### **Analysis and Evaluation**

Data was gathered via a pre and post survey to measure provider attitudes regarding standardized handoff processes before and after the implementation of a handoff form. Descriptive statistics and percentage of change between the pre and post survey responses for each item were computed utilizing the statistical package for the social sciences (SPSS) computer program.

Handoffs performed by all participants were also observed by the project lead following the education of the handoff form. The data collection tool was used to document the information, that was passed as the handoffs occurred. A chart audit was performed to verify all pertinent information was passed and was accurate for each participant. The data from the audit tool was used to calculate descriptive statistics and percentages to demonstrate the adherence to the use of the handoff guideline and the number of elements transferred after implementation of the intervention.

Any medication errors will be documented via incident reports during the implementation period and will be compared to the incident of occurrence during the previous six months prior to implementation by applying a t-test to statistically test the results.

## Pre and Post Survey Results

Ten nursing personnel at an ASC completed both the pre and post survey. The participants served in a variety of roles and were employed from one year to ten years in these roles. Six participants were CRNAs with more than ten years' experience. The sample also consisted of a CRNA, an OR RN, and a Post-Op RN who each had between three- and six-years' experience. Another participant, a Pre-Op RN participant had between one- and three-years' experience. Table 1 provides the descriptive statistics (e.g., mean, standard deviation, and median) for each item on the pre and post survey (See Appendix G).

The results demonstrate that after implementation of the handoff form, 25% of the staff had an overall poorer perception about the usefulness of the guideline to decrease error. However, 89% of the staff believed the guideline improved communication between providers after implementation post intervention see figure 1. Eighty-nine present of the staff agreed or strongly agreed they give a thorough report after the implementation of the guideline. Prior to implementation of the handoff guideline 25% of the staff reported they were either neutral or unwilling to use a handoff guideline and 75% reported they agreed or strongly agreed they were willing to use a handoff guideline. Post implementation of the handoff guideline 5% of the staff reported they were neutral regarding the handoff guideline and 95% reported they agreed or strongly agreed to use the handoff guideline. Post intervention they responded, they were more satisfied with the handoff procedure after the implementation of the guideline. Pre-intervention 45% of respondents were neutral or somewhat dissatisfied with the current patient handoff process. Post implementation 11% were neutral and 89% agreed or strongly agreed (50%) they were satisfied with the patient handoff process. After the handoff guideline was implemented, the nursing and anesthesia personnel also believed the handoff procedure was more efficient and

met the needs of patients. Post implementation 22% agreed, 72% strongly agreed and 6% were neutral as opposed to pre-implementation where 35% were neutral and 64% agreed or strongly agreed (32%) see figure 2. According to the data collected, the staff believed they gave a more thorough and complete handoff report using the handoff guideline when transferring patients to the next area of care. This is illustrated in Figure 3.

Figure 1

Do you believe the guideline or form improved communication between providers?

18 responses

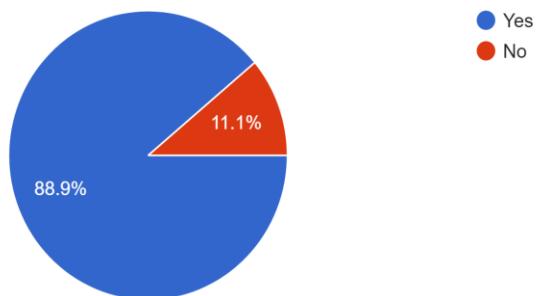


Figure 2

**Implementaion of the standardized handoff guideline improved efficency and clarity of communication in our ASC post implementation...**



