

Running Head: HANDOFF COMMUNICATION

**Handoff Communication: A Survey Study of What Anesthesia Providers need to Know**

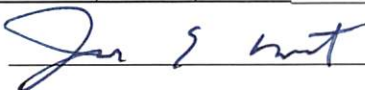
By Eunice Aguda, MSN, CRNA

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*Primary Advisor/First Reader:*

Name: Jane Motz, DNAP, CRNA

Signature:  Date: 12-04-17

*Second Reader:*

Name: Lawrence Stump, MEd, CRNA

Signature:  Date: 12/04/17

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**Abstract**

**Purpose:** The transfer of patient care between healthcare providers commonly referred to as handoff is a complex process that may lead to serious adverse consequences for patients or institutions if not conducted properly. The purpose of this scholarly project was to determine the knowledge level of Certified Registered Nurse Anesthetists (CRNAs) relating to best practices during patient handoffs, and to develop a PowerPoint Presentation intended to close knowledge gaps relating to best practices for patient handoffs. To achieve this objective, a survey of CRNAs was performed. Survey results were used to determine if CRNAs are in settings that facilitate their ability to practice within the American Association of Nurse Anesthetists' (AANA) Standards of Practice (SOP) with regards to handoffs and their knowledge regarding The Joint Commission (TJC) recommendation on effective handoff procedures. Barriers that prevent CRNAs for performing an effective and efficient handoff were investigated.

**Methods:** This project utilized an online survey. The development and electronic mailing of a questionnaire was distributed via Qualtrics®, to practicing CRNAs. The survey questionnaire was anonymous and comprised of 26 questions. CRNAs responded to questions regarding their knowledge and awareness of handoff recommendations, tools available for handoffs, tools currently utilized, and standards of practice regarding handoffs. The survey questions were meant to elicit CRNAs understanding of the current handoff practices, identify information thought to be crucial to communicate to enhance efficient handoff from one provider to another, and assess for knowledge gaps among the CRNAs in handoff processes. A review of the literature was performed. Information obtained from the literature review and survey results was utilized to develop a power point presentation to enhance knowledge and awareness.

**Results:** Production pressure/time constrains was the most cited factor hindering CRNAs from performing appropriate handoffs (25.3%). 30% of the respondents strongly agreed that they were in environments that allowed them to practice according to the AANA standards of practice. 31.8% were not aware if their department had a handoff policy/procedure. 66.2% of the respondents strongly agreed that for a handoff to be safe and effective it should be, incorporated in the Electronic Medical Record (EMR), use a checklist, and allow time for questions and answers.

**Conclusions:** Effective communication among caregivers is critical to seamless handoffs that result in safe, high quality care through analyzing key processes from the perspective of both the sender and the receiver. Survey results suggests there is room for improvement in CRNAs knowledge regarding the handoff process. Poor communication and abbreviated or incomplete handoff resulted in poor patient outcomes. Awareness of the SOP was below 65%, with nearly 26% respondents reporting they had never reviewed the SOP. This indicates a need to close the knowledge gap among the CRNAs on the standards regarding transfer of care.

**Data Sources:** ProQuest, Medscape, PubMed, Cochrane Library, CINAHL, Joint Commission websites, and Google Search.

**Keywords:** Anesthesia Handoffs, JC recommendations, Handoff tools, Standardized Checklist, Standards of Practice.

## I. INTRODUCTION

Transfer of patient care, commonly referred to as handoff, is a complex process that may lead to serious adverse consequences in healthcare if not managed properly. The performance of an appropriate handoff significantly contributes to improving healthcare quality, including patient outcomes, patient safety, and consistency of information. Effective handoff relies on provider competence and communication. Handoff as defined by The Joint Commission (TJC) is a contemporaneous, interactive process of passing patient specific information from one provider to another for ensuring continuity and safety of patient care.<sup>1</sup> Given the collective nature of patient care and handoffs, communication failures are being increasingly identified as a source of errors that contribute to serious threats to patient safety. It is necessary that handoff protocol involves consistency as much as thorough communication, collaboration, and follow through.

A handoff is an interactive process of transferring patient specific information from one care provider to another or from a team of caregivers to another. The World Health Organization (WHO) stated that communication during patient care handoffs is one of their “high five” patient safety initiatives, suggesting it is so imperative to be included in patients’ safety solutions.<sup>2</sup> Communication errors contribute to adverse events in various areas in health care. In a root cause analysis of more than 4000 adverse medical events, TJC identified communication breakdown as the most common factor implicated in these events.<sup>3</sup> This lack of communication has significant, serious implications for patient outcomes, institutional practice, and provider safety.

Effective information transfer requires a solid grasp of interpersonal communication skills. Although current research has explored the facets of professional communication in the medical setting, most research emphasized patient provider interaction instead of provider to provider interaction. This suggests that limited formal education is available to reinforce this

vital link in the continuity of patient care between practitioners. The process that accompanies shift changes such as sign-out of clinical information among health care providers for example is rarely standardized and may be haphazardly managed.

The handoff process includes three phases, (1) an exchange of information, (2) transfer of responsibility of care, and (3) continued provision of care.<sup>4</sup> Patients in most healthcare systems will be cared for by multiple providers or a provider team, it is therefore necessary for patients and provider safety that there be a dedicated protocol for exchanging patient information, transferring care, and continuing care based on patient centered needs. Discontinuity creates an opportunity for errors when clinical information is not accurately exchanged between providers. Provider communication can be a primary point of vulnerability, compromising patient safety in any hospital unit, including the Operating Rooms (OR).

Poor communication may affect patients' outcomes. A study of surgical malpractice claims involving communication failures that resulted in patient harm found the transfer of care to be particularly vulnerable.<sup>5</sup> 43% of communication breakdowns were associated with handoff and 36% of intrahospital transfer incidents originates from the OR.<sup>5</sup> Post-operative patients are at higher risk for complications or death when the teams exhibited less briefing and information sharing during handoffs.<sup>6</sup>

In 2010 TJC conducted a root cause analysis to determine major contributors of handoff related adverse effects. Results found that communication breakdown in the form of poor provider expectations, lack of safety culture, inadequate amount of handoff time, and lack of standardized handoff procedures contributed to poor handoff practices. Therefore, for providers to follow appropriate handoff protocol, it is necessary that they operate within a culture that promotes safety, clears expectations via a published or printed protocol and team cohesion.

The high incidence of errors related to poor communication during handoffs has resulted in investigation of handoff practices to reduce and attempt to prevent patient harm. The issue of handoffs has become so prominent that TJC introduced a national patient safety goal on handoffs that became effective in January 2006.<sup>7</sup> The national safety goals, developed by the Joint Commission with input from the Sentinel Event Advisory Group, identify new actions with the potential to protect patient safety. Anesthesia practice is a specialty that has always aimed at placing patient safety as its top priority.<sup>8</sup> Given the high level of finesse, education, and risk associated with anesthetics, it is necessary to explore how improved communication at the point of handoff can improve patient outcomes and provider response.

Handoffs are an essential part of anesthesia practice. CRNAs form a significant and essential component of surgical care, providing anesthesia to patients undergoing surgery. Teamwork communication and handoff procedures have significant implications for CRNAs as the process is especially valuable to upholding patient safety. It is imperative that CRNAs recognize the implications associated with appropriate handoff procedures.

The purpose of this scholarly project was to investigate CRNAs knowledge regarding the handoff process, and determine their awareness of the recommendation by TJC, and the AANA Standards of Practice (SOP). The study also investigated whether the CRNAs are in facilities that allow them to safely practice according to the AANA standards of practice. The goal of this project was to develop a Power Point presentation that aims to close the gap in knowledge about handoff process. This project addresses the following research questions:

- Is there a knowledge deficit among CRNAs regarding the current JC recommendations and AANA SOP relating to handoff procedures?
- Are CRNAs utilizing appropriate handoff tools in their facilities?

- What barriers hinder CRNAs from performing a complete, effective, and safe handoff?
- Can an accredited PowerPoint presentation be developed as a learning tool to fill the gaps in CRNAs knowledge regarding the importance of appropriate handoff practices?

## II. LITERATURE REVIEW

### Overview

More than a decade ago, the Institute of Medicine (IOM), an arm of the National Academies, published two major reports identifying significant and widespread deficiencies in the quality of U.S health care. Among the most startling of the institute's findings was that preventable medical errors caused estimated 44,000–98,000 inpatient hospital deaths per year.<sup>9</sup> Given the role of healthcare providers to provide compassionate, quality care to their patients, it is necessary to explore how “medical errors” contribute to patient mortality and, how these errors can be prevented.

Ineffective hand-off communication is recognized as a critical patient safety problem in health care. TJC, which certifies hospitals and other healthcare entities in the U.S, estimated that 80% of medical errors are related to communication deficiency, specifically during the handoff process.<sup>10</sup> This information was obtained by the Commission reviewing the sentinel event data base. On June 27, 2012, the Joint Commission Center for Transforming Healthcare launched its newest project in the Targeted Solutions Tool™ (TST) suite: The Hand-off Communications TST.<sup>11</sup> This new tool is designed to help health care organizations avoid communication-related miscues and errors during the process of passing necessary and critical patient information from one caregiver (or team of caregivers) to the next.

Types of Handoff Procedures

A standardized process can mitigate the stress associated with an ineffective patient handoff. An explicit procedure enforces hospital expectations, promotes team cohesion, and improves microsystem efficiency.<sup>12</sup> Transfer of care involves various staff, nursing units and procedures at different levels. This may be perioperative within the OR, post-operative within the Post-Anesthesia Care Unit (PACU), or intra-unit transfer from OR to external units like the Intensive Care Unit (ICU), or outpatient care areas. Multiple handoffs regularly occur in the anesthesia practice, and can be categorized into three main groups: (1) shift-to-shift, (2) duty relief (i.e., breaks), and (3) transition of care handoffs, all of which occur on a daily basis in any given care setting (Figure 1).<sup>13</sup>

Anesthesia Setting	Hand-off Type		
	Shift-to-shift	Duty Relief (Breaks)	Transition of Care
	Duty Relief by Providers with Similar Training and Responsibilities	Short-term Transfer of Patient Care, with Planned Transfer Back to Original Care Provider	Transfer of Patient Care, with Patient Movement between Locations or Change in Level of Care
ICU	✓	✓	To/from OR
OB	✓	✓	To OR
OR	✓	✓	From ED, to/from PACU
PACU	✓	✓	To/from OR, ward
Pain	✓	X	To/from primary provider
Regional/block	✓	✓	To OR

✓ indicates that hand-off type occurs in a given setting; X indicates that hand-off type does not occur in a given setting.  
 ED = emergency department; ICU = intensive care unit; OB = obstetric anesthesia; OR = operating room; PACU = postanesthesia care unit.

**Figure 1.** Types of handoffs conducted in anesthesia practice.<sup>13</sup>

Transitions in anesthesia handoff include patient transfer from the preoperative area to the OR, from the OR to the PACU, or from the OR to an ICU. In addition, handoffs occur as



patients return to acute care units or are discharged. Handoffs occur at multiple stages throughout the care process, involving a multidisciplinary team.

### Potential Causes of Poor Handoff

#### *Interpersonal Communication*

A handoff is largely dependent on the interpersonal communication skills of the caregiver as well as the knowledge and experience level of the caregiver.<sup>14</sup> There is reported variability in quality, lack of structure in how handoffs usually occur, and variance in shift handoffs.<sup>7</sup> Concern has been raised that the transition of care between providers during handoffs will continue to be problematic as research indicates that only 8% of medical schools teach how to hand off patients in formal didactic session, creating a large educational gap in new professionals and persistence of traditional models.<sup>15</sup> A technique that seeks to bridge the gap between the different communication styles is the Situation, Background, Assessment, Recommendation (SBAR) briefing model that is being used successfully to enhance handoff communication.<sup>16</sup>

Interpersonal communication has been implicated in poor communication at the time of handoff. Effective handoffs are largely dependent on interpersonal communication skills and interaction between the anesthesia provider and the PACU nurse. One study<sup>3</sup> aimed to characterize the nature of communication failures observed in the operating room and to assess whether a Team training curriculum had any impact on observed communication errors. Intraoperative observation was performed and communication errors were identified. Errors were classified according to the type of error, subject matter, and observed effect. Results of the study

indicated that a program that teaches teamwork and communication skills are one strategy that may improve communication among members of the operating team.<sup>3</sup>

Communication was addressed in a review of 33 closed cases in the PACU, where the most common risk management issues were: failure to note clinical information (e.g., vital signs), provider communication about the patient's condition, failure to follow policies and procedures, inadequate training, inconsistent documentation, inadequate documentation of the date and time, lack of clinical assessment, and alteration of documentation.<sup>17</sup> Failure to comply with basic documentation affects all stages of the handoff practice, including the sending practitioner, receiving practitioner, the receiving team, the patient, and the healthcare organization. Handoff practices impact the entire microsystem and should be prioritized as a vital point-of-care.

Many handoffs are between individuals within the same discipline, but there are also interdisciplinary handoffs such as from operating room anesthesia providers to a nurse in postoperative recovery.<sup>18</sup> Tools and checklists are only effective when communicated well. The development of good communication skills requires training and practice. Effective communication involves the accurate and timely transfer of meaningful information. The handoff problem may be partly rooted in the way providers are educated, or not educated in team training and communication skills.

