# Emergency Manuals' Use Can Improve the Providers' Efficiency in Perioperative Crisis Management

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**DNP Scholarly Project Final Approvals**

**The DNP student** Rebecca Ngaling **and the Scholarly Project** Emergency Manuals' Use Can Improve the Providers' Efficiency in Perioperative Crisis Management **meet all the requirements for the degree of Doctor of Nursing Practice at University of Saint Francis-Fort Wayne, IN.**

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## Abstract

***Aim:*** This project aimed to provide evidence that supports the use of the anesthesia emergency manual (EM) to reduce omissions and errors in care and enhance the anesthesia provider's efficiency in managing perioperative crises.

***Background:*** Healthcare-related errors account for about 200,000-400,000 preventable patient injuries or deaths in the U.S. annually. The cost of medical errors is about $20 billion a year in the U.S. Therefore, implementing specific strategies for individual healthcare workers and healthcare facilities to protect patients from medical harm is vital. EMs have long been used by other professions such as nuclear power and the aviation industry to prevent or correct errors before they occur and to improve consumer safety. Hence the anesthesia profession and many other organizations such as the World Health Organization (WHO), American Society of Anesthesiologists (ASA), Stanford Anesthesia Cognitive Aid Group (SACAG), and the Emergency Manual Implementation Collaborative (EMIC), have collaborated and developed EMs for the management of perioperative crises.

***Methodology:*** Pre-and post-questionnaires were completed by the anesthesia providers at Kosciusko Community Hospital (KCH) who attended the project intervention. In addition, the intervention used a PowerPoint Presentation to educate the anesthesia providers on how cognitive aids could significantly facilitate and improve care outcomes.

***Findings:*** The participants perceived increased errors or omission rates by 44% when one relied on memory or experience alone to perform an unfamiliar task and by 15.7% when performing the emergency procedure. Of the providers at KCH who attended the intervention, there was an increase from 60% to 100% of those who agreed to incorporate cognitive aids (CAs) as part of the standard workflow when completing anesthesia-related tasks. Also, 100% of the participants

who participated in the project intervention agreed/strongly agreed that routine training would increase the use of CAs. Furthermore, if they were patients, they would prefer their providers to use CAs while caring for them.

***Conclusions/Implications:*** CAs' use could reduce memory lapses and improve provider efficiency in managing perioperative crises. The participants rated early and thoughtful integration of CAs into the anesthesia program curriculum and the workplace highly effective in strengthening the use of CAs.

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# Chapter 1: Introduction

Medical errors remain a challenging healthcare crisis. The involvement of multiple people on a care team in caring for a patient exposes the patient to several sources of errors. Even for known errors, there is no one perfect solution that will fit all circumstances. Specific strategies must be implemented for the individual healthcare worker, for hospitals, and national levels to protect the patient from medical harm. When providers are faced with a rare occurring crisis in the perioperative care period, vital steps are often missed. These omissions, errors, and delays in essential intervention could increase patient morbidity and mortality rates. Healthcare-related errors account for about 200,000-400,000 preventable patient injuries or deaths in the U.S. annually (James, 2013). The results of these medical errors may be realized immediately, or failed to be noticed for days, months, or even years. The cost of medical errors is about $20 billion a year in the U.S. (Rodziewicz & Hipskind, 2020). A comprehensive continuing education program which integrates cognitive aids use to the medical team can improve professional knowledge and reduce performance deficiencies. Additionally, guidelines and checklists can help optimize care by promptly providing vital information to the provider. Lastly, using visual tools such as cognitive aids to supplement the provider's memory and skills can significantly reduce medical errors (Gaba et al., 2015; Rodziewicz & Hipskind, 2020).

## Problem Statement

The optimal patient outcome depends on a vigilant clinician and care team who consistently deliver evidence-based care and maintain closed-loop communication. The perioperative period can be challenging, requiring increased knowledge demands on the provider and the healthcare organization. These crises can lead to stress, fatigue, communication breakdown, and creating room for human errors (Simmons & Huang, 2019). Stressful situations

such as rare, unexpected events cause the human brain to shrink and lose its ability to promptly retrieve vital information, leading to potentially devastating consequences (Agarwala et al., 2019). Cognitive aids (CAs) and emergency manuals (EMs) reduce human errors and prevent oversights that could potentially be harmful to the patient. An example of a CA is a checklist for a specific event or procedure based on the most relevant and current guidelines. EMs contain several CAs of different events or procedures (Toff, 2010). A checklist is a structured piece of information designed to enhance cognition and encourage the use of best practices (SACAG).

According to Simmons and Huang (2019), a multi-institutional study showed EMs lower annual mortality rates by 18%. EMs prevent the omission of vital actions from 60% to less than 20% when managing a crisis, leading to improved patient outcomes. The surgical checklist has reduced complications and mortality by more than 50% within the perioperative period, especially when there is comprehensive team awareness. EMs enhance memory retention and information retrieval, especially after simulation education that improves the provider's nontechnical skills; hence EMs are necessary tools to improve patient safety. EM protocols encourage the debriefing of the crisis event and improve the provider experience and skill in managing future events. For health care facilities to receive optimal reimbursement, appropriate implementation of EMs is necessary in order to provide quality patient care (Alidina et al., 2018).

Kosciusko Community Hospital (KCH) does have an EM that covers crises not related to the perioperative area such as when cardiac arrest or bradycardia is present. However, KCH and the Midwest Anesthesia Group do not have an anesthesia emergency manual which is dedicated to crises occurring in the perioperative period. Although these crises seem related, a crisis in the perioperative area is more complex due to multiple factors involved: such as drugs, anesthetic

agents, surgical factors, and the sedated patient. Also, there are concerns about which provider should deal with the code situation in the OR: the anesthetist provider or the hospital code response team, leading to role confusion and delays in patient care. The presence of an anesthesia EM and clearly stipulated expectations for the provider role would reduce role conflict, improve team dynamics, and make the process more efficient.

**PICO Question**

Will providing recommendations to the Midwest Anesthesia Group at KCH for emergency manual (EM) implementation, lead to the adoption and implementation of the anesthesia emergency manuals for use perioperatively?

**Background of the Problem**

EMs have long been in use by the aviation industry to improve flight safety and reduce the devastating incidence of unexpected engine failure (Webster, 2017). EMs consist of evidence-based guidelines or checklists that enhance a professional team's ability to deliver optimal care in a critical event (Agarwala et al., 2019). Using a checklist to reduce false alarms, decrease distractors, and prevent provider alarm fatigue can ensure patient safety (Webster, 2017). Cognitive Aids are complementary tools to support clinical judgment but not replace critical thinking. CA use has been proven to improve team performance in the management of rare, unexpected events and reduce the time to get the crisis under control with a minimal omission of vital steps (Bromiley, 2018). The use of EMs requires behavioral change. An organizational structure that promotes patient safety would support a culture that promotes the use of EMs to improve patient care (Alidina et al., 2018).

The anesthesia profession is regarded as a leading healthcare specialty striving to enhance patient safety. The American Society of Anesthesiologists (ASA) calls for vigilance in the job

(Edsall,1993). Vigilance is impacted by human factors such as sudden tension, fatigue, high or low workload, emotional depression, noise, and extremes of temperature. These factors negatively influence vigilance, leading to reduced performance (Gaba et al., 2015). Diligence improves performance; however, further training is needed to develop the provider's expertise to perform in unforeseen moments (Gaba et al., 2015). The anesthesia curriculum in the past, focused on providing traditional medical, scientific, and technical knowledge. This form of education can equip providers with adequate skills to manage routine cases. However, the training lacks elements to develop the expertise needed in the management of critical events (Gaba et al., 2015; Marshalls, 2013). The anesthesia profession and many other organizations such as the World Health Organization (WHO), American Society of Anesthesiologists (ASA), Stanford Anesthesia Cognitive Aid Group (SACAG), National Center for Patient Safety and Veterans Affairs (NCPS and VA), and the Emergency Manual Implementation Collaborative (EMIC), have collaborated and developed EMs for the management of the perioperative crisis. The anesthesia EMs contain about 26 CAs or checklists that highlight best practice guidelines and knowledge retrieval to provide optimal care (Agrawala et al., 2019). Evidence links EMs with the potential to optimize patient outcomes. The ASA goal is to promote quality improvement programs to enhance patient safety during the perioperative period (Committee on Performance and Outcomes Measurement, 2018).

CA displays and simulations improve individuals' non-technical skills. The designated reader role enhances team performance. Training increases the participant's knowledge of when to implement a challenging airway checklist using cognitive aids (Marshall, & Mehra, 2014). However, this practice cannot be carried out in isolation. The collaboration and cooperation of the interdisciplinary team working alongside the anesthesiologist are vital for efficiently utilizing

the CA. Also, organizational policies and structures that support the implementation and use of CAs can impact real change and improve patient safety (Goldhaber-Fiebert & Howard, 2013; Marshall & Mehra, 2014).

## Practice/Knowledge Gap

### Best Practices for Health Care

According to Agarwala et al. (2019), the EMIC reports over 400,000 EMs have been downloaded internationally by anesthesia providers and anesthesia groups. Surveys showed that when EMs were utilized in the operating room, staff were better able to successfully treat a perioperative crisis. Alidina et al. (2018) highlighted that factors that play a decisive role in promoting the use of CAs include leadership support (67%), implementation champions (41%) and the institutional commitment to improve patient safety (56%).

The practice of anesthesia has been described as 99% boredom and 1% terror (Consultant, 2018; Gaba et al., 2015). The 1% percent of terror occurs when it is least expected. The anesthesia provider is required to perform with precision to alleviate the crisis. The use of CAs has been shown to reduce omissions by 75%, reduce complications and morbidity by 50%, and lower mortality by 18% (Simmons & Huang, 2019). Adopting CAs could reduce errors and improve shared decision-making by two or more providers (Bromiley, 2008; Toff, 2010).

Successful implementation has been cited as a critical factor in enhancing the use of CAs. The implementation phase should include performing routine simulation training, engaging in reflection, and debriefing of the training scenarios to allow modifications in the process that will enhance the provider's proficiency. Simulation training increases skill reproducibility in real-life crises and promotes long-term memory (Alidina et al., 2018; Agarwala et al., 2019). Developing

expertise requires repetitive activities to improve provider proficiency in dealing with a rare emergency (SACAG, 2019).

Involving the multidisciplinary care team in the implementation process and simulation training is essential to enhance familiarity with the CA. This training model clarifies the role designation of the different team members, promotes excellent communication skills, and enhances team performance (Agarwala et al., 2019; Bromiley, 2008).

Given the abundance of health-related data, the timely gathering of relevant information may not be possible in a crisis (Consultant, 2018). CAs should contain the most current evidence-based guidelines to provide the best quality of care. The anesthesia group must perform routine maintenance of the CAs to ensure optimal care is delivered when CAs are used. This revision will promote the professionalism of providers and uniformity of care and reduce the delay of intervention related to information gathering and decrease patient harm (Anderson, 2002).

Customizing the CAs to meet the resources at the facility is vital. This will prevent delays and chaos in a crisis. If the CA lists medications or tools that are not present in the facility, the result will be a delay in care as the team tries to sort out alternative ways to perform the task (Gad El-Rab, Zaïane, & El-Hajj, 2017).

Best practices require identifying a specific location for the storage of EMs. According to Goldhaber-Fiebert and Howard (2013), having the checklist located close to the specific crisis cart (i.e., malignant hyperthermia CA attached to a malignant hyperthermia cart, or the anesthesia EM attached to the anesthesia machine) where it is easily accessible can increase their use. Marshall (2017) shows that 80% of providers reported using a CA if available, even though

results suggest only 7% actually use a CA. Some providers report forgetting to apply a checklist or the CAs not being available as a reason for not using a CA.

**Knowledge Gap in Facility Practice**

Kosciusko Community Hospital lacks information on EMs tailored to the anesthesia specialty and perioperative care area. The anesthesia staff at KCH have verbalized the need for CAs to ensure optimal care is provided to the patients during all care phases. Lastly, frequent changes in the organizational structure or anesthesia group can pose a barrier to the successful implementation of EMs. However, the OR manager and the director of surgical services have shown interest in the project. They believe it will promote a culture of providing optimal care to their patients.

**DNP Project Overview**

This DNP project focused on improving the provider's efficiency by providing evidence and recommendations to the anesthesia group at KCH to adopt and use CAs to enhance care quality. The guidance provided included routine training and regular updates of the EM manual to ensure the current practice improves patient outcomes.

**Scope of Project**

This project included all of the anesthesia providers who practice at KCH. Their participation in the intervention and completion of the pre- and post-survey questions will increase their awareness of the future’s potential practice change. The intervention provided substantial evidence to the anesthetic providers at KCH for the need to adopt and install EMs in the perioperative care areas to improve the quality of care. The feedback from the survey questionnaire was used to modify the recommendations for the EM design, implementation, and

update of the manual to enhance its utilization. The project did not involve designing the manual or providing simulation training to the anesthesia providers at KCH.

### Stakeholders

The stakeholders of this project were the chief CRNA at KCH, other anesthesia providers at KCH, the OR nurse manager, the OR staff nurses, as well as patients, surgeons and other providers who will benefit from the improved patient outcomes related to the use of EMs in a crisis event in the OR. KCH would benefit from the added value of care delivered to the patients, would achieve greater patient satisfaction, and would receive increased reimbursement, resulting from a reduction in the delay of vital interventions.

## Budget and Resources

### Cost

Direct and indirect costs were estimated at $1275. The direct costs were calculated based on estimated salaries multiplied by the number of project hours needed to perform each task. The indirect costs ($400) included the sample EMs, other ancillary supplies, and transportation of the project manager to and from the project implementation site. The project was financially feasible because KCH was willing to spend the salary dollars for the potential benefit of reducing errors, increasing safety, and improving the quality of care (Lutheran Health Network, 2020). These short-term investments could result in the long-term reduction in cost by increasing provider efficiency, increasing patient safety, reducing errors, improving time management, efficiently using resources, and improving quality of care. See Appendix A for budget assessment.

### Description of Resources

The anesthesia lounge room was utilized for this presentation. Snacks and drinks were supplied from the routine inventory present at the anesthesia lounge during the event. The

PowerPoint was presented with the use of the project manager's computer. A paper copy of the PowerPoint presentation was provided to the participants to follow along during the presentation. Two copies of the EM were purchased for display during the intervention by the project manager.

## Process and Outcomes

### General Timeline

The University of Saint Francis IRB gave approval of the project on February 1, 2021. The project manager completed the PowerPoint presentation and survey questionnaires (pre-post questionnaire) by December 15, 2020. The intervention occurred on February 15, 2021. Data analysis was completed by March 10, 2021, and the project manager met with project advisor on April 5, 2021 to discuss the results of the survey. The project manager first met with the project chief CRNA on April 12, 2021, to discuss the survey results. Dissemination plan for April 19, 2021, and the project chief CRNA shared the survey results via the facility email communication with the other stakeholders. See Appendix B for the project timeline.

### Project Setting

Kosciusko Community Hospital is a part of the large Lutheran Health Network (LHN) organization located in Warsaw county, a part of northern Indiana. KCH is 72-bed facility with all-private rooms, located on a 30-acre medical campus (LNH, 2020). KCH offers a wide variety of services including an urgent care center, surgical services, intensive care unit, maternal and childcare, occupational health, heart and stroke care, health and wellness, rehabilitation services, sleep center, wound care center, outpatient services, and cancer care center which provides chemotherapy and radiation therapy. KCH promotes staff professional growth. KCH delivers nationally recognized and standardized care to its patients, as evidenced by the county's only

emergency department that is an accredited chest pain center and certified stroke center. Their mission is to work hard every day to be a place of healing, caring, and connection for patients and families in the community (LNH, 2020).

The surgical department at KCH is comprised of a registered nurse (who works in the perioperative care unit) and the operative team (physician anesthesiologist, nurse anesthesiologist, surgical nurses, surgical technicians, and the surgeon). They offer services from minimally invasive to traditional procedures. The surgical suite comprises 17 prep/recovery bays, six operating rooms, two minor procedure/endoscopy rooms, and seven recovery bays.

**Target Population**

The target number of samples included the six to ten anesthesia providers (CRNAs and physician anesthesiologists) present at KCH on February 12, 2021. Participants were not assigned to groups because the aim was to get a general perception on the use of cognitive aids. Other providers not part of the anesthesia group practicing at KCH were excluded from participating in the survey.

**Expected Outcomes**

1) The study results of this DNP project would provide recommendations that would enhance the quality of the implementation process to meet the needs of the anesthesia provider and the facility.
2) The educational intervention would increase the provider awareness of the sources of error and encourage the use of CAs to improve performance.
3) The project would improve understanding of the use of cognitive aids and emergency manuals.

4) The implementation would improve professionalism of the provider, improved team performance, communication skills, and enhanced care outcomes.

## Risk Analysis

There was no immediate or long-term risk to the participants. Participation was voluntary, and no personal identifiers were required from the participants. An informed consent form (paper copy) was provided to the participants at the start of the intervention that explained the terms of participation and the project's intended purpose. This form also disclosed any risk or potential benefits to the participant for participating in the project. A sample of the informed consent form is attached in the Appendix C.

# Chapter 2: Synthesis of Supporting Evidence and Project Framework

## Relevant Theory and Concepts

### Framework

The Framework for Changing Behavior guided the QI project at KCH, which White (2017) described as follows:

1) Educational- assumes there is an internal motivation to learn and improve the quality of care.

2) Epidemiological- obtaining and presenting a substantial amount of evidence that supports the change in practice or behavior.

3) Marketing- gaining the organizational interest by providing an attractive message to the targeted population to accept the change.

4) Behavioral- create awareness; welcome concerns; change attitudes; change knowledge/skill, and current practice. An active change process is vital for successful implementation, including giving feedback and allowing time to make and adopt a practice shift.

5) Social influence- use of opinion leaders and champions to lead the change process. Assess the barriers and supports the use of EBP search for relevant information, pursue a plan, and create innovative ways to present the situation. The organizational context should be assessed (inner characteristic of the organization) to determine how receptive they are to the innovation.

6) Organizational- identify areas of failure that need improvement and focus on creating a change to these areas to improve care quality.

7) Coercive- maintain a control process by creating policies, laws, and regulations to ensure the cognitive aid contains current guidelines.

Applying the above framework to this QI project began with identifying a healthcare need and seeking ways to address this healthcare issue. It assessed that the KCH structure provided a supportive environment that promotes learning and innovation to the employees and patients. The epidemiological phase involved an extensive literature review on the best EBP(s) on the education, training, and use of CAs to manage the perioperative crisis and address specific health needs identified by the healthcare system or organization. Relevant information gathered was presented to the chief CRNA and the OR nurse manager at KCH. The chief CRNA and the OR nurse manager recognized the lack EMs tailored to the anesthesia specialty for the use in perioperative crisis management and agreed to support the project. The marketing phase presented the benefits KCH and the Midwest Anesthesia Group would derive from using cognitive aids, including improving quality of care, reducing healthcare costs, increasing patient satisfaction, and using healthcare resources in a way that will lead to an increase in KCH net return. The behavioral phase served a primary role in identifying potential barriers and facilitators of the implementation process, assessing adaptation needs, and developing a detailed implementation plan. The chief CRNA helped facilitate communications among the other anesthetist providers to improve their participation during the project intervention. The chief CRNA and the OR nurse manager also created an environment where EBP was expected, supported, and rewarded as part of the professional duties.