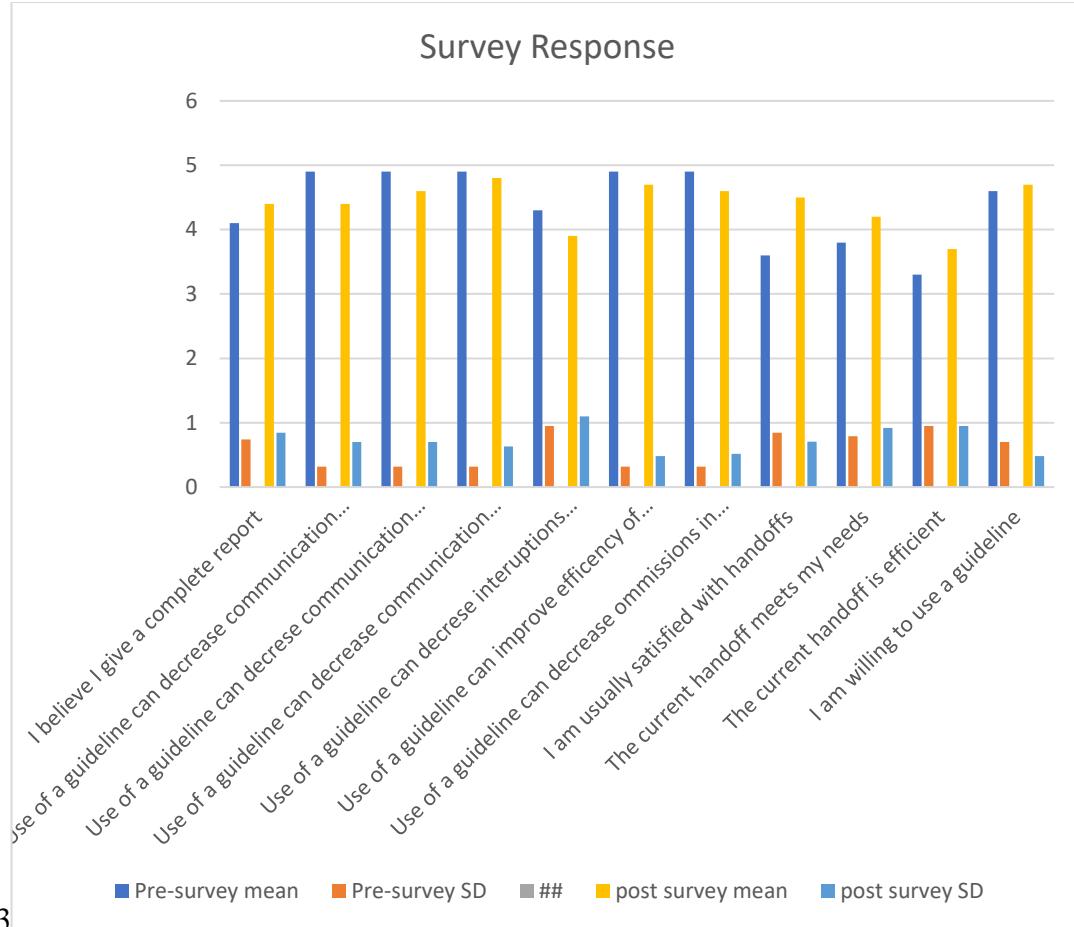


Figure 3

### Chart Audit Results

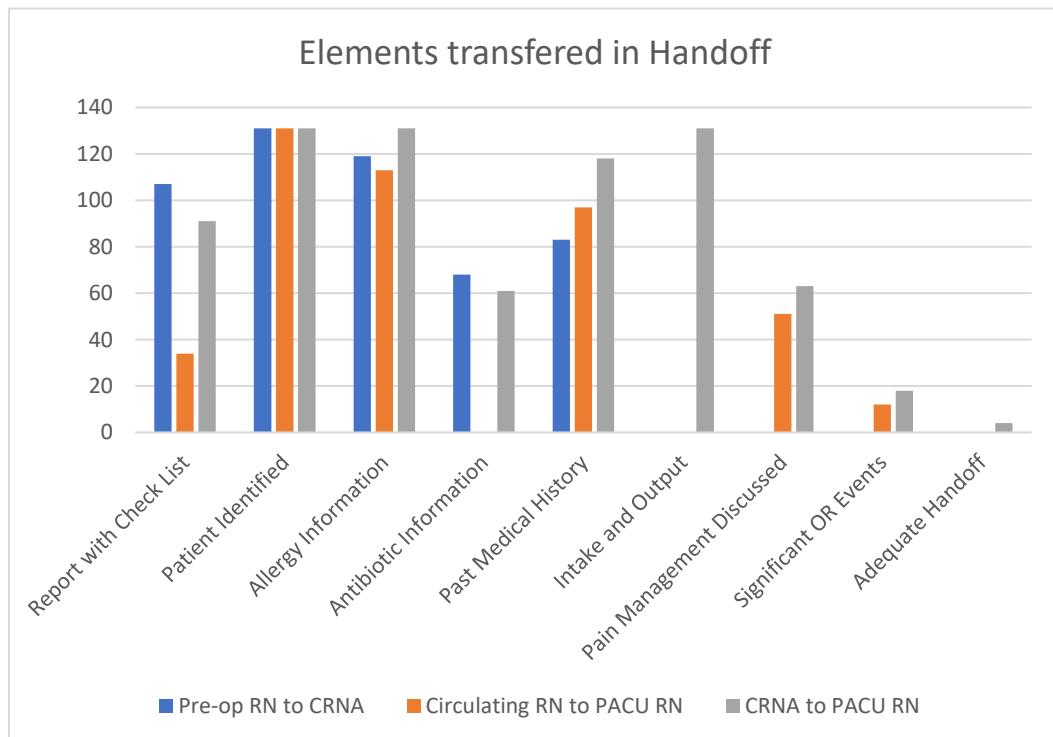
Adherence to the use of the hand off guideline and communication accuracy was examined through a retrospective chart audit of 131 cases at three steps of the patient handoff process in the ASC. This includes transfer from the pre-op RN to the CRNA, post-op from the circulator to the PACU RN, and post-op from the CRNA to the PACU RN. The frequency and percentage of adherence to the use of the handoff guideline and the number of elements communicated at each phase of patient transfer were observed. At every phase of patient transfer the patient was adequately identified by all staff members. The CRNAs also were 100% compliant in transferring information about patient allergies and input and output. The

circulating nurses did not give information about antibiotics and input and output because it is more the role of the CRNA. The use of the handoff guideline by the circulation nurses was adherent 26% of the time (Appendix H).

### **Handoff Guideline Observation**

The number of critical elements communicated at each phase of handoff were counted. The critical elements were counted to demonstrate information which was transferred in the handoff process. The key elements to be communicated were patient identified, allergies, antibiotics, past medical history, intake and output, pain management and any significant events in the operating room. Figure 3 shows the key elements transferred during handoff during the implementation of the guideline.

Figure 3



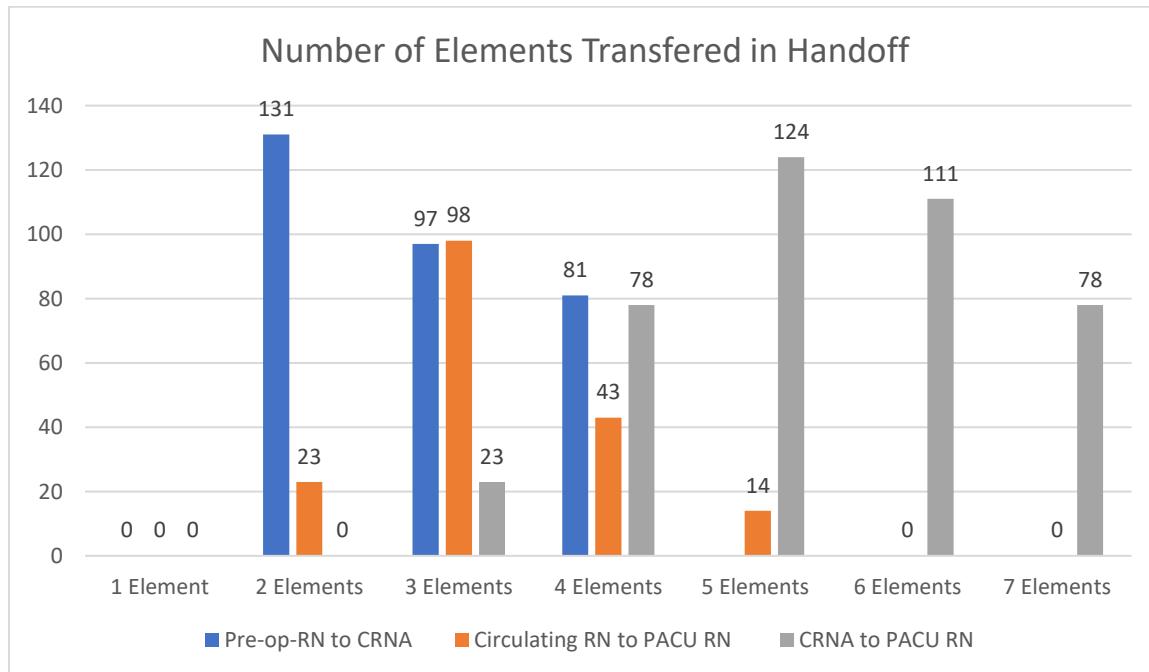
**Pre-op Nurse Handoff:** There were four pre-op nurses observed during the guideline implementation of the project. Each nurse was observed by the project lead. The primary pre-op nurse was observed in the handoff process 72 times and she was consistently adherent to the protocol. This represents 55% of the observed handoffs. During the implementation of the guideline this nurse communicated 4 critical elements 88% of the time and 3 critical elements 12% of the time. The second pre-op nurse was observed 34 times which represented 26% of the observed handoffs. This nurse communicated 4 critical elements 26% of the time, 3 critical elements 63% of the time and 2 critical elements 11% of the time. The other two pre-op nurses were per diem nurses and together represented 19% of the handoffs. One of these nurses was non-adherent with the protocol and did not use the guideline. The other per diem nurse communicated 3-4 critical elements 37% of the time and 2 critical elements 67% of the time.

**Circulating Nurse Handoff:** There were three circulating nurses observed during the guideline implementation by the project lead. Two of the primary circulating nurses were observed 56 time and 52 time respectively. This represents 82% of the circulating RN handoffs or 40% and 43%. The third circulating RN was a per diem nurse and was observed 23 times and represents 17% of the handoffs. Overall the circulators only utilized the handoff guideline 26% of the time. This is most likely due to the fact that the CRNAs and the circulators give handoff communication to the PACU nurse at the same time and the circulators allowed the CRNAs to use the guideline. Although the circulators were essentially non-adherent to utilizing the guideline the elements were still counted as a whole. The circulators communicated 2 critical elements 17% of the time, 3 critical elements 75% of the time, 4 critical elements 33% of the time and 5 critical elements 11% of the time. The circulation RN did not ever communicate six or seven elements to the PACU nurse. This is most likely due to the fact that the CRNA

communicated these items which included pre-op antibiotics, input and output and significant events which were difficult airways.

**CRNA Handoff:** There was an 85% usage rate of the handoff guideline by the CRNAs at the project site. There were six CRNAs who were observed during the implementation period of the handoff guideline. Two of the CRNAs utilized the handoff guideline 100% of the time when they were observed. The remaining 4 CRNAs utilized the handoff guideline an average of 70% of the time. Post-operatively, on average the CRNAs most often transferred five critical elements which translates to 95% of the time. Six elements were communicated 85% of the time and both 7 elements and 4 elements were communicated 60% of the time. The fewest elements transferred was 3 which was communicated 18% of the time. None of the groups communicated only 1 element and the pre-op RNs and the Circulators were the only groups who communicated 2 elements. See Figure 4

Figure 4



## **Adverse Events**

There were two medication errors and no wrong site surgery errors in the six months prior to implementation of the guideline. There were no medication errors or wrong site surgeries during the implementation period. Prior to implementation of the two medication errors in the prior six-month one of the errors required a patient to be transferred for further care. A t-test was performed to compare the medication errors pre and post implementation. T is 0.025 with a 95% Confidence Index of 1.9608, which is not statistically significant. Therefore, there is no statistical significance that utilizing a structured handoff protocol prevents adverse events from occurring.