### *Management of Care Transfers*

Multiple handoffs among anesthesia providers are partly responsible for an increase in sentinel events, medication mistakes, poor patient outcomes, reduction in patient satisfaction and prolonged length of hospital stay.<sup>19</sup> A multiple-step process, without an itemized checklist of

patient information, status, and future care, leaves room for improvement. Studies have found that, in most perioperative handoffs, the handoff is either written or verbal, but many nurses struggle to record the handoff both verbally and in the medical record. This suggests that communication errors occur between professionals as well as within the process itself.

### *Workload and Distractions*

In psychology research, multitasking is known to increase the risk for loss of information.<sup>20</sup> In health care, gaps in information flow due to multitasking have been demonstrated.<sup>21</sup> During patient handovers from the OR to the PACU, multitasking is likely to occur.<sup>22</sup> These handovers include both handover of monitoring equipment and of verbal information. Furthermore, after surgery, the anesthesia team may be pressured to start the next case to reduce turnover time.<sup>20</sup> Qualitative studies observed that handovers in the PACU were characterized as being event-driven, time-pressured, prone to concurrent distractions, and inconsistent with often incomplete information transfer.<sup>23</sup> CRNAs are prone to multitask during certain parts of their duties, for example, a CRNA may be teaching a student, while at the same time caring for the patient.

Multitasking is likely to increase the risk of information loss during patient handoff.<sup>22</sup> Albeit most providers report to multitasking during handoffs, one study showed that a minority of health providers preferred simultaneous handover of equipment and information.<sup>22</sup> In this study, the authors' objective was to find out to what extent the transfer of equipment and information occurs simultaneously or sequentially in daily practice.<sup>22</sup> The study used a survey questionnaire method. The study<sup>22</sup> showed that the simultaneous handovers were no more than 0.2 minutes faster than the sequential handoffs.

Errors in communication or record keeping can occur by no direct fault of the provider, but potentially because of poor staffing. Previous research identified that any one nursing unit can be expected to discharge or transfer 40% to 70% of their patients every day. This creates a frequency and intensity associated with understaffing, multitasking, and poor patient-to-provider ratios.<sup>24</sup>

### Handoff and Patient Safety

Anesthesiology is acknowledged as the leading medical specialty in addressing issues of patient safety.<sup>8</sup> Healthcare and anesthesiology practices have undergone marked changes over recent years. Patient acuity has been increasing, patient turnover is higher, and patients are frequently of advanced age with several comorbid disorders.<sup>25</sup> Limited resources and the pressure for higher efficiency can result in the suboptimal delivery of healthcare. During treatment within the healthcare system, a significant percentage of patients (3–16%) suffer from adverse events through system errors<sup>25</sup> with 15–65% of adverse patient events being attributed to communication failure.<sup>26</sup>

An observational study<sup>27</sup> aimed to describe how anesthesiologists hand over information and professional responsibility to nurses in the OR and PACU. The study used a non-participant practice observation and in-depth interviews with practitioners working in the recovery room of an English hospital. A qualitative method was used to analyze the results. Handoffs play an important role in maintaining patient safety. The result of this study indicated handover provides an 'audit point' in care where the patient's intraoperative progress was reviewed and plans were made for further management.<sup>27</sup> The authors concluded that although formalized handover procedures are often advocated for the promotion of safety, they are likely

to work best when the informal elements, and the cultural factors underlying them, are acknowledged.<sup>27</sup>

Preliminary findings of a study commissioned by the federal health department estimate that between 10 000 and 14 000 people died of preventable causes in both public and private hospitals in 1992.<sup>28</sup> In addition, between 25 000 and 30 000 people experienced a preventable adverse event that led to permanent disability of some kind, of these, 11% were due to communication issues, compared to 6% due to inadequate skill level of practitioner.<sup>28</sup>

During long surgical procedures, it is not uncommon practice for anesthesia providers to substitute for one another, for short breaks. There is no evidence as to whether this practice has effects that increase or decrease anesthetic risks. One study<sup>29</sup> aimed to analyze and demonstrate the effects of desirable and undesirable features associated with various relief practices, to guide the design of a safe and effective replacement protocol. The study<sup>29</sup> established that from the descriptions of the causes and discoveries of errors in these relief-related incidents, guidance can be drawn for the safe and effective conduct of the intraoperative exchange of anesthesia personnel.

Handoffs between anesthesia providers are common, and may involve multiple anesthesiologists, anesthesia residents, and CRNAs. In one study the authors concluded that Intra-operative anesthesia care transitions are strongly associated with adverse outcomes, suggesting that transfer of care during procedures results in poor record accuracy, inattentiveness, or improper patient handling.<sup>30</sup> With each anesthetic handover, patient risk for morbidity or mortality is increased by 8 %.<sup>30</sup>

### Sentinel Events

A “sentinel event” is defined by TJC as, any unanticipated event in a healthcare setting resulting in death or serious physical or psychological injury to a patient, not related to the natural course of the patient's illness.<sup>31</sup> These adverse events include medication errors, wrong-site surgery, suicide, operative and post-operative complications, and falls, for example.<sup>31</sup> Sentinel events, therefore, are unrelated, highly preventable adverse reactions. In January 2015, TJC expanded the concept for all specialties to include a patient safety event that reaches a patient and results in any of the following: death, permanent harm, or severe temporary harm”<sup>31</sup> Breakdown in communication was the leading cause of sentinel events reported to TJC in the USA between 1995 and 2006.<sup>2</sup> Data collected by TJC suggest that poor communication contributed to nearly 70% of sentinel events reported during 2005.<sup>32</sup>

The Joint Commission adopted a formal Sentinel Event Policy in 1996 to help hospitals implement sentinel event-related quality improvement.<sup>31</sup> The initiative examined Patient Safety Measures, and analyzed the rates of patient safety against handoff reports, patient adverse events, and root-cause analyses of patient morbidities. The project provided hospitals with checklist-style guidance to ensure that patient safety can be maximized. In addition, the Sentinel Event Policy highlighted a key area of concern: the IOM, report stating that it was in inadequate handoffs that safety often failed first.<sup>33</sup> Communication problems were found to be the number one root cause of both anesthesia-related sentinel events and sentinel events across medical specialties.<sup>34</sup>

### Legal Implications

Records are legal documents that can be used to provide evidence in a wide range of proceedings. There is a health care provider liability associated with ineffective coordination of care, which may cause patient harm and/or death. Medical errors that may cause patient harm and/or death during ineffective coordination of care increases the risk of medical malpractice suits. Malpractice claim files provide a useful source of data for studying patient safety in the health-care system.<sup>5</sup> These data offer an adjunct to observational studies and other safety investigations.

Serious communication breakdowns leading to malpractice claim tend to occur in verbal communication between a single transmitter and a single receiver. They occur at least as often during the pre and post-operative care as during the intraoperative course.<sup>35</sup> Advocates for hospital patients and their families say confusion about who is managing a patient's care and lack of coordination among those care givers is endemic, contributing to the estimate of 44,000 to 98,000 deaths from medical errors each year.<sup>36</sup> Researchers in *Health Affairs* report that, inadequate care coordination, including inadequate management of care transitions, was responsible for \$25 billion to \$45 billion in wasteful spending in 2011 through avoidable complications and unnecessary hospital readmissions.<sup>37</sup>

The American Medical Association (AMA) estimates that the average expense of defending a physician against one medical liability claim in 2010 was \$47,158, an increase of 62.7% since 2001.<sup>38</sup> The portion of medical liability insurance policies carried by providers with limits exceeding \$1 million has increased by 28% to 41% since 2001.<sup>38</sup> In addition to patient costs, the legal ramifications surrounding poor handoff practices impact individual providers and

their respective organizations. The cost of defending a medical malpractice lawsuit escalates with each year, as does the cost of liability insurance premiums for some specialties.<sup>38</sup>

In a healthcare climate already facing rising patient costs, technology costs, and marketplace healthcare, the added costs of malpractice claims continue to plague the industry. The cost of defending a medical malpractice continues to climb, according to two medical liability reform reports released by the American Medical Association (AMA).<sup>38</sup> In a review of 122 closed claims<sup>39</sup> four liability malpractice insurances reviewed cases in which a patient had an alleged missed or delayed diagnosis in the emergency department. Trained physician reviewers examined the litigation files and the associated medical records to determine whether an adverse outcome because of a missed diagnosis had occurred, what breakdowns were involved in the missed diagnosis, and what factors contributed to it. Results of the review indicated that inadequate handoff was a contributing factor in 24% of the missed diagnoses.<sup>39</sup>

A surgical review<sup>40</sup> of 444 surgical malpractice claims from four liability insurers was conducted. The review identified 60 cases (approx. 14%) involving communication breakdowns resulting in patient harm. Two surgeon reviewers analyzed these cases to identify common characteristics and associated factors. The results of the reviews indicated that the 60 cases involved 81 communication breakdowns, occurring in the preoperative (38%), intraoperative (30%), and postoperative periods (32%). Seventy-two percent of cases involved one communication breakdown. Much of breakdowns were verbal communications (92%) involving one transmitter and one receiver (64%).<sup>40</sup> Communication breakdowns are both costly and highly preventable with effective protocol, team cohesion, and organization support.



Standardizing Handoff Procedures

Developing and implementing existing standardized tools and checklists improves efficiency of handoffs, enhances current high-quality care practices and decreases sentinel events surrounding the perioperative period.<sup>41</sup> Communication has been targeted as a quality of care by accreditation and regulatory groups. The National Quality Forum report of 2005<sup>42</sup> recommends standardized approaches to handoff communication. The report aimed to describe the use of an innovative, translating-research-into-practice model to generate and test a cost-effective, easy to use, best-practice protocol for nurse-to-nurse shift handoffs. Roger's Diffusion of Innovations Theory was used as the overall framework for the translational model with Orlando's theory providing theoretical evidence for the best practice protocol. The report concluded that meaningful clinician participation in the development of a standardized, evidence-based, patient-centered approach to nurses' change-of-shift handoffs was achieved.<sup>42</sup>

One prospective cohort study,<sup>43</sup> investigated if standardizing the handoff process could improve handover metrics and patients' outcomes. Handoffs for postoperative Pediatrics Intensive Care Unit admissions were directly observed for three months pre- and post-implementation of the protocol, with data collected on communication, metrics, and patient outcomes.<sup>43</sup> Observations and data collection, as well as the online provider survey, were repeated approximately one year after handover protocol implementation. Survey data demonstrated increases in provider ratings of handover attendance, communication, and quality after implementation of the handover protocol.<sup>43</sup> Surgical report errors were eliminated, and the prevalence of provider attendance for the handover duration increased from 39.3% to 68.2%.<sup>43</sup> The study concluded that postoperative communication and patient outcomes can be improved and sustained over time with implementation of a standardized handover protocol.<sup>43</sup>

The patient safety goal, as described by TJC requires health care organizations to implement a standardized approach to handoff communications, including an opportunity to ask and respond to questions.<sup>7</sup> While the goal is simply stated, it is challenging to develop and implement effective strategies for handoffs across various health care settings, given the complexity of health care delivery. TJC’s guidelines for implementation of the safety goal are presented in Figure 2.

Joint Commission 2008 Hospital Patient Safety Goals Implementation  
Expectations for Handoffs

1. Interactive communications allowing for the opportunity for questioning between the giver and receiver of patient information.
2. Up-to-date information regarding the patient’s care, treatment and services, condition, and any recent or anticipated changes.
3. A process for verification of the received information, including repeat-back or read-back, as appropriate.
4. An opportunity for the receiver of the handoff information to review relevant patient historical data, which may include previous care, treatment, and services.
5. Interruptions during handoffs are limited to minimize the possibility that information would fail to be conveyed or would be forgotten.

Source: Adapted from Joint Commission, National Patient Safety Goals  
Hospital Program.<sup>48</sup>

**Figure 2.** Guidelines for Implementation of Patient Safety Goals

AANA Standards

Standards are ethical or legal duty of a professional to exercise the level of care, diligence, and skill prescribed in the code of practice of his or her profession, or as other professionals in the same discipline would in the same or similar circumstances.<sup>44</sup> Standards for the practice of nurse anesthesia are well defined by the American Association of Nurse Anesthetists. Standard VII,<sup>45</sup> of the Standards for Nurse Anesthesia practice indicates that CRNAs evaluate the patient’s status and determine when it is safe to transfer the responsibility of

care. Accurately report the patient's condition, including all essential information, and transfer responsibility of care to another qualified healthcare provider in a manner that assures continuity of care and patient safety.<sup>45</sup> Standards of Practice promote safety and eliminate professional ambiguity.

### TJC Recommendations

The aim of TJC is to continuously improve the safety and quality of care provided to the public through the provision of healthcare accreditation and related services that support performance improvement in health care organizations.<sup>46</sup> More than 90% of the hospitals in the United States (USA) use TJC standards to assure the delivery of safe and quality care.<sup>46</sup> In this way, TJC works as a supportive framework on which the entire industry bases its safety, compliance, and practice standards.

TJC has long been a leader in promoting improved communication in healthcare.<sup>47</sup> Through its National Patient Safety Goals 2E (NPSG), the commission continues to promote the widespread use of effective communication tools to universally improve patient care in all accredited organizations.<sup>47</sup> TJC also makes recommendations for hospitals in areas such as patient safety. Health care providers must meet the requirements of TJC's safety goals as part of the accreditation process.<sup>11</sup> The Commission monitors the implementation and effectiveness of its standards in accredited health institutions by performing re-surveys after the initial accreditation.<sup>11</sup> This promotes ongoing quality improvement with measurable outcomes, and ensures ongoing organization compliance. The resurveys are made as unannounced visits and involve certified surveyors composed of physicians, nurses and administrators.