The intervention phase was guided by the evidence, presented using a PowerPoint presentation developed on the best practice recommendations regarding CA implementation and use. Assessing the organizational structure provided valuable information about the setting where the project will be implemented, including individuals who can help eliminate roadblocks and complete the project. It also allows for recommendations that will generate the most benefit for

using the EMs, establish guidelines for routine training, and ensure the continuous update of the EMs. The pre- and post- questionnaire findings will allow for adequate review processes and guide further adaptation to ensure the EMs are adopted for use.

**Literature Review**

This quality improvement project is backed by current and valid evidence that has proven to improve patient care. Critical databases used in the literature review were CINAHL, Emcare, PubMed, Medline, American Society of Anesthesiologists (ASA), American Association of Nurse Anesthetists (AANA), Cochrane, Google Scholar, and the SACAG website. These sources provided a comprehensive literature review (including systemic review, randomized control trials, meta-analysis, and expert opinion) on factors that emphasized that CAs result in a better quality of care than memory alone in the management of a crisis. External data from other healthcare institutions compared with the baseline internal practices of KCH validates a practice gap. The implementation of CAs can positively impact patient care and close the practice gap (Melnyk & Fineout-Overholt, 2015).

In terms of internal evidence, KCH lacks information on EMs tailored to the anesthesia specialty and perioperative care area. The anesthesia staff at KCH have verbalized the need for CAs to ensure optimal care is provided to the patients during all care phases. The anesthesia group does not have documentation of critical or crisis events that could provide a significant statistical reference to the severity of the EM need. However, talking with the anesthetic providers, it was evident that these circumstances occur about 1-2 times in every three-month period. Additionally, there appears to be no record on these events. Even though the crisis occurrences reported may seem low, the goal is to equip the staff with the best tools and skills to efficiently manage each crisis when it occurs (SACAG, 2019; Morell, 2015). Lastly, frequent

changes in the organizational structure or anesthesia group can hinder the successful implementation of EMs. Despite the high turnover, the OR nurse manager and the chief CRNA remain supportive of the project because they believe it will promote a safety culture.

**Summary of Supportive Evidence**

A thorough examination of the existing evidence to support the use of EMs revealed that the occurrence of crises does not vary significantly between hospitals (Gaba et al., 2015; Morell, 2015; SACAG, 2019). Instead, the tools available to deal with the event results in a vast difference in the outcomes. EMs, if used appropriately, can significantly improve the quality of care (SACAG, 2019). Preliminary evidence supports the creation of a policy to guide the EM implementation process. Even though available evidence supports the use of CAs, the installation of EMs or CAs alone without adequate staff training has not proven to influence practice change (Gaba et al., 2015; Morell, 2015; SACAG, 2019). However, a well thought out plan for the design and staff training on using the EMs is vital to enhance a change in practice. The provider's readiness to learn and adopt new practices can lead to a positive behavioral change (Morell, 2015).

The dynamics and complexity of the OR environment make it susceptible to potential crises. These crises are less anticipated and challenging to manage due to several interrelating factors converging to create the event (Webster, 2005). Evidence suggests that crises in the perioperative period as multi-factorial, resulting from a combination of actions (Gaba et al., 2015; Hepner et al., 2017; Marshalls, 2013; Toff, 2010). These actions could result in unexpected medication effects, surgical complications, equipment failure, unknown patient comorbidities, and individual differences in drug response (Gaba et al., 2015). CA displays and

simulations improve individuals' non-technical skills (Marshall, & Mehra, 2014). Training increases the provider's or team knowledge on when to implement the use of cognitive aids.

The literature review also revealed potential factors that could result in a crisis:

(1) Latent errors are errors that could lie dormant for a long time. They will become evident if they combine with other elements to breach the system defense, resulting in a crisis, such as equipment or organizational culture failure (Toff, 2010).

(2) Predisposing factors trigger events. These factors include the patient (anatomical variabilities, preexisting comorbidities, or undiagnosed medical conditions), the surgery, the surgical team, the anesthetic agents, and the equipment. Disruption to any of these factors could initiate the development of a series of devastating events that could be difficult to correct (Hepner et al., 2017).

(3) Psychological precursors affect the provider performance and include distractions, fatigue, boredom, noise and illumination, illness, and drug use. Failure to address human error such as fatigue, stress, emotions, burnout, and poor communication could result in potential sources of preventable errors. The use of CAs has proven to reduce errors in such instances (Gaba et al., 2015; Hepner et al., 2017).

Breakdown in team communication and failure to involve a multidisciplinary team in the debriefing following a crisis could lead to low team performance (Girish, 2019). The anesthetist provider can facilitate this process by using a checklist to avoid omitting vital steps in dealing with high-stress situations and this in turn can enhance team dynamics (Marshall, & Mehra, 2014).

Evidence reported inadequate provider training was a potential barrier preventing CA use in a crisis (Hepner et al., 2017). CAs are additional tools. Hence the provider's knowledge and

skill of problem are essential when considering including CAs in the care plan. CAs can enhance memory and reduce the omission of vital steps. Still, they cannot explain how to perform a specific procedure if the provider lacks the necessary education on the subject.

# Chapter 3: Project Design/Methodology

## Methodology

The Donabedian model is a quality improvement methodological model that consists of three key components: structure, processes, and outcome (Moran, Burson, & Conrad, 2020). This model provided concepts that were relevant to the project. Assessing the organizational structure provided valuable information about how the project can be implemented and identified influential individuals who helped the project succeed. Processes involved the information gathering, communication, and the intervention, which increased project manager awareness of the healthcare issue. The outcome of the project consisted of reviewing the feedback to draw recommendations and conclusions for the need to adopt CAs for perioperative use.

The intervention took place at KCH. During a scheduled meeting, a PowerPoint presentation was used to translate the evidence that supports the use of cognitive aids in the management of a perioperative crisis. The project manager developed and presented the information. Pre- and post-survey questionnaires were completed to evaluate the participants' perceptions of using CAs and the likelihood of the participants using cognitive aids if installed. The project intervention occurred in February 2021.

The data collection processes were cleared of any data manipulation that could potentially interfere with the project's result by assigning unique identification numbers to participants. There was no compensation to the participants for participating in the project. The participants were provided with an informed consent form that listed the participant's roles, expectations, and rights in the project. The University of Saint Francis and the Lutheran Health Network IRBs approved the project before implementation. See attachment of the informed

consent form in Appendix C and the approval letters from LHN IRB in Appendix D, and USF IRB pending approval, Appendix E.

**Project Design**

This was a quality improvement project with a one-group pre- and post-intervention questionnaire design. The pre- and post-questionnaires were completed by all the anesthesia providers (physician anesthesiology and CRNAs) at KCH in person during the project intervention. The intervention included a display sample of the SACAG anesthesia EM and a PowerPoint presentation on how CAs can significantly facilitate and improve care quality. According to the Stanford Anesthesia Cognitive Aid Group (SACAG, 2019), a PowerPoint presentation used to transmit information on the use of CAs was effective in providing convincing evidence for the benefits of using cognitive aids rather than relying on memory alone to deal with a rare event.

**Ethical Considerations**

The project manager completed training in human subject protection and understands the need to promote safety by ensuring data security, timely disclosure of any risk or potential injury to the participants, and the importance of the Institutional Review Board (IRB) for review. CITI course completion was from January 30, 2020 -March 24, 2020. See the certificates of training completion attached as Appendix F.

**Project Schedule**

The project was scheduled at KCH on February 12, 2021. A total of 60 minutes was required from the participants, 15 minutes for filling out the pre-survey questionnaire, 20 minutes for the PowerPoint presentation, 10 minutes for post-intervention questions and answers, and 15 minutes for the post-survey questionnaire. After the data analysis, the project results and

recommendations drawn from the literature review and the pre/post-intervention questionnaire were shared with the facility.

**Implementation Methods**

The intervention took place at KCH. During the scheduled meeting, the project manager used a PowerPoint presentation to present evidence that supports the use of cognitive aids in perioperative crisis management. Also, pre- and a post- questionnaire were given to the participants to evaluate their perception of the benefits of using CAs and how likely the participants will use CAs if installed.

**Intervention Plan**

The intervention utilized a PowerPoint presentation to provide convincing evidence on the benefits of using cognitive aids rather than relying on memory in dealing with a rare occurring event. The anesthesia providers were notified in advance of the implementation date by the Chief CRNA, and they were encouraged to attend. The presentation took place in the physician lounge room at KCH. A total of 60 minutes was required from the participants. The PowerPoint presentation covered the project's aims and background, practice gap, and barriers and factors that could facilitate the adoption, display, and use of CAs. Also, three samples of the Stanford Anesthesia Manual were on displayed for the anesthesia providers to review as a means to gain insight on the design and its content. These samples were left at KCH with the anesthesia providers as a reference while designing their EMs. See Appendix G for a link to the intervention PowerPoint presentation.

**Measures/Tools/Instruments**

The project manager developed the questionnaires from a previously used tool that was reviewed by context experts. This tool establishes face validity in measuring anesthesia

providers' perception of using a checklist to complete routine, emergency, and unfamiliar anesthesia tasks (Krombach et al., 2015). See Appendix H: Letter of permission to use and adapt survey instruments. See Appendix I for the pre-questionnaire and Appendix J for the post questionnaire.

**Measures and Aims**

The project manager used the aims and outcomes listed below to achieve the project objectives.

Aim 1: Determine how competent providers feel performing anesthesia tasks without any lapses or omissions when relying only on memory and experience.

Outcome/Indicator 1a: The pre to the post-survey questionnaire data will show that anesthesia providers at KCH recognized a 40% increase in errors or omission rates when one relies on memory or experience alone to perform an emergency or an unfamiliar task. The data will be analyzed using descriptive statistics. The pre- and post-questionnaire questions 2 and 3, align with this aim and outcome. It is expected there will be an increase in mean scores for the providers preferring to use CAs to perform anesthesia tasks.

Outcome/Indicator 1b: Anesthesia providers will acknowledge limitations in their ability to perform clinical tasks without any lapses. Approximately 80% of the providers who attended the presentation will agree to use checklists and other cognitive aids if available. The data will be analyzed using descriptive statistics to measure the provider's willingness to use CAs through pre- and post-questionnaire questions 1, 2, and 3. There will be an increase in mean scores for the providers preferring to use CAs to perform anesthesia tasks.

Aim 2: Determine how anesthesia providers rate the usefulness of specific checklists in different aspects of anesthesia care (equipment preparation, hand-offs, routine and emergency procedures).

Outcome 2a: The pre to the post-survey questionnaire data will show that anesthesia providers at KCH recognized checklist use can improve the provider's efficiency and patient safety by 20% as opposed to not using a checklist. Descriptive statistics will be used to measure the responses to questions 11 and 12. These results will show an increase in mean scores for the providers' willingness to use CAs to perform anesthesia tasks.

Aim 3: Assess whether anesthesia providers would feel uncomfortable using checklists publicly ("cheat sheets").

Outcome 3: The pre-post survey will reveal a 50% increased comfort with the use of cognitive aids publicly if routine training was provided. The data will be analyzed using descriptive statistics to measure the responses to questions 11 and 16. The results will show increase mean scores for the providers' comfort level using CAs publicly.

Aim 4a: Reduce the perceived barriers to the use of cognitive aids for performing anesthesia tasks in general.

Outcome/Indicator 4a: The pre-post survey questionnaire will reveal that adequately formatted and thoughtfully integrated CAs will increase the use of CAs by about 50% by the anesthesia providers in completing the anesthesia-related tasks. The data will be analyzed using descriptive statistics. Questions 13 and 14 align with this aim. It is expected there will be an increase in mean scores in the providers preferring to use CAs to perform anesthesia tasks.

Outcome/Indicator 4b: Determine how the providers would rank factors that would promote the acceptance of checklists in anesthesia.

Outcome/Indicator 4b: Providers' feedback from pre-post survey questions will highlight areas that could facilitate the effectiveness of adopting and implementing the anesthesia emergency manual. Questions 17 through 23 will have an increase in mean scores following the educational intervention. Trends will be used to facilitate the implementation and to promote the use of cognitive aids.

**Evaluation Plan**

Data cleansing was performed to ensure the survey questions were answered thoroughly and without omissions. No manipulation of the data was required, as the project was not experimental.

## Methods for collection of data

The pre- and post-questionnaire links were delivered to anesthesia providers by email during the project's intervention at KCH. The participants used their personal electronic devices (phones, tablets, or laptops) to complete the survey. The pre-survey questionnaire was completed before the PowerPoint presentation, while the post-survey questionnaire was completed after the educational presentation. No demographic information was collected, further ensuring participant confidentiality. The participants received survey links from the chief CRNA to their professional email. After completing the surveys, the surveys were submitted without the use of any personal information. The responses were anonymous. The responses were automatically uploaded into the project manager’s Google Drive, then download to an Excel spreadsheet and transferred into SPSS for the completed data analysis. The data was stored on the project manager’s private, password-protected computer and on the USF One Drive for easy but protected access by the project manager.

A one-group pre- and post-survey questionnaire design was used for the intervention. All the data used for the data analysis was primary data collected during the intervention. The pre-survey questionnaire was used to derive baseline data of the anesthesia providers' perception on the use of cognitive aids. This information was later used to calculate knowledge gain from the education PowerPoint presentation by analyzing the difference in increased mean scores between the pre- and post-survey questionnaire. Instructions were provided at the start of the intervention on when to complete each part of the questionnaire. Only the project manager had access to the data after the intervention to ensure data security.

## Data Analysis Plan

Upon completion of the intervention, the data was entered into SPSS for analysis on the project manager's password protected computer. The data cleansing was done to account for missing data. Descriptive statistics (frequency and means), plots, and bar charts were used to gain a clear interpretation of the findings. The survey questionnaires were stored on the project manager's private, password protected computer for a period of eight weeks after the end of the project, in case any further information was needed. After eight weeks the information was deleted from the Google Drive, USF One Drive (both were password protected), and the Excel spreadsheet.

## Dissemination Plan

After the educational intervention was completed and the data collected was completely analyzed, a proper evaluation of the data outcomes was presented to KCH (Chief CRNA, and OR nurse manager) along with feedback from NAP faculty and DNP faculty in a word document for review with the anesthesia providers at KCH and other stakeholders. No manipulation was used throughout the project, as project was nonexperimental. The sharing of this information to

the other stakeholders was encouraged to promote communication and improve the surgical services interdisciplinary staff awareness of current and future practice changes.

**Implementation Process Analysis**

The implementation process had several changes, from having a one-group educational session over one hour to expanding the intervention over six hours based on the providers' availability and the need to maintain social distancing. The initial plan was for the providers to receive and possibly complete the pre-questionnaire before the intervention, but this was also not possible as the chief CRNA responsible for sending out the survey experienced technical difficulties with sharing the links. The technical problem with sharing the questionnaire was resolved by having the participants use the project manager's laptop computer and iPad to fill out both the pre-and post-questionnaire, which was also efficient in maintaining privacy to the participant. These changes allowed the project manager to achieve the close to expected sample size and improve communication with the participant due to multiple small group sessions. The participants expressed their views on the benefits of the educational session and the need to have the EMs in the perioperative care area. The presence of the EM copies on display allowed the provider to quickly review some of the critical events addressed in the EM, which further increased their approval of the project.

# Chapter 4: Results and Outcomes Analysis

## Data Collection Techniques

The project manager sent the pre- and post-questionnaire links to the chief CRNA through text messages for distribution to the participants through their professional email or SMS. However, the chief CRNA could not forward the message to the participants. The project manager resolved the technical failure by distributing the questionnaire using the project manager's password-protected laptop computer and iPad so that each participant could complete the pre- and post-questionnaire privately. The use of the project manager's laptop and iPad devices was efficient because the educational session had a maximum of one to two anesthesia providers, preventing delay or inappropriate use of the participants' time. The completed questionnaires were submitted without the use of any personal information. The submitted responses were automatically uploaded into the project manager's Google Drive. The project manager was responsible for downloading the results to an Excel spreadsheet and then transferring them into SPSS for the completed data analysis. The data was stored on the project manager's private, password-protected computer and the USF One Drive for easy but protected access by the project manager.

## Measures/Indicators

The educational intervention was attended by a total of six anesthesia providers who practice at KCH. Of the six providers that attended the project intervention, the responses of five providers who completed both the pre- and post-questionnaires were considered for the statistical analysis of the results. One of the providers completed the pre-questionnaire but could not complete part of the educational presentation due to work demands. The pre-questionnaire responses for this provider who did not finish the education presentation and the post-

questionnaire were therefore not included for statistical analysis. Completing the pre- and post-questionnaire and attending the educational presentation were two of the inclusion criteria for participation in the project. The statistical analysis was done using SPSS (descriptive statistic) to analyze each question's result based on the participants' responses. The data presented in the table below are the results of each question's mean scores in the pre- and post-questionnaires during the educational intervention at KCH. See Appendix L for SPSS data analysis from which the project manager obtained the following information on the table below.

Table 1

| | Pre-Questionnaire | Post-Questionnaire |
|---|---|---|
| Questions | Mean | Mean |
| Q1. Performing routine anesthesia tasks. | 4.80 | 4.40 |
| Q2. Performing emergency anesthesia tasks (i.e., cardiac arrhythmia, cardiac arrest, malignant hyperthermia, etc.). | 3.80 | 4.40 |
| Q3. Performing an anesthesia task in an unfamiliar or specialty population (i.e., peds, OB, etc.). | 3.20 | 4.60 |
| Q4. Has one or more routine cognitive aids or checklists (i.e., anesthesia machine checklist, WHO surgical checklist, etc.) kept you from forgetting to perform a task (i.e., set NIBP cycle, ensure suction working, turning vapor up, timely ABX administration, etc.)? | 3.00 | 2.80 |
| Q5. Would you use a cognitive aid or checklist if available while preparing for, or performing routine anesthesia care, patient handoff, or in a crisis event? | 3.80 | 4.00 |
| Q6. I currently use cognitive aids or checklists for routine anesthesia care. | 3.00 | 2.80 |
| Q7. I forget to use cognitive aids or checklists, but I want to make them part of my standard workflow. | 3.60 | 4.00 |
| Q8. The use of routine cognitive aids or checklists might distract me from patient care and potentially have an adverse effect. | 2.20 | 3.40 |
| Q9. I feel that not all information on the cognitive aid or checklist is useful. | 2.20 | 3.25 |
| Q10. Cognitive aids or checklists can significantly interfere with anesthesia workflow. | 2.40 | 2.00 |
| Q11. If I were the patient, I would want my provider to use a cognitive aid or checklist while preparing drugs or the equipment before induction? | 3.60 | 4.00 |
| Q12. I feel cognitive aids or checklists will improve the efficiency of anesthesia care. | 4.00 | 4.40 |
| Q13. If routine training were provided, I feel it would increase the use of cognitive aids and checklists. | 3.80 | 4.20 |
| Q14. What factors will increase my use of cognitive aids and checklist? | 3.20 | 3.00 |
| Q15. Does your level of clinical experience influence your interest in using cognitive aids or checklists? | 1.60 | 1.60 |

| | | |
|---|---|---|
| Q16. How comfortable are you using a cognitive aid or checklist in front of colleagues or the patient? | 3.80 | 3.60 |
| Q17. The departmental leadership | 3.80 | 4.00 |
| Q18. Endorsement from the ASA or AANA. | 4.00 | 4.60 |
| Q19. Endorsement from the majority of anesthesia providers and professional champions. | 3.80 | 4.00 |
| Q20. Early integration into anesthesia curriculum. | 4.00 | 4.25 |
| Q21. Thoughtful integration (design (electronic, paper or both) into the anesthesia workspace. | 4.00 | 4.00 |
| Q22. Routine training and simulation sessions. | 3.80 | 3.80 |
| Q23. Policies and litigation issue. | 4.20 | 4.00 |

Aim 1: Determine how competent providers feel performing anesthesia tasks without any lapses or omissions when relying only on memory and experience.