## **Discussion**

Communications omissions in patient handoff can lead to inefficient patient management and potentially patient harm (Agarwala, Nurudeen, & Haynes, 2015). The circulating nurses used the guideline the least out of all the perioperative team members. This is possibly due to the fact that the circulator and the CRNA are giving report to the PACU nurses post-operatively. The circulating nurses also did not communicate all the elements, which were considered critical for transfer of care. This is also most likely due to the fact that they are transferring the patient with the CRNA. Although it was not measured, between the circulator and the CRNA anecdotally the project lead observed all critical elements were passed between the two providers to the PACU nurse.

The pre-operative nurses were more compliant than the circulating nurses although this was mainly due to the primary pre-op nurse. The per diem nurses in both groups were the least adherent with the guideline. This may be due to the fact that they are not full-time employees and they may not have seen the value or importance of their full attention to the project. The

project lead did have the support of the medical staff and the administration for the implementation of the handoff guideline although there was not any indication that there would be any repercussions for not participating in the handoff project.

One of the objectives was the guideline would be used at least 90% of the time. This was not achieved by any group within the perioperative team. The closest was the pre-op nurses who utilized the guideline 81.7% of the time. The CRNAs used it 69.4% of the time and the circulators used it 26% of the time. The project lead noted the staff were more compliant with the use of the guideline at the beginning of the implementation period and became laxer as time went. This may be due to initial interest because the project was implemented immediately after the education sessions.

### **Significance**

The potential significance to the practice site is the willingness of the staff to use the guideline and they did believe the guideline improved communication. The use of the guideline led to improved communication which could potentially lead to improved patient outcomes. Potential significance of this project to the profession of nursing will be determined if pertinent information is passed and communication is improved. Failed communication and missed communication during the transition of care is a major cause of adverse events and medical errors (Starmer et al., 2014). Implementation of a standardized handoff tool has the potential to improve communication, decrease errors and improve outcomes (Starmer et al., 2014). Improved outcomes are one of the reasons quality improvement projects are performed. The healthcare industry in the United States is undergoing significant changes with a shift to reimbursement based on outcomes rather than volume (Squitieri, Bozic, & Pusic, 2017). Lack of communication and misinterpretation of information are known to have the potential to lead to

medical errors (Hughes, 2008). The practice site will continue to implement the guideline for patient handoff in an effort to continue to improve communication and patient outcomes because they believe there is a strong potential to improve outcomes. A standardized handoff tool places nursing at the forefront in performing proactively in the prevention of medical errors and the promotion of patient safety. Implementation of a nurses guided protocol increases the ability for advanced practice nurse to work autonomously and improve quality of care.

### **Limitations**

One of the limitations of this project was the change in staff at the project site during the implementation period. Due to this fact, the statistical testing to compare the pre and post survey results was affected. Another limitation was the small sample size. Because this is an ambulatory surgery center the staff size is small and one or two people who were non-adherent to the use of the guideline makes a big impact.

The handoff guideline was not used to its fullest extent, which was particularly noted with the observation of the circulating nurses. One of the reasons for the lack of adherence was due in part to the staffing at the project site. There was staff turnover during the implementation of the project. The operation room manager left the facility after the implementation of the project. The staff felt they did not have support or direction from their immediate superior, which was a limitation of this project.

The four-week time period for implementation is also a limitation of this project. More time for implementation could increase the use of the guideline. More support from the stakeholders would have improved the staffs' perception of stability and support, which could have led to an increase of nurses' adherence to the guideline. It is crucial to have administrative support for a successful change implementation. The administration provides the resources and

structure to support the transition (Ciccarelli & Woodward, 2018). Without the support from the top down it is almost impossible to promote the change (Ciccarelli & Woodward, 2018)

Using a standardized handoff guideline has many advantages which can lead to improved communication and improved patient outcomes. The guideline helps the individuals to remember critical elements which need to be passed along in the handoff of patients in the perioperative setting. Further investigation into the successful implementation of guidelines in the perioperative arena and do they improve care and or patient outcomes.

### **Dissemination**

Robust scholarly evidence is necessary for improvement in clinical practice and potentially improved patient outcomes (Curtis, Fry, Shaban, & Considine, 2016). Deprived of scholarly research, quality, safe, efficient and effective patient care will not be achieved (Curtis et al., 2016). The project lead plans to disseminate and utilize this handoff guideline at other affiliated ambulatory surgery centers. Additionally, the results of this project are planned to be disseminated at the California Association of Nurse Anesthetist meeting as a podium presentation at their Fall 2019 meeting. This meeting is attended by CRNAs from California and is relevant to nurse anesthesia practice. It will also be submitted to the DNP project repository for Touro University Nevada.

### **Sustainability**

Successful implementation of a practice change is dependent on the support of administration (Curtis et al., 2016). The project site is collaborating with the project lead to revise the guideline and create a policy to implement the handoff guideline on a permanent basis. The ASC management is in agreement, the standardization of handoffs at their center adds improved safety and the potential to improve outcomes.

### **Conclusion**

Department specific guidelines are known to improve handoff communication (Bruno, G., Guimond, M., 2017). The objectives of this project were to implement an evidenced-based perioperative ambulatory surgery center handoff guideline to improve handoff communication. The staff was educated on the use of the guideline and they completed a pre and post implementation survey to assess their attitudes on the use of a handoff guideline. Although the guideline was not utilized to its fullest extent, communication was improved at the project site and there were no surgical site or medication errors. Multiple providers are involved in the care of the patients in the perioperative arena. Each patient must traverse through multiple phases of care and it is critical for accurate information to be communicated between providers for the safety of the patient. Standardization of handoffs and ensuring face to face communication between providers will improve communication and promote patient safety.

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## Appendix A

### Perioperative patient safety handoff guideline

- **Definition of patient handoff**
  - Handoffs involve the transfer of essential patient information required for the care of the patient when care shifts from one care provider to another
- **Why is handoff communication important?**
  - The Joint Commission reports 70% of sentinel events were caused by miscommunication
  - Poor quality and incomplete handoffs can be attributed to 80% of preventable adverse events
  - The operating room is one of the most complex work environments in healthcare and have an average of 4 handoffs per case
  - Handovers between anesthesia providers increase the risk of morbidity or mortality by 8%
- **What information is important to pass along when taking a patient to surgery**
- **Pre-operative communication to the circulator and CRNA**
  - Patient Identification: Name, DOB
  - Name of Procedure, including site, side, any modifiers
  - Pertinent Documents: H&P, Consent, Labs, Test
  - Pertinent Medical History
  - Allergies
  - NPO Status
  - Allow for questions
- **Interoperative Communication**
  - TIME OUT
    - RN: Patient ID, Name, DOB, Surgical Procedure, Site, Allergies, Patient Position
    - CRNA: ASA Classification, Antibiotics, Type of anesthetic, any airway issues or other anesthetic concerns
    - Scrub Tech: Back Table medications, instruments, anything they may need but haven't opened at this time
- **Surgical Procedure**
- **Ineffective Communication**
  - One of the top 3 causes of reported OR sentinel events
    - Wrong site surgeries
    - Medication errors
    - Surgical fires
- **Where do the highest percentage of mistakes made as a result of communication failures resulting in malpractice claims occur**
- **Post-op Communication Circulator to PACU RN**
  - Patient Identification: Name, DOB
  - Name of Procedure, including site, side, any modifiers