Accredited U.S. hospitals continue to show measurable improvement in quality and safety.<sup>46</sup> TJC report release of 2007 investigates handoff policies during their site visits. The commission report shows that there has been increased compliance since the implementation of NSPG 2E.<sup>46</sup> This goal states that institutions should implement a standardized approach to handoff communication including an opportunity to ask and respond to questions. The compliance rate was 94% with 6% non-compliance.<sup>46</sup> National trends illustrate that hospital compliance improved from 93.9 in 2006 to 98.2 in 2007.<sup>46</sup>

### Tools and Checklists

Experience regarding how to improve handoffs can be gained from other high-risk industries such as aviation and nuclear power industries. These high-risk industries identify the need for a common language for communicating critical information.<sup>2</sup> Pioneers of the healthcare industry can glean examples from other high-risk industries on effective communication in high-risk, high-stress, or hectic situations.

One study<sup>48</sup> aimed to describe strategies employed during handoffs in four settings with high consequences for failure. The focus of the study was to analyze the observational data for evidence of use of 21 handoff strategies from NASA Johnson Space Center in Texas, nuclear power generation plants in Canada, a railroad dispatch center in the United States, and an ambulance dispatch center in Toronto. Results of the study indicated that all observed handoff updates were interactive, verbal, face-to-face interactions between the outgoing and incoming person.<sup>48</sup> Integration of these principles may have potential application to CRNAs' handoff process.

The introduction of a handoff protocol leads to improvements in all aspects of the handoff process.<sup>49</sup> A prospective intervention study aimed to improve the quality and safety of handoff of patients from surgery to intensive care using the analogy of a Formula 1 pit stop and expertise from aviation. The authors measured the change in performance before and after the implementation of a new handoff protocol that was developed through detailed discussions with a Formula 1 racing team and aviation training captains. In the results of this study, the mean number of technical errors was reduced, the mean number of information handoff omissions was reduced, and duration of handoff was reduced. The study established that expertise from other industries can be extrapolated to improve patient safety, and in areas of medicine involving the handoff of patients or information.<sup>49</sup>

#### Types of Handoff Tools

Standardizing handoffs during provision of care requires the use of appropriate tools. Various tools have been reviewed in various medical care settings in the USA, the UK, Australia, Canada, and Ireland and classified according to type, user, and the use. The study revealed that mainly two types of tools were used: paper-based and electronic-based tools. Regardless of the mode, features of a successful handoff tool included: single-page organization, tabular or checklist based templates with basic information about the patient, and support for clinical handoff plan including pre-turnover, handoff, and post-turnover phases. Therefore, even within different methods, continuity promotes quality assurance, ease of use, and accurate documentation.

In the U.S., there has been an increased trend in using EMR integrated tools for handoffs, in part due to the mandate that healthcare organizations install EMR technologies. This effort of

mandating national technology standards illustrates how regulation at the federal or institutional level can promote standardized care in the industry. In the same way that EMRs were mandated in healthcare settings, handoff protocol can be mandated to reflect the changing priorities in healthcare technology, care, and accuracy.

### Checklists & Mnemonics

A checklist is a standardized communication tool that can be used before the start of surgery to ensure the handover of critical information.<sup>10</sup> Implementation of checklists has been associated with increased awareness of potential safety issues, increased clinical team communication<sup>50</sup> and decreased post-operative complications rates,<sup>51</sup> while not significantly delaying surgical times.<sup>52</sup> Refer to Appendix A for a sample checklist.

In a systematic review through June 2008,<sup>53</sup> twenty-six trained reviewers identified articles describing twenty-four handoff mnemonics. The review surprisingly stated that little is known about what constitutes best practise for nursing handoffs. There is a call for studies that focus on system factors, human performance, and the effectiveness of structured protocols and interventions. SBAR was the most commonly used mnemonic (69%). Based on the literature, it appears there is no one solution to the problem of handoff communication and that handoff improvement will need to be individualized to the specific care setting.<sup>53</sup>

A study,<sup>54</sup> was done to determine whether structured handover tool from operating room to pediatric cardiac intensive care unit following cardiac surgery is associated with a reduction in the loss of information during transfer. The study investigated if the tool showed an improvement in the quality of communication exchange and if the tool was associated with a decrease in postoperative complications, and an improvement in patient outcomes in the first 24

hours of pediatric cardiac intensive care unit stay.<sup>54</sup> Two anonymous surveys evaluated the loss of information transfer for each of the two handoff processes. Quality of a structured handover tool was evaluated by Likert scale responses in the second survey. Survey results demonstrated opinion that the structured handoff tool was of excellent quality to enhance communication (Likert scale:  $4.4 \pm 0.7$ ). In addition, the tool was associated with a significant reduction ( $p < .001$ ) in loss of information for every category of patient clinical care including patient, preoperative, anesthesia, operative, and postoperative details and laboratory values.<sup>54</sup>

A study that aimed to examine the outcomes of checklist-driven preoperative briefings and postoperative debriefings during the Veterans Health Administration (VHA) medical team training program concluded that, Checklist-driven preoperative briefings and postoperative debriefings are associated with improvements in patient safety for surgical patients.<sup>51</sup> In this study, Checklist-guided preoperative briefing and postoperative debriefing compliance was monitored by conducting quarterly semi structured interviews with implementation teams from each facility. Briefing scores were established using a previously described scale for each facility at the time of the last follow-up interview.<sup>51</sup> This study concludes that Checklist-driven preoperative briefings and postoperative debriefings are associated with improvements in patient safety for surgical patients.<sup>51</sup>

Checklists are established methods that help to structure complex processes in other high-risk fields such as aviation. In the past few years, their implementation has attracted research interest in healthcare. In one random controlled trial,<sup>55</sup> the authors hypothesized that a checklist for handoff between anesthesiologist and post-anesthesia care unit nurse, will increase the amount of information transferred during patient handoff after anesthesia. The trial analyzed handoffs before and after implementation of a checklist. The results of the study

indicated that with the use of the written checklist, the overall items handed over increased significantly from a median of 32.4-48.7%. In conclusion, the study suggests that the use of a checklist for post-anesthesia handoff might improve the quality of patient handover by increasing the information communicated.<sup>55</sup>

Mnemonics can foster reliable implementation of standardized handoffs.<sup>56</sup> By adapting to a specific environment, the mnemonics can be successfully applied in hospitals, ambulatory care centers and in remote anesthetizing locations.<sup>57</sup> SBAR technique has become TJC stated industry best practice for standardized communication.<sup>58</sup> Regular use of SBAR is an important part of any organization's Crew Resource Management (CRM) of skills, assisting caregivers to function as effective team members while establishing a culture of quality, patient safety, and high reliability. SBAR is an acronym for:

**S - Situation** (what is happening now?)

**B - Background** (What are the circumstances leading up to this situation?)

**A - Assessment** (What do I think the problem is?)

**R - Recommendation** (What should we do to correct the problem?)

SBAR was originally developed by the United States Navy as a communication technique that could be used on nuclear submarines.<sup>59</sup> Safer healthcare introduced the tool to the health care industry as part of its CRM training curriculum. Since then SBAR has been adopted by hospitals and care facilities around the world as a simple yet very effective way to standardize communication between care givers.<sup>59</sup> In a healthcare facility, medical staff use SBAR to transmit patient information in a clear, complete, concise and structured format leading to



increased efficiency and accuracy of communication.<sup>59</sup> Communicating with the tool is assertive, effective and less repetitive. Staff can anticipate the information required by colleagues, and this tool supports assessment skills.

One study<sup>60</sup> aimed to evaluate a new handoff process based on recipients' perceptions. The study focused on completeness and comprehensiveness of verbal communication, and the usability of an SBAR form. The prospective interventional study comprised four phases: (1) evaluation of the current handoff process through an audit and opinion survey; (2) development of a new handoff process based on the opinion survey and hospital personnel feedback; (3) implementation; and (4) evaluation of the new handoff process. The new handoff process was based on a PETS (pre-handover, equipment handover, timeout and sign out) protocol with a 'single traffic communication' flow and a new SBAR handoff document. Results of the study indicated that significantly more recipients indicated that the new SBAR form was the most important handoff tool and provided more useful information.<sup>60</sup>

Given the limitations of SBAR, alternative methods such as Illness severity, Patient summary, Action list, Situation awareness, and Synthesis (I-PASS) have been developed.<sup>61</sup> I-PASS was developed as a part of curriculum development for the I-PASS study to improve the challenges that had been experienced with other mnemonics.<sup>61</sup> Although the I-PASS study was done in a pediatrics environment, it can readily be adapted for use beyond pediatrics.<sup>61</sup> I-PASS provides a framework for the patient handoff process as follows:

- **Illness severity:** one-word summary of patient acuity ("stable," or "unstable")
- **Patient summary:** summary of the patient's diagnoses and treatment plan
- **Action list:** to-do items to be completed by the provider receiving sign-out

- Situation awareness and contingency plans: directions to follow in case of changes in the patient's status, often in an "if—then" format
- Synthesis by receiver: an opportunity for the receiver to ask questions and confirm the plan of care.<sup>62</sup>

In a systematic review<sup>53</sup> of available handoff mnemonics, Riesenbergs and colleagues described other effective handoff tools to include: AIDET, ANTICipate, ASHICE, CUBAN, DeMIST, GRRRR, HANDOFFS, I PASS the BATON, Just Go NUTS, MIST, PACE, PEDIATRIC, I-SBAR, SBARR, SBAR-T, SHARED, SHARQ, SIGNOUT, SOAP, STICC, 4 P's, 5 P's (version 1), and 5 P's (version 2). These tools range across specialties (e.g., anesthesia, emergency medicine, perioperative nursing, residents, and transporters). With the availability of so many tools, communication between facility clinicians is important in providing a consistent, concise, and effective patient transfer of care report within the selected framework. Furthermore, the range of possible communication tools illustrates the potential for variation between professionals, units, and organizations. It is necessary to consider how this aspect of care can be standardized to improve communication across all specialties.<sup>53</sup>

#### Implementation and Use of Handoff Tools: Clinical Trials

Clinical trials have been conducted to assess the efficiency and applicability of different handoff tools. Figure 3 summarizes these findings. Differences in efficacy between tools are observed in the nature, methodological, and theoretical foundations of handoff tool evaluations. Investigations varied significantly in terms of their quality and rigor, resulting in a limitation of their ability to provide information about strategic standardization initiatives. The authors recommended that future research should be based on the use of rigorous, multi-method qualitative and quantitative methodologies that consider the circumstantial nuances of handoffs, and assess their effect on patient-related outcomes.

References	Methods	Results/Conclusion
Boat and Spaeth (2013)	Implementation of standardized checklist using “plan-do-study-act” methodology for intraoperative handoffs and operating room to post anesthesia care unit handoffs in a pediatric hospital	<p>Compliance with intraoperative handoff checklist improved from 20% to 100% after two months post intervention</p> <p>Compliance with post anesthesia care unit handoff checklist improved from 59% to 90% over a 5-month period</p>
Tan and Helsten (2013)	Introduction of an electronic anesthesia provider handoff checklist	- Informal feedback survey completed by anesthesia providers one year later showed mostly positive feedback with some criticisms.
Abraham et al (2014)	<p>Implementation of a handoff intervention tool (HAND-IT) for physician in a medical intensive care unit</p> <p>Nonrandomized pre-post prospective intervention investigations done using audio recordings and observations of 82 resident handoffs</p>	<p>Use of HAND-IT resulted in:</p> <ul style="list-style-type: none"> <li>• Fewer communication breakdowns</li> <li>• Greater number and more ideal communication events (CE)</li> <li>• More request-response CE transition</li> <li>• An increase of the ability of physicians to organize and comprehend patient information</li> <li>• - Interactive and streamlined communication, with limited external input</li> </ul>
Robins (2015)	<p>- Use of a checklist for transfer of care in the PACU</p> <p>- Monitoring of specific metrics before and after implementation to assess information loss, information clarification, anesthesia providers’ time, and to rate the adequacy of the report</p>	<p>The use of a checklist during a handoff results in</p> <ul style="list-style-type: none"> <li>• Appropriate exchange information</li> <li>• Increased adequacy of the handoff procedure</li> <li>• No increase of the time required for information exchange in the PACU by staff</li> <li>• No impact on the turnover time</li> <li>• Improved accuracy of the report</li> <li>• - Decrease in information loss and the need for clarification among providers</li> </ul>

**Table 1.** Evaluation of Handoff Tools

Barriers to the Implementation of Standardized Handoffs

While multiple standardized handoff tools exist, barriers to implementation impede effective, industry-wide standardization. Potential barriers<sup>2</sup> to achieving standardization include: resistance of caregivers to change behavior, time pressures from patient care needs and other responsibilities, time and cost for implementing new tools, insufficient accepted research data, economic rationale regarding cost-benefit analysis or return of investment for implementing these recommendations, and risk for unintended consequences for delays in patient care due to increased hand over time.<sup>2</sup> Common barriers to safe, effective postoperative handoffs include the incomplete transfer of information, other communication issues (e.g., inaccurate information, lack of consistency and organization, information overload), distractions, inconsistency or incomplete teams, absent or inefficient execution of clinical tasks, and poor standardization.<sup>5</sup>

These barriers fall into five major categories of implementation barriers (Figure 3):

- Standardization processes (i.e., insufficient training, lack of evidence-based research to guide training, staff resistant to change, lack of leadership, poor understanding of the tool)
- Communication (i.e., omissions, errors, or misunderstandings; documentation errors)
- System factors (i.e., multitasking during a report, lack of privacy, time constraints, environmental distractions)
- Clinical factors (i.e., too many patients, change in patient status during handoff)
- Human factors (i.e., fatigue, stressful shifts, high staff turnover).<sup>13</sup>

