

Fall 12-2016

## **Use of a Handoff Communication Tool Between Certified Registered Nurse Anesthetists, Anesthesiologists, and Post Anesthesia Care Unit Nurses**

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USE OF A HANDOFF COMMUNICATION TOOL BETWEEN CERTIFIED  
REGISTERED NURSE ANESTHETISTS, ANESTHESIOLOGISTS,  
AND POST ANESTHESIA CARE UNIT NURSES

by

Rachel Louise Johnson

A Capstone Project  
Submitted to the Graduate School  
and the Department of Advanced Practice  
at The University of Southern Mississippi  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Nursing Practice

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December 2016

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## ABSTRACT

### USE OF A HANDOFF COMMUNICATION TOOL BETWEEN CERTIFIED REGISTERED NURSE ANESTHETISTS, ANESTHESIOLOGISTS, AND POST ANESTHESIA CARE UNIT NURSES

by Rachel Louise Johnson

December 2016

Ineffective communication in the post-anesthesia care unit (PACU) is considered to cause incidences of increased error, mortality, morbidity, which leads to decreased patient outcomes and quality of care. Therefore, the purpose of this study was to introduce a structured, standardized, and consistent handoff tool to Certified Registered Nurse Anesthetists (CRNA), Anesthesiologists, and Post Anesthesia Care Unit Nurses (PACU) that may result in favorable perception of usage. Without a structured handoff tool, the organization risks the occurrence of increasing errors when the message is not transmitted effectively and efficiently every time. Distractions leave the handoff susceptible to a breakdown during the patient transfer process. Using a structured handoff tool as the centerpiece for communication will require the development of routine actions by the anesthesia providers and the PACU nurse, which will introduce consistency in communication. An organized handoff process should be adopted as standard operating procedure as it will lessen much of the weak links in patient handoffs, which currently pose increased risks to morbidity, mortality, and generally undesirable outcomes to the patient care (Hudson, McDonald, Hudson, Tran, & Boodhwani, 2015; Nagpal et al., 2010a).

This doctoral project assessed whether the introduction of a structured, standardized, and consistent communication handoff tool would result in favorable perception of usage. Evidenced-based studies were reviewed and supported the need to institute an effective handoff communication tool in the clinical setting. A well-known mnemonic communication tool “I PUT PATIENTS FIRST” designed by Moon, Gonzales, and Woods (2015) were introduced to the CRNAs, Anesthesiologists, and PACU RNs. The sample (N=28) consisted of CRNAs (n=14), Anesthesiologists (n=5), and PACU RNs (n=9) that used the tool for 2 weeks. To measure favorable perception of usage, this project included a post handoff survey that revealed favorable perception of usage of a communication tool as a means that could increase patient safety, decrease errors, and improve verbal communication, efficiency, and quality of care.

Keywords: *Nursing, handoff, handover, nurses, post-operative, surgery, communication, anesthesia, cost-effective, morbidity, mortality, post-anesthesia, checklist, safety, improving, incomplete handoffs, communication errors and quality.*

## ACKNOWLEDGMENTS

My committee members' appreciation merits recognition for their guidance and expertise throughout the development of this doctoral project. First, a special thank you to my committee chair, Dr. Katherine Nugent for her endless amount of advice, encouragement, and mentoring along the way. Your leadership and knowledge helped with growth in the ability to recognize, implement, analyze, and interpret the results in this project. Next, I would like to sincerely thank Dr. Lachel Story. Initially, what appeared to be a daunting task aided my research knowledge and experience. Thank you for assisting me to flourish in this endeavor. Dr. Patsy Anderson, thank you for your involvement, enthusiasm, and viewpoints that were most helpful in assisting me to make this doctoral project a success. Lastly, but not least, Dr. Bonnie Harbaugh, you are truly an example of a generous, noble, benevolent, and compassionate human. Thank you for invigorating, inspiring, and directing me on the correct pathway to success. I greatly appreciate each of you.

## DEDICATION

I give honor, glory, and praise to God because as I look back at the footsteps, I know he carried me all the way. I would not have succeeded if it were not for his mercy and glory. Additionally, I would like to thank my family and friends for their support and patience as I weathered this storm. A special thank you to my sisters Artherine, Pauline, and Renee for giving special attention to my son, Mason Arthur, while I pursued my dream in obtaining my Doctor of Nursing Practice with an emphasis in Nurse Anesthesia. To my dad, Arthur B. Johnson, the father who instilled the values, beliefs, and courage within me to strive and persevere in whatever I have envisioned to accomplish. Anything that is worth having is worth working hard to achieve. As you rest in peace, I still hear those words of wisdom echoing in my auricles. Words cannot express the gratitude I have, therefore, I dedicate this doctoral project to all of you, your patience, love and understanding, without you, my dream would just be a dream.

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## LIST OF ABBREVIATIONS

<i>AHRQ</i>	Agency for Healthcare Research and Quality
<i>ASA</i>	American Society of Anesthesiologist
<i>CINAHL</i>	Cumulative Index to Nursing and Allied Health Literature
<i>CRNA</i>	Certified Registered Nurse Anesthetist
<i>DNP</i>	Doctor of Nursing Practice
<i>EBP</i>	Evidence-Based Practice
<i>EHR</i>	Electronic Health Record
<i>IBM</i>	International Business Machine
<i>ICU</i>	Intensive Care Unit
<i>IOM</i>	Institute of Medicine
<i>IRB</i>	Institutional Review Board
<i>IPC</i>	Interpersonal Communication
<i>IV</i>	Intravenous
<i>JC</i>	The Joint Commission
<i>MEDLINE</i>	Medical Literature Analysis and Retrieval System Online
<i>OHI</i>	Ottawa Heart Institute
<i>OR</i>	Operating Room
<i>PACU</i>	Post Anesthesia Care Unit
<i>PUB MED</i>	Public MEDLINE
<i>RN</i>	Registered Nurse
<i>SRNA</i>	Student Registered Nurse Anesthetist

*SPSS*

Statistical Package for the Social Sciences

*WOL*

Wiley On Line

## CHAPTER I - INTRODUCTION

In the Post Anesthesia Care Unit (PACU), the entire healthcare team is responsible for patient care and during the course of post-surgical treatment must communicate to ensure safe care (Nagpal et al., 2012). According to Encyclopedia Britannica (n.d.), communication is the act of conveying intended meanings to another entity through the use of equally understood interpretations, and if done clearly may curtail any adverse events in healthcare situations (p.1). A sentinel event is an adverse event that leads to mortality. The Joint Commission (2014) identified a sentinel event as an untoward patient safety incident resulting in death or permanent harm. Overall, medical errors have been estimated to result in total costs between \$17 billion and \$29 billion per year in hospitals nationwide (Institute of Medicine [IOM], 1999).

Negative occurrences such as a sentinel event resulted from inadequate communication and were primary reasons for mortality and harm in many United States hospitals (The Joint Commission, 2014). Despite the supporting evidence of interventions aimed at preventing their occurrences, the literature demonstrated an increase in mortality and morbidity. According to Dufault et al. 2010, the primary reason for the increase in mortality and morbidity in the clinical setting is the lack of evidence-based research supporting effective communication. The authors further stated the issue mainly results from lack of an efficient tool, guideline, or protocol that is consistently followed by the healthcare team.

A review of current literature has determined that providing a structured and standardized communication tool would result in diminished occurrences of sentinel events and medical errors and thus decrease mortality and morbidity. The ultimate goal



of instituting a structured and consistent handoff communication tool in the PACU to decrease error and improve quality of care (Hudson et al., 2015; Segall et al., 2012).

### Problem Statement

Ineffective handoff communication between PACU Registered Nurses (RNs) and anesthesia providers is determined by the literature to cause errors. Furthermore, 50% of surgical errors occurred in the PACU (Nagpal et al., 2010b). The errors led to increased mortality and morbidity that ultimately diminished quality of care (Hudson et al., 2015; Johnson et al., 2013; Nagpal et al., 2010a; Nagpal et al., 2010b). In addition to an unstructured handoff tool, other contributing factors to the problem are lack of attention during handoff noise level and distraction (Nagpal et al., 2010a). Furthermore, 50% of surgical errors occurred in the PACU (Nagpal et al., 2010b). The Joint Commission (2006) mandated that all facilities institute some form of standardization to improve patient safety. In conjunction, National Patient Safety Goals (NPSG) recommended use of clear and concise patient care handoff (Paine & Millman, 2009). Despite the recommendations and mandates by The Joint Commission and NPSG to institute standardized handoff towards improving safety and quality of patient care, the problem remains a current issue. High-quality patient care can be achieved by providing an efficient, standardized, structured, and consistent handoff tool between PACU RNs and anesthesia providers that prevent adverse outcomes. This doctoral project included an introduction of a structured, standardized, and consistent handoff communication tool to Certified Registered Nurse Anesthetists (CRNAs), and Anesthesiologists, and PACU RNs in a local hospital that may result in favorable perception of usage.

## Clinical Question

Will the use of a structured, standardized and consistent handoff communication tool introduced to CRNAs, Anesthesiologists, and PACU RNs result in favorable perceptions of usage in the PACU?

## Background and Significance

The purpose of the doctoral project is to introduce a structured, standardized handoff communication tool between the CRNAs, Anesthesiologists and PACU RNs that may result in favorable perception of usage. The literature recommends the use of a structured, standardized, consistent handoff tool and suggests it will result in decreased patient errors and improved outcomes (Boat & Speath, 2013; Dufault et al., 2010; Funk et al., 2016; Robins & Dai, 2015; Salzwedel et al., 2013; Segall et al., 2012). In conjunction with Electronic Health Records (EHR), an effective, structured communication handoff tool can swiftly and efficiently update the receiving healthcare provider. Since its introduction, EHRs have shown to improve reporting quality and create a continuation of care and safety in addition to giving real-time records (Lin, Chase, & Mathias, 2014). The successful use of EHR validates its necessity in combination with instituting an effective handoff tool in the PACU area.

From 2004 to 2015, 113 anesthesia-related sentinel events were identified by The Joint Commission (2015). In 2006, The Joint Commission mandated standardization of a handoff tool for all patient areas because of the increase in sentinel events throughout the healthcare industry. However, the pre-operative, intra-operative, or post-operative areas were lacking in initiating the recommendation.

The evidence identifies an existing problem between the anesthesia providers and PACU RNs due to ineffective handoff communication. For this reason, the communication gap should be improved. IOM (2001) issued a profound statement that continues to echo today: “Between the health care we have and health care we could have lies, not just a gap but a chasm” (p 1). This penetrating statement promoted health care professionals to combine efforts and assist in improving the quality of healthcare.

The significance of this DNP project was to introduce evidence that supports a structured, standardized, and consistent handoff tool that favors perception of usage in the PACU setting. The usage of the handoff communication tool could possibly decrease errors, improve quality of care, efficiency, verbal communication, and increase patient safety in the PACU area.