- Allergies
- Interoperative medications given
- Pertinent information related to the surgical site, dressing, drains, packing
- Any significant OR events
- Allow for questions
- **Post-op Communication CRNA to PACU RN**
  - Patient Identification: Name, DOB
  - Name of Procedure, including site, side
  - Allergies, pertinent medical history, significant pre-op labs or test results
  - Type of anesthetic, IV Fluids, EBL, UO
  - Last pain medication, patient's pre-op pain level
  - Airway and oxygenation status, hemodynamic stability, any other anesthetic concerns
  - Allow for questions
- **Handoff Form**

		[REDACTED]	
REFERRAL NURSE:  ANESTHETIST: Drug/Drug Team	NON-EMERGENCY PROCEDURE:		
	<b>LAWYER:</b> <b>CONTACT PERSON:</b> <b>STAFF SPECIALISTS:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> FNP</li> <li><input type="checkbox"/> SSI-CERTIFIED</li> <li><input type="checkbox"/> ERNO</li> <li><input type="checkbox"/> CRASH/TRAUMA</li> <li><input type="checkbox"/> NCOE</li> </ul>	<b>ACTUAL PROCEDURE:</b> <b>ANESTHESIA TYPE:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> GENERAL</li> <li><input type="checkbox"/> LOCAL</li> <li><input type="checkbox"/> SPINAL</li> <li><input type="checkbox"/> IV REGIONAL</li> <li><input type="checkbox"/> MONITOR</li> </ul> <b>ANESTHETIC TIME:</b> <b>MONITOR AND TIME:</b>	<b>INSTRUMENTATION:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> STERILE</li> <li><input type="checkbox"/> TISSUE</li> <li><input type="checkbox"/> DENTAL</li> <li><input type="checkbox"/> PACING TYPE</li> </ul> <b>IMMEDIATE POST-OP:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> RECOVERY</li> <li><input type="checkbox"/> PREGNANT</li> <li><input type="checkbox"/> JP</li> <li><input type="checkbox"/> SPOLLET</li> <li><input type="checkbox"/> OTHER</li> </ul>
[REDACTED]		15%	1.00
<b>PATIENT DATA:</b> Sex: M/F DOB: 12/31/1999 DRUGS: N/A  <b>Post-Op Status:</b> INTRAVENOUS, IV fluids Blood Transfusion, blood transfused Glucose, glucose, Dextrose, Dextrose		<b>PACU:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> PORT CATHETER/CHLORHEXIDE</li> <li><input type="checkbox"/> BAND AID/PLASTIC BANDAGE, A TO WASTE</li> <li><input type="checkbox"/> INTRAVENOUS FLUIDS: 1000ML D5W OVER 120 MINUTES</li> </ul> <b>ADMISSION STATUS:</b> NORMAL HYPOVOLMIC HYPOVOLMIC/HYPOTENSIVE/DEHYDRATED	

- **Instructions for Handoff Tool**
  - Not a permanent part of the patient record
  - It will follow the patient throughout all phases of the perioperative arena
  - (Verbal instructions will be given)

## Appendix B

			Patient study number
<b>ALLERGIES:</b>	<b>SCHEDULED PROCEDURE:</b>		
<b>NPO:</b>	<b>LANGUAGE:</b>	<b>ACTUAL PROCEDURE</b>	<b>WOUND CLOSURE:</b>
<b>ANTIBIOTIC:</b> Drug Due/Time	<b>CONTACT PERSON:</b>	<b>ANESTHESIA TYPE:</b> <ul style="list-style-type: none"> <li><input type="radio"/> GENERAL</li> <li><input type="radio"/> MAC</li> <li><input type="radio"/> LOCAL</li> <li><input type="radio"/> SPINAL</li> <li><input type="radio"/> IV SEDATION</li> <li><input type="radio"/> BLOCK</li> </ul> <b>ANESTH. END TIME:</b> <b>SURGERY END TIME:</b>	<b>DRESSINGS/PACKING:</b> <ul style="list-style-type: none"> <li><input type="radio"/> CLEAN/DRY</li> <li><input type="radio"/> INTACT</li> <li><input type="radio"/> PACKING TYPE</li> </ul> <b>LINES/DRAINS/TUBES</b> <ul style="list-style-type: none"> <li><input type="radio"/> HEMOVAC</li> <li><input type="radio"/> PENROSE</li> <li><input type="radio"/> JP</li> <li><input type="radio"/> FOLEY</li> <li><input type="radio"/> OTHER:</li> </ul>
<b>HISTORY:</b>	<b>IVF:</b>	<b>I &amp; O</b>	
<b>PRE-OP LABS:</b> BG: H&H: URINE PREG:	PT/INR: NA+: K+:	<b>PACU CHECKLIST:</b> <ul style="list-style-type: none"> <li><input type="radio"/> POST OP BLOOD GLUCOSE _____ mmHg</li> <li><input type="radio"/> DOC. PAIN MEDS, PRN RESPONSE, &amp; WASTE</li> </ul> <b>ANESTHESIA CONCERNS:</b> AIRWAY: ANTIEMETICS: NEUROMUSCULAR BLOCKADE REVERSAL:	
<b>BETA BLOCKERS</b>	<b>MEDS:</b>		