<p><b>Standardization</b></p> <ul style="list-style-type: none"> <li>• Absent or insufficient hand-off training</li> <li>• Lack of evidence-based research to guide hand-off best practices</li> <li>• Mnemonic difficulties: which one should be used and how should it be taught?</li> <li>• Staff resistant to changes in hand-off system</li> <li>• Lack of hand-off procedural protocols or tools</li> <li>• Problems with the standardized protocols or tools</li> <li>• Poor recognition and/or understanding of protocol or tool in use</li> </ul>	<p><b>Systems factors</b></p> <ul style="list-style-type: none"> <li>• Multitasking during report</li> <li>• Interruptions and distractions</li> <li>• Lack of privacy</li> <li>• Time constraints</li> <li>• Too much noise</li> <li>• Poor lighting</li> </ul>
<p><b>General communication</b></p> <ul style="list-style-type: none"> <li>• Lack of understanding of how to engage in an effective hand-off dialogue</li> <li>• Omissions, errors, or misunderstandings</li> <li>• Language communication barriers (<i>i.e.</i>, dialectic, accent, vernacular barriers)</li> <li>• Social interactions occurring during handoffs</li> <li>• Incorrect information recall</li> <li>• Disorganized report</li> <li>• Hierarchical culture that discourages questions</li> <li>• Differences in clinical knowledge</li> </ul>	<p><b>Clinical factors</b></p> <ul style="list-style-type: none"> <li>• Patients with multiple complex, medical problems</li> <li>• Too many patients (<i>e.g.</i>, ICU, pain, OB)</li> <li>• Rapid case turnover</li> <li>• Change in patient status during hand-off</li> </ul> <p><b>Human factors</b></p> <ul style="list-style-type: none"> <li>• Fatigue or illness</li> <li>• Stressful shifts</li> <li>• Memory limitations</li> <li>• High staff turnover</li> <li>• Information and sensory overload</li> </ul>

ICU = intensive care unit; OB = obstetrics.

**Figure 3.** Barriers to effective anesthesia hand-off communication.<sup>13</sup>

Effective information transfer requires a solid foundation in communication skills. Little formal attention or education is available to reinforce this vital link in the continuity of patient care.<sup>15</sup> In another review,<sup>15</sup> the authors reviewed the literature on patient handoffs and evaluated the patient handoff process. In the review, the authors identified four major barriers to communication; (1) the physical setting, (2) the social setting, (3) language barriers, and 4) communication barriers. The authors conclude that irrespective of local context, precise, unambiguous, face-to-face communication is the best way to ensure effective handoffs of hospitalized patients.<sup>15</sup>

A systematic review of literature,<sup>5</sup> addressed handoffs from the OR to PACU or ICU. Recommendations for structuring the handoff process included; standardizing the process through the use of checklist and protocols, completing clinical tasks before the information transfer, allowing only patient specific discussions during verbal handoffs, requiring all team members to be present, and providing training in team skills and communications.<sup>5</sup> More research is needed to define what makes an optimal patient handoff and to determine the effect of handoff quality on patient outcomes.<sup>5</sup>

### Summary

It is not surprising that post-operative handoffs are rife with technical and communication errors. Several studies point to a relationship between handoffs and patient outcomes.<sup>32</sup> The review of literature performed for this project demonstrates that while several studies have been done in handoff communication amongst perioperative patient care providers, literature investigating this topic for anesthesia providers is limited. Checklists and mnemonics have been utilized to help reduce adverse events related to communication at the time of handoff. The purpose of this scholarly project was to investigate CRNAs' knowledge level regarding the handoff process, and determine their awareness of recommendations by TJC and AANA standards of practice. The study also investigated whether the CRNAs are in facilities that allow them to safely practice according to the AANA standards of practice. The goal of this study was to develop a PowerPoint presentation that aims to close the gap in knowledge regarding the handoff process. This project addresses the following research questions:

- Is there a knowledge deficit among CRNAs regarding the current recommendations and AANA SOP relating to handoff procedures?
- Are CRNAs utilizing handoff tools in their facilities?

- Can an accredited PowerPoint presentation be developed to fill the gaps in CRNAs knowledge regarding the importance of appropriate handoff practices?
- What barriers hinder CRNAs from performing a complete, effective and safe handoff?

### **III. THEORETICAL MODELS:**

#### Mathematical Theory of Communication

By using concepts from Mathematical Theory of Communication (MTC),<sup>63</sup> human communication can be analyzed to understand how effective, reliable communication is best achieved. A mathematical theory of communication, also known as the Shannon and Weaver communication model, is a model that is designed to develop effective communication between sender and receiver.<sup>63</sup> This model was initially developed and used in technical communication, but later was used for field communication. Its principles apply in various communication theories and it is more effective in person-to-person communication than a group or mass audience.

Shannon and Weaver also found factors which affect the communication process called “noise”.<sup>63</sup> Understanding “noise” will help identify gaps in communication and identify if there is room for improvement.<sup>63</sup> This is relevant because handoff is a process that requires effective communication between the sender and the receiver. CRNAs give a report to the next provider on a person to person level. Extraneous factors can affect communication during handoff, these factors include but are not limited to pressure for room turnovers, patient monitors and multitasking at the time of handoff. A visual depiction of MTC is shown in Appendix B.

David Ausubel's Assimilation Theory

This scholarly project was guided by the David Ausubel's assimilation theory,<sup>64</sup> that explains the nature of knowledge and how new knowledge is created. Ausubel's theory states that learning is effective and remembered only when it is meaningful, as opposed to when it is purely memorized, unanchored, and easily forgotten.<sup>64</sup> Meaningful learning occurs when new knowledge is acquired and is assimilated with prior knowledge; this suggests that meaning arises from building on an existing knowledge base.<sup>64</sup> Prior and newly-acquired knowledge combine to connect knowledge concepts which gives meaning and context to information.<sup>64</sup>

New learning is influenced by organization, clarity, and stability of existing knowledge or cognitive structure of an individual.<sup>65</sup> As shown in Appendix C, the human cognitive structure is a hierarchy of concepts that is organized with more general concepts at the top, and more specific concepts at the bottom.<sup>65</sup> If a cognitive structure is well-organized, it will be easier to assimilate new concepts. Because of meaningful learning, a learner develops an understanding of the new information and finds meaning in the new information. Then, this newly-learned material is anchored to a subsume (anchoring site of a new idea) within the existing cognitive structure, creating more integrated cognitive knowledge structures where new information is held for future use.<sup>65</sup> Meaning, therefore, can be cultivated from an existing knowledge base, giving context, insight, and vested interest to pre-existing knowledge.

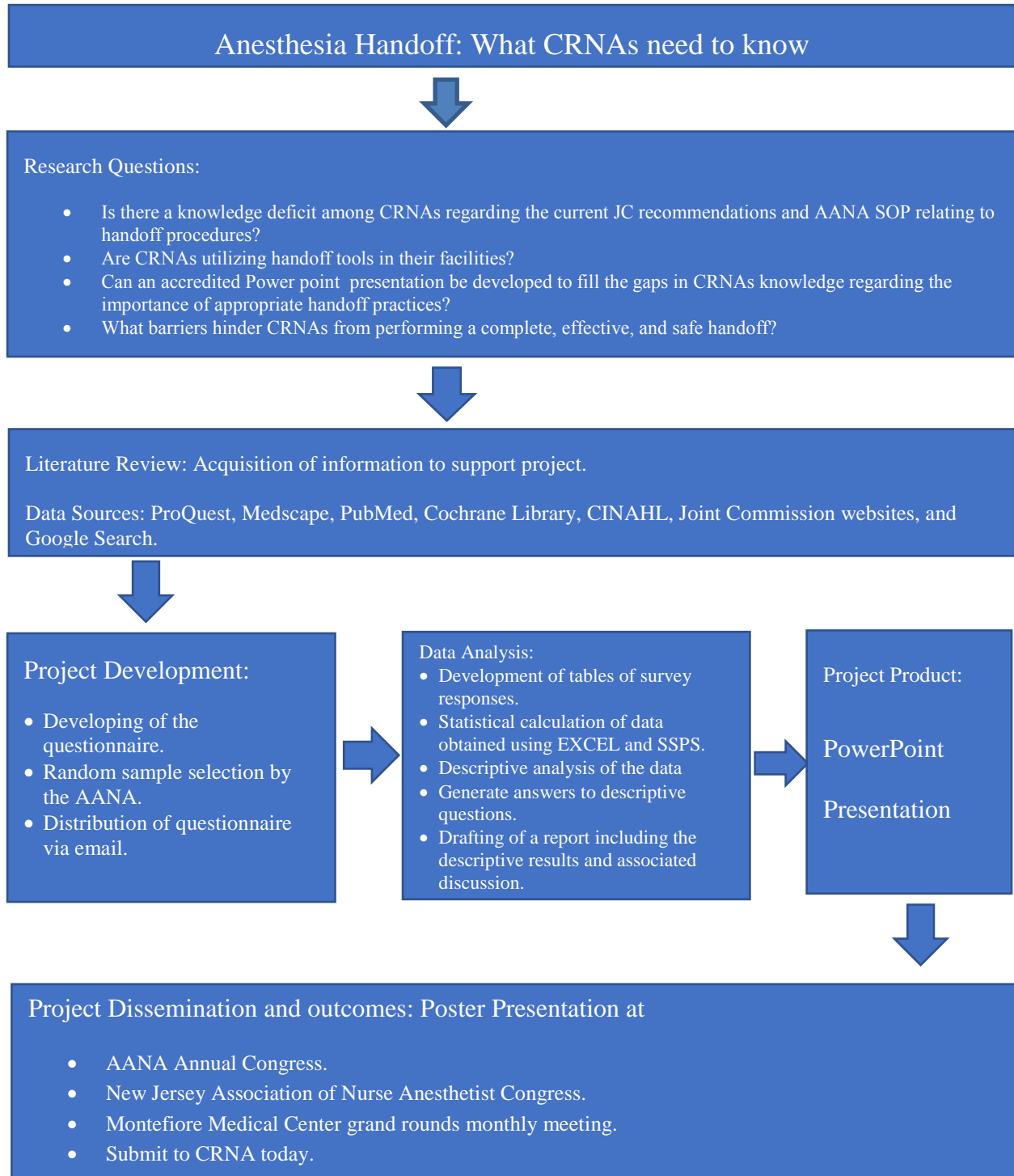
This scholarly project was intended to promote meaningful learning for anesthesia providers. CRNAs generally have prior knowledge regarding the need for good communication during transfer of patient care, and possess the crucial higher-level concepts that serve as subsumers for new knowledge. According to this theory, prior knowledge facilitates meaningful



learning, and assimilation of newly acquired concepts with existing ones. In the development of a PowerPoint, and poster presentation of the project at conferences, the researcher will be educating the practitioners on the need for, and importance of, thorough patient handoffs. Legal implications of poor handoff practices will be incorporated, supplemented by a review of the AANA Standards of practice regarding communication at the time of handoff.

#### **IV. METHODOLOGY**

An extensive literature review was performed to complete necessary information to address the topic of handoffs by CRNAs in the perioperative settings. Data sources included, ProQuest, Medscape, PubMed, Cochrane Library, CINAHL, Joint Commission websites, and Google Search. This project utilized an online survey questionnaire designed to evaluate current anesthesia provider practices, and to elicit perceptions regarding patient handoffs policy and procedures. A survey method was chosen to assist in determining the awareness in the CRNA population regarding best practice during the transfer of patient care. Using the online survey questionnaire method, the researcher identified important beliefs and attitudes of CRNAs towards handoff procedures in a way that was anonymous, informed, and consensual. The survey lasted from July 28<sup>th</sup> to August 30<sup>th</sup>, 2016. The Conceptual framework of the project is shown below (Figure 4).



**Figure 4.** Project Conceptual Model

### Study Population

The AANA complied with the request to assist with the mailing of the survey to practicing CRNAs in the U.S. The survey was web-based. An email with a link to the survey questionnaire was sent to participants through the AANA. Participation was anonymous but population-specific. A fee was paid to the AANA. 1500 recertified members were randomly selected from the entire membership population (Recertified was defined as CRNAs who passed the certification examination over two years ago and are practicing active members). The first email was an invitation to the survey, and one reminder email was sent to those who had not responded in four weeks. All questionnaires were anonymous.

### Ethics

After permission was granted by the Institutional Review Board (IRB) at the University of Michigan -Flint, surveys were emailed to CRNAs as described above. The survey included a statement that completion of the survey indicates participants consent (Appendix D). Participants were informed that they could withdraw from the study at any time. Participation was voluntary and not incentivized. There were no known conflicts of interest in the research group. This research adhered to confidentiality regulations outlined by the IRB of the University of Michigan-Flint. No experimentation or interventions took place, as this was a collection of CRNAs' opinions via mass email survey. Data collected from participants was saved online in a secure database. Results of the survey were saved in a password protected computer.

### Study Design

Surveys have been widely used in education and academic research.<sup>66</sup> In cross-sectional survey design, the researcher collects data at one point in time. The key characteristics of a survey research are:

- Sampling from a population
- Collecting data through questionnaires or interview
- Designing instruments for data collection
- Obtaining a high response rate.<sup>66</sup>

This project employed descriptive qualitative and quantitative research methods. The results of the study were used to create a Power Point Presentation to assist in closing the knowledge gap among CRNAs regarding effective communication during handoff.