#### Theoretical Framework

Imogene’s King’s Theory of Conceptual System and Goal Attainment guided this doctoral project to introduce a structured, standardized, and consistent handoff communication tool between the CRNAs, anesthesiologists, and PACU RNs through interaction and communication. King (1981) devised a conceptual framework that signified personal (individual), interpersonal (group), and social (society) systems as the domain of nursing. The main element in all three of the systems is the individual. Alligood and Tomey (2010) noted nursing is an “interpersonal process of action, reaction, interaction, and transaction” (p.292). The authors further stated when two or more individuals interact an interpersonal system is formed whether small or large. King’s (1981) framework utilizes a systems approach to assist in organizing interaction among individuals to reach a goal as an accomplished outcome. Fawcett (2005) elaborated on

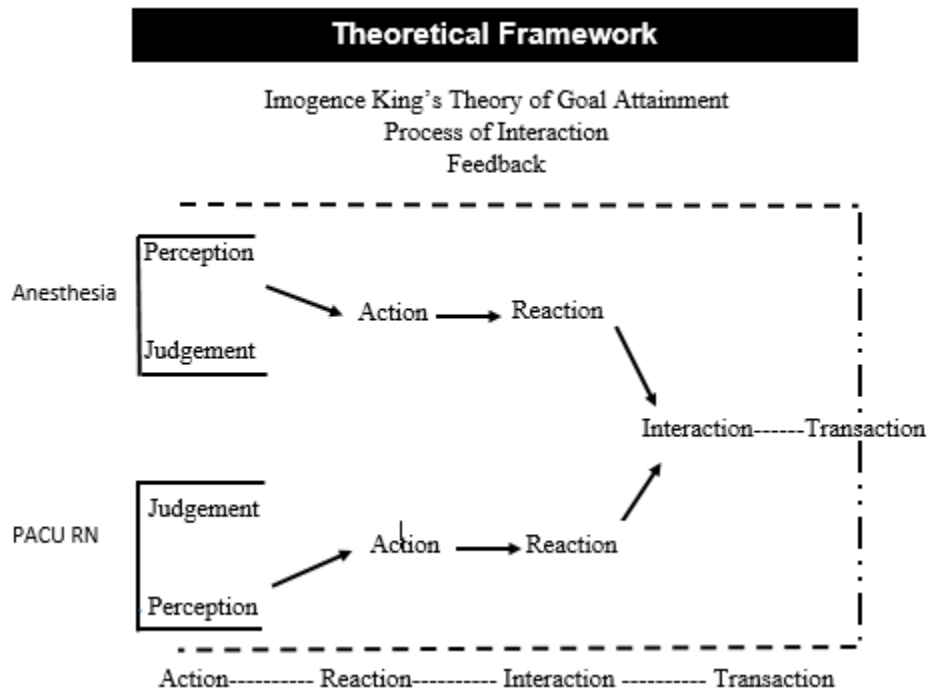
King's interpersonal system in that human beings increase awareness and are open to interpersonal perceptions in the communications and interactions with persons and things in the environment. Jeffs et al. (2013) states "from an implementation perspective, the anticipation is the data will determine improvement in patient outcomes, nurses ability to participate in evidence-based practice, and organizational support for evidence-informed nursing care that results in quality patient outcomes" (p 142.)

The primary assumptions of King's theory significant to this project are a) individuals are open systems interacting with the environment and positioning for transition; b) Individuals have the capacity to think, know, make choices, and select alternative courses for action; and c) communicate to form a goal that is mutual and actions to attain the set goal (Killeen & King, 2007; King, 1981). This doctoral project will focus on King's interpersonal system approach to attain the goal of favorable usage from an introduction of a structured, standardized, and consistent communication handoff tool.

The interpersonal system is an ongoing dynamic process with one individual affecting another in certain situations in the environment (Fawcett, 2005). An example is the anesthesia providers, who transport patients from the operating room (OR) to the PACU and employ the handoff tool to transfer patient information to the PACU RN. An effective handoff to the PACU RN is dependent upon the anesthesia providers' appropriate transfer of data. The handoff tool assisted the participants to maintain structure and consistency.

The concepts of interpersonal system consist of interaction, communication (reaction), and transaction and are demonstrated in Figure 1 (Fawcett, 2005). The combination of

the concepts expresses the theoretical framework’s foundation to support the introduction of a structured, standardized, and consistent handoff tool. King’s (1981) model shown in Figure 1 illustrates the “process of human interactions that lead to transactions” (p. 61).



*Figure 1.* Imogene King’s Theory of Goal Attainment Process of Interaction Feedback. A process of human interaction that leads to actions and transactions.

(King, 1981).

According to King (1981), interaction is a “process of perception and communication between people and the environment that are goal oriented represented by verbal or nonverbal” (p.145). For example, meetings were held in the surgery area with the CRNAs, Anesthesiologists, and PACU RNs to discuss the institution’s current handoff process. This process allowed for feedback, input, and suggestions. Additionally, the approach allowed interaction to take place between the providers at the bedside when patient information was transferred.

Communication (reaction) is the process of developing and maintaining a relationship (King, 1981). The communication between the collaborating teams is a fundamental part of the dynamic process of facilitating interaction among the anesthesia providers and the PACU RNs to obtain favorable usage of the handoff tool. Furthermore, “transaction is the process of interaction in which human beings communicate with the environment to attain the goal” (King, 1981, p. 82). For example, the interactions with the collaborating teams, their perceptions, and willingness to participate should result in an agreement to use the tool for the 2-week trial period.

Alligood and Tomey (2005) stated King related the conceptual framework method to the nursing process, which includes assessment, diagnosis, planning, intervention, and evaluation. In the nursing process, a person’s perception is analyzed, conclusions are made, and actions are taken. The events transfer into reaction and thus interactions resulting into mutual agreement. Therefore, to relate the theory this doctoral project explained the step-by-step outline of the nursing process. The nursing process:

a) Assessment- literature identified ineffective handoff procedures that led to increased cost, increased mortality, increased morbidity and decreased quality of care in the post anesthesia care area; evaluation of related tools and mandates that translated to the development of an appropriate tool for the PACU area;

b) Diagnosing and Planning- a standardized handoff tool between PACU RNs and anesthesia providers for the proposed solution, ensuring safeguards to limit ineffectiveness and maximize potential effective communication;

c) Implementation- Moon's communication handoff tool "I PUT PATIENT FIRST" was introduced as a guideline that shaped the process to ensure structure and consistency at all times;

d) Evaluation- the doctoral project used a post handoff survey to measure the tool's usefulness in obtaining favorable perception of usage. Butts and Rich (2015) stated that measurements of outcomes that are specific and definitive would limit statistical errors and potential bias in the data collected.

King's theory was used to guide the project using the step-by-step process through interacting and communicating with the participants. The interaction and communication led to transition to use the handoff tool in order to gain favorable perception of usage. With structure and consistency, the goal of obtaining favorable usage of a structured, standardized, and consistent handoff tool that can possibly decrease error and improve quality of care was achieved.

#### Review of Related Literature

The following databases were used to examine evidence-based scholarship on patient safety among anesthesia providers, post anesthesia care unit (PACU), general nurses, economics, and human's resources between the years 2009-2016. The databases included Public MEDLINE (PubMed), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Google Scholar, Medical Literature Analysis and Retrieval System Online (MEDLINE), EBSCO host, and Wiley Online Library (WOL). The key terms were nursing, handoff, handover, nurses, post-operative, surgery, communication, anesthesia, cost-effective, morbidity, mortality, post-anesthesia, checklist, safety, improving, incomplete handoffs, communication errors and quality, single and in

combination. The articles excluded did not provide enough data to support the current recommendation of a structured, standardized, and consistent communication handoff tool to decrease error and improve quality of care. Inclusive criteria for selection of scholarly articles were retrieved that strongly recommended and identified strategies to decrease error and improve quality of care in the PACU. The initial assessment generated approximately 33 probable articles. A variety of common knowledge studies were reviewed to establish relevance to handoff communication and improved quality of care. Of the 33 probable articles, 14 were pertinent to identification of handoff communication errors and suggestions for increasing patient safety, decreasing error, improving verbal communication, efficiency, or quality of care with emphasis on PACU. The articles are listed in Appendix A. The remainder of this chapter concentrates on evaluating and describing the importance of a structured, standardized, and consistent handoff tool in relation to communication, safety, structured and unstructured handoff, morbidity, mortality and cost-effectiveness.

### Communication

Communication is defined as a way to transmit data from one person to the next with a clear and concise understanding (Oxford Pocket Dictionary, 2009). Mosby Medical Dictionary (2009) defined communication as any process in which a message containing information is transferred, especially from one person to another.

Communication is also defined as the process of sending and receiving messages through nonverbal, verbal, writing, signals and behavior (Glossary of Grammatical and Rhetorical Terms, n.d). The Joint Commission (2014) specified that communication between healthcare clinicians should be clear to ensure both parties understand the responsibilities



at handoff. The postoperative period is extremely stressful for patients. In this period, the patient loses personal sovereignty, thereby relinquishing control and safety to the healthcare provider. For that reason, the patient seeks reassurance from the healthcare provider that safety is a priority and maintained at all times.

Examination of the evidence conducted has yielded statistics demonstrating that post-operative care is at a high risk for patient errors resulting from communication failure. The pressure of a fast paced and high acuity environment leads to inaccurate and incomplete transfer of information (Segall et al., 2012). Robins and Dai, (2015) found 80% of serious medical errors were associated with miscommunication during patient handoff. In one study, approximately 27% increase in morbidity among handoff from one anesthesiologist to another and 43% increase in mortality were related to anesthesia handoff compared to overall hospital morbidity (Hudson et al., 2015). The postoperative area has been identified as having a high incidence of errors, it is imperative that handoff communication between doctors, nurses, and the receiving healthcare provider is effective, reliable, and understood (Nagpal et al., 2012). Handoff should never be a one way data transfer. Performing handoff is a professional duty and responsibility to patients, families and colleagues. Communication between the parties is essential. An effective, structured handoff communication tool can swiftly and efficiently update the receiving healthcare provider. The Agency for Healthcare Research and Quality (AHRQ) (2011) stated the issue of error arises when patient information is not transmitted effectively from one health care provider to the next. As a result, negative patient consequences such as a sentinel event can occur. Another study showed ineffective handoff communication between PACU areas resulted in increased incidences of

mortality, decreased patient outcomes and decreased quality of care while raising medical costs (Funk et al., 2016).

An example of patient safety provided by the Institute for Safe Medication Practices (ISMP) 2013 documents a patient undergoing a routine uncomplicated tonsillectomy performed in an outpatient ambulatory surgery center received a dose of Fentanyl 150 micrograms upon completion of surgery. After the surgery was completed, a CRNA administered 150 micrograms of Fentanyl slow IV push to the 17 year old in the OR to assist with managing her pain. Upon arrival to the PACU, the information was not conveyed to the receiving nurse. Twenty-five minutes later, the patient was found pulseless and breathless. The fentanyl led to respiratory depression and subsequent respiratory arrest. Despite resuscitation efforts, the patient suffered oxygen deprivation causing profound, permanent brain damage that led to her death. According to Segall et al. (2012) post-operative handoffs are filled with technical and communication errors and can adversely impact patient safety. A structured handoff tool would allow pertinent information to be transferred to the receiver permitting patient safety and decreasing error. American Society of Anesthesiologists (ASA) Standards for Post Anesthesia Care (2014) note that when an anesthesia provider transfers a patient to the PACU and during recovery from anesthetics, a quantitative method of assessing oxygenation such as pulse oximetry should be employed during the initial phase of recovery. ASA Standards for Post Anesthesia Care suggested that during the initial 15 minutes in the PACU, one nurse should be caring exclusively for that patient to ensure the patient receives attention and avoid interruptions (ASA, 2014). A key element to delivering collaborative, quality, patient-centered care and improving outcomes is effective communication (Suter et al.,

2009; Torres, 2009). In addition, a concept analysis using Walker and Avant (2005) eight-step approach concluded that communication is essential for patient handoff between anesthesia providers and PACU RNs. Ineffective communication can lead to patient injury or death (Dufault et al., 2010).

The number one cause of sentinel events in United States hospitals is ineffective communication (The Joint Commission, 2014). Additionally, The Joint Commission identified that structured; standardized communication practices reduced the risk of harm to the patient in the acute care environment. Torres (2009) reported many safety events in the healthcare setting are the result of inadequate communication among members of the healthcare team. The study concluded effective communication is clear and essential in order to eliminate misinterpreted or misunderstood information and to prevent the occurrence of sentinel events. Therefore, effective handoff communication requires the cooperation, collaboration and understanding of the healthcare team involved with a focus on achieving the same goal: the best outcome for the patient. The literature implied that PACU RNs and anesthesia providers have different views and expectations on handoff information content; therefore, an effective handoff tool is an important component in solving this issue. A collaborative healthcare team is the key to effective handoff communication between the PACU and anesthesia providers to achieve the primary goals that include decreasing errors and improving patient quality of care (Torres, 2009).