Outcome/Indicator 1a: The pre- to the post-survey questionnaire data will show that anesthesia providers at KCH recognized a 40% increase in errors or omission rates when one relies on memory or experience alone to perform an emergency or an unfamiliar task. The data will be analyzed using descriptive statistics. The pre- and post-questionnaire questions 2 and 3 align with this aim and outcome.

The data analysis results of questions 2 which looked at “performing emergency anesthesia tasks (i.e., cardiac arrhythmia, cardiac arrest, malignant hyperthermia, etc.)” and 3 which looked at “performing an anesthesia task in an unfamiliar or specialty population (i.e., peds, OB, etc.)” indicated that the anesthesia providers at KCH had an increase in the perception of errors or omission rates when one relies on memory or experience alone to perform an unfamiliar task by 44% and 15.7% when performing the emergency procedure. The result implies the intervention highlighted CAs use can be instrumental tools in reducing preventable errors from the provider reliance on memory alone. See Figures 2a and 2b, and 3a and 3b under Appendix L for a visual representation of the results.

Outcome/Indicator 1b: Anesthesia providers will acknowledge limitations in their ability to perform clinical tasks without any lapses. Approximately 80% of the providers who attended the presentation will agree to use checklists and other cognitive aids if available. The data will be analyzed using descriptive statistics to measure the provider's willingness to use CAs through pre- and post-questionnaire questions 5 and 7.

The data analysis results of question 5 which asked, "would you use a cognitive aid or checklist if available while preparing for, or performing routine anesthesia care, patient handoff, or in a crisis event?" indicated that 80% of the providers who attended the presentation agree/strongly agree to use checklists/CAs if available. The educational session was instrumental in influencing 25 % of the providers decided to use CAs while preparing for, or performing routine anesthesia care, patient handoff, or in a crisis event to strongly agree that the benefits of using CAs could enhance the quality-of-care outcomes. Also, data analysis of question 7 which asked, "I forget to use cognitive aids or checklists, but I want to make them part of my standard workflow", showed an increase from 60% to 100% of the providers at KCH agreeing to incorporate CAs as part of the standard workflow when completing anesthesia-related tasks. The results were remarkable, indicating the knowledge gain from the educational intervention could increase the use of CAs amongst providers at KCH. See Figures 5a and 5b, and 7a and 7b under Appendix L for a visual representation of the results.

Aim 2: Determine how anesthesia providers rate the usefulness of specific checklists in different aspects of anesthesia care (equipment preparation, hand-offs, routine and emergency procedures).

Outcome/Indicator 2: The pre- to the post-survey questionnaire data will show that anesthesia providers at KCH recognized checklist use can improve the provider's efficiency and patient

safety by 20% as opposed to not using a checklist. Descriptive statistics will be used to measure the responses to questions 11 and 12.

The data analysis results of question 11 which looked at "if I were the patient, I would want my provider to use a cognitive aid or checklist while preparing drugs or the equipment before induction" had an increase in the mean scores of 3.6 to 4.0, and question 12 which says "I feel cognitive aids or checklists will improve the efficiency of anesthesia care" indicated an increase in the mean scores of 4.0 to 4.4. Thus, by the post-intervention questionnaire, 100% of the providers at KCH felt that CAs use has the potential to improve the efficiency of anesthesia care (equipment preparation, hand-offs, routine and emergency procedures). This finding was important in that 20 to 40% of the providers that were neutral concerning the benefit of using a CA, recognized and agreed that using CAs could enhance the efficiency of care delivery and improve care outcomes after the educational presentation. The results also reflected some knowledge gain from the educational intervention. For example, using a checklist or CA with equipment preparation, hand-offs, routine and emergency procedures can help identify faulty systems and prevent adverse situations from causing harm to the patient or the staff or delaying care. See Figures 11a and 11b, and 12a and 12b under Appendix L for a visual representation of the results.

Aim 3: Assess whether anesthesia providers would feel uncomfortable using checklists publicly ("cheat sheets").

Outcome 3: The pre to post survey will reveal a 50% increased comfort with the use of cognitive aids publicly if routine training was provided. The data will be analyzed using descriptive statistics to measure the responses to questions 11 and 16. The results will show increased mean scores for the providers' comfort level using CAs publicly.

The results of question 11 which looked at "if I were the patient, I would want my provider to use a cognitive aid or checklist while preparing drugs or the equipment before induction" showed an increase from 60% to 100% of the providers at KCH who felt they would be comfortable with their providers using CAs if they were the patient. Also, question 16 which looked at "how comfortable are you using a cognitive aid or checklist in front of colleagues or the patient?" did not show any notable difference after the education presentation, indicating the information presented by the project manager had a low impact on improving the provider's confidence with using a CA in front of a colleague or publicly. However, the five providers who completed the intervention recognized that they would prefer their own providers to use a CA if they were the patient. The responses of these providers seem to signify the providers understand the benefits of using CAs to reduce errors and improve quality of care outcomes.

Aim 4: Reduce the perceived barriers to the use of cognitive aids for performing anesthesia tasks in general.

Outcome/Indicator 4a: The pre to post survey questionnaire will reveal that adequately formatted and thoughtfully integrated CAs will increase the use of CAs by about 50% by the anesthesia providers in completing the anesthesia-related tasks. The data will be analyzed using descriptive statistics. Questions 13 through 14 align with this aim. It is expected there will be an increase in mean scores in the providers preferring to use CAs to perform anesthesia tasks.

The data analysis results of question 13 which asked "If routine training were provided, I feel it would increase the use of cognitive aids and checklists" had an increase in the mean scores of 3.80 to 4.20, with 100% of the anesthesia providers at KCH who attended the project intervention agreeing/strongly agreeing that routine training would increase the use of CAs. Also, question 14 which looked at "what factors will increase my use of CAs and checklist"

about the design of the CA, large print, paper, and color were favorable factors cited by the providers who attended the project intervention as essential to make CA more user-friendly. See Figures 13a and 13b, and 14a and 14b under Appendix L for a visual representation of the results.

Outcome/Indicator 4b: Determine how the providers would rank factors that would promote the acceptance of checklists in anesthesia.

Outcome 4b: Providers' feedback from pre to post survey questions will highlight areas that could facilitate the effectiveness of adopting and implementing the anesthesia emergency manual. Questions 17 through 23 will have an increase in mean scores following the educational intervention. Trends will be used to facilitate the implementation and to promote the use of CAs.

Based on the questionnaire responses, the providers at KCH ranked the thoughtful integration of CAs into the anesthesia workspace, early integration into the anesthesia curriculum, and endorsement from the ASA or AANA as some of the most influential factors for their use of a CA. The other factors, such as the departmental leadership, routine training and simulation, and policies and litigation issues, were ranked as less influential by the providers to increase the possible use of CAs. Even though the providers ranked the litigation issue low in the questionnaires, during the intervention, the providers verbalized concerns that could lead to lawsuits and other penalties if a provider was found to have errors or omissions in care due to a lapse in memory while caring for a patient. Therefore, the generalized conclusion was that the providers at KCH would be comfortable having the CAs adequately formatted and installed in the perioperative care area for routine and emergency usage. See Figures 17 to 23 under Appendix L for a visual representation of the results.

**Data Analysis Inferences**

1. The five providers at KCH who attended the education intervention agreed that the use of CAs could reduce lapses in memory by about 20%.
2. One hundred percent of the providers at KCH who attended the project intervention felt they would be comfortable with their providers using CAs if they were the patient.
3. One hundred percent of the providers at KCH who attended the project intervention agreed/strongly agreed that routine training would increase the use of CAs.
4. Early integration of CAs into the anesthesia program curriculum and thoughtful integration of CAs in the workplace were ranked as highly influential in enhancing the use of CAs. Other factors of significance that could potentially increase the use of CAs were endorsements from a professional organization (ASA and AANA) and leadership support. Litigation seems to have little effect on enhancing the use of CAs based on the data analysis.

**Gaps**

The small sample size of the participants was a potential gap in the project. However, the project manager anticipated this issue as only six providers showed up for the educational intervention out of the eight providers usually present at KCH daily, and only five providers were able complete the project intervention despite expanding intervention hours to allow for flexibility for the providers to attend the educational intervention. Therefore, even though the project results had some significant findings, the results will be considered less applicable due to the narrow sample size of the project participants.

**Unanticipated Consequences**

The project manager had no unanticipated consequences such as risk or harm to participants. Also, the project was non-experimental, participation was voluntary, and the project manager ensured confidentiality of the providers' responses on the questionnaires.

**Expenditures**

The cost for printing four EMs for display at the intervention was $450, with an additional $10 charge for printing the PowerPoint Presentation. Other indirect costs ($50) included ancillary supplies and the project manager's transportation to and from the project implementation site. In addition, the anesthesia providers using their break time to attend the educational intervention led to a reduction in the project expenditures. The anesthesia providers using their time reduced the financial burden on the organization that could have resulted from having all the providers attend only one educational session. These changes prevented interruption in workflow and the cost for overtime hours endured by the facilities.

# Chapter 5: Leadership and Management

## Organizational Culture

Kosciusko Community Hospital (KCH) is a part of Lutheran Health Network (LHN) located in Warsaw County, a part of northern Indiana. KCH houses a 72-bed facility with all-private rooms, located on a 30-acre medical campus, and believes in the power of its health care professionals to deliver exceptional care (LNH, 2020). KCH offers a wide variety of services including an urgent care center, surgical services, intensive care unit, maternal and childcare services, occupational health services, heart and stroke care, health and wellness resources, rehabilitation services, sleep center, wound care center, outpatient services, and cancer care center which provides chemotherapy and radiation therapy. Properly assessing the organization and understanding of the mission (to work hard every day to be a place of healing, caring, and connection for patients and families in the community) explains why KCH's culture promotes staff professional growth and supports high quality-of-care delivered to the community.

A Causal Model of Organizational Performance and Change, or the Burke & Litwin Model, fits to explain the organizational culture and structure at KCH. The Causal Model hypothesizes that performance is affected by internal and external factors of an organization (Burke & Litwin, 1992). It creates a framework to assess the organizational and environmental dimensions that are essential to a successful change. The model also demonstrates how the relationship between the different features of the organization affect the effectiveness of adopting new policies or practical skills (Burke & Litwin, 1992). The causal model merges practical knowledge and what is developed from research and theory to improve the organizational outcomes. This model also provides a guide for diagnosing organizational structure, creating a plan, and managing organizational change that clearly shows cause-and-effect relationships. The

model can be used to distinguish transformational and transactional dynamics in organizations. The model revolves around 12 organizational dimensions (Burke & Litwin, 1992).

1- External environment
2- Mission and strategy
3- Leadership
4- Organizational culture
5- Structure
6- Management practices
7- Systems
8- Work unit climate
9- Task and individual skills
10- Individual needs and values
11- Motivation
12- Individual and organizational performance

The casual model views KCH as comprising of systems functioning together to promote its mission. It is believed that some systems have stronger influence on the organizational performance. For example, the organizational culture having a strong linkage with the organizational reward system (Robinson, 2019). KCH is dedicated to providing excellent care for its patients and to creating a safe work environment for the practitioners and staff (LNH, 2020). KCH promotes diversity, working together, and openly sharing important information with its employees, patients, and the community to promote health education and health management strategies. Using the Burke & Litwin model, three significant components can be used to assess the KCH organization:

*1) External environment*

The use of evidence-based practice is the acceptable national standards to assess healthcare system adherence to safe practices. External disciplines such as the aviation and nuclear power industries use a checklist and emergency manuals (EMs). Over the years, these industries had a tremendous decrease in unexpected events. The pilots and nuclear power professionals are well trained and equipped to manage a crisis promptly and effectively when

they occur to prevent harm to customers and the environment. Current evidence holds the same to the anesthesia and surgical services in the healthcare industry (Agarwala et al., 2019; Alidina et al., 2018; Morell, 2015; SACAG, 2019; Toff, 2010).

The SACAG (2019) and other organizational studies found the use of anesthesia cognitive aids to enhance the provider's proficiency in managing a perioperative crisis event. The World Health Organization (WHO) surgical checklist has also been effective in reducing medical error and providing a better quality of care (Agarwala et al., 2019; Alidina et al., 2018). The organizational management and leadership at KCH recognized the importance of a checklist and promoted the use it. Internal data reported that there were zero infections after surgery for colon cancer patients as a result of using the surgical timeout checklist (LeapFrog Hospital Safety Grade, 2020). Having the data with decreased infection rates from the use of the surgical checklist motivated the leadership at KCH to buy into the project manager's DNP project to continue equipping their staff with evidence-based tools to enhance quality of care. The anesthesia group was influenced by the evidence presented from the external environment to adopt the EM in their perioperative care area (Agarwala et al., 2019; Alidina et al., 2018; Morell, 2015; SACAG, 2019; Toff, 2010).

*2) Transformational factors*

Organizational culture at KCH promotes a non-discriminatory environment to its employees which applies to but is not limited to age, race, citizenship, veteran status, sex, sexual orientation, disability, religion, hiring, placement, promotion, termination, layoff, transfer, leaves of absence, compensation, or training (LNH, 2020). KCH respects employee input and feedback to improve organizational performance (LNH, 2020). The organization encourages career opportunities, professional development, and a positive work climate that improves job

satisfaction. KCH had 166 million dollars invested capital dollars in 2018. LHN contributed 18.4 million dollars to local taxes and had a total of 723 million dollars reinvested in the local economy (LNH, 2020). It received 10.3 million dollars from community sponsorships and partnerships. Hence, KCH has the financial viability to support its operation in the short, medium, and long term, while maintaining the inflow of financial resources higher than the outflow (LHN, 2020).

*3) Transactional factors*

The managers at KCH promote team communication, huddling, and debriefing to update staff on the shift workflow and other innovative ideas and processes needed to improve team dynamics. Effective leadership and management serve as behavioral role models for all employees, promoting a culture that facilitates a change process (Burke & Litwin, 1992; Joseph, 2015).

*Systems*: KCH surgical services have several policies in place to prevent patient injury. For example, the nurse verifies that the patient met with the provider in person before signing the consent form, and time out is observed before any invasive procedure (LHN surgical services, 2020). The system provides for clear roles and responsibilities of the different professional staff. It encourages staff members to verbalize doubts for clarification before the surgical procedure to promote patient safety (Joseph, 2015).

The work unit climate is respectful and encourages teamwork. Assignments are made based on individual skills and qualifications. Proper communication between units helps, especially during care handoff to enhance continuity of care. Electronic medical records also facilitate access to valuable patient information between one group and another (Ingersoll et al., 2000; LNH, 2020). This DNP project's recommendation was for KCH to train other professional

disciplines working near the anesthesia staff on the use of the anesthesia EM, as this will enhance the team performance in dealing with a crisis. The impressions presented by the unit staff which the project manager witnessed during clinical rotation, reflected a positive working relationship with their boss, making it easier to implement a new innovative idea.

*Individual needs and values:* The project manager while communicating with the perioperative care staff was presented with the information that many staff at KCH have worked there for 10-25 years. They consider KCH not only as a workplace but as a family (LHN, 2020). They promote a culture of care, respect, and support for each other. Their values include timeliness, reliability, and flexibility. They also celebrate coworkers' achievements and group accomplishments, and they are very resourceful when help is needed.

*Motivation:* Staff at KCH are passionate about their jobs and strive to promote a high quality of care. They are motivated to continue their education, attend conferences to promote professional growth, and above all, demonstrate the willingness to educate students in their professional development (Burke & Litwin, 1992; LNH, 2020). The individual and collective goals to improve organizational performance are shown by their actions to move towards the goal, take necessary steps, and remain persistent until the satisfaction is achieved (Burke & Litwin, 1992). Their motivation has served as the impetus to have the EM installed in the perioperative care area to promote the delivery of high-quality care to patients.

**Change Strategy**

Nursing practices are continually evolving. The use of evidence-based practice demands the use of current and valid information in caring for our patients. Leaders need to support an innovative environment to promote patient safety (Grossman & Valiga, 2013). Change can be prompted by the healthcare organization, or it may be implemented to meet the national

standards (Aitkenhead et al., 2019). Appropriate communication and training are needed to achieve positive behavior. Also, the human tendency to resist change should be handled diligently with the provision of adequate scientific evidence to necessitate the change in practice.

The use of innovative models in healthcare to improve quality of care and patient safety has made critical advancement in reducing medical error. However, the complexity of the health system still has room for improvement. Burton (2017) relates the healthcare system to the aviation industry and cites some of the striking differences in safety between the two. The lack of standardization of practices was cited as one of the loopholes in care delivery that have continued to lead to medical error. The aviation industry operates as a system with several standardized checklists that are followed by every pilot. The use of a checklist will reduce the reliance on one professional to making critical decisions in a stressful and time constrained period. This practice has greatly improved safety in the aviation industry and promotes standardization of the profession with limited room for questioning if one pilot was better than the other.

The healthcare system has made some progress with the development of specific guidelines to improve standardization in providers' practice. However, the delay in the translation of evidence into practice contributes some challenges in making critical decisions in a crisis. This increases room for omissions, errors, and adverse patient outcomes (Burton, 2017; Goldhaber-Fiebert and Howard (2013; Marshall, 2017). The project manager’s DNP project focus was to increase the awareness of sources of errors and to enhance the implementation and use of the anesthesia EM at KCH. The EM if adopted would enable the anesthesia providers at KCH to use a standardized checklist in the management of a perioperative crisis. This change in

practice will reduce medical error, enhance provider efficiency, and improve quality of care outcomes (Burton, 2017).