### Tools

A web-based questionnaire was designed to evaluate current handoff practice and elicit opinions about communication during handoff. The survey was created using Qualtrics®, a computerized online survey program. The survey included a cover letter that outlined the standard information included in a consent form, including IRB approval, purpose of the study, methods, and implications for practice. The questionnaire used a combination of graded Likert scale questions and open-ended questions. A total of 26 questions were included in the questionnaire. Refer to Appendix E for the questionnaire.

### Data Analysis

Three steps for analysing the questionnaire data were followed:

**Step 1**

- Identification of response rate
- Development of a table of percentage of responses to the survey.

**Step 2**

- Descriptive analysis of the data
- Statistics calculation of the data obtained for each question using statistical software (EXCEL)
- Organization of the results in a descriptive table
- Data analysis for development of a demographic profile of the samples
- Data analysis to generate answers to descriptive questions included in the study.

**Step 3**

- Drafting of a report including the descriptive results and associated discussion.

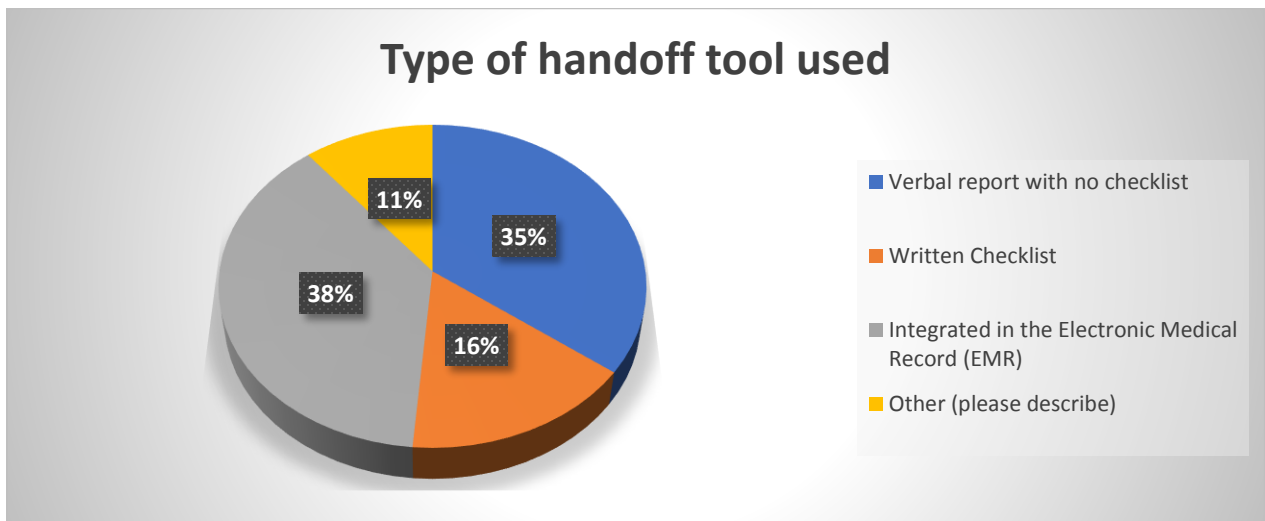
**V. RESULTS**

Of 1500 surveys distributed, 88 responded after two invitations were emailed over a four-week period. Two surveys were discarded because the respondents started the survey but never completed it. The overall response rate was 5.8%. Based on the survey results 68.6% of the respondents stated they had a handoff policy/protocol at their institution of which 38% stated their policy included the necessary elements for effective handoff. 31.4% respondents reported not having a departmental standardized handoff policy/protocol (Table 1).

Survey Questions	Yes	No
Does your department have a handoff protocol/policy?	68.6%	31.4%
Does this handoff policy define the necessary elements you believe should be included in a handoff?	38%	62%
Do you use a standardized handoff tool when taking a case from another provider?	58.5%	41.5%

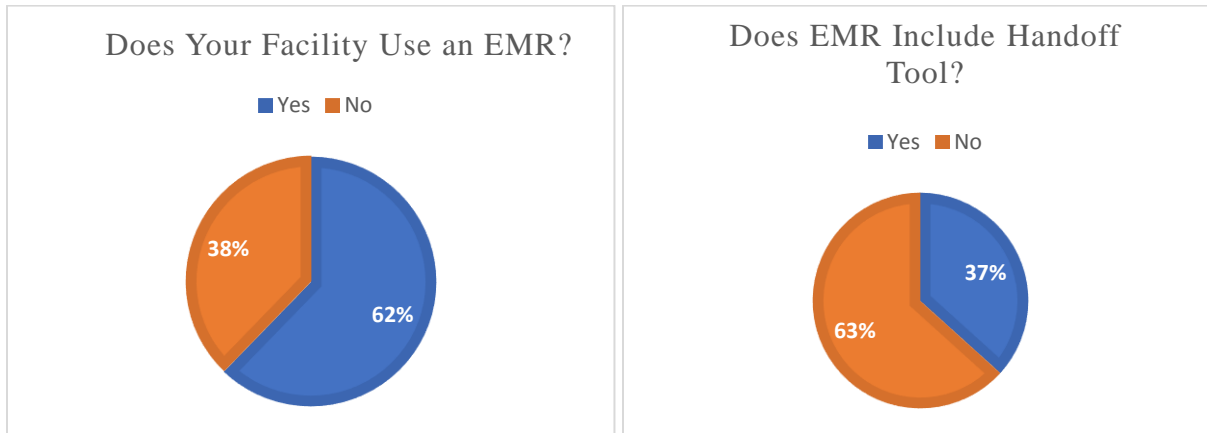
**Table 2.** Survey Responses to Handoff Policies and Standardization.

Responding to what type of handoff tool they used, 35.1% of the CRNA participants used a verbal report with no checklist, 16.22% have a written checklist, 37.84% have a tool integrated in the EMR, and 10% had other forms such as SBAR, verbal, and noted on record. 11% reported that CRNA to CRNA handoff was verbal but there was a checklist between CRNA and the PACU RN (Figure 5).



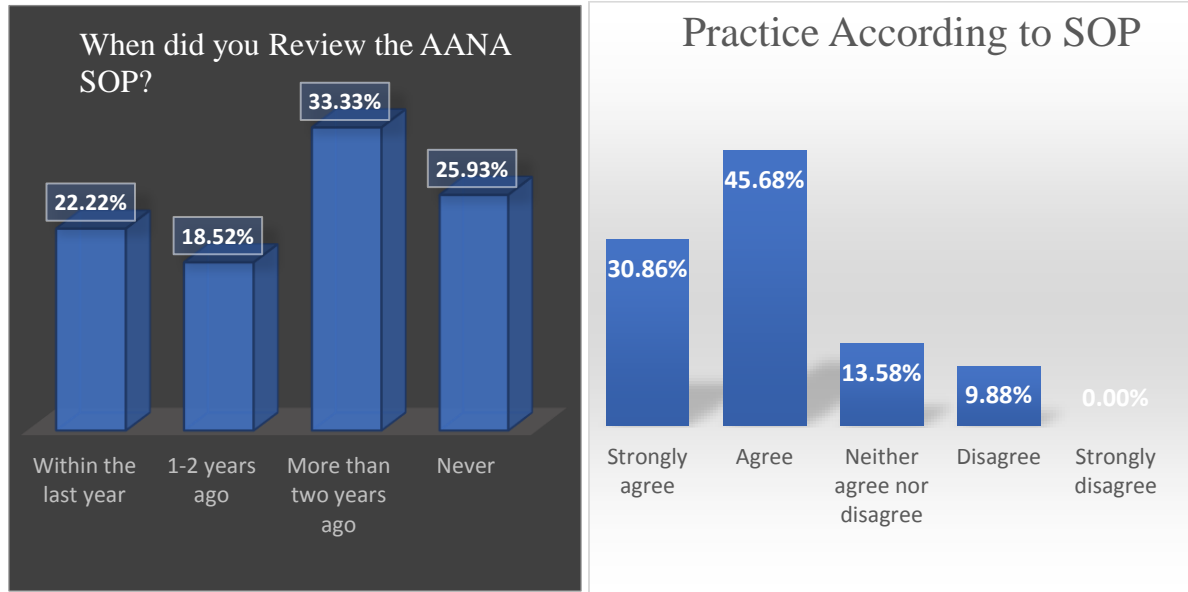
**Figure 5.** Types of Handoff Tools used by CRNAs in their Institutions

Survey participants indicated that the duration for use of the handoffs tools in their facility averaged 1-2 years (32.26%). 19.35% had used a tool for less than one year, 16.13% had used a tool for 3-4 years, and 32.26% had used their tools for greater than five years. 62.2% of study participants were in facilities that used an EMR and 36.7% of those EMRs included a handoff tool as a part of the patient’s medical record. 37.8% reported not having an EMR (Figure 6).



**Figure 6.** EMR in Facility and Intergration of Handoff Tool

To determine CRNAs’ knowledge about the AANA SOP, 62.29% of the CRNA participants responded to being aware of standard VII which related to patient care transfer, 37.04% were not aware. Of survey participants, 22.22% had reviewed the SOP within the last year, 18.53% within the last 1-2 years, 33.33% reviewed the SOP more than two years ago, and 25.93% of CRNA survey participants indicated they had never reviewed the SOP standard VII for transfer of care. Of the CRNAs surveyed, 30% strongly agree that their departments allowed them sufficient time to conduct patient handoff according to the AANA SOP, 45.68% agreed, and 13.5% neither agreed nor disagreed (Figure 7).



**Figure 7.** Review of SOP and ability to Practice According to SOP

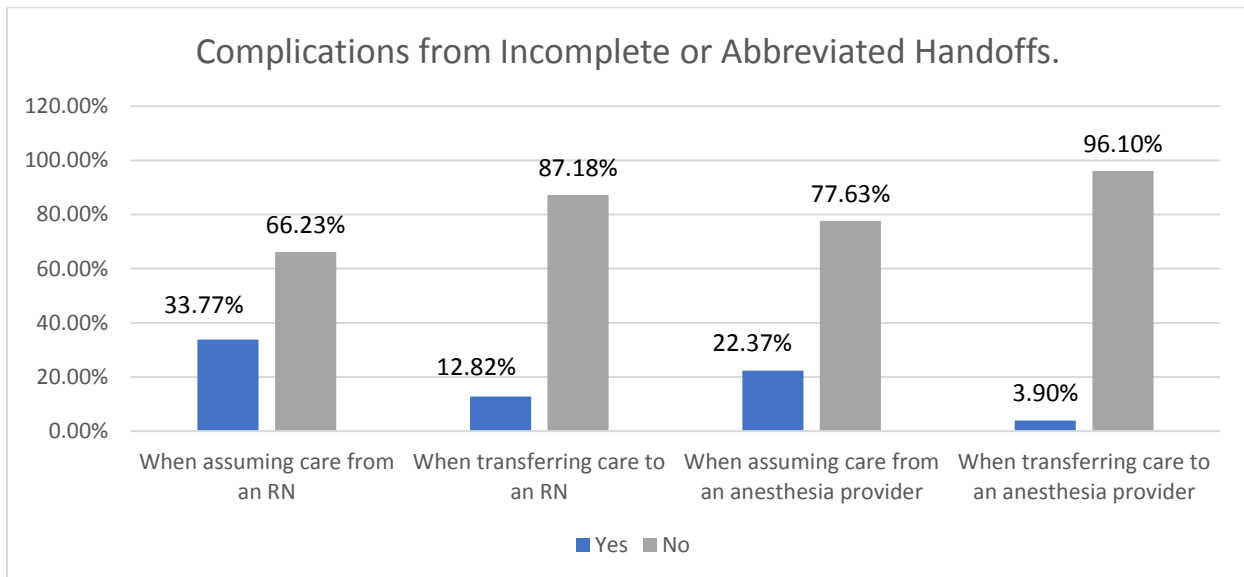
Adverse effects can occur as the result of deficient handoffs. 4.9% of the survey participants have experienced negative outcomes during patient handoffs. These negative outcomes were experienced, during, CRNA to RN in PACU 25%, CRNA to RN in the inpatient unit 25%, Emergency department to CRNA 25%, and anesthesiologist to CRNA 25%. There was no reported negative outcome during CRNA to another anesthesia provider handoff (Table 3).

Characteristics	No (%)
<b>Experienced a negative outcome</b>	
Yes	4.9%
No	95.1%
<b>During what type of handoff did the event occur?</b>	
RN to CRNA in pre-operative area	0%
CRNA to RN in PACU	25%
CRNA to RN in the inpatient unit	25%
CRNA to another anesthesia provider	0%
ED to CRNA	25%
Other (Anesthesiologist to CRNA)	25%

**Table 3.** Negative Patient Outcome During Patient Handoffs.



The survey participants responded to experiencing patient complications when an incomplete or abbreviated handoff was performed. 33.7% of the study participants experienced patient complications when assuming care from an RN, 12.8% when transferring care to an RN, 22.3% when assuming care from an anesthesiologist, and 3.9% when transferring care to another anesthesia provider (Figure 8).