#### Common Barriers to Effective Communication

Nagpal et al., (2010b), utilized a failure mode and effect analysis to identify critical processes prone to information transfer and communication failures. In the study,

the authors used a qualified, diverse, multidisciplinary team primarily consisting of four anesthetists, four surgeons, six nurses, and a psychologist, which comprised of a wide variety of healthcare professionals in all phases of the surgical pathway. The systematic, qualitative method provided the authors the ability to assess risks in the process of information transfer from all three phases of the surgical care areas that resulted in patient harm. The rationale for lack of data transfer and communication from preoperative to postoperative was highly significant. Therefore, the authors desired to fill the disconnected gap in communication and discovered a solution to the problem.

Nagpal et al. (2010b) explained the team used flow diagrams, hazard scoring, and decision trees to identify potential problems in determining potential ramifications of patient care. Ultimately, the purpose was to discover potential errors and intercede before causing patient harm. Through interviews and content analysis, they found preoperative memory lapses, lack of knowledge, inadequate medication and failure to evaluate pre-operative risk factors as the leading causes that led to communication problems. Intra-operative failure modes concluded poor communication and redundancy contributed to wrong site surgeries and medication errors. Postoperative discrepancies were attributed to high acuity and the pressure of fast pace environments leading to inaccurate and incomplete transfer of information. The study concluded the issues could be resolved by delegating responsibilities, having a constructive checklist, and debriefing. Moreover, safety interventions were directed towards developing a safe, effective, structured handoff communication tool to avoid the errors (Nagpal et al., 2010b).

Nagpal et al., (2010a), used a qualitative semi-structured interview study with 18 healthcare, which included nurses, surgeons and anesthetists, to uncover the concerns with postoperative handoffs and find a solution. Therefore, the study identified the problem as inadequate transfer information from one healthcare professional to another. The post-operative handoff from the operating room to recovery is the key element to patient safety and information transferred should be comprehensive, transparent, and concise (Nagpal et al., 2010a). The general consensus between the healthcare team concluded that questions should be allowed, which permits open dialogue among the team.

Blind coders and a Delphi method were used to assure reliability, identifying a valid strategy to collect and improve outcomes. The nurses, surgeons, and anesthetists agreed that the strategy should center on a structured protocol to prevent any valuable patient information from being omitted. The two studies Nagpal et al. (2010a) and Nagpal et al. (2010b) identified similar barriers that contributed to ineffective communication and offered solutions including adapting a structured communication protocol.

### Safety

In hospital settings, patient safety is placed at increased risk without effective communication. The PACU area is a concern for patient safety because it has been identified as high risk for error due largely to the number of patients entering and exiting the pre-operative, intra-operative and post-operative areas (Segall et al., 2012). In addition, the probability of compromising patient safety increases when anesthesia providers rush through the handoff process to begin the next case on time. Consequently,

an effective handoff tool between the PACU RNs and anesthesia providers is ultimately important.

A successful transfer can be defined as one that includes acceptance of responsibility for the patient specific information from one healthcare provider to the next thus ensuring patient safety and continuity of care (The Joint Commission, 2014). In addition, effective communication is significant to safe surgical practice and the delivery of high-quality patient care (Nagpal et al., 2010b). Seventy-eight percent of healthcare errors are caused by human elements that are connected with poor team communication and understanding (Xyrichis & Ream, 2007). The majority of medical errors are the result of faulty systems, processes, and conditions that lead people to make mistakes or fail to prevent them rather than from individual carelessness. However, standardizing healthcare processes at all levels makes it safer for the patient. Furthermore, with structure and standard protocols, errors are less likely to occur. Therefore, healthcare clinicians can make patients safety a priority (IOM, 1999).

Maxield, Grenny, McMillian, Patterson, and Switzler (2005) reported that 60% of medication errors were caused by mistakes in interpersonal communications (IPC) resulting from faulty systems. Kent (2007) defines IPC as communication between a minimum of two parties in which meaningful exchange is intended with the sender trying to elicit a response from a person or group. IPC involves specific objectives including: relational or qualitative communication in which the two parties share the role to create a meaning whether situational or contextual in order to achieve the goal. The communication between the individuals must be measurable and strategic (Xyrichis & Ream, 2007).

## Handoff

When critical patient information is not accurately transferred between providers, a window of opportunity for error is created. The Agency for Health Research and Quality (AHRQ, 2015a) stated the process of transferring responsibility for care is referred to as the "handoff" with the term "signout" used to refer to the act of transmitting information about the patient. The PACU nurse's attention is typically altered because most anesthesia providers present handoffs among a variety of additional activities and distractions. When situational awareness is altered or prevented by breakdown in communication at handoff, there can be devastating consequences. Subsequently handoff communication between anesthesia providers and PACU RNs should be concise, free of distractions, relevant to patient condition and timely in order to deliver the best care to the patient. Situational awareness cannot be accomplished without well-defined and high-quality communication between all of the providers who are involved in patient care (AHRQ, 2015b). One of the best known handoff tools created by Moon et al. (2015) has the mnemonic "I PUT PATIENTS FIRST", developed to serve as a guideline to improve the effectiveness of handoff, predominantly through increased standardization of the process. The tool provides structure that supports reasoning and improving overall quality of care (Moon et al., 2015). A consistent and structured handoff tool circumvents many of the weak links in an unstructured handoff process and avoids unnecessary mishaps, misunderstandings or omissions of pertinent patient data

Nagpal et al. (2010b) identified communication failures occurring across the surgical care area, thus inevitably placing patients in harm's way. Effective communication is paramount in the accomplishment of cultivating better patient

outcomes and controlling costs. Conversely, ineffective communication leads to mishaps, misunderstandings, and unsafe practice (Torres, 2009). Ineffective communication was identified as the leading cause of unfavorable events (Nagpal et al., 2010b). The authors used a quantitative failure mode and effect analysis to assess risks in the process of information transfer in the different stages of surgical care. The sample comprised of a multidisciplinary team of 15 members. The members included four surgeons, four CRNAs, six nurses and a psychologist. Of the different stages of surgical care, postoperative area was found to be at high risk for patient error due to inadequate, inconsistent, and unstructured transferring of communication. The authors determined that a consistent, formal handoff checklist is a necessary tool for the transfer of significant patient information to avoid errors and improve patient outcomes (Nagpal et al., 2010b; Torres, 2009). In addition, Lee et al. (2012), validated poor handoffs result from a lack of teamwork and communication, patient instability on arrival, unclear procedures, technical errors, unstructured processes, interruptions, distractions and lack of a safe destination for transfer of key information. The studies concluded that ineffective communication led to communication failures, ultimately leaving patient safety questionable.

#### Unstructured Handoff

Segall et al. (2012) acknowledged ineffective and informal handoff downfalls could lead to treatment hindrance and accelerate unfortunate occurrences for the patient. They conducted a qualitative study using six-sigma method on unstructured handoff from OR to PACU or ICU. Five hundred articles were evaluated in the systematic review and 31 met inclusion criteria. The authors demonstrated an association between poor quality



handoffs and adverse events. Similarly, The Joint Commission (2014) determined substandard handoffs results in inadequate care, inappropriate treatment, and increase in cost, adverse events, omission of care, increased hospital length of stay, avoidable readmissions, increased costs, inefficiency from rework, and other minor or major patient harm.

The literature identified a relationship between handoffs and patient outcomes as well as offering recommendations to improve the handoff process. One proposal for improving handoff communication included having a formal checklist or guideline, performing the task before transferring, and allowing time to ask questions (Segall et al., 2012). Additionally, Boat and Speath (2013) supported and validated the utilization of checklists to improve the reliability of patient handoff in the operating room and PACU areas. A qualitative pilot study with 45 anesthesiologist and 40 CRNAs observing 1280 patient transfers was used. The study concluded that implementation of a standardized checklist reliability of data transfer improved from 20% to 100% in the intraoperative area and from 59% to 90% in PACU. However, vital to patient safety, further studies are needed to identify tools to improve handoff quality, establish validity, and reduce patient morbidity or mortality (Segall et al., 2012).

#### Mortality and Morbidity

The Joint Commission (2014) identified lack of communication as the number one cause of sentinel events leading to patient harm. Further identification of the consequences of ineffective hand off communication was shown in a retrospective cohort study (Hudson et al., 2015). Hudson et al. (2015) sought to identify whether a handoff of anesthesia care has an association with increased mortality and morbidity. A quantitative

retrospective control design was used in which databases selected all patients undergoing major cardiac surgical procedures. The chosen facility to perform the study was Ottawa Heart Institute (OHI), a quaternary care surgery center and university research hospital. Included in the study were all patients encountering a cardiac surgery procedure between April 1999 and October 2009. The participants included one group that received handoff and one group that did not receive handoff. In addition, anesthesiologists were exchanging only verbal communications. Next, the association between the unstructured, verbal handoff of anesthesia care and mortality were evaluated and compared to the post-operative morbidity. As a result, there was a 43% statistical significance increase in hospital mortality in all cases compared to no handoff cases.

Additionally, handoff from one anesthesiologist to another was associated with a 27% increase in morbidity due to incomplete transfer of care. Furthermore, identifiable barriers to ineffective handoff between the anesthesiologist were fatigue, end of shift reports and surgeries that occurred on the weekends or evening shifts. The results further supports Nagpal et al. (2010a) recommendation for a safe, effective, structured handoff communication to maintain patient safety. Unfortunately, the information relayed from one health care person to another at the current handoff process is incomplete, which leads to a communication error and patient misfortune. The findings demonstrated an increase in morbidity and mortality related to ineffective handoff communication (Hudson et. al., 2015).

#### Developing a Structured Handoff Tool

The recent data on handoff communication and medicine illuminated the need for adopting a concise, standardized, effective approach to handoff communication (Hudson

et al., 2015). Segall et al. (2012) conducted a systematic review to identify current postoperative handoff issues with handoff communication and ways of improvement that coincide with (Nagpal et al., 2010a). Some authors provided a high degree of quantitative or qualitative descriptions of current post-surgical care transfers (Segall et al., 2012). Also, the items were categorized into four groups to obtain the data:

1. Category 1 included a comprehensive intervention-based study
2. Category 2 consisted of an intervention-based study
3. Category 3 designated pre-intervention study
4. Category 4 depicted published opinions or reviews

The study groups were used to structure handoff protocols and checklist that proved successful in improving efficiency and teamwork. In that case, the evidence supports Nagpal et al.,'s 2010a suggestion of establishing a standardized checklist. According to Segall et al. 2012, clinical participation contributed to the achievement of a meaningful development of a standardizing, evidence-based, patient centered, approach to nurse change of shift handoffs. The authors determined the most common barrier in the OR was verbal breakdown. In the PACU area, the second most common identifiable factor contributing to reported incidents was poor communication. The postoperative patients were at a disadvantage when surgical teams exhibited less briefing and patient information during handoff (Nagpal et al., 2010a; Segall et al., 2012;

Johnson, Logsdon, Fournier, and Fisher (2013) demonstrated the use of an effective handoff communication tool that produced favorable outcomes. The study's objective was to guide providers in implementing a safe, effective, standardized approach to handoff communication that included allowing the staff members to ask and respond to

any questions. The study revealed tools for patient data transfer previously implemented, however, not specific for pre-operative, intra-operative, and post-operative areas as the following:

1. SBAR (situation, background, assessment, and recommendation),
2. I PASS the Baton (introduction, patient, assessment, situation, safety concerns, the background, actions, timing, ownership, next)
3. SHAQR (situation, history, assessment, questions, recommendations)
4. Five P's (patient, plan, purpose, problem, precaution, and post-operative areas).

The authors noted that pre-operative handoffs should include a total of medication administered, specimens, instrument count, and details surrounding the specimens.

However, Johnson et al. (2013) ascertained that some details were being omitted with the current handoff tool mostly because of distractions and the need for speedy OR turn over.

Therefore, the emergence of the SWITCH tool, which is an acronym for: S-surgery procedure, W- wet (fluids), I- instruments- tissue (specimen), C- counts and H-have any questions, to improve the current handoff skills and prevent communication errors in each area was instituted. The findings supported a successful implementation of SWITCH. The tool benefited the team and most of the patients.