Also, CRNAs at KCH should take proactive steps to report on quality and cost measures that can improve patient care such as performing a root cause analysis after a crisis event. Information gathered from the analysis can lead to new ideas and training to improve the staff professional development. Also, with the current health crisis and rules on social distance, the healthcare providers need to develop a creative model to enhance patient involvement in care planning and coordinating. The use of telehealth, remote patient monitoring, and electronic medical records are vital change strategies that could greatly facilitate care (Telehealth.hhs.gov, 2021).

**Leadership Style**

Leaders should possess a passion for leading, motivating, and inspiring their followers. They exert a positive influence on others when it comes to getting the task done. Leaders should be able to provide constructive feedback and seek ways to strengthen their followers to become successful leaders as this will not only improve the number of proficient providers but also lessen the burdens on existing leaders and decrease burnout (Grossman, & Valiga, 2013).

Leaders play a vital role in promoting a safe work environment for the employees and the patients. Leaders are not born. Thus, even good leaders need to continue to seek opportunities for growth to improve the work relationships (Anderson, 2012). Leaders should have the drive for new ideas, be open to feedback, and also provide opportunities to enhance their employees' professional development. Good leaders and managers appreciate the contributions of the team, improve job satisfaction, use of healthcare resources appropriately, increase productivity, and ensure high employee retention rates.

Leadership at KCH provides opportunities for physicians and the other practitioners to sit at the table as partners with hospital leadership, including post-acute providers, to improve patient care (LHN, 2020). The leadership promote a safe work environment, encouraging patient engagement, involving primary care physicians across the continuum, and facilitating coordination of care across providers. The leadership advocates for needed resources to improve patient outcomes and reduce cost. Because of this, the leadership accepted the DNP project proposal and created provision for the education intervention at the facility.

The project manager's leadership style is in line with the leadership style at KCH. The project manager is motivated to share new knowledge, and to inspire team members to adopt new practices that can improve the team performance and quality of care they offer to the patients. The project manager commitment to observantion and open to communication promotes a trustful work relationship. This allows identification of gaps in practice between the project manager, other teams, or external facility. The project manager uses the gaps in practice identified to look for evidence that can improve patient care and enhance the team's performance.

**Interprofessional Collaboration**

The concept of collaboration is a complex and dynamic process involving a wide range of skill sets. Collaboration has several definitions, and it is best understood in the context to which it is used or applied. Standard terms used in the description include sharing, partnership, power, interdependency, and process (D'Amour et al., 2005). The models of collaboration are based on organizational theory, organizational sociology, and empirical data and offer an expectation of each team member's role to the appreciation goal. Sharing practices should employ the best professional knowledge to deal with complex health problems (D'Amour et al., 2005).

Collaboration encourages logic rather than competition, where an individual contributes their best input to address the needs of the patient. Thus, collaboration requires that professionals be interdependent rather than autonomous, and their combined efforts should have a synergistic effect to produce a more prodigious output of the team. Team members' contributions should assist the group in attaining their unified objectives.

*Communication factor*: Collaboration has its own challenges, such as team dynamics and planning for events. In the past, the lack of clear team communication was cited as a result of the providers having limited formal training on interdisciplinary roles upon entering the practice (Interprofessional Education Collaborative, 2016). This can lead to obstruction in care, duplication of resources, ineffective time management, and adverse patient outcomes (Conrad, 2020). It can also place constraints on available healthcare resources, limiting the number of services available to the population. Most organizations have sought to provide training to enhance interprofessional collaboration (IPC) to improve the quality of patient care and promote effective utilization of healthcare resources. According to White (2016), essential elements that can facilitate team communication include active listening, including the patient in decision making, being respectful to team members, providing appreciation, and sharing the achievement of the group.

The project manager’s DNP project facility (KCH) employs interprofessional collaboration through care coordination for perioperative patient optimization. The interdisciplinary surgical team also uses both timeout before surgery and the surgical checklist to minimize medical error (Agarwala et al., 2019; Bromiley, 2008). The policies at KCH also encourage multiple disciplines to ensure the patient meets the appropriate provider and signs the informed consent form before surgery. Following these different team roles allows for thorough

preoperative evaluation and addresses any patient or provider consents before surgery. This vital step ensures the patient is evaluated and that there are plans to deal with any potential abnormalities before proceeding to surgery.

*Role differentiation*: The interdisciplinary team is a structured entity with a common goal to enhance the decision-making processes to achieve optimal patient outcomes. Professional territories or boundaries, if clearly defined, can improve flexibility in sharing professional responsibilities while maintaining the primary focus on the patient. According to the IPC, interdisciplinary communication should be included in the professional curriculum to enlighten students of the duties of related partners (Interprofessional Education Collaborative, 2016). For complex problems, the integration of the knowledge and expertise of each professional will enhance clear communication, coordination of care, reduce delay, and improve care outcomes. The interdisciplinary team effort to integrate and translate the responsibilities shared by several professions is vital to enhance a safe work environment.

The OR manager in charge of the perioperative care area was involved in the project team. Interdisciplinary team efforts are needed to integrate and translate the different professional roles to enhance the utilization of EM in the OR safely. Adoption of CAs will facilitate interprofessional collaboration especially in a crisis. It will lead to reduced errors, improved shared decision making with two or more providers, reduced conflicts, and delays in care. (Bromiley, 2008; Toff, 2010). The organizational structure should provide the needed resource and time for the training of interdisciplinary surgical staff on the use of the anesthesia EM. This will improve team performance and promote patient safety (Alidina et al., 2018; Agrawala et al., 2019; Goldhaber-Fiebert & Howard, 2013).

**Conflict Management**

Chaos and conflict are ongoing struggles in a work environment. Adequate resolution of conflict leads to a healthy work environment (Grossman, & Valiga, 2013). Conflict resolution requires excellent managerial skills, active listening, not taking sides, and show both partners are heard. Providing constructive feedback and working with both parties involved in the conflict is vital in order to explore the reasons for the individual actions (Santos et al., 2018). Poorly resolved conflict can be destructive to staff productivity, create distress, lead to poor staff retention, and increase burnout.

Components such as respect, good communication, self-awareness, trust, and the desire to embrace change are essential for a team if they have to overcome the uncertainty, chaos, volatility, and ambiguity that arise in the workplace. Leaders should take a moment of pause to assess the severity of the issue before making a snap decision, especially in situations where one's action can be difficult reversed, like in anesthesia. Mentors use the saying "It is better to give less as more can always be added". You cannot take back certain words or sentences spoken. You can try other means to resolve the situations, but sometimes it might be too late.

The things a person can control in life are thoughts, emotions, and behavior (Tsipursky, 2017). Leaders need a sense of self-awareness and possess good emotional intelligence (EI) skills. Just like other leadership skills, EI needs to be learned and developed to strengthened one's leadership style. The use of scientific-based patterns to understand how emotions work can foster a healthier working relationship and improve problem-solving skills (Tsipursky, 2017). Our feelings can often overwhelm our rational thinking. Taking a moment of pause or being mindful can change the way our emotions could have led us to react in a specific situation. EI entails exercising self-management, understanding the emotions of others, being present, and

having empathy for the event at hand. Having the understanding of how the mind works can help us to prevent making decisions based on our feelings. Realizing the complexity in make specific decisions regarding conflict management, leadership training on EI could be beneficial in dealing with everyday real-life situations. Developing skills on EI can strengthen one's interactive and relational skills with others, creating a better leader. EI requires the energy and time to evaluate reality more clearly to make better decisions with more expectational values and increased long-term productivity. Also, effective management skills can empower others using positive ideas to increase productivity. Focusing on the strengths of the team member is essential to improve creativity and productivity as everyone has something good to offer. Also, transformative leaders should strive not only to fix the problem but to empower the group to rise above the situation to achieve greatness using the collective strength in the group rather than dealing with the weaknesses of a team member.

The link between chaos and spirituality seems to go hand in hand to improve organization productivity. A spiritual workplace integrates and promotes a sharing culture that incorporates other higher-order values (Khari & Sinha, 2018). Spirituality further enhances the employees' experience of meaning, connectedness, and purpose of the job to their life values. This culture strengthens positive work behaviors, increases trust, and shows appreciation for the contribution of each team member. Also, it highlights more rewards for collective achievements, rather than for individual accomplishment which could precipitate competition, negative pressure, loss of sight of collective goal, and reduced productivity. This happens because there of variability in proficiency of the different professionals. A sharing culture promote skills acquisition by other practitioners and increases team knowledge, flexibility, and organizational competitiveness. It

also increases job satisfaction, employee retention, and the number of experienced workers available to enhance the team performance (Khari & Sinha, 2018).

There was a potential risk of not having enough turnout (a minimal sample size) for the intervention because the anesthesia department at KCH is small (Maximum of 8 to 10 providers). The small sample size could skew the findings, making it difficult to have adequate data on which valuable findings can be derived. This was corrected by expanding the intervention hours from one hour to six hours (0900-1500). Having multiple small groups throughout the six hours promoted social distancing and allowed the anesthesia providers' more flexibility to attend the presentation. Lastly, electronic questionnaire formatting created unforeseen difficulties that resulted from technical issues with sharing the pre-and post-questionnaire. Also, the project manager experienced a major threat with technological issues during the IRB submission process. The result of technical failure led to a delay in the project's IRB approval, ultimately affecting the implementation plan and project timeline. Working in advance of the anticipated date of the IRB review process would create room to accommodate certain unforeseen circumstances and allow the project to continue as planned. Also, seeking contacts and maintaining communication to assure that appropriate personnel received the submitted documents is critical in preventing a delay.

# Chapter 6: Discussion

## Impact of Project

During the educational intervention, participants who attended verbalized the need to design and install EMs in the perioperative care area. Some providers communicated that they were in the process of contacting their professors or peers on what they use and how to obtain the anesthesia EM. The participants expressed satisfaction with the project timing and agreed that the information presented was significant to support the need for EM implementation. The educational intervention effectively got 100% of the providers at KCH who attended the project intervention to agree to use cognitive aids to improve proficiency in a crisis. The anesthesia providers at KCH agreed that the evidence provided during the educational intervention about the sources of errors was valid. The participants also agreed that the use of CAs can serve as a vital tool to enhance the provider's performance in a stressful moment when proficiency and efficiency are expected to prevent adverse patient outcomes.

## Decisions and Recommendations

Successful implementation has been cited as a critical factor in enhancing the use of CAs (Alidina et al., 2018; Agarwala et al., 2019). The findings of the project's intervention support the fact that the providers' use of CAs could be improved if EMs were appropriately implemented in the perioperative care areas. Proper implementation should include the appropriate design of the CAs, routine simulation, and debriefing sessions after the training scenarios to modify the implementation process. These steps were not included as part of this project. Simulation training increases skill reproducibility in real-life crises and promotes the development of long-term memory (Alidina et al., 2018; Agarwala et al., 2019). Developing

expertise requires repetitive activities to improve provider proficiency in dealing with a rare emergency (SACAG, 2019).

Involving a multidisciplinary care team in simulation training and the implementation process is essential to enhance familiarization with the CA, role designation of the different team members, excellent communication skills, and appropriate team performance (Agarwala et al., 2019; Bromiley, 2008). Therefore, the project manager initiated communication with the chief CRNA and the OR manager at KCH to identify staff who could assume and lead the project successfully. In addition, the project manager also volunteered to offer support to the staff personnel to take on the completion of the EM implementation project. The project manager's assistance included helping acquire information and literature that could guide further steps in the implementation process based on recommendations from the SACAG website and other articles referenced in this project (Alidina et al., 2018; Agarwala et al., 2019; SACAG, 2019; Marshall, 2013).

Given the wide availability of health-related data, the timely gathering of relevant information may not be possible in a crisis (Consultant, 2018). Therefore, CAs should contain the most current evidence-based guidelines to provide the best quality of care. Routine maintenance of the CAs is necessary by the anesthesia group to ensure optimal care is delivered when CAs are used. These routine updates will assure the providers that information in the EM meets the standard of current guidelines and improve confidence in the use of CAs. Also, this will reduce the delay in care related to information gathering and improve the quality of care (Anderson, 2002).

Customizing the CAs to meet the resources at the facility is vital. This customization will prevent delays and chaos in a crisis, such as when resources are listed in the CAs but not

available in the facility. If the CA lists medications or tools that are not present in the facility, the result will be a delay in care as the team tries to sort out alternative ways to perform the task (Gad El-Rab et al., 2017).

Identifying a specific location for the storage of EMs is necessary. Findings from Marshall (2017) show that 80% of providers reported using a CA if available, even though results suggest only 7% use a CA. Some providers report forgetting to apply a CA because they did not know it was present. According to Goldhaber-Fiebert and Howard (2013), having the CA located close to the specific crisis cart (i.e., malignant hyperthermia CA attached to a malignant hyperthermia cart, or anesthesia EM attached to the anesthesia machine) improves its accessibility and will increase its use in a crisis.

Time limitations for anesthesia staff to take on the project can pose a barrier to the project implementation. Presenting the team with an EM already designed by the SACAG that requires minimal modification or formatting to meet the facility's needs, will reduce the time commitment on the implementation team. It is also recommended that the implementation champions encourage staff members to review the EM for familiarization before a crisis to enhance productivity (Marshall, 2013).

Frequent change in organizational structure or anesthesia group can pose a barrier to successful implementation (Alidina et al., 2018). Therefore, encouraging the development of a regulatory policy to maintain the EM and provide regular simulation training to promote the Cas' use is essential.

*Summary of recommendations for KCH:*

- All perioperative care areas should adopt the EM.

- The design of the EM should be easy to read (font size and color), on paper, formatted, and user-friendly.
- An appropriate location should be designated for the EM.
- CAs should be crosschecked for feasibility with emergency tools available.
- A team should be created to update and maintain the EM.
- Champions or EM leaders should be identified to guide the implementation process and continual simulation training to help sustain the change in practice.
- The implementation should be broken down into discrete phases to allow for feedback and modifications.
- Users of CAs should become familiar with the CA before use in a crisis.
- Debriefing and self-reflective strategies should be encouraged after CA use.
- Evidence should continue to be collected on crisis events and CA use.
- Data should be evaluated, and gaps should be identified to improve team performance.
- Attached is a video link to aid on why and how to guide the implementation of the EM. https://emergencymanual.stanford.edu/implementation/ (SACAG, 2019).

**Limitations of the Project**

Limitations of the project included the small sample size of the participants, making the project findings less applicable to other facilities. Given the limited amount of time, this project did not include all the appropriate steps for successfully implementing the EM, such as simulation training and evaluation of the project outcomes. The impact on patients and the improvement of the providers' actual use of CAs was not measured in this setting and was outside of this project's scope, making it difficult to draw specific conclusions. Also, because of the project manager's timeline of the degree program, the project manager could not be part of

the facility EM design team. Being part of the facility implementation team would have allowed the project manager to gain more insight into what did or did not work well and how to make amends in the future.

**Application to Other Settings**

This project had a small size, making the findings less valid for generalization to other clinical facilities. In addition, the impact on patients and the improvement of the providers' actual use of CAs was not measured in this setting and was outside of this project's scope, making it difficult to draw specific conclusions. However, the review of evidence to support the need for EM implementation shows the occurrence of a crisis does not vary significantly between hospitals (Gaba et al., 2015; Morell, 2015; SACAG, 2019). Instead, the difference in the outcomes relies on the tools available to deal with the event. Hence, if present and implemented correctly, EMs will serve as a vital tool to enhance the providers' performance in dealing with a crisis and patient outcomes.

**Strategies for Maintaining and Sustaining**

The project manager had already highlighted some strategies for maintaining and sustaining the EM implementation project in the recommendation section. These strategies include creating a policy and team for the maintenance and update of the EM, allocating regular simulation sessions for staff training, and obtaining staff feedback on current EMs, especially after the use of CAs in a crisis event. The OR manager and the chief CRNA are currently developing a team to continue with the implementation process and to familiarize the other perioperative care staff on the content and their role when using the EM. In addition, the implementation team should provide a quarterly update on the use of CAs and the outcome of crisis events. Direct staff comments regarding the use of CAs in the crisis events can help

facilitate processes that could promote the maintenance and regular use of CAs. Gaining the buy-in from the OR manager and chief CRNA has been key to ensuring this project's sustainability.

**Lessons Learned**

Communication is a very influential factor in determining the outcome of a project. The project was time-consuming and demanded the project manager maintain adequate and frequent communication on the project development with the project advisor, the chief CRNA, and the OR manager at KCH. Information transfer was sometimes problematic, leading to delays in specific steps of the project that negatively impacted the project's implementation timeline. Also, other unforeseen circumstances such as the current health care crisis and social distancing rules required that the project manager consider alternative plans because a situation could arise that would potentially interrupt the project intervention. The project manager used different communication methods such as phone, text, email, and video to help facilitate communication with the project mentors and project advisor to consult on subject matters of the project that require their expertise. Also, the review of the literature and the process of completing the project implementation served as a reward for the project manager's individual professional growth and development. This project improved the project manager's ability to evaluate an organization's system and seek opportunities to promote evidence-based practice to enhance care outcomes.

***DNP Essentials***

The project manager attended conferences and workshops related to EBP that focused on project construction, refined literature searching (web, print, etc.), and appraised the literature for relevance to the project. The project manager also had the opportunity to construct and refine a PICOT question related to the project manager's DNP project. The project manager made several

presentations about the PICOT question to the DNP faculty. The project manager discussed the evidence found from the literature search and used it to improve the providers' knowledge at KCH on the EMs' use to support the use of EBP in practice. The project manager developed a PowerPoint Presentation for the anesthesia staff at KCH that highlighted the sources of medical errors and the benefits of using CAs to prevent medical errors in the perioperative area.

The project manager used the Causal Model of Organizational Performance and Change or the Burke & Litwin Model to assess the practice setting. The project manager used the Framework for Changing Behavior to guide the project manager QI project to educate the anesthesia providers at KCH on the benefits of implementing and using CAs. The project manager created a comprehensive SWOT analysis of the organization and established a working relationship with the chief CRNA and the OR manager at KCH to improve collaboration with key stakeholders to identify strategies to enhance systems thinking that could improve health care delivery, increase safety, or reduce error.

In addition, the project manager completed core measure training on research and human subjects' protection, in which the project manager gained knowledge to gather valuable data related to the DNP project while protecting the project participants' confidentiality. Finally, the project manager initiated, scheduled, and attended meetings pertinent to the project to discuss the progress of the project and seek solutions to any challenges experienced with the project, such as making amendments to the project proposal to meet the recommendation from the USF IRB review board.

The project manager gained knowledge on the data collection process, data analysis, and dissemination of DNP project findings to improve practice knowledge on the use of EMs. The project manager also gained knowledge on developing a DNP project proposal, constructing an

IRB proposal, serving as a proposal reviewer for other peers, implementing a DNP project, formulating recommendations for sustainability, and preparing the final DNP project manuscript for dissemination at the USF library.