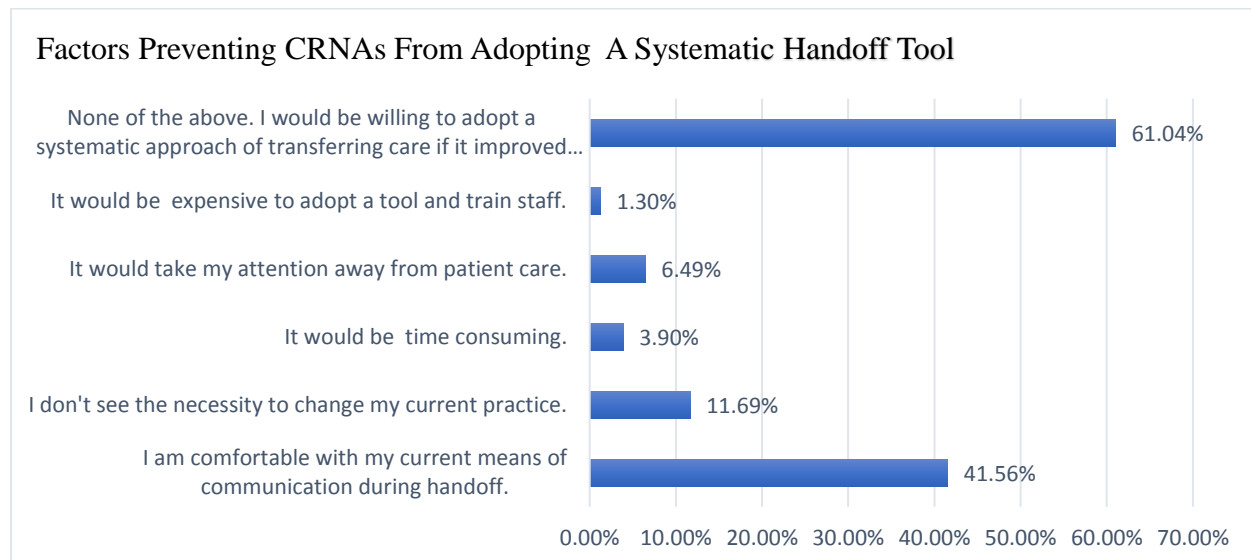
**Figure 8.** Complications from Incomplete or Abbreviated Handoffs

CRNA’s knowledge on TJC, recommendation regarding handoffs was determined by asking three questions. Based on the survey results, 69(87.34%) practised in a facility that was accredited by TJC. 44(55.7%) were familiar with TJC recommendations in relation to communication at the time of patient handoffs and 42(58.85%) worked in facilities that utilized a standardized tool as recommended by TJC (Table 4).

Survey Questions.	Yes	No
Is your facility JC accredited?	87.3%	12.7%
Are you familiar with TJC recommendations on handoff communication?	55.7%	44.3%
Do you use a standardized handoff tool as recommended by TJC?	58.8%	41.2%

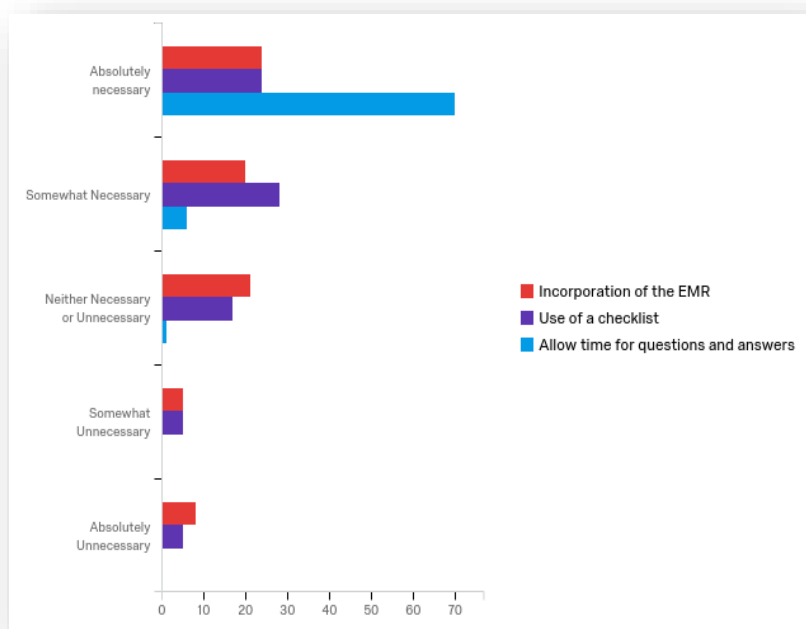
**Table 4.** Survey Responses for TJC questions.

Factors that prevent CRNAs from adopting a systematic handoff in their primary work area were evaluated. Based on the results of the survey, 41.56% of the respondents felt comfortable with their current handoff practices, 11.6% did not see the need to change their current practice, 3.9% felt it would be time consuming to change current handoff practices, 6.49% responded that changing handoff practices would take away attention from their patient care, and 1.3% responded it would be expensive to adopt a tool and train staff. Of the CRNAs surveyed in this study, 61.04% responded that nothing would prevent them from changing their handoff practices. Most of survey participants indicated they are willing to adopt a systematic approach to transfer of care if it improved their practice and patient safety (Figure 9).



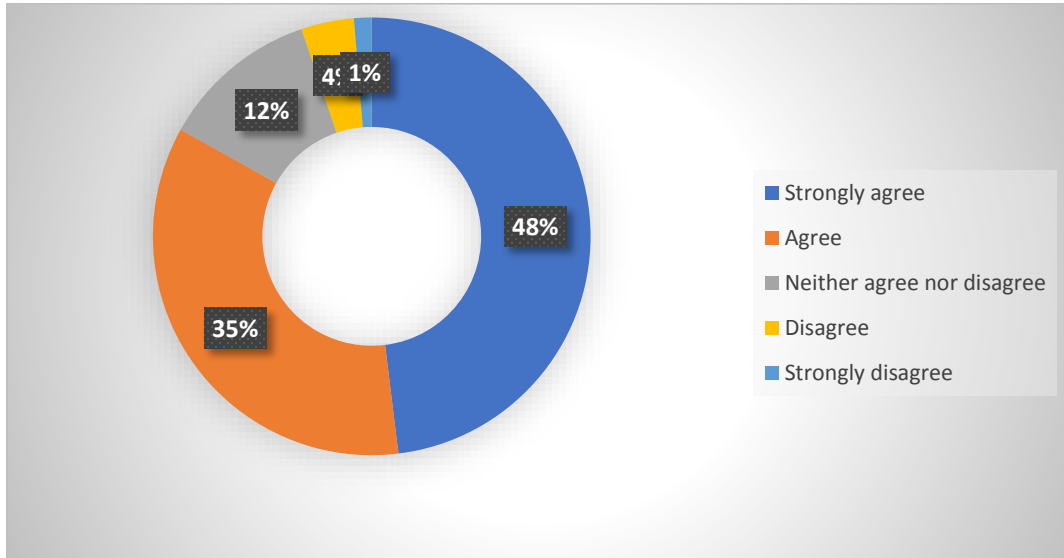
**Figure 9.** Factors Preventing CRNAs from Adopting a Systematic Handoff in their Primary Area of Practice

Three necessary components of a handoff tool to be safe and effective were investigated in the survey performed for this study. CRNA study participants responded to survey questions regarding; the incorporation of a handoff tool in the EMR, use of a checklist, and allowing time for questions and answers at the end of the handoff procedure. Based on the survey results, 30.77% of the respondents indicated that it is necessary to incorporate a handoff tool in the EMR, 30.38% of survey participants responded that it was absolutely necessary to utilize checklists, and 90.91% of CRNA respondents indicated it was absolutely necessary to allow time for questions and answers during the handoff process. (Figure 10).



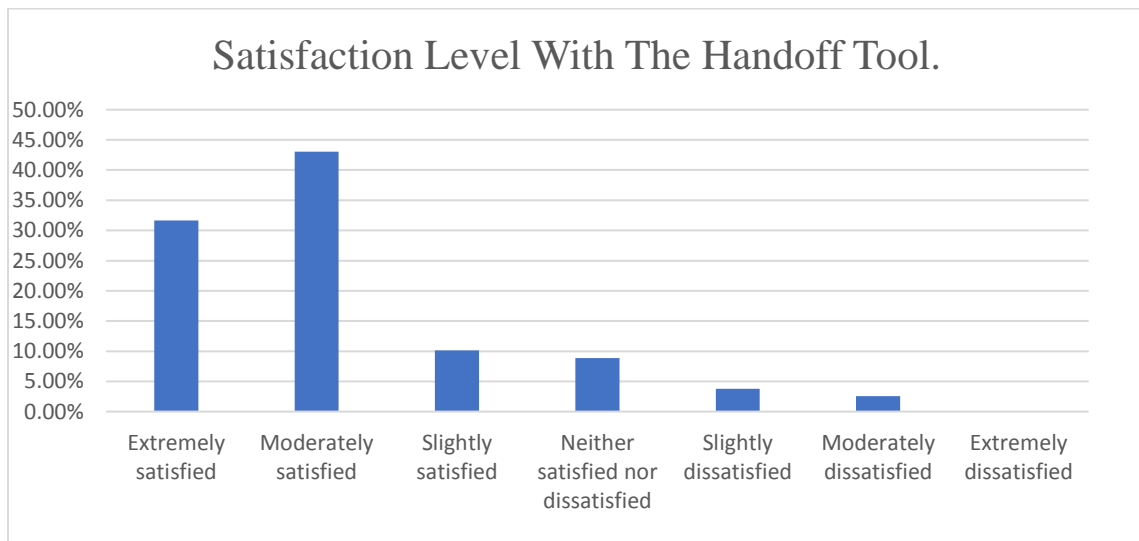
**Figure 10.** Necessary Components for a Safe and Effective Handoff Tool

When asked if handoff should be a standardized procedure among patient care providers, 37(48.05%) of survey respondents strongly agreed, 27(35.06%) agreed, 9(11.6%) neither agreed nor disagreed, 3(3.90%) disagreed and only 1(1.3%) strongly disagreed that it should be a standardized procedure among patient care providers. (Figure 11)



**Figure 11.** Opinions of CRNA Regarding Standardization of Handoffs

The CRNAs participating in this study were asked how satisfied they were with the handoff communication in their practice facilities. Based on the survey responses, 25(31.6%) were extremely satisfied, 34(43.04%) were moderately satisfied, 8(10.13%) were slightly satisfied, 7(8.86%) were neither satisfied nor dissatisfied, 3(3.8%) were slightly dissatisfied, and 2(2.5%) were moderately dissatisfied. (Figure 12).



**Figure 12.** CRNAs Satisfaction with Handoff Tools in Their Facilities.

CRNA survey participants were asked to identify factors that hinder an appropriate handoff. Based on the survey results, production pressure/time constraints were the most frequent factors that hindered CRNAs from performing an appropriate handoff (25.3%). Other factors were absent or inconsistent training (7.5%), interruptions and distractions (15.1%), multitasking during handoffs (20.5%), patients with multiple complex medical problems (17.2%), and changes in patient status during handoff (3.8%). Differences in clinical knowledge between providers (16.4%), hierarchical cultures that discourage questions (5%), and social interactions during handoffs (8.6%), were also identified as being factors that hinder appropriate handoffs (Table 5).

<b>Factors that hinder appropriate handoff</b>	<b>Never No (%)</b>	<b>Rarely No (%)</b>	<b>Sometimes No (%)</b>	<b>Frequently No (%)</b>
<b>Absent or inconsistent handoff training</b>	26 (32.9)	31 (39.2)	16 (20.25)	6 (7.5)
<b>Interruptions and distractions</b>	6 (7.5)	27 (43.1)	34 (43.0)	12 (15.1)
<b>Production pressure/Time constrain</b>	7 (8.6)	20 (25.3)	32 (40.5)	20 (25.3)
<b>Too much noise</b>	12 (15.1)	24 (30.8)	31 (39.2)	12 (15.1)
<b>Multitasking during handoff</b>	11 (13.9)	23 (29.1)	29 (36.7)	16 (20.5)
<b>Patients with multiple, complex medical problems</b>	5 (6.3)	28 (35.4)	32 (40.5)	14 (17.2)
<b>Change in patient status during handoff</b>	13 (16.4)	45 (56.9)	18 (22.7)	3 (3.8)
<b>Differences in clinical knowledge between providers</b>	8 (10.1)	25 (31.6)	33 (41.7)	13 (16.4)
<b>Hierarchical culture that discourages questions</b>	35 (44.3)	29 (36.7)	11 (13.2)	4 (5.0)
<b>Social interaction during handoff</b>	17 (21.7)	32 (40.5)	23 (29.1)	7 (8.6)

**Table 5.** Factors Hindering CRNAs from Performing Appropriate Handoffs

The following are some significant findings based on demographics reported by the CRNAs taking part in the survey for this study. The ages ranged from 31 years old to 70 years old. The highest number of participants ranged from ages 51-60(31.6%) 72% of the CRNA respondents had a mastered degree. 40% of CRNA respondents are practising in large facilities with more than 300 bed capacity and 77% of the participant respondents have been practising for more than ten years (Table 6). Responses were received from 26 out of 50 states with Texas having the highest number of respondents 12.9%.