## Appendix C

### Handoff Pre/Post-intervention survey

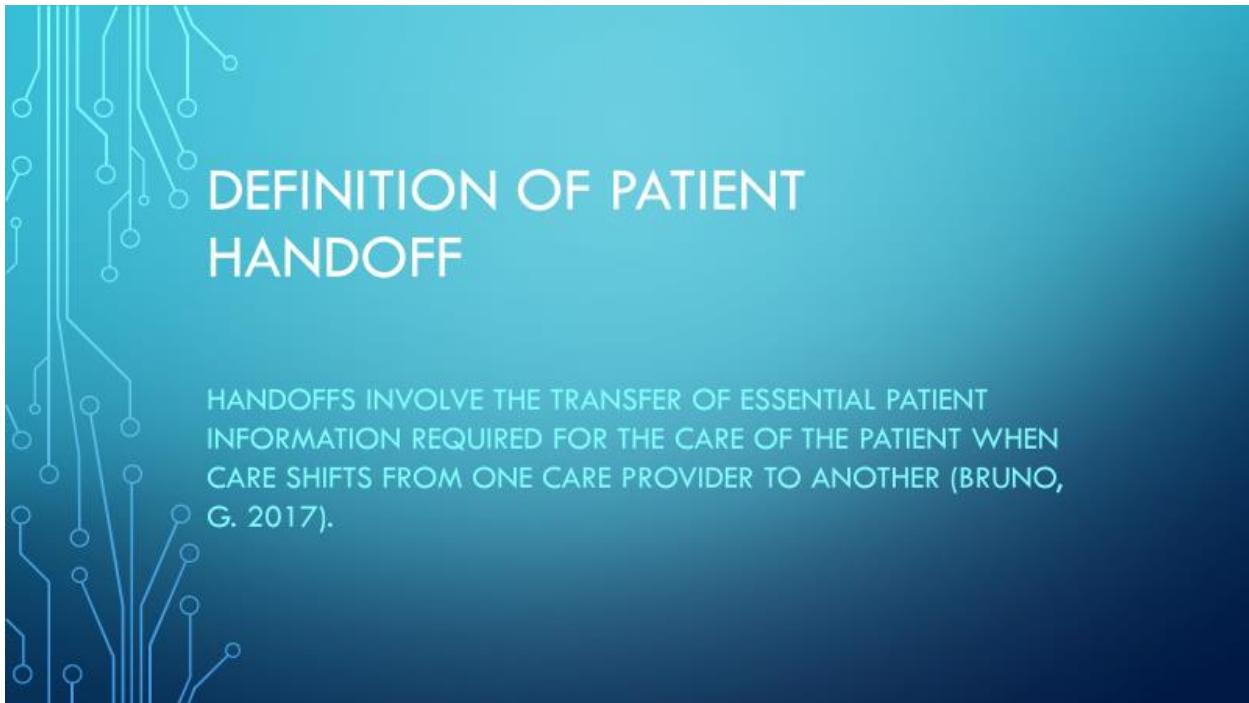
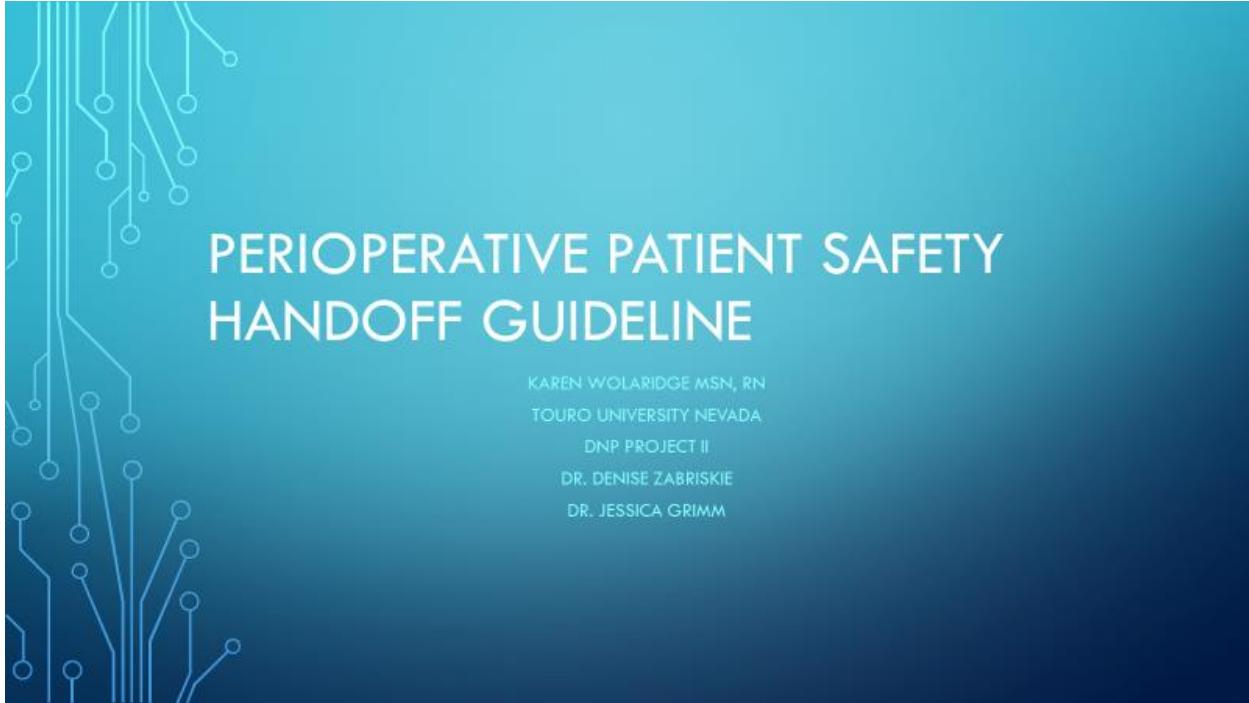
1. Identify your role at the Ambulatory Surgery Center (ASC). Please circle response
  - a. Pre-op RN
  - b. OR RN
  - c. Post-op RN
  - d. CRNA
  - e. Anesthesiologist
2. How long have you been in this role?
  - a. Less than 1 year
  - b. At least a year but less than 3 years
  - c. At least 3 years but less than 6 years
  - d. At least 6 years but less than 10 years
  - e. 10 years or more
3. Have you ever used a standardized guideline or form for patient handoffs anywhere you've worked?
  - a. Yes
  - b. No
4. If you answered yes to number 3, do you believe the guideline or form improved communication between providers?
  - a. Yes
  - b. No
  - c. Not Applicable

For the next section of questions please circle the response which corresponds with your level of agreement.

5. I believe I give a complete handoff report when transferring patients to the next area of care.
  - a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
6. The use of a standardized handoff form can decrease the amount of communication errors between the pre-op nurse, the circulating RN, and the CRNA
  - a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
7. The use of a standardized handoff form can decrease the amount of communication errors between the OR nurse and the PACU nurse.
  - a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
8. The use of a standardized handoff form can decrease the amount of communication errors between the anesthesia provider and the PACU nurse.
  - a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
9. The use of a standardized handoff form can decrease interruptions during handoff report.
  - a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
10. Implementing the use of a standardized handoff form can improve the efficiency and clarity of communication in our ASC.
  - a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
11. Use of a standardized handoff form can decrease omission of pertinent patient information during handoff report.
  - a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
12. I am usually satisfied with patient handoff report between caregivers.

- a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
13. The current handoff done at this ASC meets my needs to continue caring for the patient.
- a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
14. The current handoff process at this ASC occurs efficiently and without interruptions.
- a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree
15. I am willing to use a standardized handoff form to improve communication, efficiency and patient safety at this ASC.
- a. Strongly Disagree b. Disagree c. Neutral d. Agree e. Strongly Agree

## Appendix D



## WHY IS HANOFF COMMUNICATION IMPORTANT

- The Joint Commission reports 70% of sentinel events were caused by miscommunication (The Joint Commission, 2017).
- Poor quality and incomplete handoffs can be attributed to 80% of preventable adverse events (The Joint Commission, 2017).
- The operating room is one of the most complex work environments in healthcare and have an average of 4 handoffs per case (Robins, H. & Dai, F. 2015)
- Handovers between anesthesia providers increase the risk of morbidity or mortality by 8% (Petrovic, M. et al., 2015).

## WHAT INFORMATION IS IMPORTANT TO PASS ALONG WHEN TAKING A PATIENT TO SURGERY



## PRE-OPERATIVE COMMUNICATION TO THE CIRCULATOR AND CRNA (AORN, 2018)

- Patient Identification: Name, DOB
- Name of Procedure, including site, side, any modifiers
- Pertinent Documents: H&P, Consent, Labs, Test
- Pertinent Medical History
- Allergies
- NPO Status
- Allow for questions