# Chapter 7: Conclusion

## Potential Project Impact on Health Outcomes Beyond Implementation Site

This project increased the awareness on sources of errors and omissions in the perioperative care period for the anesthesia providers at KCH who were present at the educational session. As a result, 100% of the providers agreed to use CAs in care delivery, which will increase the frequency and presence of CAs' use in the perioperative period. The increased use of the CAs and the observation of other staff can serve to remind, inspire, and motivate other providers to incorporate CAs' use in their practice. In addition, the providers can share information with peers or social groups on where to obtain EMs related to anesthesia practice for use in the perioperative period. The increased awareness and use of CAs can lead to the decreased omissions in care, reduced medical errors, and improved quality of care provided in different facilities.

## Health Policy Implications of Project

The development of a policy by the leaders at KCH to govern the implementation, use, and maintenance of the EM will ensure the EM is kept current and provides time for routine training of the providers (Agrawala et al., 2019; Goldhaber-Fiebert & Howard, 2013). The policy will increase the staff's awareness of the EM as a vital tool for routine and emergency events. The routine training will enhance the provider proficiency in using CAs to prevent delay in care and improve the team dynamics when CAs are later used in a crisis. Creating a policy could influence a culture that supports CAs' use in providing patient care and decrease the stigma of the CAs used as a weakness (Alidina, 2018; Agrawala et al., 2019; Goldhaber-Fiebert & Howard, 2013; SACAG, 2019).

**Proposed Future Direction for Practice**

Anesthesia practice should be guided by an evidence-based approach to managing a crisis in perioperative care. The checklist or CAs should provide the basis for managing the identified issue at hand and allow the team to make modifications to meet the individual patient's needs. The literature used for this project demonstrated that using standardized CAs in perioperative crisis management is the best practice to reduce errors and improve the quality of care (Gaba et al., 2015; Morell, 2015; SACAG, 2019). Evidence-based care supports the principle of beneficence and nonmaleficence in healthcare. EBP use in practice might keep the provider out of legal trouble if there is proof the provider administered care based on current information that was relevant in the management of the situation. This project will be continued as an ongoing QI initiative at KCH. Hence, having a policy and designated teams to maintain and update the anesthesia EM is essential to improve the credibility of the informational content of the EM. In addition, the increasing use of electronic applications may require that the EMs be incorporated into the perioperative flow sheets even if available on paper as some providers expressed that apps make EMs more accessible and feasible.

CAs should have a synergic effect but not replace critical thinking skills. The use of a checklist is not a weakness but promotes a cultural change that enhances the provider's confidence and patient safety (SACAG, 2019). Checklists are used in many other professions for reference so that nothing is forgotten. An examination of existing evidence to support the need for EM installation shows the occurrence of a crisis does not vary significantly between hospitals. Instead, the difference in the outcomes relies on the tools available to deal with the event. The five providers at KCH who attended the educational intervention agreed that the use of CAs could reduce lapses in memory by approximately 20%. Also, one hundred percent of the

providers at KCH who attended the project intervention agreed/strongly agreed that routine training would increase the use of CAs. Furthermore, 100% of the providers at KCH who attended the project intervention felt they would be comfortable with their providers using CAs if they were the patient. Lastly, early integration of CAs into the anesthesia program curriculum and thoughtful integration of CAs in the workplace were ranked as highly influential in enhancing the use of CAs. Other factors of significance that could potentially increase the use of CAs include endorsements from a professional organization (ASA and AANA) and leadership support. Litigation seems to have little effect on enhancing the use of CAs based on the data analysis of the pre-and post-questionnaire that the participants completed during the project intervention. Adequate training and consistent utilization are vital to improving proficiency with the use of CAs. Simulated scenarios enhance the provider's skill in real-life crisis events and develop excellent team communication skills (Marshall, 2013). Organizational policies and structure should be supportive of innovations and the use of EMs to improve patient outcomes. Proper documentation, analysis of the crisis, and feedback are essential to guide the implementation and use of CAs.

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# Appendix A

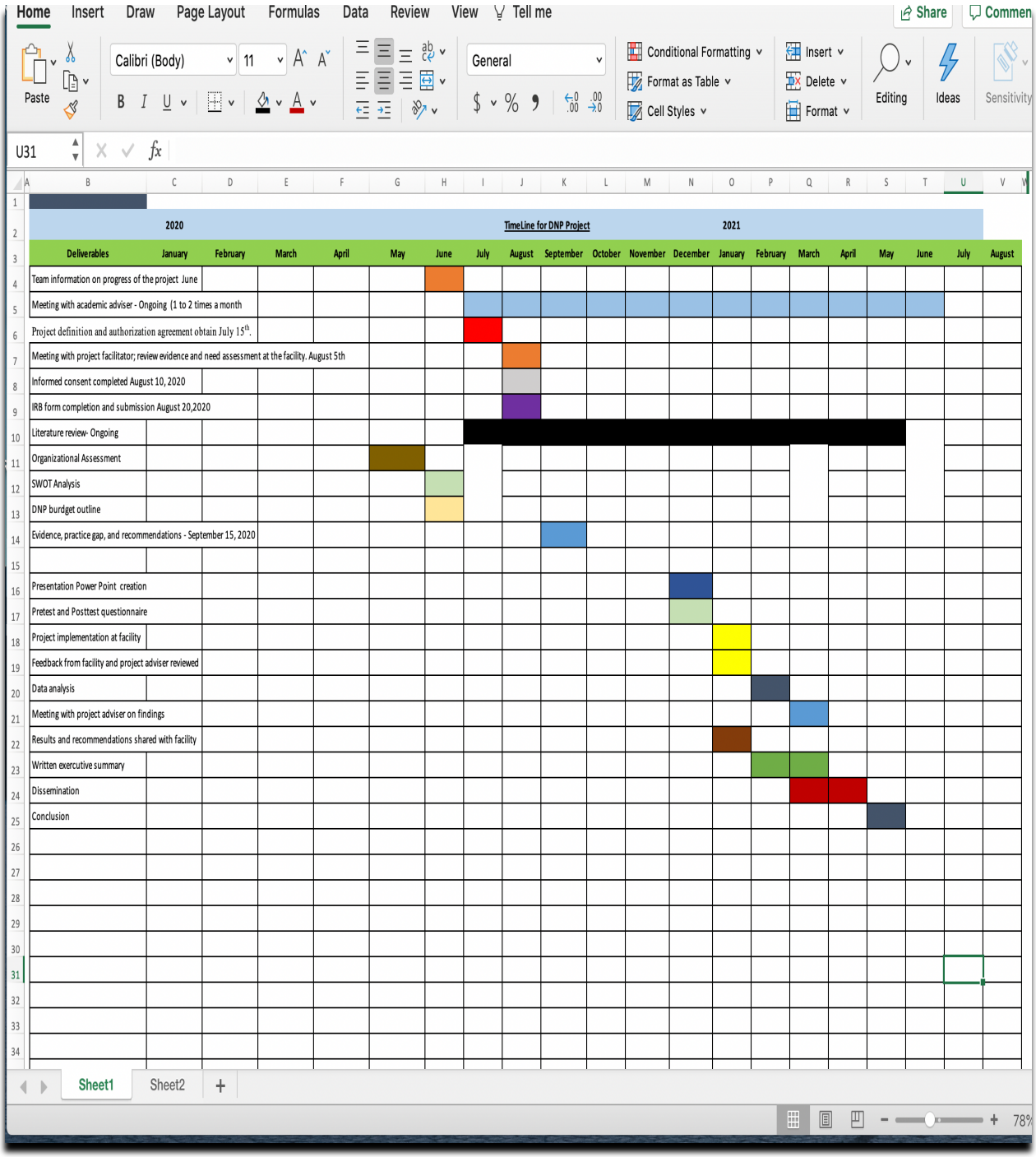
## DNP Project Budget Template

B21

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | **NURS 658 DNP Project Budget Template** | | | | |
| 2 | Legend | Direct Costs | | | |
| 3 | | Indirect Costs | | | |
| 4 | | In-Kind Costs | | | |
| 5 | | | | | |
| 6 | **Project Expenses** | | | | |
| 7 | **Salaries and Wages** | **Description** | **Year 1** | **Year 2** | **Total** |
| 8 | DNP Project Manager- 8 CRNA at project site | $120 X 1.5 hours for intervention | 0 | 900 | 900 |
| 9 | food and drinks | from staff lounge | 0 | 0 | 0 |
| 10 | 1 physician anesthesiology | $200 x 1.5 hours for intervention | 0 | 300 | 300 |
| 11 | OR manager and head of surgical department | $50 x 1.5 intervention | 0 | 75 | 75 |
| 12 | DNP student - project developer | 300 hours | | | 0 |
| 13 | Total Salary Costs | | 0 | 1275 | 1,275 |
| 14 | **Startup Costs** | **Description** | **Year 1** | **Year 2** | **Total** |
| 15 | Marketing- Transportation to Project site | | | $50 | 50 |
| 16 | Focus Groups | 0 | 0 | 0 | 0 |
| 17 | Project Training- Sample of Standford anesthesia | 0 | 0 | 0 | 0 |
| 18 | emergency manual | $50 each for 3 copies | | 150 | 150 |
| 19 | Total Start Up Costs | | 0 | 200 | 200 |
| 20 | **Supplies and Materials** | **Description** | **Year 1** | **Year 2** | **Total** |
| 21 | Handouts, paper, and pen | | | 50 | 50 |
| 22 | | | | | 0 |
| 23 | | | | | 0 |
| 24 | Total Supplies and Materials | | 0 | 50 | 50 |
| 25 | **Capital Costs (costs >2,000)** | **Description** | **Year 1** | **Year 2** | **Total** |
| 26 | 3 Labtop Computers | Data gathering, assemble project information | 0 | 0 | 0 |
| 27 | | communication | | | 0 |
| 28 | Statistical analysis | | | 100 | 100 |
| 29 | Total Capital Costs | | 0 | 100 | 100 |
| 30 | Total Expenses | | 0 | 1625 | 1,625 |
| 31 | **Project Revenue** | **Description** | **Year 1** | **Year 2** | **Total** |
| 32 | Patient Visits | | 0 | 0 | 0 |
| 33 | | | | | 0 |
| 34 | | | | | 0 |
| 35 | | | | | 0 |
| 36 | | | | | 0 |
| 37 | Total Project Revenue | | | | 0 |
| 38 | Project Benefit/Loss | | | | |
| 39 | Total Revenue | | 0 | 0 | 0 |
| 40 | Less Expenses | | 0 | 1625 | 1,625 |
| 41 | Total Project Benefit/Loss | | 0 | -1625 | -1,625 |
| 42 | | | | | |

# Appendix B

## Project timeline



## Appendix C

*Project Informed Consent*
Rebecca Ngaling, SRNA.

### Informed Consent

Emergency Manual Use Can Improve the Providers' Efficiency in Perioperative Crisis Management

**Introduction and Purpose:** I am Rebecca Ngaling, a Student Registered Nurse Anesthetist (SRNA) at the University of Saint Francis in Fort Wayne, Indiana. My DNP project Advisor, Dr. Leah Scalf, and I are conducting a quality improvement project providing education to anesthesia providers regarding how the use of emergency manuals (EM) can improve the providers' efficiency in perioperative crisis management. I will be providing evidence that supports using EMs in perioperative crises to improve patient safety. Recommendations will include the design for the EM, as well as their implementation, use, and maintenance. I would appreciate your participation in this quality improvement project. This will assist in gathering data of the providers' perception of using cognitive aids for completing routine and emergency anesthesia tasks to help determine the need for emergency manual implementation.

**Procedures**

You would be required to complete a pre- and post-survey, which will help us determine if the information presented was sufficient to enhance knowledge on the benefits of using cognitive aids. It will require a total of 15 minutes to complete each survey. The number of participants will be six to ten anesthesia providers at KCH. After the pre-survey, there will be a 20-minute Power Point Presentation on the benefits of using perioperative cognitive aids, and 10 minutes for post-intervention questions and answers. Your participation in this project will take approximately one hour.

**Alternative Procedures**

Although we could conduct this quality improvement project by installing the EM in the OR, research shows that this method of implementation is usually not successful as it does not increase the anesthesia staff awareness and utilization of the EM. Also, the design or formatting may not be user-friendly to the providers. The EM may include essential tools or resources lacking at KCH, possibly causing confusion and a resulting delay in care during high-stress situations. Therefore, involving the anesthesia staff in the design, implementation, and maintenance of the EM is essential to enhance its utilization.

**Potential Risks and Benefits**

No risk is associated with participating in the project. No injuries or medical treatments are involved in the project**.** The findings of the project will enhance the quality of the implementation process to meet the needs of the anesthesia provider and the facility, increase awareness of the sources of error and reduce missteps in the management of a crisis, improve understanding of the use of cognitive aids and emergency manual, increase professionalism, and promote provider confidence and autonomy in the management of crisis events. Cognitive aid use will lead to better quality of care outcomes and improved team performance and communication skills. Participants will receive no compensation for participating in the project.

**Safeguards and Confidentiality**

Anesthesia provider confidentiality will be maintained via anonymous surveys. Each survey will have no individual information through which the participant can be identified directly or indirectly (i.e., name, sex, age, provider type). Data will be collected by the project team leader and entered into a SPSS dataset for statistical analysis. The dataset will be stored on the password protected University of Saint Francis OneDrive and only accessible to the project team leader. Data encryption is not required as no identifiable information will be present in the dataset. The SPSS dataset will only be shared with project team members if needed for clarification purposes. Final project data will be reported in aggregate form and distributed to the KCH anesthesia leadership and staff and the University of Saint Francis doctoral faculty and students, and thus individual survey and chart information will remain confidential and nonidentifiable.

**Voluntary Participation and Freedom to Withdraw**

Participation in this project is free, and a participant can withdraw from the project at any time and for any reason. The decision to participate or not will not result in any punitive action from the anesthesia group or KCH such as decisions regarding employment agreements. Data will be used to make modifications to enhance the implementation project. The project will be terminated if the facility and anesthesia group determine that there is no need for EMs in the perioperative care area, or if they determine there is not sufficient data that shows EMs could improve patient care. A copy of the signed consent will be provided to the participant.

**Inquiries.** You have been provided with contact information for the quality improvement project manager. If you have any questions about the project, feel free to reach out to the contact person at any time with questions about the project. I will be glad to answer any questions you may have. On completion of the project, I would be delighted to share the findings with you. Also, the results of the project may be published in a professional journal with the permission of the anesthesia group and KCH to enhance the dissemination of the evidence and to improve clinical practice. In the meantime, if you have any questions, please contact me at:

**Contact Person:**

Rebecca Ngaling. Nurse Anesthesia Department, University of Saint Francis.
8408 #2B Lakeside Drive. Fort Wayne, IN 46816
Phone number: (651) 403-3368
Email: Ngalingrn@cougars.sf.edu

If you have any complaints about your treatment as a participant in this study, please call or write:

IRB Chairperson
University of Saint Francis
2701 Spring Street
Fort Wayne, Indiana 46808
(260) 399-7700
IRB@sf.edu

Signing of this form indicates you have received an explanation of the project, that you understand your role, and agree to participate in the project. I understand that my participation in this project is strictly voluntary as outlined in the Informed Consent.

_____

Printed Name

_____/_____

Signature /Date

This quality improvement project has been approved by the University of Saint Francis' Institutional Review Board for the Protection of Human Subjects for one year.

# Appendix D

**Lutheran Health Network**
**Institutional Review Board (IRB) Expedited Approval Letter**

November 13,2020

Rebecca Gnaling, SRNA

Re: **LHN File:** **20-571**
Study Name: Emergency Manuals use can improve the Providers Efficiency in Perioperative Crisis Management

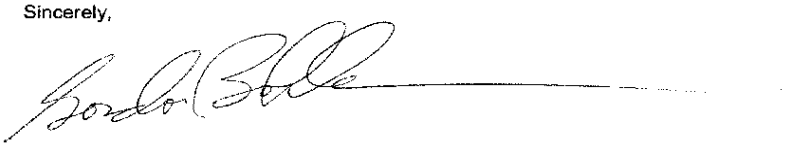
Submission: **Protocol Version Date Sept 9, 2020**
**Exempt from Informed Consent**

Dear Ms. Gnaling

Enclosed is the **expedited** Approval Form of the Lutheran Health Network Institutional Review Board (IRB) for the above referenced study.

Should you have any questions or require any additional information, please do not hesitate to contact me at 260-435-7718.