**Demographics**

Characteristics	N (%)
<b>Age</b>	
<30	0(0)
31-40	16(20.25)
41-50	22(27.5)
<b>51-60</b>	<b>25(31.6)</b>
61-70	16(20.25)
<b>Highest Level of education</b>	
Diploma	3(3.80)
Associate	2(2.5)
Baccalaureate	8(10.1)
<b>Masters</b>	<b>57(72.1)</b>
Doctorate	9(11.3)
<b>Current Practice facility</b>	
<b>Large hospital &gt;300 beds</b>	<b>32(40.5)</b>
Medium hospital 300 beds	19(24.05)
Small hospital <100 beds	17(21.5)
Same day ambulatory surgery	9(11.39)
Office based practice	1(1.27)
Other (physician owned speciality hospital).	1(1.27)
<b>Years practising anaesthesia</b>	
<1	0(0)
1-3	3(3.8)
4-6	10(12.66)
7-10	5(6.33)
<b>&gt;10</b>	<b>61(77.22)</b>

**Table 6.** Demographic Characteristics as a Percentage of the Sample

## VI. DISCUSSION

This study indicates that the handoff process is multifaceted. Several elements of this process were investigated for this project. Topics included knowledge assessment for department policies, standardized tools, knowledge of practitioners regarding AANA and TJC recommendations, types of handoffs utilized, safety issues, perceived necessary components of handoffs, and barriers to performing appropriate handoffs. Each of these areas can play an intricate role in the handoff process.

Research questions posed by this study included:

- Is there a knowledge deficit among CRNAs regarding the current JC recommendations and AANA SOP relating to handoff procedures?
- Are CRNAs utilizing appropriate handoff tools in their facilities?
- What barriers hinder CRNAs from performing a complete, effective, and safe handoff?
- Can a PowerPoint presentation be developed as a learning tool to fill the gaps in CRNAs knowledge regarding the importance of appropriate handoff practices?

The findings from this study revealed that there is need for improvement in the CRNAs knowledge regarding handoff process. A concerning and key finding of the study was that 25% of the CRNAs had never reviewed their SOP. More emphasis is needed in encouraging CRNAs to review the AANA Standards of practice because this is what guides practice. Of the survey respondents, 32% were not familiar with the AANA SOP regarding safe transfer of patient care. It is prudent that CRNAs familiarize themselves with their SOP not only in this area but in all areas. Lack of knowledge regarding SOP, can have serious patient safety and legal implications. According to the results of this study 87% of survey participants are practising in TJC accredited facilities. 55% of the survey respondents are familiar with TJC recommendation on handoff tools

and 58% are in facilities that use a standardized tool as recommended by TJC. More emphasis needs to be placed on the accredited facilities to practice within the recommendations of TJC which is their regulatory organization.

The results of the survey performed for this study revealed a need for improving the utilization of appropriate handoff tools. 35% of respondents are using verbal reports only, without checklists. This indicates that despite survey responses that majority of practitioners feel that handoffs should be standardized, many facilities are still utilizing verbal reports without standardization. Studies have shown that there is higher risk of information loss when verbal communication is used during handoff procedures. 16% of survey participants are using a written checklist and 38% have the handoff integrated in the EMR. More facilities should be educated to ensure that handoff tools are integrated in the EMR as this is the recommended method of documentation in current and future health care.

In an investigation of barriers that hinder CRNAs from performing a complete, safe, and effective handoff, this study identified several barriers which CRNAs determined attributed to barriers. Production pressure/time constraints were identified as the most frequent factors hindering CRNAs from performing an effective handoff. Approximately one quarter of the CRNAs surveyed have experienced being pressured to improve room turn over. Other major factors were, multitasking during handoff, and interruptions and distractions during handoffs. These findings align with literature findings<sup>47</sup> that multiple elements in the perioperative environment have the potential to create major barriers in communication process. Physical barriers to communication include noise sources, such as multiple conversations in small areas, music, public address systems, monitors alarms and telephones, all of which foster a poor environment for communication.<sup>47</sup> Several studies suggest limiting distractions during



handoffs.<sup>22,41</sup> Just like the airline industry refers to locking the cockpit during take-off and landing to minimize interruptions, the same concept can be applied to handoffs in which conversations and tasks are limited to immediate patient care.

Effective communication among perioperative team members is an essential component of providing quality and safe healthcare. Effective handoffs are largely dependent on the interpersonal communication skills and interactions between anaesthesia providers and other healthcare members. Hierarchical relationships among providers, which was a barrier identified in this study exist and could serve as barriers to communication. There are many components that can make a handoff process safe and effective. The number one priority for the CRNA respondents was to have enough time for question and answers. Second and third priorities included having a written checklist, and incorporating the checklist in the EMR.

Lack of proper handoff can lead to negative patient outcomes. 5% of the CRNAs surveyed responded to having experienced negative outcomes at some point during handoff procedures. These negative outcomes were experienced at CRNAs handoffs to RNs, handoffs from RNs, handoffs to and from anesthesia providers. Complications were not only experienced from lack of handoffs but abbreviated or incomplete handoffs had negative outcomes and complications. 33.7% of CRNAs experienced complication when assuming care from RNs and 12% when transferring care to RNs. Complications were also experienced when assuming care from and transferring care to other anesthesia providers, 22.3% and 3.9% respectively.

Patient safety continues to be the highest priority for health care providers CRNAs not excluded. Communication checklists, are essential and useful to building a culture of perioperative communication and collaboration. Use of checklists during handoff has been

shown to help providers correctly exchange information and increase the adequacy of reports. 58% of the survey respondents are in environments that utilize a check for handoffs. There is room for improvement to meet TJC goal of 100% use of standardized handoff tools.

This project determined that 62% of institutions have an EMR, however only 37% have a handoff tool incorporated in the EMR. 68% of the CRNAs surveyed responded to be in departments that have a department policy involving a standardized handoff tool, however only 58% of the CRNAs surveyed responded to be using a standardized handoff tool when receiving a handoff from another provider. 83% of the survey participants agree that handoffs should be standardized. Standardization of handoffs makes transfer of care systematic and better defines the expectations from both the sender and receiver of the handoff.

Many of the existing problems with handoffs such as poor quality, inconsistency, lack of structure, and information omission are attributed to lack of framework and standardization.<sup>67</sup> Standardization of information transfer reduces variability among information transfer and provides structured communication goals for handoffs.<sup>67</sup> More departments are adopting a system and protocol of a standardized checklist that gives providers an opportunity to ask questions and have clear information. Results from this study are consistent with literature review. Research supports the premise that significant improvements in the quality and efficiency of handoffs can occur when the process is standardized.<sup>67</sup>

According to the results of this project 87.3% of the respondents are practising in TJC accredited facilities, and 58.8% have a standardized tool for the handoff process. 55.7% of survey respondents, were familiar with TJC recommendation regarding handoff process. This finding suggests that there is need for creating awareness of CRNAs regarding the

recommendations of TJC on handoff procedures. Development of standardized instruments should reflect current NPSG 2E.<sup>46</sup> By developing and implementing standardized handoff protocols, institutions will align their quality improvement effort with TJC requirement of healthcare organizations to implement a standardized approach to handoff communication. Albeit the goal has not been fully achieved, most facilities that are JC accredited are working towards the goal.

A Power Point presentation was presented to a group of anesthesia providers at the Montefiore Medical Center in Bronx New York on October 27<sup>th</sup>, 2017. The information was well received by the group as was evidenced by the evaluations. As a result of the presentation, a process to include a handoff menu as a mandatory field on the electronic anesthesia record has been initiated. This will institute a more formalized procedure for patient transfers, thereby promoting patient safety.

*OR Xchange* is a program funded by Merck that seeks to facilitate improved communication between perioperative team members.<sup>47</sup> The program offers a forum to focus on interdisciplinary communication and collaboration with a goal of improved patient care and outcomes while minimizing error and adverse events.<sup>47</sup> National or organizational initiatives, such as this, can bridge the communication gap between professionals.

### Project Dissemination

Dissemination was achieved by submitting an application to publish an article in *CRNA today* for Continuing Education (Appendices F to H). The application was approved. The article will feature in the 2018 publication. A local presentation has been done at the department of anesthesiology monthly meeting at the Montefiore Medical Centre in Bronx New York on

October 27<sup>th</sup> 2017. This works to share the evidence-based research and engage professionals in a meaningful discourse on effective and safe handoff communication.

### Study Limitations

This study targeted only CRNAs. Anaesthesia care is provided by other professionals like anesthesiologists, anesthesia residents, and anesthesia assistants. The study was limited to CRNAs and hence excluded articles and studies with information involving anesthesiologists, anesthesia residents, and anesthesia assistants. This made it difficult to evaluate opinions and knowledge of other anesthesia providers as well as other members of the perioperative team. Another limitation was that the sample size was too small to generalize the results across the CRNA population.

Lack of response to questionnaire by potential respondents in a sample or population is referred to as nonresponse bias.<sup>68</sup> Nonresponse bias is a deadly blow to both the reliability and validity of survey study findings. Questionnaires can be either telephoned, administered in person, mailed only, e-mailed only, Internet mediated only, or a combination of these. Response rates to e-mail surveys have decreased since the late 1980s.<sup>68</sup> E-mail response rates may only approximate 25% to 30% without follow-up e-mail and reinforcements.<sup>68</sup> This project utilized an online survey via email and suffered a non-response bias.

## **VII. CONCLUSION AND RECOMMENDATIONS**

Effective communication among caregivers is critical to seamless handoffs that result in safe, high-quality care through analyzing key processes from the perspectives of both the sender and the receiver.<sup>69</sup> Information transfers are critical point of care transitions. It is essential to optimize communication among providers and to design valid and feasible information transfer

practices. Communication checklists, guidelines and goals, and policies are essential and useful to building a culture of perioperative communication but they are only a start. Use of checklist during handoff has been shown to help providers correctly exchange information and thereby increase adequacy of handoff. Standardizing information transfer has been shown to increase the amount of information transferred and improve provider satisfaction with the transfer process.<sup>67</sup> CRNAs are likely to support and use specific communication tools but there is room for improvement. Of the surveyed CRNAs in this study, 61.4% were willing to adopt a systematic approach of transferring care.

Of the CRNA survey respondents, 25% indicated they had never reviewed the AANA SOP. Based on participant responses, there is need to improve CRNA awareness and education regarding the importance of the AANA SOPs. TJC goal to standardize the handoff process is being implemented, but there are more facilities that need to implement a standardized format to meet the goal. Most facilities utilize handoff tools that allow CRNAs to practice within the AANA SOP, according to survey results.

Satisfaction with the use of a handoff tool may influence the compliance of using the tool. This study revealed that less than 40% of the study respondents are satisfied with the tools at their facilities. More emphasis is needed to include the CRNAs in the process of developing the tool to make the tool user friendly. This may increase their satisfaction level with the tools and by extension their compliance.

Primary findings of this study such as negative outcomes experienced during handoffs and complications from incomplete or abbreviated handoffs indicate that CRNAs receive and hand off a patient's care to other providers like RNs and anesthesiologists or anesthesia residents.

Future research is recommended which would investigate handoff process for all anesthesia providers. A multimodal method of eliciting response from the sample population should be used to avoid non-response bias and increase the rate of responses. More innovative research is needed to define optimal patient handoffs and to determine the effect of handoff quality on patient outcomes. Simulation-based research on handoffs could address interpersonal communication issues encountered during information transfers. Addressing factors that negatively influence information transfer is critical in providing safe patient care.

## VIII. APPENDICES

## Appendix A: Sample Checklist

**ASSESS READINESS** Are you ready for report?

**YES** → **TIME OUT**

**NO** → **STOP**

Both parties ask for a time-out for information exchange.

**START HANDOFF**

• **IDENTIFYING INFORMATION**

- ✓ Patient name
- ✓ Verify name on ID band
- ✓ Procedure
- ✓ Surgeon

• **MEDICAL HISTORY**

- ✓ Past health conditions
- ✓ Past surgeries
- ✓ Allergies

• **ANESTHESIA**

- ✓ Type of anesthesia
- ✓ Airway management/concerns
- ✓ Antibiotics
- ✓ Vascular access: size/location
- ✓ Invasive monitoring

• **INTRAOPERATIVE COURSE**

- ✓ Anesthetic events/treatment/concerns
- ✓ Analgesics
- ✓ Antiemetic
- ✓ Neuromuscular blockade/reversal
- ✓ Surgical events/concerns
- ✓ Intake/output/EBL
- ✓ Blood products Yes/No
- ✓ Labs

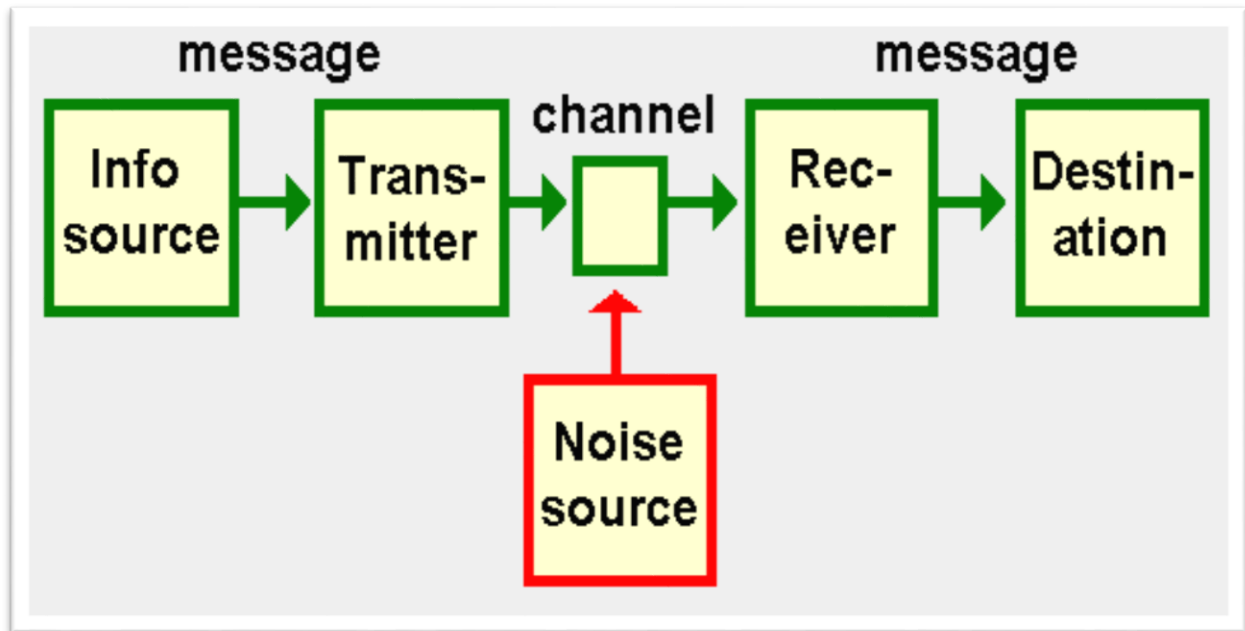
• **POSTOPERATIVE**

- ✓ Patient status
- ✓ Airway/O<sub>2</sub>/Ventilator settings
- ✓ Infusions
- ✓ Postoperative analgesic/sedation plan
- ✓ Postoperative antiemetic plan
- ✓ Disposition