Potestio, Mottla, Kelley, and DeGroot (2015) reported that improving a post anesthesia care handoff could be accomplished by implementing a succinct checklist. The checklist expedited the handoff process and increased communication between the anesthesia providers and PACU. The authors identified an association in a significant reduction in mortality and morbidity with the introduction of a structured checklist into the PACU area, subsequently leading to less post-operative complications and

improvement in 24-hour patient outcomes. The previous standardization approaches were perceived as a hindrance and increased the amount of time to handoff. Nevertheless, Robins and Dai (2015) argued that the use of a checklist during handoff can help provide an exchange of patient information correctly and thus increase the adequacy of the handoff process without increasing the time spent at the handoff. The authors reported there was a statistically significant lower rate in call back for information clarification by the PACU RNs by 69%, which supports usefulness of handoff checklist. The authors used a pilot study in which 29 PACU RNs and 29 CRNAs were asked to participate in evaluating the accuracy of the anesthesia specific contents during patient handoff. The study used two groups with a checklist to implement during handoff. One group was given a structured checklist and the other was not. The ratings were higher among the group with the checklist as oppose to no checklist. The findings suggest the use of a checklist during a handoff can help providers exchange patient information correctly and thus increase the adequacy of the handoff process without increasing time spent at handoff. Moreover, the results correspond to Moon et al. (2016) findings that a bundled comprehensive communication tool could possible increase efficiency and quality of data transferred.

#### Cost Effectiveness

Medical errors occur because of the failure of a planned action to be completed as intended or the use of a wrong plan to achieve a goal (IOM, 1999). According to IOM, (1999) “the problems that commonly occur during the course of providing health care are adverse drug events and improper transfusions, surgical injuries and wrong-site surgery, suicides, restraint-related injuries or death, falls, burns, pressure ulcers, and mistaken

patient identities” (p. 1). The IOM also found high error rates with serious consequences are most likely to occur in OR, ICU and Emergency Department.

Pham et al. (2012) reported 98,000 deaths resulted from medical errors each year in the United States. In 2014, the rate was much higher; between 210,000 and 440,000 patients suffered some preventable harm that led to death (State of Health, 2014). As a result, healthcare costs and the numbers of disability claims have increased. In addition, consumers have lost confidence in the health care system. Thus resulting in healthcare providers’ loss of morale and frustration at the lack of quality care. The medical error occurred effected society as well as worker productivity, reduced school attendance, and lower levels of population health status (IOM, 1999).

In comparison, other types of medical errors identified by Pham et al. (2012) included medication errors, healthcare-acquired infections, handoffs, falls, diagnostic, and surgical errors. The contributing factors identified in handoff medical errors were communications breakdowns and inconsistencies. Handoff errors contributed to “28% of surgical adverse events, wrong site surgery rates were estimated at 0.09 to 4.5 per 10,000 surgical cases, and diagnostic errors accounted for 40,000 – 80,000 fatalities in U.S. hospitals” (Pham et al., 2012, pp. 454-456). Moreover, communication failures were cited for 70% of sentinel events (The Joint Commission, 2014). The statistical data further supports the prerequisite for a standardized, structured, handoff tool for anesthesia providers and PACU RNs to improve quality care and decrease error. Additionally, medial errors have been estimated to result in total costs including the expense of extra care necessitated by the errors, lost income and household productivity, and disability of between \$17 billion and \$29 billion per year in hospitals nationwide (IOM, 1999).

Dufault et al. (2010) justified the need to identify information transfer and communication problems in the postoperative handoff process and develop a valuable, cost-effective protocol for standardizing the interface. The author described the use of an innovative, translating-research-into-practice model. The model generated and tested a cost-effective, easy to use best practice protocol for nurse-to-nurse shift handoffs in a 129-bed magnet-designated community hospital in the United States. Roger's Diffusion of Innovations Theory for the translational model in addition to Orlando's theory was used to provide theoretical evidence for the best practice protocol and decrease cost. Although the article was not unique to the operating room, it gave clear and concise methods to obtaining a cost-effective procedure.

The cost of medical errors from preventable damage has escalated over the last two years. The injury or damage is mostly contributed to communication failures and inconsistencies in healthcare. One way to decrease the cost is to develop and institute a standardized approach of transferring data from one health care provider to the next. As a result of using a structured and consistent handoff tool, medical errors and cost should decrease thus bridging the gap resulting from lack of communication.

## CHAPTER II – METHODOLOGY

The purpose of this doctoral project was to introduce a structured, standardized, and consistent handoff communication tool among the CRNAs, Anesthesiologists and PACU RNs that may result in favorable perception of usage. A hospital in south Mississippi was chosen for the study to be conducted. As a travel nurse providing care across many states in various clinical settings, a serious clinical issue with handoff communication was perceived. The issue was observed in different areas of patient care across the country. As a Student Registered Nurse Anesthetist (SRNA), the handoff issue was witnessed among anesthesia providers and PACU RNs. For this reason, the incentive to cultivate a solution to improve the problem and subsequently improve patient safety, decrease errors, improve communication, improve efficiency and improve quality care was a high priority. Therefore, the opportunity was provided to introduce a solution with the possibility of reducing the current issue. The anesthesia providers and PACU RNs were requested to participate in the project to use a structured, standardized, consistent handoff communication tool in the PACU. The current handoff process in the facility lacked consistency and structure and delivered patients without consistent identification of the provider or adequate data transfer. In addition, the attention of the PACU RNs was diverted during handoff by searching for information and connecting the patient to the monitors thus increasing the window of opportunity for errors. The lack of consistency can contribute to increased errors and decreased quality of care.

### Setting and Target Population

The setting for the doctoral project took place in the PACU at a hospital in Mississippi. The hospital has 512-beds that provide regional health services to a 19-



county service area has been designated as a Level-II trauma center by the Mississippi Hospital Association, one of only three in the state with this uniqueness. The hospital's surgical department consisted of 17 surgery suites. The surgical procedures scheduled included general, orthopedics, gynecology, spine urology, open heart and vascular. The population consisted of CRNAs, Anesthesiologists and PACU RNs employed in the facility and who transferred patients from the OR to the PACU.

#### Detailed Procedure

Meetings were held in the surgery areas with the CRNAs, Anesthesiologists, and PACU RNs to discuss the institutions current handoff process. At the same time evidence-based data and "I PUT PATIENTS FIRST" communication tool by Moon et al. (2015) were introduced to the participants. A poster board displaying current background and significance, purpose of the project, theoretical framework, summary of evidence and proposed strategies of the project was shown to the participants. The strategies of the project involved discussion of the literature, statistics of anesthesia related sentinel events, effective communication and its impact on improved patient outcomes and quality of care through the usage of a standardized, structured, and consistent handoff tool. The handoff tool included the mnemonic, I PUT PATIENTS FIRST, was presented to the anesthesia providers and PACU RNs. Written consent to use/edit the communication tool as needed to benefit the PACU was obtained from Moon et al. (2015) (See Appendix B). The process allowed for feedback and input from the CRNAs, Anesthesiologists, and PACU RNs concerning the tool. All anesthesia providers and PACU RNs were educated on each of the 17 components of the communication handoff tool to promote clarity of the pertinent information that should be transferred from the sender (i.e., anesthesia

providers) and received by the messenger (i.e., PACU RN). Based on the study performed by Moon and colleagues, the tool was introduced to serve as a guideline and improved the effectiveness of handoff, predominantly through increased standardization of the process. The tool was designed to provide structure that improved overall quality of care (Moon et al., 2015). Assembled from input of the participants, the communication tool was edited for specific transfer from OR to PACU exchange. For example, the mnemonic I PUT PATIENTS FIRST is described as follows:

1. I- identify yourself and role and obtain the nurse's name;
2. P - patients past medical history (medical, surgical, social);
3. U- underlying diagnosis and procedure;
4. T -states a brief discussion of the anesthetic technique chosen may indicate special requirements to the PACU RN. Did you use LMA of Endotracheal tube? Did the patient receive Exparel (which is used to decrease post-operative pain)?
5. P-states it is important for the PACU RN to be aware of what venous access, arterial lines, and other drains/tubes that are present are the means by which therapeutics will be administered;
6. A-allergies should be discussed because they may explain why another alternative drug was used intraoperative;
7. T- therapeutic interventions should occur to provide a general outline of the patient's planned medical course;

8. I - stated if there was any difficulty with intubation; PACU RN should be alerted so that additional airway equipment can be prepared should the patient need to be re-intubated (breathing tube replaced) at a later time;
9. E- If the patient will be kept intubated, the PACU can be prepared with a ventilator (breathing machine) and respiratory therapist present, eliminating any potential delays. Does the patient or family members have a cholinesterase deficiency?
- 10.N- Need for drips or the presence of any continuous infusions should be discussed if applicable so that there is a clear consensus of all drips and their rate of administration;
- 11.T- treatment plan for postoperative care. Postoperative care can vary significantly depending on the patient's medical course and the surgical procedure that was performed. For example, if a carotid endarterectomy was performed, the receiving PACU RN should carefully monitor blood pressure and acceptable parameters should be discussed with the surgical and anesthesia teams;
- 12.S- signs, a patient's vital signs can provide an early warning of decompensation or future medical course. It should be noted that goal ranges vary in the context of disease. For example, patients with chronic hypertension may require a higher blood pressure to achieve adequate perfusion;
- 13.F- fluids, the receiving unit should be made aware of all fluid and blood product administration. Fluid output, such as urine output and estimated blood loss, should also be communicated to PACU RN;

- 14.I-intraoperative events, any major intraoperative events should be discussed, as well as any consequent interventions, especially if it differs significantly from the planned course of action;
- 15.R- recent labs, recent laboratory results provide insight to the patient's condition and relay the efficacy of past interventions, such the administration of blood products;
- 16.S- suggestions, any special supplies, such as intrathecal catheters or infusion pumps, should be requested in advance of the patient's arrival to prevent any unnecessary delays. Special instructions for positioning, such as the requirement for a patient to lay flat for a number of hours following an endovascular procedure, should be discussed;
- 17.T-Timing/expected time of arrival to PACU, as accurately as possible, the estimated time of the patient's arrival to the PACU should be approximated, so that the receiving RN is ready (See Appendix C).

Three forms of the tool were laminated, a standard 8.5 x 11 inch (See Appendix C) which included detailed explanations of each letter of the mnemonic tool and what should be included in the handoff. Additionally, a 6.5 x 5.0 inch condensed version was laminated (See Appendix D) to conveniently fit in the pockets of the providers and also, a 9.5 x 7.0 inch short version was laminated and strategically placed on top of each of the 10 workstations in the PACU area. Furthermore, a 35 x 24 inch poster board was hung and displayed with OR manager's approval, on the wall of entrance to PACU where all anesthesia providers could observe the poster coming from the OR. The manager of

PACU reviewed the edited checklist and gave feedback before inserting on the workstations in the PACU.

### Evaluation

The CRNAs, Anesthesiologists and PACU RNs used the handoff tool for 2 weeks. At the end of 2 weeks, a post handoff checklist survey (See Appendix E) was distributed to those participants who used the tool to determine its usefulness. The post handoff communication survey consisted of one stem question and five subsequent scaled questions. Each subsequent question required a separate answer. A scale consisting of 1- was not useful, 2- sort of useful, 3- not sure, 4- very useful and 5- extremely useful was used. Specific questions asked included: “Compared to your previous process of patient handoff, how useful was the handoff tool for 1) increasing patient safety, 2) reducing errors, 3) improving verbal communication, 4) increasing efficiency and 5) improving quality?” In addition, there was a section to add comments.

The demographic data collected for the project contained no personal identifiers; however, the participants were categorized as CRNA, Anesthesiologist, and PACU RN. Analyzed data was entered into a Microsoft 2010 excel spreadsheet. Next, the data was input into IBM SPSS Statistics Version 22 and presented in frequencies and percentages for each question. The percentages displayed the participants’ perception of the usage of the handoff communication tool. The usefulness of the handoff communication tool was determined by measuring post-handoff checklist. The post-handoff checklist results were gathered, reviewed, and entered into SPSS for analysis to determine favorability. The usefulness of the handoff communication tool was determined by measuring a post handoff checklist.