## INTEROPERATIVE COMMUNICATION



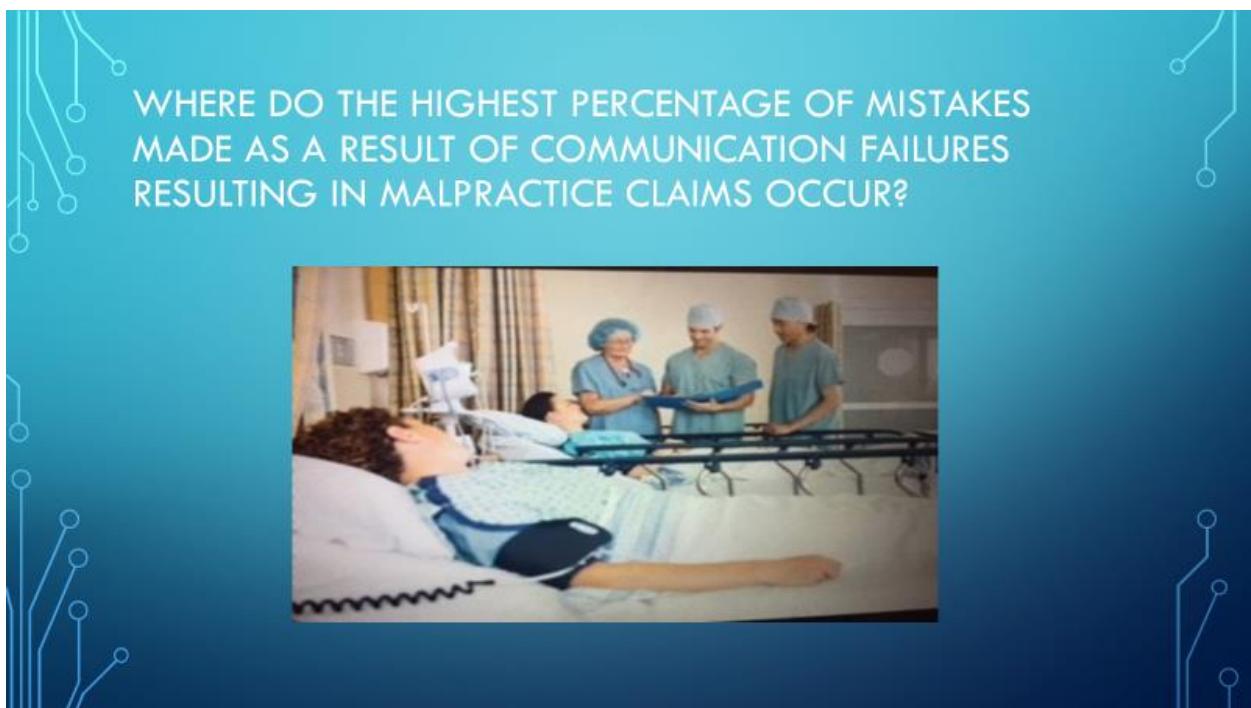
## INTEROPERATIVE COMMUNICATION (AORN, 2018)

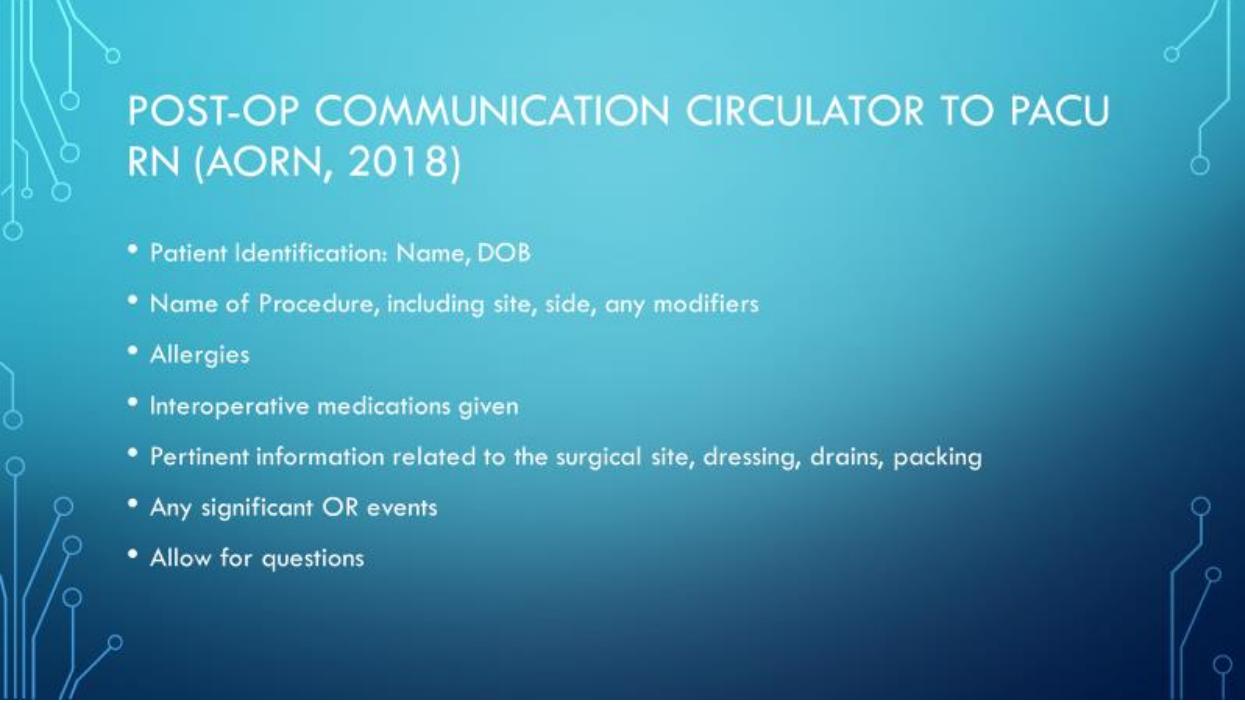
- TIME OUT

- RN: Patient ID, Name, DOB, Surgical Procedure, Site, Allergies, Patient Position
- CRNA: ASA Classification, Antibiotics, Type of anesthetic, any airway issues or other anesthetic concerns
- Scrub Tech: Back Table medications, instruments, any thing they may need but haven't opened at this time

## SURGICAL PROCEDURE

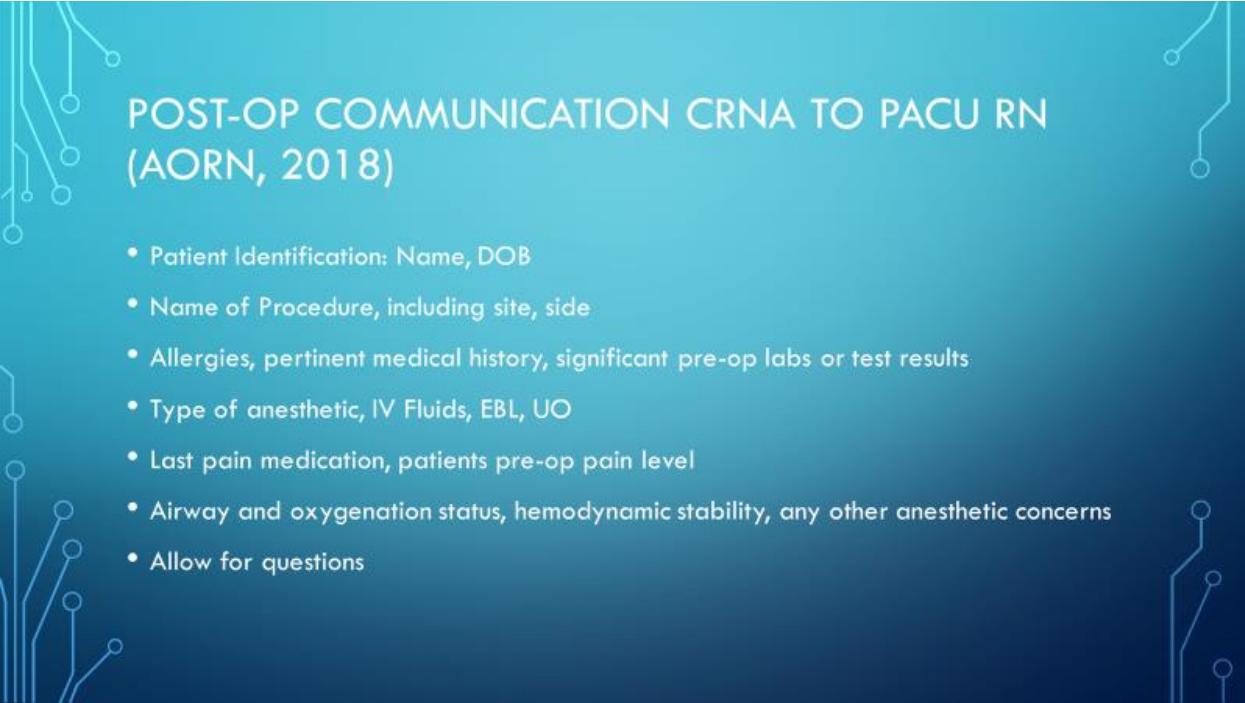






## POST-OP COMMUNICATION CIRCULATOR TO PACU RN (AORN, 2018)

- Patient Identification: Name, DOB
- Name of Procedure, including site, side, any modifiers
- Allergies
- Interoperative medications given
- Pertinent information related to the surgical site, dressing, drains, packing
- Any significant OR events
- Allow for questions