**CLARIFICATION:** Do you have any questions?

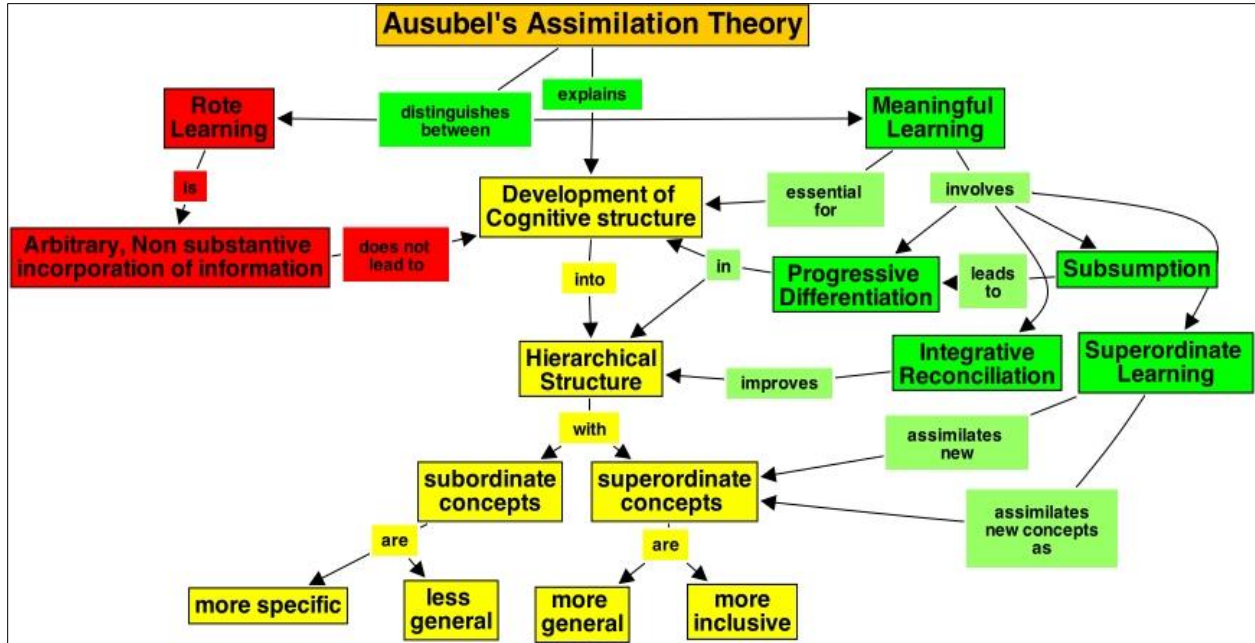
**END HANDOFF**

**Appendix B: Mathematical Theory of Communication.**





Appendix C: Ausubel's Assimilation Theory.



**Appendix D: Informed consent Document**

## Handoff Process in Nurse Anesthesia Practice

As a graduate student in the University of Michigan-Flint, Doctor of Anesthesia Practice program, I invite you to participate in a graduate program research project by taking about 15 minutes to complete the following survey. This project is designed to investigate barriers and knowledge gaps among Certified Registered Nurse Anesthetists (CRNAs) regarding communication at the time of patient care transfer. For the purpose of this investigation, the transfer of patient care between the CRNA, and either another anesthesia provider, or a Registered Nurse (RN), will be identified as a "handoff". Please consider your primary practice facility in your responses. Your participation will provide valuable information. To protect contributor privacy, all responses are anonymous. You are not required to answer every question. Answering one or more survey questions implies consent to participate in this project. The Institutional Review Board (IRB) Project Coordinator can be reached at the University of Michigan-Flint Office of Research at 810-762-3383 or by email at [research@umflint.edu](mailto:research@umflint.edu). For specific questions pertaining to the survey/project, please contact primary researcher Eunice Aguda at 734-239-3287 or [eaguda@umflint.edu](mailto:eaguda@umflint.edu) Thank you for your anticipated participation.

Eunice Aguda, CRNA, MSN

**Appendix E: Survey Questions**

For this survey, "handoff" is defined as a formal means of communication between the Certified Registered Nurse Anesthetist (CRNA), and the provider transferring or assuming patient care.

1. Are you aware if your department has a handoff policy/protocol?
2. Does this departmental handoff policy/protocol define the necessary elements that should be included during handoff?
3. Are you currently using a handoff tool for communicating vital patient information during handoff? What type of handoff tool does your facility use?
4. How long has your facility been using the current handoff tool?
5. Does your department use an Electronic Medical Record (EMR)?
6. Does the EMR include a handoff tool?
7. Are you familiar with the American Association of Nurse Anesthetists' (AANA) Standards of Practice (SOP) VII related to patient care transfers?
8. When was the last time you reviewed the AANA-SOPs?
9. Do the anesthesia department where you practice allow you sufficient time to conduct patient handoffs according to AANA-SOP VII?
10. Have you had an adverse event/negative patient outcome related to poor communication during patient handoff?
11. During what type of handoff did an adverse event occur?
12. Have you experienced complications or mismanagement of a patient's care related to abbreviated or incomplete handoffs?
13. Is your facility accredited by TJC?
14. Are you familiar with TJC recommendations in relation to communication at the time of patient handoff?
15. Does your facility practice TJC recommendations for handoffs?
16. Which of the following would most likely prevent you from adopting a systematic handoff tool in your primary area of practice? Select all that apply.
17. In your opinion, what are the necessary components for a safe and effective handoff.
18. Should handoffs be a standardized procedure among patient care providers?
19. How frequently do the following situations present a hindrance to your performance of an appropriate handoff? Select all that apply.
20. Overall, how satisfied are you with handoff communications in your facility?
21. What is your age, educational level and years of CRNA practice?
22. In what type of facility do you primarily practice?
23. In which state do you currently practice?

**Appendix F:**

**Please see the power point slides.**

Update for Nurse Anesthetists

Handoff process in Nurse Anesthesia Practice:

*Eunice N Aguda, MSN, CRNA*

*Handoffs are an essential part of anesthesia practice. The importance can be measured by the fact that TJC has identified them as such. Standardized handoff communication is a “process in which information about patient care is communicated in a consistent manner” from one health care provider to another. Even though they are common enough, providers receive little formal training in how to effectively implement handoffs. This is a critical responsibility and effective handoff procedure should be developed and providers adequately educated to communicate effectively. Communication and flow of information can be a primary point of vulnerability for patient safety and efficiency in the operating room. An integral part of health care involves the safe and efficient transfer of essential information when the care of the patient is transferred from one provider to another. Handoff is vulnerable to communication errors that may negatively impact patient safety. Anesthesia providers are not exempt from the vulnerability of errors that happen at patient handoff.*

*Key words: Handoff, SOP, Standardization.*

**Objectives:**

At the completion of this course the reader should be able to:

- ❖ Define handoff
- ❖ List the components of an effective handoff
- ❖ Explain the JC and AANA recommendations for handoff process
- ❖ Identify barriers of effective handoffs
- ❖ Discuss the importance of standardizing the handoff process

**Appendix G: Journal Course Post Test**

- 1) Handoff communication is important to anesthesia providers because
  - A. The joint commission has it as one of the national patient safety goals
  - B. It is part of the American Association of Nurse Anesthetist's standards of practice
  - C. Proper and adequate handoffs reduce information loss among providers
  - D. All the above
  
- 2) IPASS is an acronym for a handoff checklist tool. P stands for patient summary. Which of the following is **NOT** a part of the patient summary in the P?
  - A. Events leading to admission
  - B. Summary of events
  - C. Plan and ongoing assessment
  - D. Summary of what receiver heard
  
- 3) Each of the following statements about the Abraham study of 2014 is true **EXCEPT**
  - A. The study was a nonrandomized, pre-post, prospective intervention done by audio recordings and observations of 82 anesthesia resident handoffs
  - B. The results showed fewer communication breakdowns
  - C. Compliance with the intraoperative handoff checklist improved from 20% to 100% at 2 months after intervention
  - D. The physicians' ability to organize and comprehend patient information increased after the intervention.
  
- 4) Potential barriers to effective communication during handoff include which of the following:
  - A. Absent or insufficient handoff training
  - B. Multitasking during report
  - C. Time pressure for patient care needs and other responsibilities
  - D. All the above
  
- 5) A standardized approach to handoff communication is one of the national patient safety goals of The Joint Commission
  - A. TRUE
  - B. FALSE
  
- 6) You are getting ready to go for a lunch break but will be coming back to take care of the same patient-, one of your colleagues comes to give you a break-, what type of anesthesia handoff are you doing?
  - A. Shift to Shift
  - B. Duty relief (Breaks)
  - C. Transition of care
  - D. None of the above

- 7) Each of the following is true about the I-PASS mnemonic **EXCEPT**
- A. It was developed because of limitations noted in SBAR
  - B. The A in I-PASS is for Assessment
  - C. Although the I-PASS study was done in a pediatrics environment, I-PASS can readily be adapted for use beyond pediatrics.
  - D. The I in I-PASS stands for Illness severity
- 8) As documented by The Joint Commission, Communication failure was a root cause of ----- what percentage in sentinel events
- A. >70
  - B. <70
  - C. >80
  - D. <80
- 9) Each of the following statement about SBAR is true **EXCEPT**
- A. SBAR was originally developed as a communication technique by the US Navy for use on nuclear submarines.
  - B. Implementation in 1 hospital was associated with a substantial drop in the rates of adverse events from 90 to 40 per 1000 patient days.
  - C. The A in SBAR is for Action list
  - D. SBAR was implemented in 2002 at Kaiser Permanente, a health care organization, for use by the rapid response teams-, to investigate patient safety.
- 10) The Robins study of 2015 reported which of the following results?
- A. No impact on the turnover time
  - B. Improved accuracy of the report
  - C. Appropriate exchange of information
  - D. All the above
- 11) The SBAR technique has become The Joint Commission stated industry best practice for standardized communication
- A. TRUE
  - B. FALSE
- 12) Which of the following is a potential barrier to effective communication?
- A. Lack of standardized tools and checklists
  - B. Language barriers
  - C. Multitasking
  - D. All of the above
- 13) The use of a structured handoff tool from the operating room is associated with a reduction in the loss of information transfer and improvement in the quality of communication exchange.
- A. True

B. False

- 14) The AANA standards of practice VII states which of the following?
- A. Evaluate the patient's status and determine when it is safe to transfer the responsibility of care.
  - B. Document pertinent anesthesia-related information on the patient's medical record in an accurate, complete, legible, and timely manner.
  - C. Implement and adjust the anesthesia care plan based on the patient's physiologic status.
  - D. Perform and document a thorough preanesthesia assessment and evaluation.
- 15) The 2 most commonly used mnemonics to enhance handoff communication are
- A. SBAR and SOCRATES
  - B. I-PASS and APGAR
  - C. SBAR and I-PASS
  - D. None of the above
- 16) The following are true about Mathematical Theory of Communication EXCEPT
- A. It is also known as Shannon and Weaver
  - B. Effective in person to person communication than group or mass audience.
  - C. Factors which affect communication are labelled as "noise"
  - D. Meaningful learning occurs when new knowledge is assimilated to existing knowledge.
- 17) According to Ausubel's Assimilation theory
- A. Learning is effective and remembered when it is meaningful.
  - B. Meaningful learning occurs when new knowledge is assimilated to existing knowledge.
  - C. Prior and newly-acquired knowledge combine to connect knowledge concepts which gives meaning and context to information
  - D. All the above
- 18) Handoffs between anesthesia providers are common-, and may involve multiple anesthesia providers. With each anesthetic handover, patient risk for morbidity or mortality is increased by what percentage?
- A. 8 %
  - B. 10%
  - C. 6%
  - D. 60%
- 19) Recommendations for overcoming barriers to communication include which of the following?
- A. Standardizing the process using checklist and protocols.
  - B. Completing clinical tasks before the information transfer.
  - C. Allowing only patient-specific discussions during verbal handoffs
  - D. All the above.
- 20) Improving the Implementation of handoff procedures may

- A. Limit the number of barriers to a successful implementation
- B. Increase the quality of care and patient safety
- C. A and B



**Appendix H:****Answer Key**

<b>Question</b>	<b>Answer</b>	<b>Question</b>	<b>Answer</b>
1	D	11	A
2	D	12	D
3	C	13	A
4	D	14	A
5	A	15	C
6	A	16	D
7	B	17	D
8	D	18	A
9	C	19	D
10	D	20	C

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