## Human Subject Protection

Prior to introducing the study, approval was obtained from The University of Southern Mississippi Institutional Review Board (IRB). The approval number is 16071201 (see Appendix F). In addition, a letter of support from the local facility was received (see Appendix G). The participants willingly signed a written consent form and were informed that participation in the project was completely voluntary. All voluntary participants were given the opportunity to receive a copy of consent form during the initial interaction. The consent form described the study and the individual's rights as participants including the right to privacy and confidentiality. The subjects could withdraw at any time without penalty. The opportunity for inquiries regarding the project and processes was given. To protect confidentiality, no names of subjects were disclosed. The paper copies were stored in a personal lock box in which the primary investigator has the only access. The de-identifiable paper copies were destroyed after successful completion of the doctoral project. The data obtained did not contain any sensitive information by the subject who completed the survey. The final results of the project are included in the doctoral defense.

## Limitations

The facility included SRNAs that transferred patients to the PACU and could have been included in the population. Additional demographic variables could have been obtained to establish a potential correlation between years of experience, level of education, or gender and perception of usefulness of the communication tool. The information would permit additional data analysis in assessing means and standard deviations between groups, establishing whether gender contributes to participation or

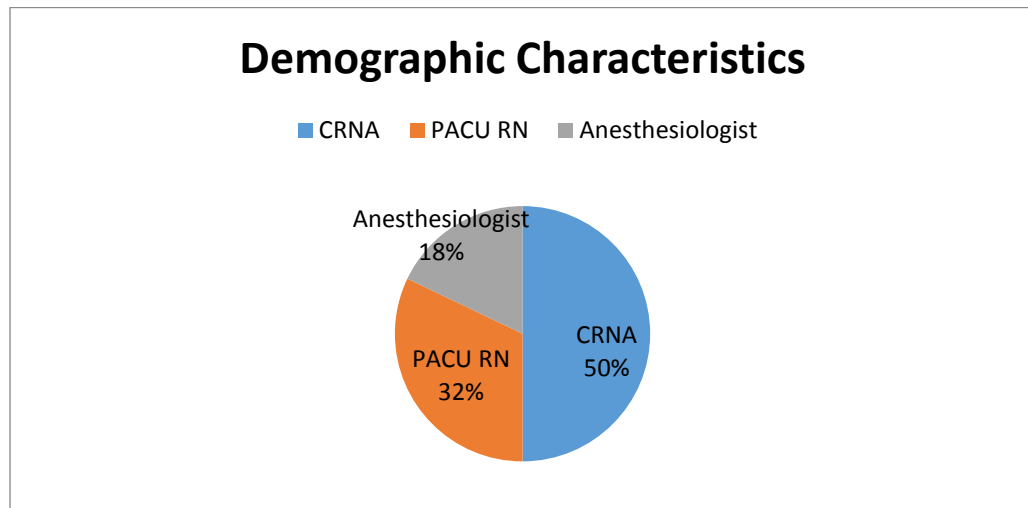
correlation of results. The length and details of the handoff tool was another limitation for the study, however, the hypothesis is that using a structured, standardized, and consistent communication handoff tool among CRNAs, Anesthesiologists, and PACU RNs would increase patient safety, decrease errors, improve efficiency, and quality of care.

## CHAPTER III - RESULTS

### Analysis of Data

The purpose of the project was to determine if the introduction of a structured, standardized, and consistent handoff communication tool among the Certified Registered Nurse Anesthetists (CRNA), Anesthesiologists, and Post Anesthesia Care Unit Registered Nurses (PACU RNs) would result in favorable perceptions of usage. The sample (N=28) consisted of CRNAs (n=14), Anesthesiologists (n=5), and PACU RNs (n=9). Descriptive statistics were used to examine the perception of usefulness among the participants. The results of data analysis and descriptive statistics are presented in this chapter as percentages and frequencies.

### Presentation of Findings



*Figure 2.* Demographic Characteristics.

The post handoff survey asked, “Compared to your previous process of patient handoff, how useful was the handoff tool for increasing patient safety, decreasing errors, improving verbal communication, improving efficiency, and improving quality of care?” Participants answering each of the subscales answered the questions. Although the post



handoff survey consisted of one stem question and 5 subscale questions, no participants answered not useful. The results are displayed in the following tables as frequencies and percentages.

Table 1

*Response of Usefulness for Patient Safety*

	Frequency	Percent
Sort of Useful	1	3.6
Not Sure	4	14.3
Very Useful	10	35.7
Extremely Useful	13	46.4
<b>Total</b>	28	100.0

Note: Represents the perception of project participants' usefulness of the handoff tool for increasing patient safety. Eighty-two percent of project participants indicated that compared to previous process of patient handoff, the use of handoff communication tool was perceived to increase patient safety.

Table 2

*Response of Usefulness for Decreasing Errors*

	Frequency	Percent
Sort of Useful	1	3.6
Not Sure	4	14.3
Very Useful	11	39.3
Extremely Useful	12	42.9
<b>Total</b>	28	100.0

Note. Represents the perception of project participants' usefulness of the handoff tool for decreasing errors. Eighty-two percent of project participants indicated that compared to previous process of patient handoff, the use of communication handoff tool was perceived to decrease staff errors.

Table 3

*Response of Usefulness for Verbal Communications*

	Frequency	Percent
Sort of Useful	1	3.6
Not Sure	4	14.3
Very Useful	10	35.7
Extremely Useful	13	46.4
<b>Total</b>	28	100.0

Note. Represents the perception of project participants' usefulness of the handoff tool for improving verbal communication. Eighty-two percent of project participants indicated that compared to previous process of patient hand off, the use of handoff communication tool was perceived to improve verbal communication among staff.

Table 4

*Response of Usefulness for Efficiency*

	Frequency	Percent
Sort of Useful	1	3.6
Not Sure	13	46.4
Very Useful	8	28.6
Extremely Useful	6	21.4
<b>Total</b>	28	100.0

Note. Represents the perception of project participants' usefulness of the handoff tool for improving efficiency. Forty-six percent of project participants indicated that compared to previous process of patient hand off, they were unsure if the use of handoff communication tool improved efficiency. Fifty percent of project participants indicated that compared to the previous process of patient handoff, the use of handoff communication tool was perceived to increase efficiency.

Table 5

*Response of Usefulness for Quality Care*

	Frequency	Percent
Sort of Useful	1	3.6
Not Sure	5	17.9
Very Useful	11	39.3
Extremely Useful	11	39.3
<b>Total</b>	28	100.0

Note. Represents the perception of project participants' usefulness of the handoff tool for improving quality of care. Seventy-nine percent of project participants indicated that compared to previous process of patient hand off, the use of handoff communication tool was perceived to improve quality of care.

Table 6

*Percentage of Providers Level of Perception to Patient Safety*

	Sort of Useful	Not Sure	Very Useful	Extremely Useful	Total
CRNA Count	0	2	6	6	14
% of total	0.0	7.1	21.4	21.4	50
PACU RN Count	1	2	3	3	9
% of total	3.6	7.1	10.7	10.7	32.1
Anesthesiologist Count	0	0	1	4	5
% of total	0.0	0.0	3.6	14.3	17.9
Total Count	1	4	10	13	28
% of total	3.6	14.3	35.7	46.4	100

Note. Represents the participants' perceptions of useful of the handoff tool as compared to the previous tool when considering patient safety. The findings indicate 46.4% of project participants found the tool was perceived useful for increasing patient safety.

Table 7

*Percentage of Providers Level of Perception to Decreasing Errors*

	Sort of Useful	Not Sure	Very Useful	Extremely Useful	Total
CRNA Count	0	2	6	6	14
% of total	0.0	7.1	21.4	21.4	50
PACU RN Count	1	2	4	2	9
% of total	3.6	7.1	14.3	7.1	32.1
Anesthesiologist Count	0	0	1	4	5
% of total	0.0	0.0	3.6	14.3	17.9
Total Count	1	4	11	12	28
% of total	3.6	14.3	39.3	42.9	100

Note. Represents the participants' perception of usage of the handoff tool as compared to the previous tool when decreasing errors.

The findings indicate approximately 42.9% of project participants found the tool was perceived useful for decreasing errors.

Table 8

*Percentages of Providers Level of Perception to Verbal Communication*

	Sort of Useful	Not Sure	Very Useful	Extremely Useful	Total
CRNA Count	0	2	6	6	14
% of total	0.0	7.1	21.4	21.4	50
PACU RN Count	1	2	1	5	9
% of total	3.6	7.1	3.6	17.9	32.1
Anesthesiologist Count	0	0	3	2	5
% of total	0.0	0.0	10.7	7.1	17.9
Total Count	1	4	10	13	28
% of total	3.6	14.3	35.7	46.4	100

Note. Represents the participants' perception of usefulness of the handoff tool as compared to the previous tool when increasing verbal communication among the staff. The findings indicate that 46.4% found the tool was perceived useful for improving verbal communication.



Table 9

*Percentages of Providers Level of Perception to Efficiency*

	Sort of Useful	Not Sure	Very Useful	Extremely Useful	Total
CRNA Count	0	4	5	5	14
% of total	0.0	14.3	17.9	17.9	50
PACU RN Count	1	4	3	1	9
% of total	3.6	14.3	10.7	3.5	32.1
Anesthesiologist Count	0	5	0	0	5
% of total	0.0	17.9	0.0	0.0	17.9
Total Count	1	13	8	6	28
% of total	3.6	46.4	28.6	21.4	100

Note. Represents the participants' perceptions of useful of the handoff tool as compared to the previous tool when improving staff efficiency. The findings indicate 46.4% of project participants were unsure if the tool improved efficiency. Fifty percent of project participants' responses found the tool were perceived useful for improving verbal communication.

Table 10

*Percentages of Provides Level of Perception to Quality Care*

	Sort of Useful	Not Sure	Very Useful	Extremely Useful	Total
CRNA Count	0	3	5	6	14
% of total	0.0	10.7	17.9	21.4	50
PACU RN Count	1	2	4	2	9
% of total	3.6	7.1	14.3	7.1	32.1
Anesthesiologist Count	0	0	2	3	5
% of total	0.0	0.0	7.1	10.7	17.9
Total Count	1	5	11	11	28
% of total	3.6	17.9	39.3	39.3	100

Note. Represents the participants' perception of useful of the handoff tool as compared to the previous tool when improving quality of care for patients. The findings indicate 39.3% of project participants found the tool was perceived useful for improving quality of care.

## Discussion of Findings

According to the descriptive analysis, the most favorable perception of usage of the structured, consistent, and standardized tool were among CRNAs and Anesthesiologists. The CRNAs and Anesthesiologist were eager to use the tool. The PACU RNs favored structure and consistency and preferred the transfer of patient information in the EHR. All participants favored the adapted tool's mnemonic "I PUT PATIENTS FIRST," which reinforced the rationale for patient safety. The results demonstrated that in a fast pace high acuity environment, efficiency would most likely not improve. Additionally, the anesthesia providers stated the tool did not appropriately fit the setting because it was too detailed and interfered with getting back to the OR to start the next case on time. Furthermore, the anesthesia providers stated that previously, the PACU RNs did not listen while giving handoff and information was lost. The PACU RNs were more focused on connecting the patients to monitors instead of focusing on the handoff. The PACU RNs prefer the data to be entered into EHR and thus easily accessible. Additional comments alluded to first time structured, standardized, and consistent, handoff receivers (PACU RN) and being overwhelmed with patient information. According to the comments (See Appendix H), a narrative correlation can be linked to the literature stating some of the rationales for error in the PACU are the pressure of fast pace and high acuity environment, distractions, lack of attention, and noise level which leads to inaccurate and incomplete transfer of patient information (Robins & Dai, 2015; Segall et al., 2013). The lack of information, unstructured process, and interruptions constitutes poor handoff (Lee et al., 2012). Therefore, post-operative safety measures to improve information transfer includes incorporation of a checklist

which results in a structured, organized handoff thus reducing information exclusion and errors (Nagpal et al., 2010b).

Table 1 demonstrates a frequency distribution table of responses in improving patient safety. Eighty-two percent of project participants indicated that compared to previous process of patient handoff, the use of handoff communication tool should increase patient safety in the PACU. Based on the participants' responses it can be interpreted that the communication handoff tool was perceived to increase patient safety in the PACU.