Sincerely,



Gordon Bokhart Pharm D,
Director of Research
Lutheran Hospital
Fort Wayne, IN 46804

enclosure

**Lutheran Health Network**
**Institutional Review Board (IRB) Approval Form**

| | |
|---|---|
| **IRB Name:** | Lutheran Health Network Institutional Review Board |
| **IRB Address:** | 7950 W. Jefferson Blvd.<br>Fort Wayne, IN 46804 |
| **Principal Investigator:** | Rebecca Gnaling SRNA |
| **Study Site(s):** | Warsaw Health Systems LLC<br>Dba Kosciusko Community Hospital<br>2101 Dubois Drive<br>Warsaw, IN 46580 |
| Protocol Title and Number: | Emergency Manuals use can Improve the Providers Efficiency in Perioperative Crisis Management |

**Date Received Expedited Review By IRB:** 11-13-2020

The items below have been submitted for review **(check all that apply)**:

☒ Original Protocol Version 1, Date September 9, 2020

☐ Protocol Revision: Dated _____
☐ Investigator Brochure: Dated _____ / _____ / _____
☐ Informed Consent Form (indicate one or all that apply):
Version number _____
Date _____
IRB stamp or notation with approval date of _____
☐ No clinical trial personnel, who are IRB members, deliberated or voted on this protocol.
☐ Subject Advertisements, Recruiting Materials, and Written Information – specify:

☐ Other documents – specify:
_____

**Approval:**
☒ **Expedited Approval** granted on 11/13/2020 to 11-12-2021
☐ Approval granted on _____ from _____ to _____
☐ Conditional approval* granted on _____
☐ Not approved*

*Comments: **This study is exempt from informed consent form.**

The IRB performing this review is duly constituted and operates in accordance and compliance with local and federal regulations and ICH guidelines.

| Gordon Bokhart Pharm D. | | 11-13-2020 |
|---|---|---|
| Printed Name<br>(IRB Chair or designee) | Signature | Date<br>of Signature |

# Appendix E

USF IRB approval letter

**University of Saint Francis**
**Institutional Review Board**
**Human Subjects Review Committee/ACUC/IBC**
**Institutional Review Board Approval Form**

**Protocol Number:** 16104133976-HSRC
**Review by (underline one):** Michael Bechill, IRB Chair
**Date Reviewed:** 02/01/2021
**Principal Investigator:** Rebecca Ngaling
**Faculty Advisor:** Dr. Leah Scalf
**Protocol Title:** Emergency Manuals' Use Can Improve the Providers' Efficiency in Perioperative Crisis Management
**Study Site(s):** University of Saint Francis Main Campus

Type of Proposal:
☐Original research
☐ Replication or extension of previous research
☒Quality Improvement/Evidence-Based Practice Project

Items submitted for review:
☒CITI Certificate
☒Initial protocol
☒Abstract
☒Informed Consent Form (if applicable)
☐Approval letter from outside institution
☐Other – explain: Email request was made for waiver

Type of Review:
☒Full Review
☐Expedited Review
☐Exempt Review

Approval:
☒Approval granted on 02/01/2021
☐Approval granted on _____ for a period of one year.
☐Conditional approval* granted on _____ for a period of one year.
☐Not approved*
☐IRB approval is not required:
☐Other

*Comments:

The committee performing this review is duly constituted and operates in accordance and compliance with local and federal regulations and guidelines.

| Michael P. Bechill | Michael P. Bechill | 2021.02.01 |
|---|---|---|
| Printed Name (Chair or designee) | Signature | Date |

IRB Committee Approval Form mpb 01/01/2021

# Appendix F.

CITI PROGRAM

Completion Date 24-Mar-2020
Expiration Date 24-Mar-2023
Record ID 35162804

This is to certify that:

**Rebecca Ngaling**

Has completed the following CITI Program course:

**Social and Behavioral Responsible Conduct of Research** (Curriculum Group)
**Social and Behavioral Responsible Conduct of Research** (Course Learner Group)
**1 - RCR** (Stage)

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

Under requirements set by:

**University of Saint Francis**

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wb2babcfa-3593-48dd-9ace-df6a5d112a3c-35162804

CITI PROGRAM

Completion Date 21-Mar-2020
Expiration Date 21-Mar-2023
Record ID 35162802

This is to certify that:

**Rebecca Ngaling**

Has completed the following CITI Program course:

**Social & Behavioral Research - Basic/Refresher** (Curriculum Group)
**Social & Behavioral Research** (Course Learner Group)
**1 - Basic Course** (Stage)

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

Under requirements set by:

**University of Saint Francis**

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w02b66245-bdc0-431f-8e5d-5ee07cbc84d1-35162802

CITI PROGRAM

Completion Date 16-Mar-2020
Expiration Date 16-Mar-2023
Record ID 35162805

This is to certify that:

**Rebecca Ngaling**

Has completed the following CITI Program course:

**GCP – Social and Behavioral Research Best Practices for Clinical Research** (Curriculum Group)
**GCP – Social and Behavioral Research Best Practices for Clinical Research** (Course Learner Group)
**1 - Basic Course** (Stage)

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

Under requirements set by:

**University of Saint Francis**

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wc8711a10-cb73-44b1-b3a5-50f330acc440-35162805

CITI PROGRAM

Completion Date 19-Mar-2020
Expiration Date N/A
Record ID 35162803

This is to certify that:

**Rebecca Ngaling**

Has completed the following CITI Program course:

**Information Privacy Security (IPS)** (Curriculum Group)
**Researchers** (Course Learner Group)
**1 - Basic Course** (Stage)

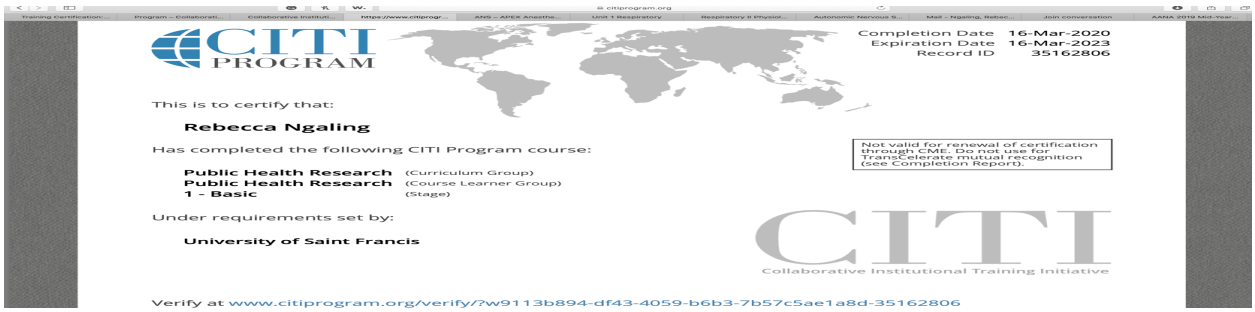
Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

Under requirements set by:

**University of Saint Francis**

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w6be206ac-c2e8-44d4-849b-7b2b299aa4d4-35162803



CITI PROGRAM

Completion Date 16-Mar-2020
Expiration Date 16-Mar-2023
Record ID 35162806

This is to certify that:

**Rebecca Ngaling**

Has completed the following CITI Program course:

**Public Health Research** (Curriculum Group)
**Public Health Research** (Course Learner Group)
**1 - Basic** (Stage)

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

Under requirements set by:

**University of Saint Francis**

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w9113b894-df43-4059-b6b3-7b57c5ae1a8d-35162806

## Appendix G

Link to the intervention PowerPoint Presentation.

https://drive.google.com/file/d/1KznG4Y0MntHk4xrPy4EQymnqqDhhABxS/view?usp=sharing

## Appendix H

Permission to use survey instruments and a sample of the survey questionnaire

from Krombach et al. (2015)

Krombach, Jens <Jens.Krombach@ucsf.edu>

Thu 9/10/2020 1:37 PM

To:

Ngaling, Rebecca N



**Sure! Good luck with your doctoral project! Especially the implementation is the most critical part**

Sent from my iPhone

On Sep 10, 2020, at 11:33, Ngaling, Rebecca N <NgalingRN@cougars.sf.edu> wrote:

**Greetings, Dr. Krombach, and thank you for your excellent contributions to the subject of cognitive aid use in anesthesia.**

I am Rebecca Ngaling, SRNA at the University of Saint Francis, Nurse anesthesia program in Fort Wayne, IN. My Doctoral project is on providing recommendations for the development and implementation of anesthesia emergency manual at a local community here in Fort Wayne, Indiana.

**I am seeking permission to use the survey tool (Appendix 2) in the article listed below during the implementation of my project.**

Checklists and Other Cognitive Aids For Emergency And Routine Anesthesia Care-A Survey on the Perception of Anesthesia Providers From a Large Academic US Institution

I am hopeful my permission will be granted and as a student.

Thank you, Rebecca Ngaling.

# Appendix I

Pre-Questionnaire

Google Forms
Pre-Questionnaire link https://forms.gle/BGRNsHCXQCFJJ69h9

How competent do you feel to perform the following anesthesia tasks without any errors or lapses when relying on memory and experience alone?
Q1. Performing routine anesthesia tasks.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q2. Performing emergency anesthesia tasks (i.e., cardiac arrhythmia, cardiac arrest, malignant hyperthermia, etc.).
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q3. Performing an anesthesia task in an unfamiliar or specialty population (i.e., peds, OB, etc.).
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.

Please answer these questions regarding routine cognitive aids or checklists.
Q4. Has one or more routine cognitive aids or checklists (i.e., anesthesia machine checklist, WHO surgical checklist, etc.) kept you from forgetting to perform a task (i.e., set NIBP cycle, ensure suction working, turning vapor up, timely ABX administration, etc.)?
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q5. Would you use a cognitive aid or checklist if available while preparing for, or performing routine anesthesia care, patient handoff, or in a crisis event?
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q6. I currently use cognitive aids or checklists for routine anesthesia care.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree____.
Q7. I forget to use cognitive aids or checklists, but I want to make them part of my standard workflow.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q8. The use of routine cognitive aids or checklists might distract me from patient care and potentially have an adverse effect.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q9. I feel that not all information on the cognitive aid or checklist is useful.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q10. Cognitive aids or checklists can significantly interfere with anesthesia workflow.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q11. If I were the patient, I would want my provider to use a cognitive aid or checklist while preparing drugs or the equipment before induction?
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q12. I feel cognitive aids or checklists will improve the efficiency of anesthesia care.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree.
Q13. If routine training were provided, I feel it would increase the use of cognitive aids and checklists.

Strongly Disagree____, Disagree___, Neural___, Agree__ , Strongly Agree___.
Q14. What factors will increase my use of cognitive aids and checklist?
Minimal print on paper__, Large print___, Color coded___, Paper__, Electronic___
Q15. Does your level of clinical experience influence your interest in using cognitive aids or checklists?
Yes____, No___
Q16. How comfortable are you using a cognitive aid or checklist in front of colleagues or the patient?
Very uncomfortable____, uncomfortable ___, Neural___, comfortable__ , Very comfortable___.

Please rank the following in level of importance regarding the acceptance of cognitive aids or checklists in anesthesia.
Q17. The departmental leadership.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q18. Endorsement from the ASA or AANA.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q19. Endorsement from the majority of anesthesia providers and professional champions.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q20. Early integration into anesthesia curriculum.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q21. Thoughtful integration (design (electronic, paper or both) into the anesthesia workspace.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q22. Routine training and simulation sessions.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q23. Policies and litigation issue.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.

## Appendix J

Post Questionnaire

Google Forms
Post Questionnaire link https://forms.gle/d4YtL8wTJ4kddjRk6

Please re-answer the following questions in light of the information presented.

How competent do you feel to perform the following anesthesia tasks without any errors or lapses when relying on memory and experience alone?
Q1. Performing routine anesthesia tasks.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q2. Performing emergency anesthesia tasks (i.e., cardiac arrhythmia, cardiac arrest, malignant hyperthermia, etc.).
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q3. Performing an anesthesia task in an unfamiliar or specialty population (i.e., peds, OB, etc.).
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.

Please answer these questions regarding routine cognitive aids or checklists.
Q4. Has one or more routine cognitive aids or checklists (i.e., anesthesia machine checklist, WHO surgical checklist, etc.) kept you from forgetting to perform a task (i.e., set NIBP cycle, ensure suction working, turning vapor up, timely ABX administration, etc.)?
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q5. Would you use a cognitive aid or checklist if available while preparing for, or performing routine anesthesia care, patient handoff, or in a crisis event?
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q6. I currently use cognitive aids or checklists for routine anesthesia care.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree____.
Q7. I forget to use cognitive aids or checklists, but I want to make them part of my standard workflow.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q8. The use of routine cognitive aids or checklists might distract me from patient care and potentially have an adverse effect.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q9. I feel that not all information on the cognitive aid or checklist is useful.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q10. Cognitive aids or checklists can significantly interfere with anesthesia workflow.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q11. If I were the patient, I would want my provider to use a cognitive aid or checklist while preparing drugs or the equipment before induction?
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree___.
Q12. I feel cognitive aids or checklists will improve the efficiency of anesthesia care.
Strongly disagree____, Disagree___, Neural___, Agree__ , Strongly agree.
Q13. If routine training were provided, I feel it would increase the use of cognitive aids and checklists.

Strongly Disagree____, Disagree___, Neural___, Agree__ , Strongly Agree___.
Q14. What factors will increase my use of cognitive aids and checklist?
Minimal print on paper__, Large print___, Color coded___, Paper__, Electronic___
Q15. Does your level of clinical experience influence your interest in using cognitive aids or checklists?
Yes____, No___
Q16. How comfortable are you using a cognitive aid or checklist in front of colleagues or the patient?
Very uncomfortable____, uncomfortable ___, Neural___, comfortable__ , Very comfortable___.

Please rank the following in level of importance regarding the acceptance of cognitive aids or checklists in anesthesia.
Q17. The departmental leadership.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q18. Endorsement from the ASA or AANA.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q19. Endorsement from the majority of anesthesia providers and professional champions.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q20. Early integration into anesthesia curriculum.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q21. Thoughtful integration (design (electronic, paper or both) into the anesthesia workspace.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q22. Routine training and simulation sessions.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.
Q23. Policies and litigation issue.
Very unimportant____, Unimportant___, Neural___, Important__ , Very important___.

# Appendix K

Project team

5-2019

University of Saint Francis
DOCTOR OF NURSING PRACTICE

## DNP SCHOLARLY PROJECT TEAM AGREEMENT

**Name:** Rebecca Ngaling
**Cohort:** August 2018-August 2021 **Student ID:** 465026

**Project Name:** Emergency Manuals Use Can Reduce Patient Harm.

**Project Facility: Kosciusko Community Hospital**

Signatures on this form indicate an agreement that all team members will work collaboratively toward timely completion of the scholarly project [implementation Spring 2021]. The completed form before is to be submitted into Canvas by the specified due date.

| Name | Signature | Date |
|---|---|---|
| Student Rebecca Ngaling, SRNA |  | 7/24/2020 |
| Project Advisor<br>Dr. Scalf Leah |  | 8/20/20 |
| Practice Mentor<br>Mike Caskey, CRNA |  | 7/24/20 |
| Academic Advisor<br>~~Prof.~~ Dr. Louck, Gregory |  | 8/20/2020 |

# Appendix L

## SPSS Data Analysis

Pre-Questionnaire

**Statistics**

| | | Q1. Performing routine anesthesia tasks. | Q2. Performing emergency anesthesia tasks (i.e cardiac arrhythmia, cardiac arrest, malignant hyperthermia , etc.) | Q3. Performing an anesthesia task in an unfamiliar or specialty population (i. e., peds, OB, etc.). |
|---|---|---|---|---|
| N | Valid | 5 | 5 | 5 |
| | Missing | 0 | 0 | 0 |
| Mean | | 4.40 | 4.40 | 4.60 |

**Q1. Performing routine anesthesia tasks.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 20.0 | 20.0 | 20.0 |
| | Agree | 1 | 20.0 | 20.0 | 40.0 |
| | Strongly Agree | 3 | 60.0 | 60.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

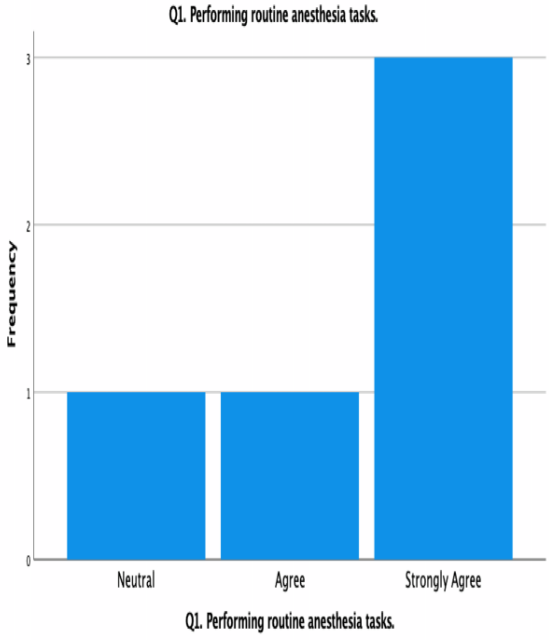



Figure 1a

Post-Questionnaire

**Statistics**

| | | Q1. Performing routine anesthesia tasks. | Q2. Performing emergency anesthesia tasks (i.e cardiac arrhythmia, cardiac arrest, malignant hyperthermia , etc.) | Q3. Performing an anesthesia task in an unfamiliar or specialty population (i. e., peds, OB, etc.). |
|---|---|---|---|---|
| N | Valid | 5 | 5 | 5 |
| | Missing | 1 | 1 | 1 |
| Mean | | 4.80 | 3.80 | 3.20 |

**Q1. Performing routine anesthesia tasks.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Agree | 1 | 16.7 | 20.0 | 20.0 |
| | Strongly Agree | 4 | 66.7 | 80.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

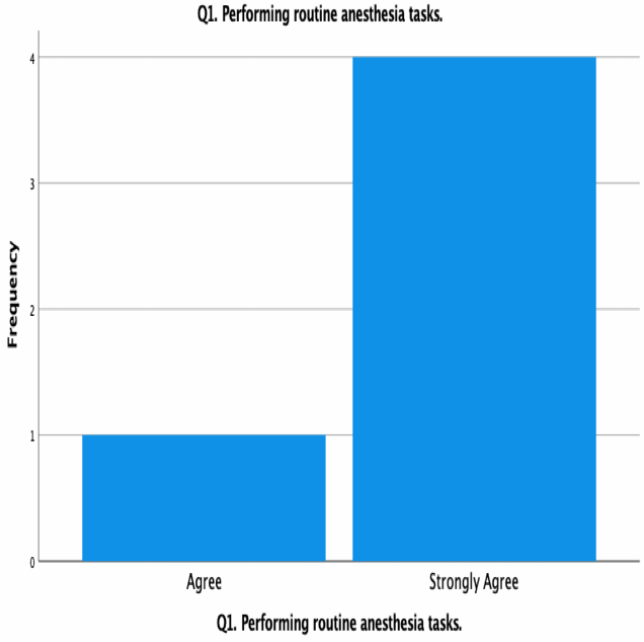



Figure 1b

**Q2. Performing emergency anesthesia tasks (i.e cardiac arrhythmia, cardiac arrest, malignant hyperthermia, etc.)**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 1 | 16.7 | 20.0 | 20.0 |
| | Agree | 3 | 50.0 | 60.0 | 80.0 |
| | Strongly Agree | 1 | 16.7 | 20.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

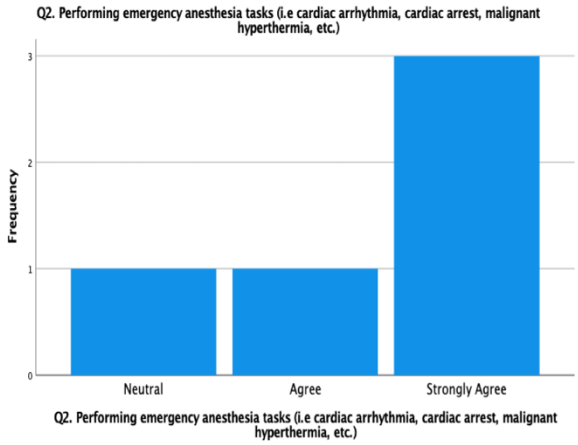



Figure 2a

**Q2. Performing emergency anesthesia tasks (i.e cardiac arrhythmia, cardiac arrest, malignant hyperthermia, etc.)**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 20.0 | 20.0 | 20.0 |
| | Agree | 1 | 20.0 | 20.0 | 40.0 |
| | Strongly Agree | 3 | 60.0 | 60.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

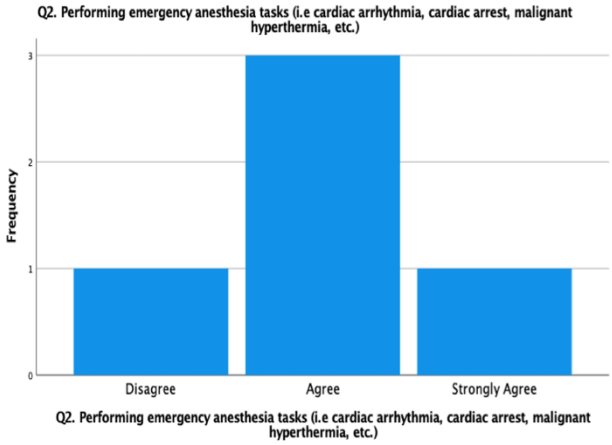



Figure 2b

**Q3. Performing an anesthesia task in an unfamiliar or specialty population (i.e., peds, OB, etc.).**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Agree | 2 | 40.0 | 40.0 | 40.0 |
| | Strongly agree | 3 | 60.0 | 60.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