## POST-OP COMMUNICATION CRNA TO PACU RN (AORN, 2018)

- Patient Identification: Name, DOB
- Name of Procedure, including site, side
- Allergies, pertinent medical history, significant pre-op labs or test results
- Type of anesthetic, IV Fluids, EBL, UO
- Last pain medication, patients pre-op pain level
- Airway and oxygenation status, hemodynamic stability, any other anesthetic concerns
- Allow for questions

## HANDOFF FORM

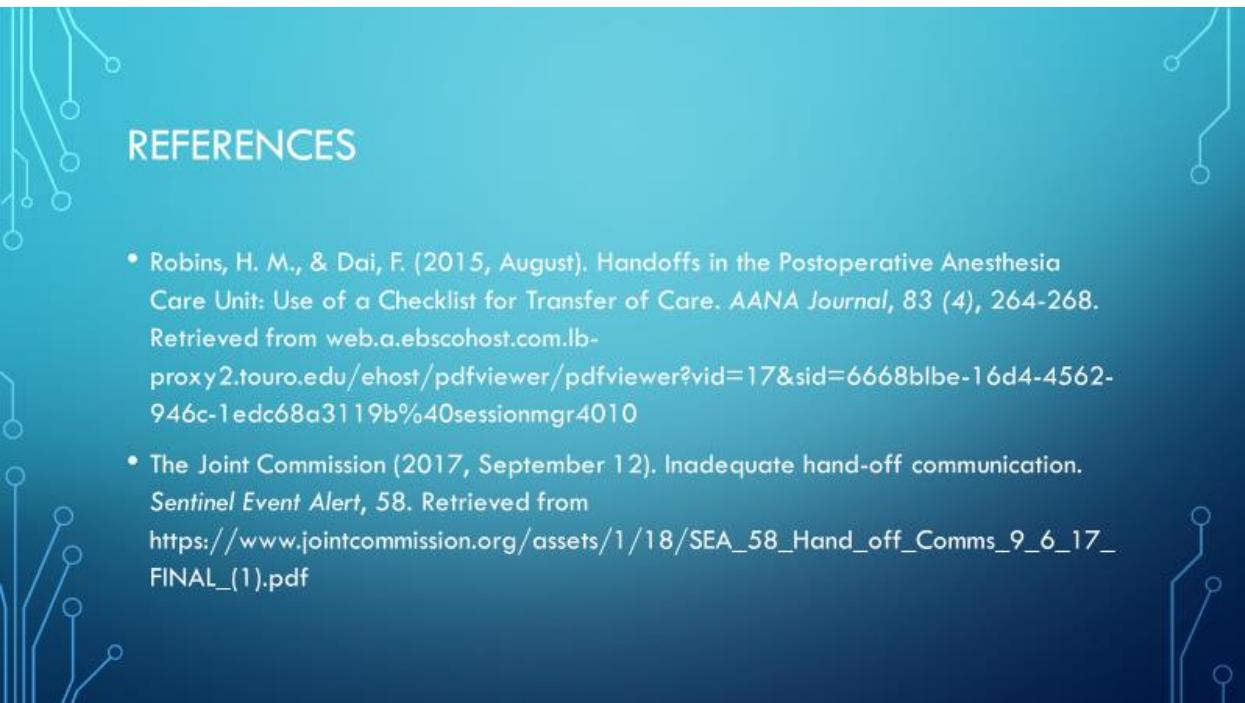
(BY SIGNATURE)			
ALLERGIES:  NPD  ANTIBIOTIC: Drug One-Time	SCHEDULED PROCEDURE:		
	LANGUAGE:  CONTACT PERSON:	ACTUAL PROCEDURE:	NOTICE OF CLOSURE:  o OUTPATIENT o HOSPITAL o HOME CARE
PREP CHECKLIST:  o YES CONSENT o ERAS o STAP MACHINE o STDR	ANESTHESIA TYPE:  o GENERAL o LOCAL o REGIONAL o NEUROBLOCK o BLOCK	DECRIPTION OF PACKING:  o CLEAN DRY o SOAKED o FACTORY TYPE	
	ANESTHESIA TIME:  SURGERY END TIME:	LICENSE/IDENTIFICATION:  o HOSPITAL ID o IP o FOLEY o OTHER	
NOTICE:	DATE:  03/03/03	L.A.O.	
POL. OF LABS:  o PT/INR o TSH o CRIME SCENE o ETC	EMERGENT:  o PART OF BLOOD/URINE _____ o PAIN MEDS, PRERESPONSE, & WASTE o NOTIFIY FAMILY AND DOCTOR/STAFF IN NURSES		
For use (Home Health):  BELL'S BLOCKERS: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes  Blood Thinner: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  Warfarin/Medic: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	ANESTHESIA CONCERN:  o HYPOTENSIVE o CARDIAC o NEUROLOGICAL BLOCKADE REVERSAL		
NOTE: A COPY OF THE PERMANENT RECORD			

## INSTRUCTIONS FOR HANDOFF TOOL



## REFERENCES

- Association of Operating Room Nurses {AORN} (2018). Hand-off Tool Kit to Improve Transitions in Care within the Perioperative Environment. Retrieved from <https://www.aorn.org/guidelines/clinical-resources/tool-kits/patient-hand-off-tool-kit>
- Bruno, G., Guimond, M. (2017). Patient Care Handoff in the Post anesthesia Care Unit: A Quality Improvement Project. *Journal of Peri Anesthesia Nursing*, 32(2), 125-133. <https://doi.org/http://dx.doi.org/10.1016/j.jopan.2015.10.002>
- Petrovic, M., Aboumatar, H. School, A., Krenzischek, D., Camp, M., Senger, C., Chang, T., Jurdi, Z., Martinez, E. (2015). The perioperative handoff protocol: evaluating impacts on handoff defects and provider satisfaction in adult peri-anesthesia care units. *Journal of Clinical Anesthesia*, 27(1), 111-119. <https://doi.org/http://dx.doi.org/10.1016/j.jclinane.2014.09.007>



## REFERENCES

- Robins, H. M., & Dai, F. (2015, August). Handoffs in the Postoperative Anesthesia Care Unit: Use of a Checklist for Transfer of Care. *AANA Journal*, 83 (4), 264-268. Retrieved from web.a.ebscohost.com.lb-proxy2.touro.edu/ehost/pdfviewer/pdfviewer?vid=17&sid=6668blbe-16d4-4562-946c-1edc68a3119b%40sessionmgr4010
- The Joint Commission (2017, September 12). Inadequate hand-off communication. *Sentinel Event Alert*, 58. Retrieved from [https://www.jointcommission.org/assets/1/18/SEA\\_58\\_Hand\\_off\\_Comms\\_9\\_6\\_17\\_FINAL\\_\(1\).pdf](https://www.jointcommission.org/assets/1/18/SEA_58_Hand_off_Comms_9_6_17_FINAL_(1).pdf)

## Appendix E

Circle: Pre-op Handoff    Post-op Handoff

Title: Pre-op RN   Circulator   PACU RN   CRNA (circle)

**Study ID Number:** \_\_\_\_\_

**Report with Checklist? Yes / No**

### **Key Elements**

Please circle yes or no if the information listed was given in the handoff

1. Patient identified Yes / No
2. Patient allergy information given Yes / No
3. Antibiotic information given Yes / No
4. Significant past medical history Yes/ No
5. Intake and output Yes / No (PACU only)
6. Pain management discussed Yes / No (PACU only)
7. Any significant OR events discussed Yes/ No (PACU only)