Table 2 shows a frequency distribution table of responses in decreasing errors. Eighty-two percent of project participants indicated that compared to previous process of patient hand off, the use of communication handoff tool should decrease errors. From the participants' responses, it can be postulated that the handoff communication tool was perceived to decrease errors in the PACU.

Table 3 represents a frequency distribution table of responses in improving verbal communication. Eighty-two percent of project participants indicated that compared to previous process of patient handoff, the use communication handoff tool should improve verbal communication. Based on the study, the participant responses implied that the communication tool was perceived to increase verbal communication among anesthesia providers and PACU RNs.

Table 4 demonstrates a frequency distribution table of responses in improving efficiency. Forty-six percent of project participants indicated that compared to previous process of patient hand off, they were unsure if the use of communication handoff tool

improved staff efficiency. From the participants' responses, it is presumed that efficiency is not perceived to increase with the tool in the PACU.

Table 5 expresses a frequency of responses in improving quality care. Seventy-nine percent of project participants indicated that compared to previous process of patient handoff, the use of communication handoff tool was perceived to improve quality of care. From the project, the participants perceived the quality of care increased in the PACU.

According to Emanuel et al. (2008) "patient safety is a discipline in the health care sector that applies safety science methods toward the goal of achieving a trustworthy system of health care delivery" (p. 6). The author further stated that patient safety is a quality of healthcare systems and minimizes the possibility of adverse events. The literature identified the key component of safety is directly related to the element of the health care systems. Therefore, the objective is to avoid and prevent adverse events from the process of safe care. The elements in the system plays an integral part in curtailing the adverse events and improving patient safety by 1) organization and management 2) work environment 3) team 4) individual 5) patient 6) task and 7) external environment factors. Additionally, the authors stated elements composite three influences: "the systems for therapeutic action, the people working in the healthcare and the people who receive or have a stake in its accessibility" (Emanuel et al., 2008, p. 15). An example of people working in healthcare and have accessibility is demonstrated in Table 6. Table 6 is responses from participants' on patient safety in percentage. The survey asked participants to rate the usefulness of the handoff tool as compared to the previous handoff tool in evaluating patient safety. The study showed 3.6% found the tool sort of useful,

14.3% were uncertain of the usefulness, 35.7% percent found the tool very useful and 46.4% found the tool extremely useful for improving patient safety. The results demonstrated that 82% of project participants perceived the tool improved patient safety in the PACU. The perception of usefulness of the handoff tool was higher between CRNA's at 21.4%. Approximately 7% of the CRNAs were not sure of the usefulness of the tool for improving safety.

Joy, Elliot, Sullivan, Backer, and Kane (2011) indicated the use of a structured, standardized, and consistent handoff checklist will decrease medical error and improve quality of care. Effective communication is an essential element in assisting with decreasing error. Robins and Dai (2015) agree by stating information loss at handoff due to ineffective communication can lead to increase in errors, sentinel events, and unfortunate patient outcomes. IOM (1999) identified that one person, however, does not cause errors; faulty processes, systems, and situations that lead people to fail to prevent harm cause more common errors. Therefore, it is priority to curtail errors by creating a safe environment for the patient. The communication handoff tool is a way to decreased error. Table 7 shows the responses from the participants in decreasing errors in percentage. The survey asked participants to rate the usefulness of the adapted handoff tool as compared to the previous handoff tool in decreasing errors. The study revealed 3.6% found the tool sort of useful, 14.3 % were uncertain of the usefulness, 39.3% found the tool very useful and 42.9% perceived the tool extremely useful in decreasing error. The perception of usefulness of the handoff tool was higher between CRNAs at 43%. Approximately 7% of the CRNAs were not sure of the usefulness of the tool for decreasing error. The PACU RNs perception of the tool's usefulness was 32.1%. Seven

percent was not sure of the tool's usefulness and 3.6% scored sort of useful. The anesthesiologist perception of the tool for decreasing error was the lowest at 17.9%. Eighty-two percent of project participants' perception favored usefulness of the tool in decreasing errors in the PACU.

Effective communication is a valuable tool among healthcare workers in order to maintain great safe patient care (Boat & Speath, 2013). Miscommunication contributed to 85% of hospital sentinel events (The Joint Commission, 2008). In addition, the literature concluded that in healthcare, interpersonal communication contributes to building teamwork and relationships to achieve high performance. Funk et al. (2013) implicated that a "structured checklist is associated with increased communication of handoff content and improved provider satisfaction" (p. 6). A correlation to the evidence-based literature is evident by a CRNAs post handoff survey comment, which included, "the checklist improved verbal communication and rapport between me and the PACU RNs." The structured, standardized, and consistent checklist allowed interaction among the PACU RNs and the anesthesia providers to open dialogue to clarify any omitted or misunderstood information. Table 8 shows participants responses of verbal communication in percentage. The survey asked participants to rate the usefulness of the adapted handoff tool as compared to the previous handoff tool in improving verbal communication. The study showed 3.6% found the tool useful, 14.3% were uncertain of the usefulness, 35.7% found the tool very useful and 46.4% perceived the tool extremely useful in improving verbal communication. The perception of the tool was highest among CRNAs at 42.8%. Only, 7.1% were not sure of the usefulness in improving verbal communication. The PACU RNs perception of the tool was 32.1%. Seven

percent were not sure of the tool's usefulness and 3.6% scored sort of useful. The anesthesiologists' perceptions of the tool for decreasing error were the lowest at 17.9%. Therefore, 82% of project participants perceived the tool increased verbal communication in the PACU.

Efficiency is defined by Merriam Webster Dictionary (2016) as the ability to do something or produce something without wasting materials, time, or energy: the quality or degree of being efficient. The expressed comments from the participants in this project yielded the checklist was too detailed and required additional time that prolonged the handoff process and impinged on efficiency. Robins and Dai (2015) conducted a study that showed "the use of a check list did not increase the length of time the provider was in the PACU exchanging information during handoff" (p. 268). In addition, Boat and Speath (2013) conducted a study demonstrating the use of a checklist did not significantly impact patient flow by lengthening the handoff process (p. 652). Therefore, according to the literature, the consistent use of a handoff tool is not presumed to effect the time it requires to give an adequate handoff. Table 9 displays the responses of the perception of efficiency in percentages. The survey asked participants to rate the usefulness of adapted handoff tool as compared to the previous handoff tool in improving efficiency. The study showed 3.6% found the tool sort of useful, 46.4% were uncertain of the usefulness, 28.6 % found the tool very useful and 21.4% perceived the tool extremely useful in improving efficiency. The perception of the tool was highest among CRNAs 35.8%. Fourteen percent were not sure of the usefulness in increasing efficiency. The PACU RNs perception of usefulness of the tool was 14.2%. Fourteen percent were not sure of the tool's usefulness and 3.6% scored sort of useful. The anesthesiologists'



perception of the tool for increasing efficiency was the lowest at zero percent. Eighteen percent were not sure of the usefulness of the communication tool in improving efficiency in the PACU. Therefore, 50% of project participants' perception favored the communication tool increased efficiency in the PACU. Fifty percent of project participants' perception of the tool did not increase efficiency in the PACU.

The initial step in cultivating quality of care is consistency. Default et al. (2012) stated that standardization and consistency are basic aspects in improving quality care. Furthermore, an important component in continuity, quality and safety is adequate patient handoff (Salzwedel et al., 2013). Inconsistencies can lead to decreased quality of care and patient harm. The Quality of Health Care in America Committee of the IOM concluded "it is not acceptable for patient to be harmed by healthcare systems that is supposed to offer healing and comfort—a system that promises, to do no harm (p.2). Table 10 shows the responses from participants of quality care in percentages. The survey asked participants to rate the usefulness of the adapted handoff tool as compared to the previous handoff tool in improving quality of care. The study showed 3.6% found the tool sort of useful, 17.9% were uncertain of the usefulness, 39.3% found the tool very useful 39.3% found the tool extremely useful in improving quality of care. The perception of the tool was highest among CRNAs at 39.3%. Approximately, 11% were not sure of the usefulness in increasing quality. The PACU RNs perception of usefulness of the tool was 21.4%. Seven percent were not sure of the tool's usefulness and 3.6% scored sort of useful. The anesthesiologists' perception of the tool for increasing quality of care was the lowest at 18%. Therefore, 78.6% of project participants perceived the tool's usefulness improved quality care in the PACU.

## CHAPTER IV – SUMMARY

The purpose of the doctoral project was to introduce a structured, standardized and consistent handoff communication tool to the CRNAs, Anesthesiologists, and PACU RNs that may have resulted in favorable perception of usage. After a 2-week trial period of using the tool in the PACU, five subscale questions were asked to evaluate the usefulness of the tool. The results of the project indicated favorable perception of usage of the introduction of the adapted communication handoff tool among the CRNAs, anesthesiologists, and PACU RNs. Detailed analysis was generated using word spread sheet and data entered into SPSS. The results were displayed in frequency distribution and percentage tables of favorable perception of usage of each five-subscale question. The project revealed an 82% favorable perception of usage. The CRNAs scored highest in all four of the subscale questions. Anesthesiologists scored the lowest in four subscale questions perhaps because they accounted for 18% of the participants. None of the participants scored not useful. Favorable perception of usage for improving efficiency revealed approximately 50% favorable and 50% not favorable in the PACU. Responses from subscale frequency question demonstrated 46% of project participants' were unsure if the use of the handoff communication tool improved efficiency in PACU. The results demonstrated that in a fast pace high acuity environment, efficiency would most likely not improve. Responses from subscale frequency questions revealed 80% of all project participants' perception of usefulness of the tool compared to previous process of patient handoff were perceived to increase patient safety, decrease errors, and improve verbal communication and quality of care. Due to a small population, it was determined that

statistical analysis would yield unreliable results. However, this study demonstrated favorable perception of usage of the communication handoff tool.

Doctor of Nursing Practice (DNP) is characterized by American Association of Colleges of Nursing (AACN) 2006 as: “any form of nursing intervention that influences health care outcomes for individuals or populations, including the direct care of individual patients, management of care for individuals and populations, administration of nursing and health care organizations, and the development and implementation of health” (p. 2). The AACN has identified 8 Essentials (See Appendix I) for DNP prepared nurses as foundational outcome competencies. These essentials define and distinguish advance practice nurses roles and provide a framework for their expertise. Therefore, observation of ineffective communication and lack of transfer of patient information led the advance practice nurse the opportunity to make a difference in the clinical setting with the introduction of a standardized, structured, and consistent handoff communication tool. With the introduction of the tool, the possibility of making a change in practice that could ultimately decrease error, improve quality of care, improve efficiency, improve verbal communication and increase patient safety in the PACU area. This doctoral project used the theoretical framework to assist in guiding interaction, reaction and transaction by a step-by-step process among the project participants’ to reach a goal of obtaining favorable perception of usage of the communication handoff tool. Imogene’s King Theory of Conceptual System and Goal Attainment of interpersonal system permitted the investigator to interact and communicate with the participants’ to gain favorable perception of usage of the tool introduced to CRNAs, Anesthesiologists, and PACU RNs.

DNP prepared nurse are able incorporate expert communication skills, consult with stakeholders, and incorporate leadership skills with all team members whether inter-professional or intra-professional in order to achieve transformational change in this complex 21st century health care system.

### Barriers

The main barriers identified in this doctoral project contributed to lack of a protocol, procedure, and process for a consistent handoff transfer and the fact that PACU nurses preferred the transfer information in the EHR. Additionally, the lack of attention encountered from PACU nurses secondary to distractions, connecting patients to monitors and looking in the computer for data contributed to barriers. Lastly, the lack of infrastructure in the OR that supports the willingness to change practice and improve patient safety and quality of care was a major barrier.