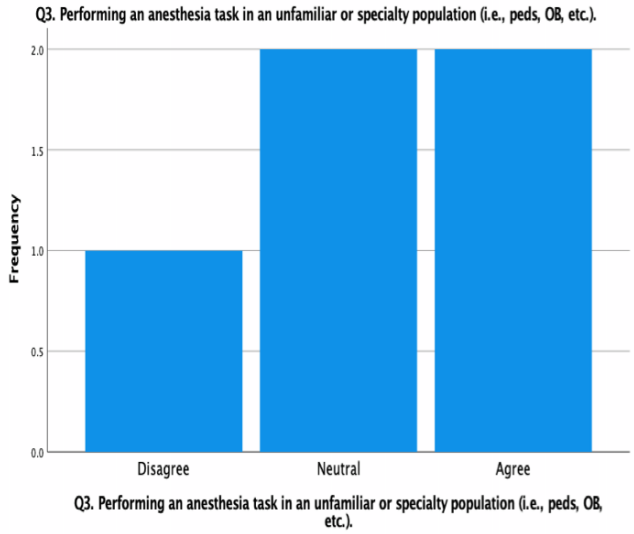



Figure 3a

**Q3. Performing an anesthesia task in an unfamiliar or specialty population (i.e., peds, OB, etc.).**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 1 | 16.7 | 20.0 | 20.0 |
| | Neutral | 2 | 33.3 | 40.0 | 60.0 |
| | Agree | 2 | 33.3 | 40.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

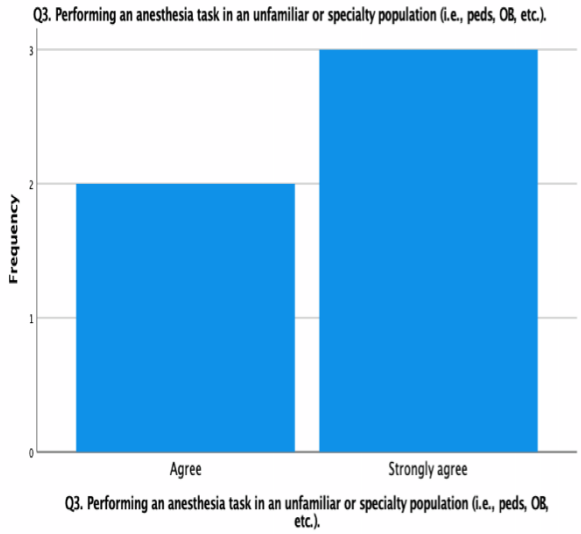



Figure 3b

**Statistics**

| | | Q4. Has one or more routine cognitive aids or checklists (i.e., anesthesia machine checklist, WHO surgical checklist, etc.) kept you from forgetting to perform a task (i.e., set NIBP cycle, ensure suction working, turning vapor up, timely ABX administration, etc.)? | Q5. Would you use a cognitive aid or checklist if available while preparing for, or performing routine anesthesia care, patient handoff, or in a crisis event? | Q6. I currently use cognitive aids or checklists for routine anesthesia care. |
|---|---|---|---|---|
| N | Valid | 5 | 5 | 5 |
| | Missing | 1 | 1 | 1 |
| Mean | | 3.00 | 3.80 | 3.00 |

**Statistics**

| | | Q4. Has one or more routine cognitive aids or checklists (i.e., anesthesia machine checklist, WHO surgical checklist, etc.) kept you from forgetting to perform a task (i.e., set NIBP cycle, ensure suction working, turning vapor up, timely ABX administration, etc.)? | Q5. Would you use a cognitive aid or checklist if available while preparing for, or performing routine anesthesia care, patient handoff, or in a crisis event? | Q6. I currently use cognitive aids or checklists for routine anesthesia care. |
|---|---|---|---|---|
| N | Valid | 5 | 5 | 5 |
| | Missing | 0 | 0 | 0 |
| Mean | | 2.80 | 4.00 | 2.80 |

**Q4. Has one or more routine cognitive aids or checklists (i.e., anesthesia machine checklist, WHO surgical checklist, etc.) kept you from forgetting to perform a task (i.e., set NIBP cycle, ensure suction working, turning vapor up, timely ABX administration, etc.)?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly Disagree | 1 | 16.7 | 20.0 | 20.0 |
| | Neutral | 2 | 33.3 | 40.0 | 60.0 |
| | Agree | 2 | 33.3 | 40.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

**Q4. Has one or more routine cognitive aids or checklists (i.e., anesthesia machine checklist, WHO surgical checklist, etc.) kept you from forgetting to perform a task (i.e., set NIBP cycle, ensure suction working, turning vapor up, timely ABX administration, etc.)?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly Disagree | 1 | 20.0 | 20.0 | 20.0 |
| | Disagree | 2 | 40.0 | 40.0 | 60.0 |
| | Agree | 1 | 20.0 | 20.0 | 80.0 |
| | Strongly Agree | 1 | 20.0 | 20.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

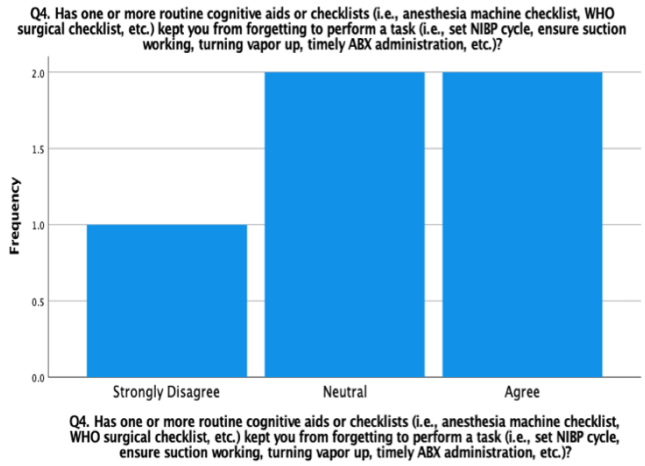



Figure 4a

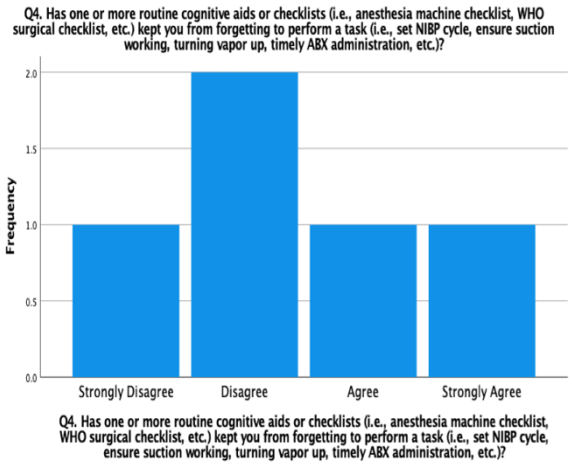



Figure 4b

**Q5. Would you use a cognitive aid or checklist if available while preparing for, or performing routine anesthesia care, patient handoff, or in a crisis event?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 20.0 | 20.0 | 20.0 |
| | Agree | 3 | 60.0 | 60.0 | 80.0 |
| | Strongly Agree | 1 | 20.0 | 20.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

**Q5. Would you use a cognitive aid or checklist if available while preparing for, or performing routine anesthesia care, patient handoff, or in a crisis event?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 16.7 | 20.0 | 20.0 |
| | Agree | 4 | 66.7 | 80.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

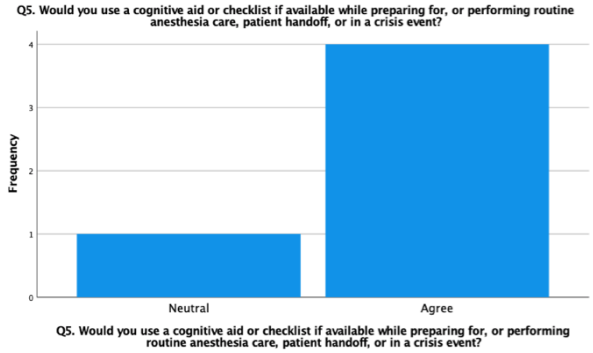



Figure 5a

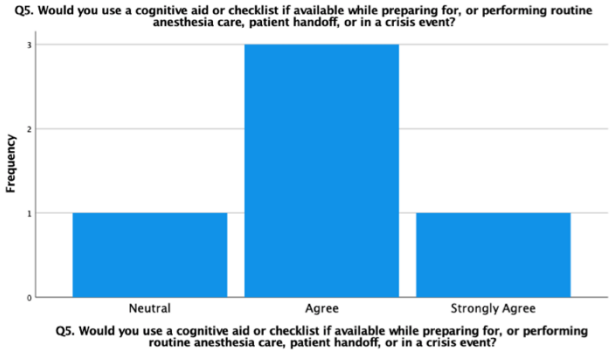



Figure 5b

**Q6. I currently use cognitive aids or checklists for routine anesthesia care.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 2 | 33.3 | 40.0 | 40.0 |
| | Neutral | 1 | 16.7 | 20.0 | 60.0 |
| | Agree | 2 | 33.3 | 40.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

**Q6. I currently use cognitive aids or checklists for routine anesthesia care.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly Disagree | 1 | 20.0 | 20.0 | 20.0 |
| | Disagree | 1 | 20.0 | 20.0 | 40.0 |
| | Neutral | 1 | 20.0 | 20.0 | 60.0 |
| | Agree | 2 | 40.0 | 40.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

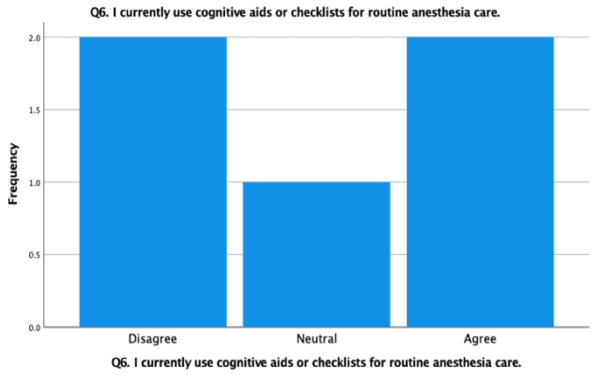



Figure 6a

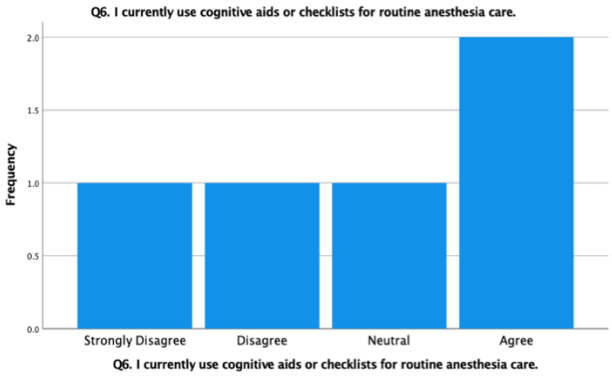



Figure 6b

Pre-Questionnaire

**Statistics**

| | | Q7. I forget to use cognitive aids or checklists, but I want to make them part of my standard workflow. | Q8. The use of routine cognitive aids or checklists might distract me from patient care and potentially have an adverse effect. | Q9. I feel that not all information on the cognitive aid or checklist is useful. | Q10. Cognitive aids or checklists can significantly interfere with anesthesia workflow. | Q11. If I were the patient, I would want my provider to use a cognitive aid or checklist while preparing drugs or the equipment before induction? | Q12. I feel cognitive aids and checklists will improve the efficiency of anesthesia care. | Q13. If routine training were provided, I feel it would increase the use of cognitive aids and checklists. | Q14. What factors will increase my use of cognitive aids and checklists? | Q16. How comfortable are you using a cognitive aid or checklist in front of colleagues or the patient? |
|---|---|---|---|---|---|---|---|---|---|---|
| N | Valid | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| | Missing | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Mean | | 3.60 | 2.20 | 2.20 | 2.40 | 3.60 | 4.00 | 3.80 | 3.20 | 3.80 |

Post-Questionnaire

**Statistics**

| | | Q7. I forget to use cognitive aids or checklists, but I want to make them part of my standard workflow. | Q8. The use of routine cognitive aids or checklists might distract me from patient care and potentially have an adverse effect. | Q9. I feel that not all information on the cognitive aid or checklist is useful. | Q10. Cognitive aids or checklists can significantly interfere with anesthesia workflow. | Q11. If I were the patient, I would want my provider to use a cognitive aid or checklist while preparing drugs or the equipment before induction? | Q12. I feel cognitive aids and checklists will improve the efficiency of anesthesia care. | Q13. If routine training were provided, I feel it would increase the use of cognitive aids and checklists. | Q14. What factors will increase my use of cognitive aids and checklists? | Q15. Does your level of clinical experience influence your interest in using cognitive aids or checklists? | Q16. How comfortable are you using a cognitive aid or checklist in front of colleagues or the patient? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| N | Valid | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 5 |
| | Missing | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Mean | | 4.00 | 3.40 | 3.25 | 2.00 | 4.00 | 4.40 | 4.20 | 3.00 | 1.00 | 3.60 |

**Q7. I forget to use cognitive aids or checklists, but I want to make them part of my standard workflow.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 1 | 16.7 | 20.0 | 20.0 |
| | Neutral | 1 | 16.7 | 20.0 | 40.0 |
| | Agree | 2 | 33.3 | 40.0 | 80.0 |
| | Strongly Agree | 1 | 16.7 | 20.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

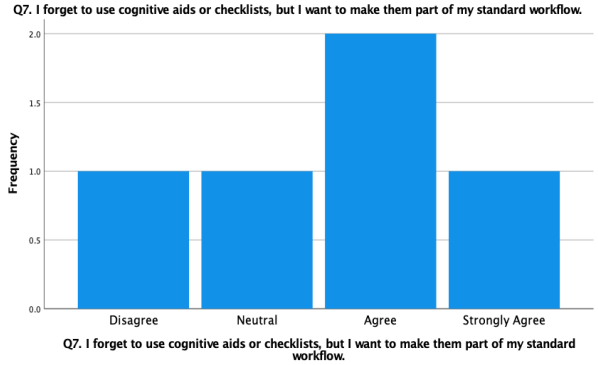



Figure 7a

**Q7. I forget to use cognitive aids or checklists, but I want to make them part of my standard workflow.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Agree | 5 | 100.0 | 100.0 | 100.0 |

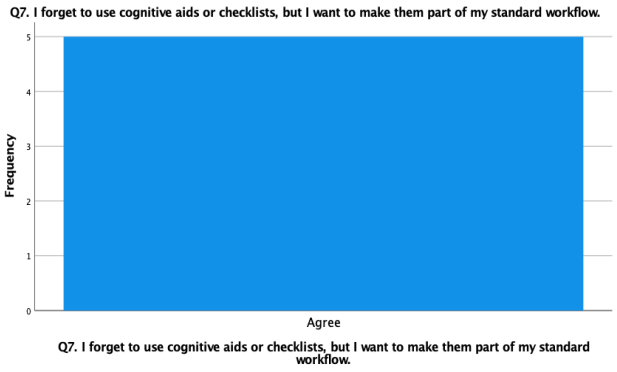



Figure 7b

**Q8. The use of routine cognitive aids or checklists might distract me from patient care and potentially have an adverse effect.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 4 | 66.7 | 80.0 | 80.0 |
| | Neutral | 1 | 16.7 | 20.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

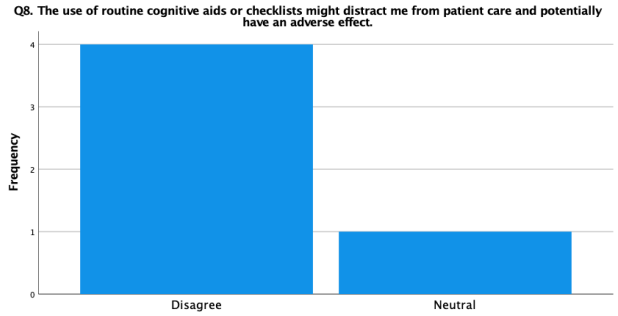



Figure 8a

**Q8. The use of routine cognitive aids or checklists might distract me from patient care and potentially have an adverse effect.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 2 | 40.0 | 40.0 | 40.0 |
| | Agree | 2 | 40.0 | 40.0 | 80.0 |
| | Strongly Agree | 1 | 20.0 | 20.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

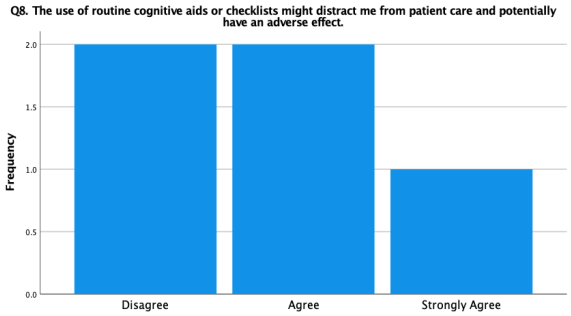



Figure 8b

**Q9. I feel that not all information on the cognitive aid or checklist is useful.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 4 | 66.7 | 80.0 | 80.0 |
| | Neutral | 1 | 16.7 | 20.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

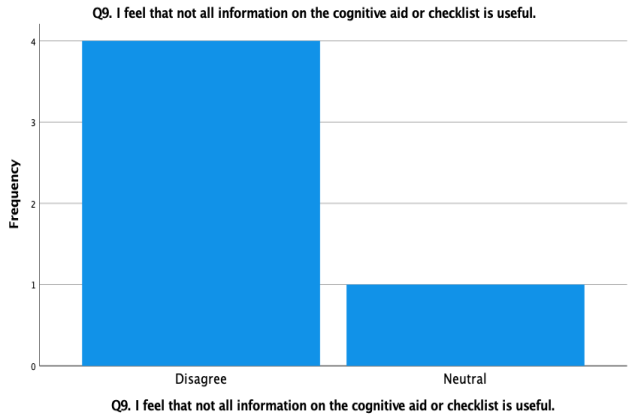



Figure 9a

**Q9. I feel that not all information on the cognitive aid or checklist is useful.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 1 | 20.0 | 25.0 | 25.0 |
| | Neutral | 1 | 20.0 | 25.0 | 50.0 |
| | Agree | 2 | 40.0 | 50.0 | 100.0 |
| | Total | 4 | 80.0 | 100.0 | |
| Missing | System | 1 | 20.0 | | |
| Total | | 5 | 100.0 | | |