### **Handoff Questions**

1. Did you need further clarification from the RN or CRNA Y / N
2. Was the handoff adequate Y / N

To be completed by the data collector

**Key Element Information Score** \_\_\_\_\_ Pre-op 1-4 \_\_\_\_\_ Post-op 1-7

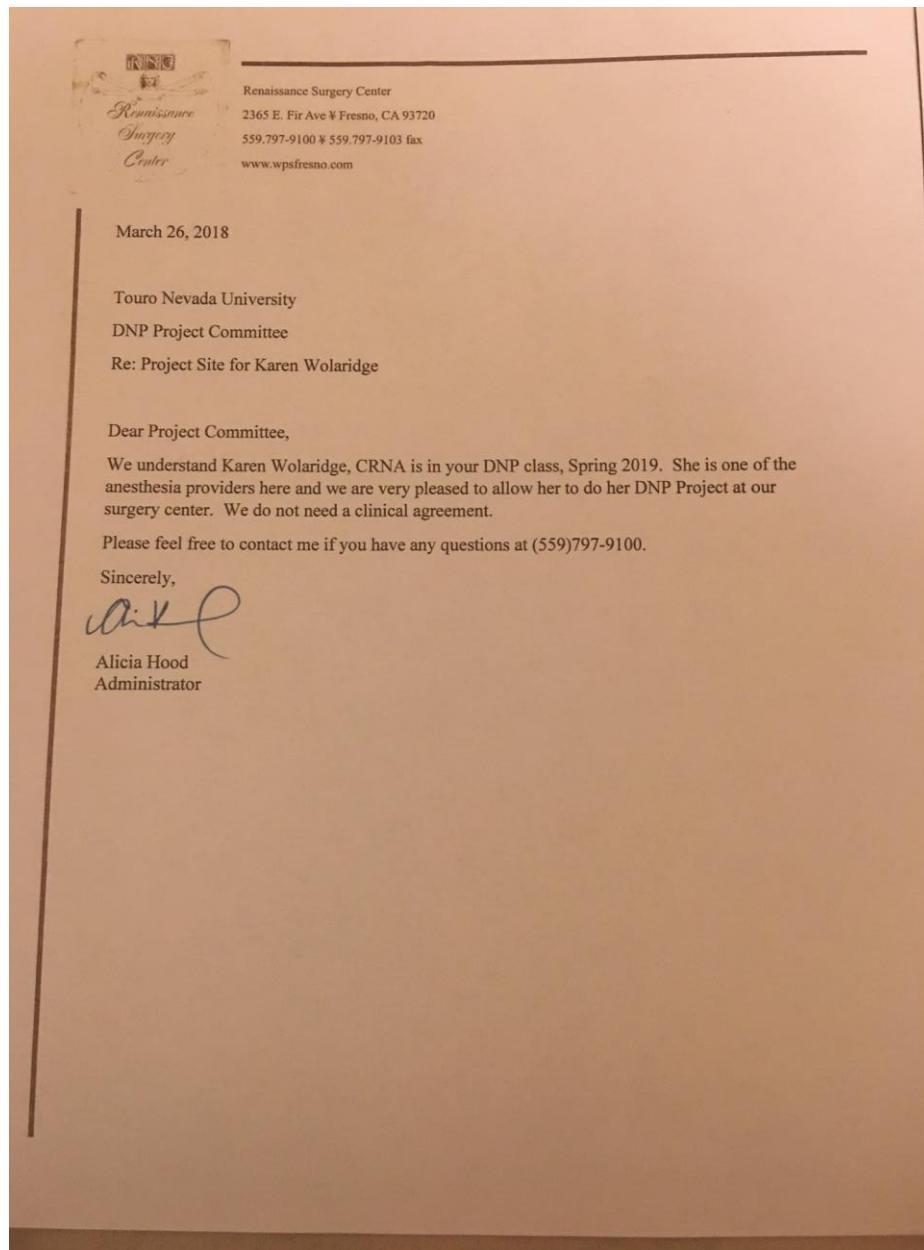
**Clarification Needed Y / N**

**Report Adequate Y / N**

**Were there any adverse events, wrong site, medication error? Describe:**

## Appendix F

### Permission for project to be conducted at ASC



## Appendix G

Table 1

*Descriptive Statistics for Pre and Post Survey Responses (N = 16)*

	Pre-Survey	Post Survey	% of		
			M	M	
			(Mdn)	SD	
1. I believe I give a thorough complete handoff report when transferring patients to the next area of care	4.10 (4)	.738	4.40 (5)	.843	7.32
2. The use of a standardized handoff form can decrease the amount of communication errors between the pre-op nurse and the circulating RN and the CRNA	4.90 (5)	.316	4.40(4.50)	.699	-10.20
3. The use of a standardized handoff form can decrease the amount of communication errors between the OR nurse and the PACU nurse	4.90 (5)	.316	4.60 (5)	.699	-6.12
4. The use of a standardized handoff form can decrease the amount of communication errors between the anesthesia provider and the PACU nurse.	4.90 (5)	.316	4.80 (5)	.632	-2.04

- 
5. The use of a standardized handoff form 4.30 (5) .949 3.90 (4) 1.10 -9.30  
can decrease interruptions during handoff report.
6. Implementing the use of a standardized handoff form can improve the efficiency and clarity of communication in our ASC. 4.90 (5) .316 4.70 (5) .483 -4.08
7. Use of a standardized handoff form can decrease omission of pertinent patient information during handoff report. 4.90 (5) .316 4.60 (5) .516 -6.12
8. I am usually satisfied with patient handoff report between caregivers. 3.60 (3) .843 4.50 (5) .707 25
9. The current handoff done at this ASC meets my needs to continue caring for the patient. 3.80 (4) .789 4.20 (.450) .919 10.52
10. The current handoff process at this ASC occurs efficiently and without interruptions. 3.30 (3) .949 3.70 (4) .949 12.12
11. I am willing to use a standardized handoff form to improve communication, efficiency and patient safety at this ASC. 4.60 (5) .699 4.70 (5) .483 2.17
-

## Appendix H

Table 2.

*Frequency and Percentages for Adherence to the Handoff Guideline (N= 131)*

Audit Item	Pre-op	Post-op	Post-op
	(from pre-op nurse to CRNA)	(from Circulating RN to PACU RN)	(from CRNA to PACU RN)
	n (%)	n (%)	n (%)
Report with Checklist	107 (81.7%)	34 (26%)	91 (69.4%)
Patient Identified	131 (100%)	131 (100%)	131 (100%)
Patient Allergy Information Provided	119 (90.8%)	113 (86.3%)	131 (100%)
Antibiotic Information Given	68 (51.9%)	0 (0%)	61 (46.5%)
Significant Past Medical History	83 (63.3%)	97 (74%)	118 (90.0%)
Intake and Output	-	0 (0%)	131 (100%)
Pain Management Discussed	-	51 (38.9%)	63- (48.0%)
Any significant OR event discussed	-	12 (9.1%)	18 (13.7%)
Did you need further clarification	0 (0%)	0 (0%)	4 (3.0%)
Was the handoff adequate?	131(100%)	131(100%)	131(100%)
1 Element	0 (0%)	0 (0%)	0 (0%)
2 Elements	131 (100%)	23 (17.5%)	0 (0%)
3 Elements	97 (74.0%)	98 (74.8%)	23 (17.5%)
4 Elements	81(61.8%)	43 (32.8%)	78 (59.5%)
5 Elements	-	14 (10.6%)	124 (94.6%)

6 Elements	-	0 (0%)	111(84.7%)
7 Elements	-	0 (0%)	78 (59.5%)
Were there any adverse events, wrong sites, or medication errors?		0 (0%)	0 (0%)

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