### Implications of Nursing Practice

A large body of evidence was examined and evaluated to determine the implication for nursing practice of a standardized, structured, and consistent handoff tool for anesthesia providers and PACU RNs. The literature points to the need for a consistent tool, as a way of addressing patient safety related to errors and decreased quality of care in the PACU. The use of the tool designed by Moon et al. (2015) is a way of intervening, and because of its structured nature, will provide more predictable results of improving patient safety, decreasing errors, improving verbal communication, efficiency and quality of care. Also, the communication tool could possibly improve standards of care, and because of its structured nature and simplicity could be entered into EHR for easier access. The decision to disseminate this method to future

investigators can have a phenomenal impact on improving patient outcomes. Further modifying is needed to develop an effective and efficient handoff tool for the anesthesia providers and PACU areas.

### Conclusion

Evidence based-literature supports the use of a structured, standardized, and consistent handoff tool to improve patient safety, decrease error, and improve verbal communication, efficiency, and quality of care in the clinical setting. Without structure, consistency, and effective communication, patient outcomes are decreased. In this doctoral project, a well-known mnemonic communication tool “I PUT PATIENTS FIRST” designed by Moon et al. (2015) was introduced to the CRNAs, Anesthesiologists, and PACU RNs that could possibly result in favorable perceptions of usage of the tool in the PACU. The project resulted in 82% of project participants indicated that compared to previous process of patient handoff, the use of the handoff communication tool was perceived useful in four of the five-subscale question. To gain the additional 18% perception of favorable usage in all five subscale questions, this project found that initiation of protocols, consistency, and structure would assist in curtailing decreased outcomes and amplifying improved quality of care. Additional modification/editing of the adapted handoff tool that can be input into EHR for easier access is recommended. Moreover, departmental infrastructure that supports the willingness to change practice and improve patient safety and quality of care is also needed and recommended to assist with streamlining the process.

Additional studies are vital to determine if the engagement of a protocol or guideline will actually lead to decreased errors and improved quality of care. In the

meantime, the literature focuses on developing a safe and effective practice tool to facilitate improving patient outcomes and quality of care.

APPENDIX A – Review of Related Literature Matrix

Table A1.

*Literature Matrix 1*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Dufault et al. (2010)	Nurse to nurse shift report in 129 bed urban community hospital with high tourist patient population, military, older adults and minorities	Qualitative	Collaborative Research Utilization Model	Communication and a cost-effective handoff protocol to reduce the risks to patient harm	<ul style="list-style-type: none"> <li>Clinical participation contributed to the achievement of meaningful development of a standardized, evidence based, patient centered approach to nurse change of shift handoffs</li> </ul>	Utilization of the method to solve problems and more cost effective approach to handoffs

Table A2.

*Literature Matrix 2*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Funk et al. (2016)	Convenience samples of 52 pre-implementation and 51 post-implementation handoff interactions (N=103)	Qualitative	Observational pre and post implementation	Communication and a structured handoff	<ul style="list-style-type: none"> <li>• A statistically significant increase in percentage if checklist items were transferred</li> <li>• .No statistically significant difference in time spent at handoff. All levels of checklist improved from pre to post with exception of one</li> </ul>	A structured, standardized check list is associated with increased communication and transfer of information



Table A3.

*Literature Matrix 3*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Hudson et al. (2015)	Actual patients undergoing surgery in a quaternary care cardiac surgery center between April 1, 1999-October 31, 2009	Quantitative	Retrospective control study in which the databases selected all patients undergoing major cardiac surgical procedures divided into those received handoff and those that did not	Communication problems during handoff among anesthesia providers	<ul style="list-style-type: none"> <li>• Handoff of anesthetic care was 43% relative increase in all hospital mortality compared with cases in which no handoff occurred.</li> <li>• Handoff care from one anesthesiologist to another was associated with 27% increase in morbidity</li> <li>• The results derived from poor handoff communication, fatigue, and surgeries occurring during weekends and evening shift.</li> </ul>	Structured, standardized handoff checklist among anesthesia providers

Table A4.

*Literature Matrix 4*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Johnson, F., and Fournier, K. (2013)	Randomized study	Qualitative	none identified	Communication problems with inconsistencies in SBAR	<ul style="list-style-type: none"> <li>• Identification of safety concerns lead to development of SWITCH, a handoff tool for improving communication</li> <li>• 97% of the participants stated SWITCH handoff tool was very important for patient safety and 87% states it was easy to use</li> </ul>	Structured and Consistent Handoff tool

Table A5.

*Literature Matrix 5*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Nagpal et al. (2012)	18 healthcare professionals of varying levels of experience including seven-surgeons five-anesthetists, and six-nurses	Qualitative	Semi-structured interviews were recorded, transcribed verbatim, and submitted to emergent theme analysis	Communication problems/failures across the surgical care area	<ul style="list-style-type: none"> <li>• Information transfer and communication failures were common in surgery and equally dispersed along the continuum of care causing patient harm.</li> <li>• Hand off was characterized by fragmented information being transferred by incomplete team. Lack of structured handoff lead to information overload.</li> <li>• Need for standardization of information transfer</li> </ul>	Surgical care pathway checklist/electronic list

Table A6.

*Literature Matrix 6*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Nagpal et al. (2010b)	Multidisciplinary team consisting of four surgeons, four anesthetists, six nurses in ward, operating room, and recovery and a psychologist	Quantitative	Systematic assessment from interviews	Communication problems across the surgical area	<ul style="list-style-type: none"> <li>• Most failure modes were identified in the preoperative assessment area.</li> <li>• Forty one (31.1%) of 132 failures were identified as critical</li> <li>• The most important failure mode identified in the postoperative area was inadequate handoff</li> </ul>	A structured postoperative handoff checklist will result in structured and organized handoff thus reduce information omissions and technical errors

Table A7.

*Literature Matrix 7*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Nagpal et al. (2010a)	18 healthcare professionals of varying levels of experience including seven surgeons, five anesthesiologists, and six nurses	Qualitative	Semi-structured interviews	Communication problems in postoperative handoff	<ul style="list-style-type: none"> <li>• Handoff was characterized as fragmented information being transferred by incomplete team</li> <li>• Postoperative handoff is informal, unstructured, and inconsistent with incomplete transfer of information</li> </ul>	Standardization of information transfer through the use of a communication protocol to create rules for interaction

Table A8.

*Literature Matrix 8*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Potestio et al. (2015)	Residents (N=21) Group A (did not use checklist)and Group B (used checklist)	Qualitative	Observation	Communication succinct checklist to exchange information and decrease adverse events	<ul style="list-style-type: none"> <li>• Overall, the percentage of items handed off statistically increased with the use of a checklist</li> <li>• (Group B 69.5% +/- 16.5% and Group A 51.5% +/- 8.2%)</li> <li>• Use of checklist yielded a higher number of items handed off</li> <li>• The study yielded handoffs in Group B were 26 seconds longer</li> </ul>	Creation of all-inclusive handoff tool will perpetually increase the length of the handoff while an effort to create an efficient handoff tool will simplify the process possibly eliminating vital transfer of information and decrease adverse events

Table A9.

*Literature Matric 9*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Robins, H.M. and Dai, F. (2015)	29 PACU RNs and 29 CRNAs a checklist group and no checklist group	Qualitative	Randomized pilot study	Communication with use of a handoff checklist in the PACU	<ul style="list-style-type: none"> <li>• The anesthesia providers that used the checklist showed a statistical significant reduction in the number of callbacks from the PACU RNs. The use of the checklist also led to an increase of accuracy ratings than the non-checklist group</li> <li>• No statistically significant difference in anesthesia providers time spent in the PACU between the checklist group and the no check list group</li> </ul>	Standardized checklist could assist providers to correctly exchange information

Table A10.

*Literature Matrix 10*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Salzwedel, C. et al. (2013)	120 handoffs recorded on video and analyzed by 41 anesthesiologist. Forty before the implementation and 80 afterwards (two separate groups)	Qualitative	Randomized controlled trial	Communication with the use of a written checklist	<ul style="list-style-type: none"> <li>• With the use of checklist, handoff information increased significantly from a median of 32.4 to 48.7%.</li> <li>• Utilization of a checklist, handoff might improve the quality of patient handoff</li> </ul>	Checklist for PACU might improve the quality of care



Table A11.

*Literature Matrix 11*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Segall et al. (2012)	Literature Review of 31 out of 500 articles that met the inclusion criteria	Qualitative	Six Sigma	Communication problems on patient safety in the PACU	<ul style="list-style-type: none"> <li>• Poor team work and communication contributed to ineffective handoffs thus jeopardizing patient safety</li> <li>• Post-operative patients found at higher risks for mortality and morbidity</li> <li>• Post-operative handoffs were fraught with technical errors that impact patient safety</li> </ul>	Checklist guides communication and structure

Table A12.

*Literature Matrix 12*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Speath, J.P. and Boat, A.C. (2013)	45 anesthesiologist, 40 CRNAs 120-1280- transfer of patient care were observed	Qualitative	Pilot study	Communication problems and reliability of information transfer checklist in the PACU and OR	<ul style="list-style-type: none"> <li>• The reliability of intra-operative anesthesia handoffs improved from 20% to 100% with the use of standardized intraoperative handoff checklist.</li> <li>• The reliability of introduction of a standardized, structured and consistent PACU checklist improved from 59% to 90%</li> </ul>	Standardized checklist could improve reliability in intraoperative and postoperative areas

Table A13.

*Literature Matrix 13*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Suter et al. (2009)	Health care providers and administrators (N=60) Physicians, nurses, and other professions. Mostly females	Qualitative	Individual and group semi structured interview	Organizational culture and structure	<ul style="list-style-type: none"> <li>• Lack of communication between providers interferes with collaboration.</li> <li>• Two competencies for effective collaborative practice were communication and role understanding and is the key to patient-centered collaborative practice.</li> </ul>	The evidence advises that substantial gains in quality of patient care and provider outcomes can be accomplished by concentrating learning efforts on improving health providers' communication skills and role understanding

Table A14.

*Literature Matrix 14*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Xyrichis & Ream (2007)	Literature Review between on teamwork	Qualitative	A concept analysis approach	Teamwork and outcomes	<ul style="list-style-type: none"> <li>• Teamwork incorporates bringing together healthcare professionals skills and knowledge to reach a common goal in assessing, planning, and evaluating patient care.</li> <li>• Interdependent collaboration, open communication and shared decision-making equals increased patient outcomes and organizational success.</li> </ul>	Teamwork in healthcare is beneficial in solving issues and discrepancies

Table A15.

*Literature Matrix 15*

Author/ Year	Sample	Design	Method	Outcome Measures	Findings	Recommendations
Moon et al. (2016)	Anesthesia providers and ICU nursing staff.	Qualitative	Prospective interventional study using Pre-intervention and post-intervention surveys	Communication using a “I PUT PATIENTS FIRST” to improve the quality and efficacy of the OR to ICU handoff with	<ul style="list-style-type: none"> <li>• Satisfaction levels increased between anesthesia and ICU nurse</li> <li>• Satisfaction levels among the providers significantly increased</li> <li>• Effectiveness of the tool was highly perceived</li> <li>• Satisfaction from the ICU nurses in regards to estimated time of arrival</li> </ul>	Implementation of a bundled communication tool could be associated with increased satisfaction, perception of increased efficacy, and quality of the overall handoff process and avoid omitting pertinent patient information

APPENDIX B Email Correspondence

From: Rachel Johnson [rachel.l.johnson@usm.edu]  
Sent: Tuesday, March 08, 2016 3:27 PM  
To: Tiffany Moon  
Subject: Permission/ I PUTS PATIENTS FIRST/ Mnemonic

Dr. Tiffany Sun Moon,  
It was a pleasure speaking with you today. I wanted to officially request your permission. Can you please provide me with an official letter via email that I can print and submit to my committee?

My name is Rachel Johnson and I am a doctoral Student Registered Nurse Anesthetist at The University of Southern Mississippi. I am in the process of doing research on my Capstone project. It includes introduction of an effective handoff tool at my facility between the Post Anesthesia Care Unit (PACU) Registered Nurses (RN), Certified Registered Nurse Anesthetists (CRNA), and Anesthesiologists with the possibility of instituting to decrease error, mortality and morbidity, cost, and ultimately improve patient outcomes and quality of care in the PACU.

I discovered a handoff tool you created that has been effective and reliable. It would be an honor and a privilege to utilize the tool you designed in my project. However, it could possibly require slight changes or adjustments to benefit the PACU area. Therefore, I am requesting your permission to use the handoff communication tool you designed.

Thanking you in advance for your time and consideration.

Sincerely,

Rachel Johnson, SRNA  
The University of Southern Mississippi  
Doctor of Nursing Practice Anesthesia Program  
118 College Drive # 5095  
Hattiesburg, MS 39406-0001

From: Tiffany Moon <Tiffany.Moon@utsouthwestern.edu>  
Date: Wed, Mar 9, 2016 at 10:28 AM

Subject: RE: Permission/ I PUTS PATIENTS FIRST/ Mnemonic  
To: Rachel [Johnson.rachel.l.johnson@usm.edu](mailto:Johnson.rachel.l.johnson@usm.edu)>

Rachel,

You have permission to use and modify our mnemonic for use at your own institution, with the caveat that it needs to be properly referenced anytime you use it. Good luck to you!

TSM

Tiffany S. Moon, M.D.  
Assistant Professor  
Director of Resident Recruitment  
Department of Anesthesiology & Pain Management  
UT Southwestern Medical Center  
5323 Harry Hines Blvd.  
Dallas, TX 75390-9068  
[Tiffany.Moon@UTSouthwestern.edu](mailto:Tiffany.Moon@UTSouthwestern.edu)

## APPENDIX C – Handoff Checklist

### Participant Information Sheet on the 16 point

#### Mnemonic checklist

Adapted from: Moon, Gonzales, and Woods, 2015

The Mnemonic: **I PUT PATIENTS FIRST**

#### **I-Identify yourself and role and obtain nurse's name**

By announcing your name and role, you clearly define your participation as part of the care team and have the opportunity to clarify your role to the receiving unit. Additionally, taking the opportunity to meet with the receiving nurse will facilitate future communication.

#### **P-Patient's past medical history (medical, surgical, social)**

The patient's pertinent past medical, surgical, and social history should be discussed with the receiving PACU RN as it should relate a clear narrative of the patient's medical course.

#### **U-Underlying diagnosis and procedure**

The patient's underlying diagnosis should be discussed in addition to the intervention or procedure.

#### **T-Technique (general anesthesia, neuraxial, regional)**

A brief discussion of the anesthetic technique chosen may indicate special requirements to the PACU RN. Did you use LMA or Endotracheal tube? Did the patient receive Exparel?

#### **P-Peripheral IVs, arterial lines, central lines, drains**

It is important for the PACU RN to be aware of what venous access, arterial lines, and other drains/tubes that are present as these are the means by which therapeutics will be administered.

#### **A-Allergies**

Allergies should be discussed because they may explain why another alternative drug was used intraoperatively.

#### **T-Therapeutic interventions (pain medications, antibiotics)**

Therapeutic interventions should occur to provide a general outline of the patient's planned medical course.



**I-Intubation (very difficult, moderately difficult, easy)**

If there was any difficulty with intubation, PACU RN should be alerted so that additional airway equipment can be prepared should the patient need to be reintubated at a later time.

**E-Extubation likelihood (already extubated, very likely, unlikely, definitely no extubation planned)**

If the patient will be kept intubated, the PACU can be prepared with a ventilator and respiratory therapist present, eliminating any potential delays. Does the patient or family members have a cholinesterase deficiency?

**N-Need for drips**

The presence of any continuous infusions should be discussed if applicable so that there is a clear consensus of all drips and their rate of administration.

**T-Treatment plan for postoperative care (blood pressure goals, ventilator settings)**

Postoperative care can vary significantly depending on the patient's medical course and the surgical procedure that was performed. For example, if a carotid endarterectomy was performed, the receiving PACU RN should carefully monitor blood pressure and acceptable parameters should be discussed with the surgical and anesthesia teams.

**S-Signs (vital signs during case and most recent)**

A patient's vital signs can provide an early warning of decompensation or future medical course. It should be noted that goal ranges vary in the context of disease. For example, patients with chronic hypertension may require a higher blood pressure to achieve adequate perfusion.

**F-Fluids (Intake and Output, blood product(s) administered)**

The receiving unit should be made aware of all fluid and blood product administration. Fluid output, such as urine output and estimated blood loss, should also be communicated to PACU RN.

**I-Intraoperative Events (if any)**

Any major intraoperative events should be discussed, as well as any consequent interventions, especially if it differs significantly from the planned course of action.

**R-Recent labs (Hemoglobin, glucose, etc.)**

Recent laboratory results provide insight to the patient's condition and relay the efficacy of past interventions, such as the administration of blood products.

**S-Suggestions for immediate postop care (ex: special positioning, pain control, need for pumps, etc.)**

Any special supplies, such as intrathecal catheters or infusion pumps, should be requested in advance of the patient's arrival to prevent any unnecessary delays. Special instructions for positioning, such as the requirement for a patient to lay flat for a number of hours following an endovascular procedure, should be discussed.

**T-Timing/expected time of arrival to PACU**

As accurately as possible, the estimated time of the patient's arrival to the PACU should be approximated, so that the receiving RN is ready.

**QUESTIONS???**

## APPENDIX D – Condensed Version of Tool

Adapted from: Moon, Gonzales, and Woods, 2015

### **DNP Project by Rachel L. Johnson**

The Mnemonic: I PUT PATIENTS FIRST

- I Identify yourself and role and obtain nurse's name
- P Patient's past medical history (medical, surgical, social)
- U Underlying diagnosis and procedure
- T Technique (general anesthesia, neuraxial, regional)
  
- P Peripheral IVs, arterial lines, central lines, drains
- A Allergies
- T Therapeutic interventions (pain medications, antibiotics)
- I Intubation (very difficult, moderately difficult, easy)
- E Extubation likelihood (already extubated, very likely, unlikely, definitely no extubation planned)
- N Need for drips
- T Treatment plan for postoperative care (blood pressure goals, ventilator settings)
- S Signs (vital signs during case and most recent)
  
- F Fluids (Intake and Output, blood product(s) administered)
- I Intraoperative Events (if any etc.)
- R Recent Labs (Hemoglobin, glucose, etc.)
- S Suggestions for immediate postop care (ex: special positioning, pain control, need for pumps, etc.)
- T Timing/expected time of arrival to PACU

### **QUESTIONS?**



## APPENDIX F – Institutional Review Board Approval



THE UNIVERSITY OF  
SOUTHERN MISSISSIPPI

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**INSTITUTIONAL REVIEW BOARD**  
118 College Drive #5147 | Hattiesburg, MS 39406-0001  
Phone: 601.266.5997 | Fax: 601.266.4377 | [www.usm.edu/research/institutional.review.board](http://www.usm.edu/research/institutional.review.board)

### NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.  
Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 16071202

PROJECT TITLE: Use of a Handoff Communication Tool between Certified Registered Nurse Anesthetists (CRNA), Anesthesiologists and Post Anesthesia Care Unit Registered Nurses (PACU RN)

PROJECT TYPE: New Project

RESEARCHER(S): Rachel Johnson

COLLEGE/DIVISION: College of Nursing

DEPARTMENT: Nursing

FUNDING AGENCY/SPONSOR: N/A

IRB COMMITTEE ACTION: Exempt Review Approval

PERIOD OF APPROVAL: 07/22/2016 to 07/21/2017

**Lawrence A. Hosman, Ph.D.**

**Institutional Review Board**

APPENDIX G – Letter of Support



LETTER OF SUPPORT

June 24, 2016

To the Institutional Review Board (The University of Southern Mississippi):

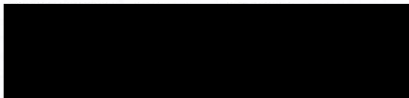
It is my pleasure to write a letter in support of the proposal (USE OF A HANDOFF COMMUNICATION TOOL BETWEEN CERTIFIED REGISTERED NURSE ANESTHETISTS, ANESTHESIOLOGISTS AND POST ANESTHESIA CARE NURSES) being submitted by Rachel Johnson at the University of Southern Mississippi's Nurse Anesthesia Program.

The purpose of the doctoral project is to evaluate favorable perception of usage of a structured, standardized, and consistent handoff communication tool between the CRNAs, Anesthesiologists and PACU RNs that may result in willingness to change practice in the Post Anesthesia Care Unit in Southeastern Mississippi.

Target population: Employed CRNAs, Anesthesiologists and PACU RNs at [REDACTED] Hospital.

In conclusion, I fully support the efforts of Rachel Johnson as she seeks to expand Nurse Anesthesia's body of knowledge and promote patient safety.

Signature: [REDACTED]  
Dr. [REDACTED]



APPENDIX H – Participants Comments

CRNA 2	I don't think it is my responsibility to call PACU for a bed
CRNA 4	excellent tool
CRNA 6	The tool is excellent but majority of time, we are in a hurry to get back and start the next case on time.
CRNA 9	Previously, I found the PACU RNs didn't appear to listen to my handoff because they were busy connecting the patient to the monitors or looking in the computer
CRNA 10	I think it's a great tool especially for SRNA students that don't know how or what to handoff. I will continue to use it even after the study is completed
CRNA 12	I used the tool ever time. It improved verbal communication and rapport between me and the PACU RN.
CRNA 13	Excellent guide for use in PACU and Handoff intraop. I think we need a tool for provider to provider as well because the majority of the time, I don't receive handoff when relieving another anesthesia provider
CRNA 14	It may have taken a few additional minutes but it's a great tool.
PACU RN 1	I have never used a tool before but it stimulated conversation about our current process
PACU RN 3	Some were consistent and some were not with using the tool. I feel getting a good idea of how the tool could be useful didn't really happen. Also, I think most of us are used to digging for our own information that we continued to look in the computer for it

APPENDIX I – DNP Essentials

DNP Essentials	Clinical Implications
DNP Essentials I – Scientific Underpinnings for Practice	<ul style="list-style-type: none"> <li>• Identified communication between the PACU RNs and anesthesia providers.</li> </ul>
DNP Essentials II – Organizational and Systems Leadership for Quality Improvement and Systems Thinking	<ul style="list-style-type: none"> <li>• Interacting with PACU RNs, managers &amp; clinical coordinator to introduce and utilize the tool for a two-week trial period</li> </ul>
DNP Essentials III – Clinical scholarship and analytical methods for evidence-based practice	<ul style="list-style-type: none"> <li>• Evidenced-based research identified ineffective communication, lack of structure and inconsistency as the reasons of unsafe practice in the PACU harm</li> <li>• Introduction of a standardized, structured, consistent communication tool among PACU RNs, CRNAs and Anesthesiologists</li> <li>• Evaluate the usage perception of the tool</li> </ul>
DNP Essentials IV – Information systems or technology and patient care technology for the improvement and transformation of health care	<ul style="list-style-type: none"> <li>• Analyze the descriptive statistics input into SPSS for statistical data analysis</li> </ul>
DNP Essentials V – Healthcare policy for advocacy in healthcare	<ul style="list-style-type: none"> <li>• Active student member of American Association of Nurse Anesthetists (AANA)</li> <li>• Interaction between the organizational stakeholders</li> <li>• Anesthesia clinical coordinator/OR manager/ PACU manager/ anesthesia providers and PACU RNs</li> </ul>



	<ul style="list-style-type: none"> <li>• Advocacy for new policy that could possibly improve patient outcomes</li> </ul>
DNP Essentials VI – Interprofessional collaboration for improving patient and population health outcomes	<ul style="list-style-type: none"> <li>• PACU RNs and anesthesia providers’ clarification and agreement with using the communication handoff tool to improve patient quality of care</li> <li>• Enhance the teams’ communication.</li> </ul>
DNP Essentials VII – Clinical prevention and population health for improving the nation’s health	<ul style="list-style-type: none"> <li>• Introduction of structured, standardized and consistent communicate handoff tool will increase patient safety, decrease error, improve verbal communication, efficiency, and quality of care</li> </ul>
DNP Essentials VIII – Advanced nursing practice	<ul style="list-style-type: none"> <li>• Consistent presence in clinical setting provides insight into the current issue of ineffective handoff communication and reinforces the need for change and improved quality care in the PACU</li> </ul>

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