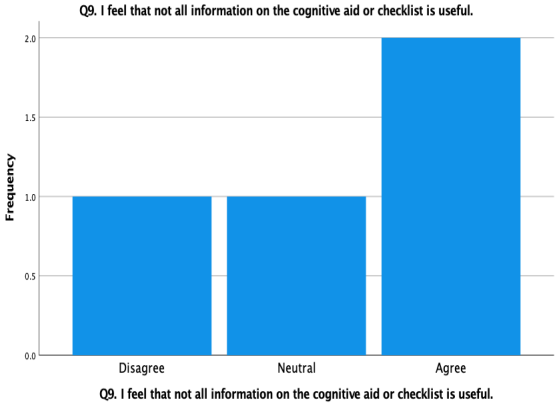



Figure 9b

**Q10. Cognitive aids or checklists can significantly interfere with anesthesia workflow.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 3 | 50.0 | 60.0 | 60.0 |
| | Neutral | 2 | 33.3 | 40.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

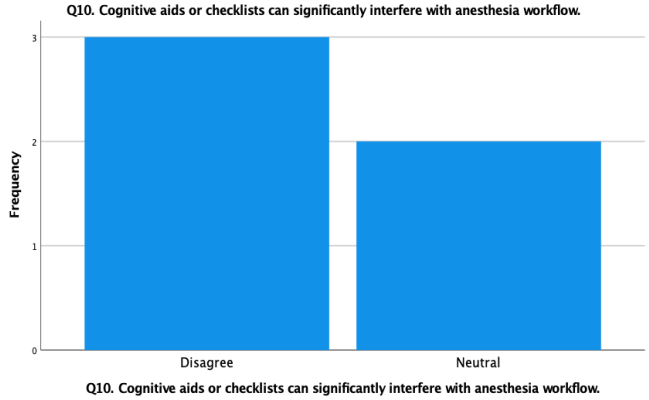



Figure 10a

**Q10. Cognitive aids or checklists can significantly interfere with anesthesia workflow.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly Disagree | 1 | 20.0 | 20.0 | 20.0 |
| | Disagree | 3 | 60.0 | 60.0 | 80.0 |
| | Neutral | 1 | 20.0 | 20.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

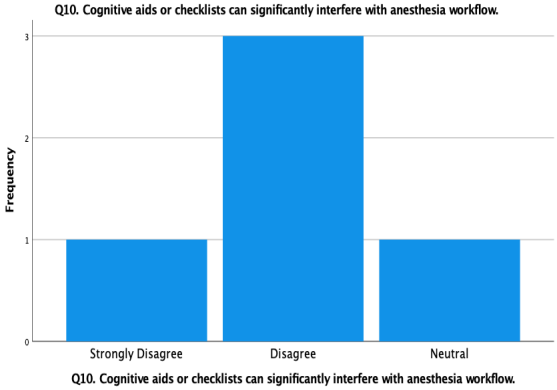



Figure 10b

**Q11. If I were the patient, I would want my provider to use a cognitive aid or checklist while preparing drugs or the equipment before induction?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 2 | 33.3 | 40.0 | 40.0 |
| | Agree | 3 | 50.0 | 60.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

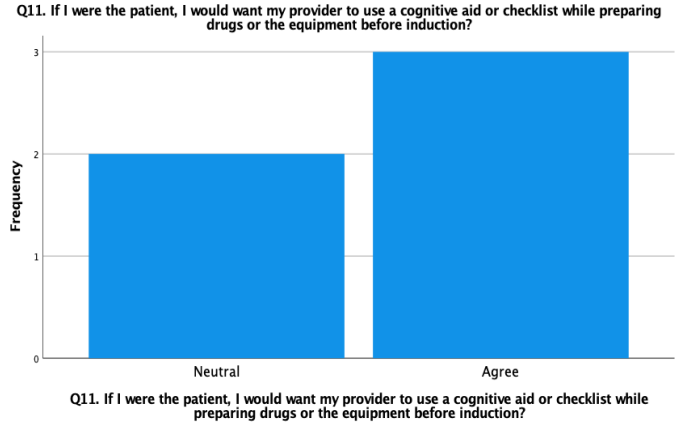



Figure 11a

**Q11. If I were the patient, I would want my provider to use a cognitive aid or checklist while preparing drugs or the equipment before induction?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Agree | 4 | 80.0 | 100.0 | 100.0 |
| Missing | System | 1 | 20.0 | | |
| Total | | 5 | 100.0 | | |

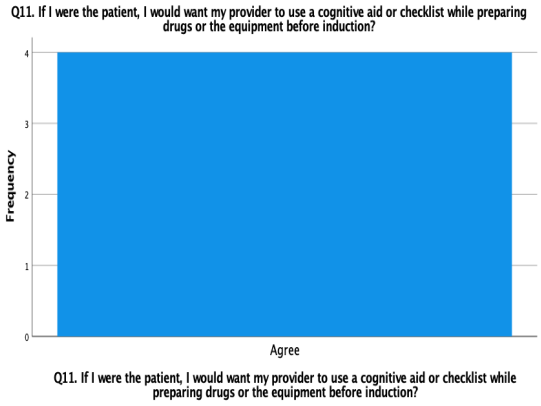



Figure 11b

**Q12. I feel cognitive aids and checklists will improve the efficiency of anesthesia care.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 16.7 | 20.0 | 20.0 |
| | Agree | 3 | 50.0 | 60.0 | 80.0 |
| | Strongly Agree | 1 | 16.7 | 20.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

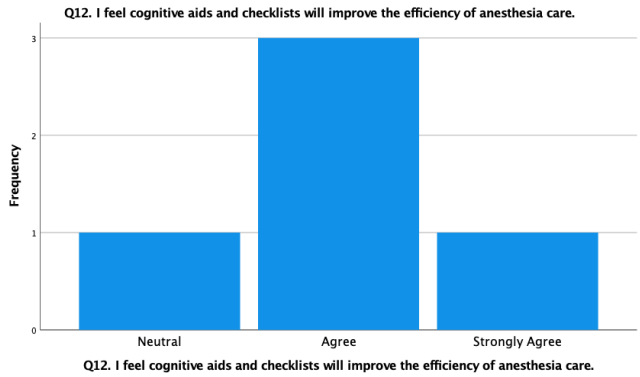



Figure 12a

**Q12. I feel cognitive aids and checklists will improve the efficiency of anesthesia care.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Agree | 3 | 60.0 | 60.0 | 60.0 |
| | Strongly Agree | 2 | 40.0 | 40.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

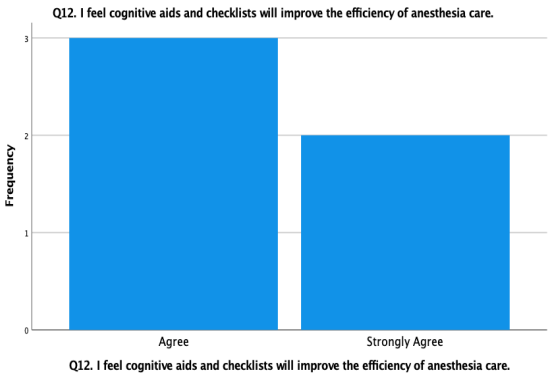



Figure 12b

**Q13. If routine training were provided, I feel it would increase the use of cognitive aids and checklists.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 16.7 | 20.0 | 20.0 |
| | Agree | 4 | 66.7 | 80.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

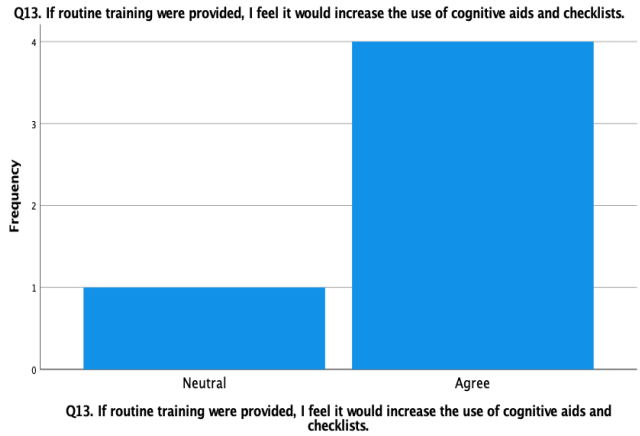



Figure 13a

**Q13. If routine training were provided, I feel it would increase the use of cognitive aids and checklists.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Agree | 4 | 80.0 | 80.0 | 80.0 |
| | Strongly Agree | 1 | 20.0 | 20.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

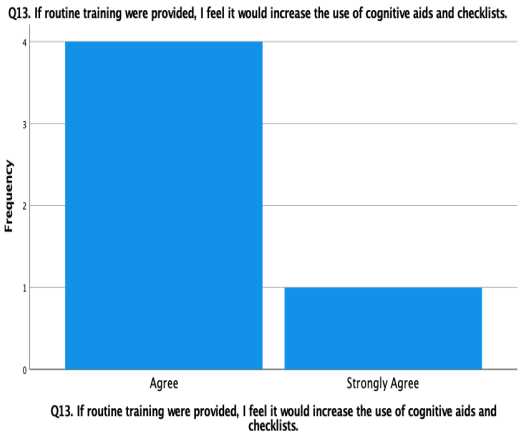



Figure 13b

**Q14. What factors will increase my use of cognitive aids and checklists?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Minimal print on page | 1 | 16.7 | 20.0 | 20.0 |
| | Color coded | 2 | 33.3 | 40.0 | 60.0 |
| | Paper | 1 | 16.7 | 20.0 | 80.0 |
| | Electronic | 1 | 16.7 | 20.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

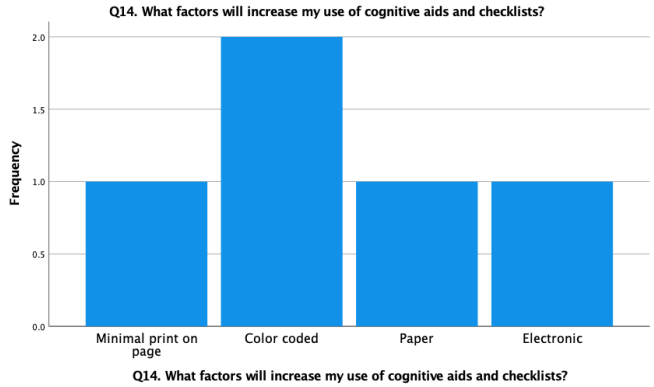



Figure 14a

**Q14. What factors will increase my use of cognitive aids and checklists?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Large print | 2 | 40.0 | 40.0 | 40.0 |
| | Color coded | 1 | 20.0 | 20.0 | 60.0 |
| | Paper | 2 | 40.0 | 40.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

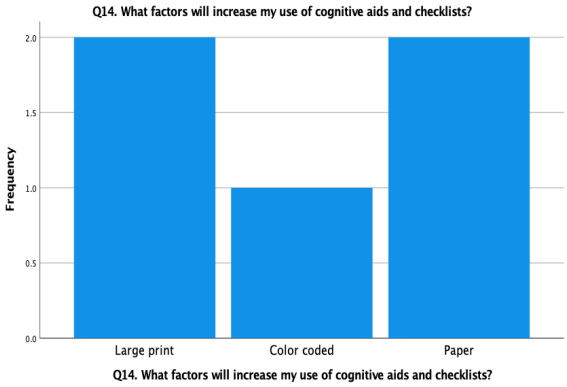



Figure 14b

**Q15. Does your level of clinical experience influence your interest in using cognitive aids or checklists?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly Disagree | 3 | 50.0 | 60.0 | 60.0 |
| | Disagree | 2 | 33.3 | 40.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

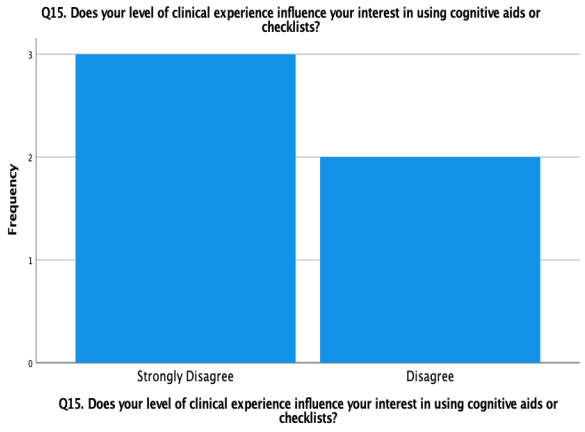



Figure 15a

**Q15. Does your level of clinical experience influence your interest in using cognitive aids or checklists?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 5 | 100.0 | 100.0 | 100.0 |

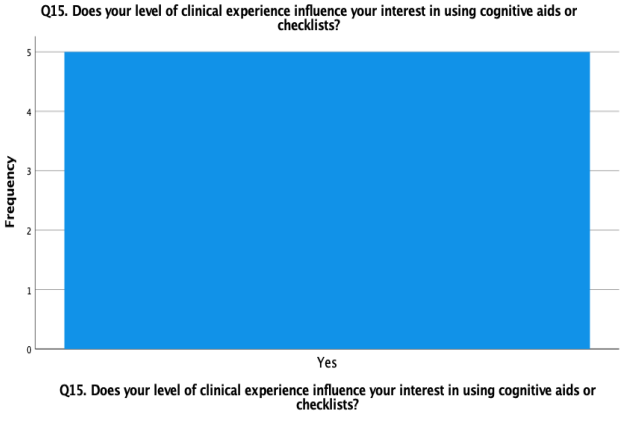



Figure 15b

**Q16. How comfortable are you using a cognitive aid or checklist in front of colleagues or the patient?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 16.7 | 20.0 | 20.0 |
| | Comfortable | 4 | 66.7 | 80.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

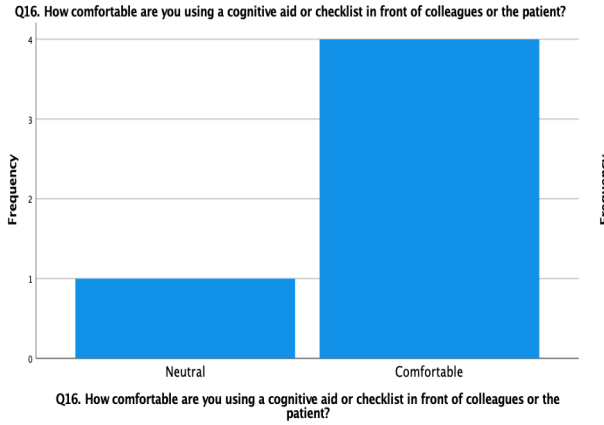



Figure 16a

**Q16. How comfortable are you using a cognitive aid or checklist in front of colleagues or the patient?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 2 | 40.0 | 40.0 | 40.0 |
| | Comfortable | 3 | 60.0 | 60.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

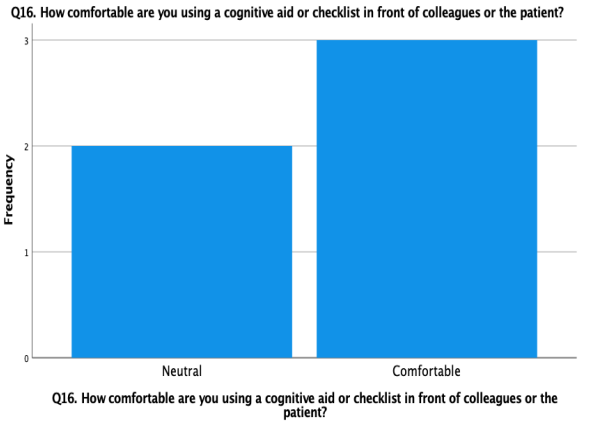



Figure 16b

Pre-Questionnaire

**Statistics**

| | | Q17. The departmental leadership. | Q18. Endorsement from the ASA or AANA. | Q19. Endorsement from the majority of anesthesia providers and professional champions. | Q20. Early integration into anesthesia curriculum. | Q21. Thoughtful integration (design (electronic, paper, or both) into the anesthesia workspace. | Q22. Routine training and simulation sessions. | Q23. Policies and litigation issues. |
|---|---|---|---|---|---|---|---|---|
| N | Valid | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| | Missing | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Mean | | 3.80 | 4.00 | 3.80 | 4.00 | 4.00 | 3.80 | 4.20 |

Post-Questionnaire

**Statistics**

| | | Q17. The departmental leadership. | Q18. Endorsement from the ASA or AANA. | Q19. Endorsement from the majority of anesthesia providers and professional champions. | Q20. Early integration into anesthesia curriculum. | Q21. Thoughtful integration (design (electronic, paper, or both) into the anesthesia workspace. | Q22. Routine training and simulation sessions. | Q23. Policies and litigation issues. |
|---|---|---|---|---|---|---|---|---|
| N | Valid | 5 | 5 | 5 | 4 | 4 | 5 | 5 |
| | Missing | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Mean | | 4.00 | 4.60 | 4.00 | 4.25 | 4.00 | 3.80 | 4.00 |

**Q17. The departmental leadership.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Unimportant | 1 | 16.7 | 20.0 | 20.0 |
| | important | 3 | 50.0 | 60.0 | 80.0 |
| | Very important | 1 | 16.7 | 20.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

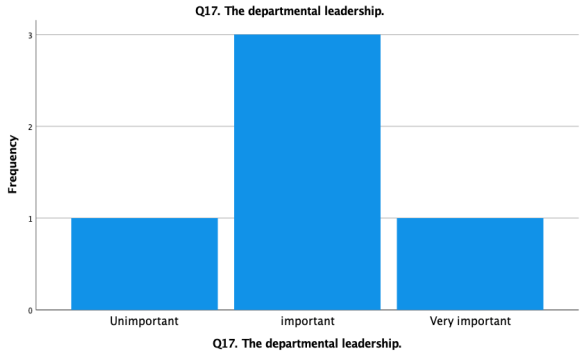



Figure 17a

**Q17. The departmental leadership.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 20.0 | 20.0 | 20.0 |
| | Important | 3 | 60.0 | 60.0 | 80.0 |
| | Very important | 1 | 20.0 | 20.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

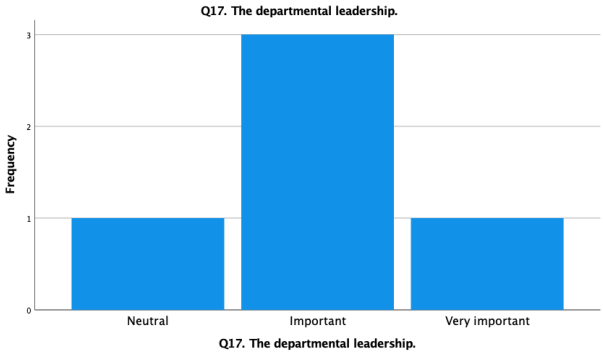



Figure 17b

**Q18. Endorsement from the ASA or AANA.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 2 | 33.3 | 40.0 | 40.0 |
| | Important | 1 | 16.7 | 20.0 | 60.0 |
| | Very important | 2 | 33.3 | 40.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

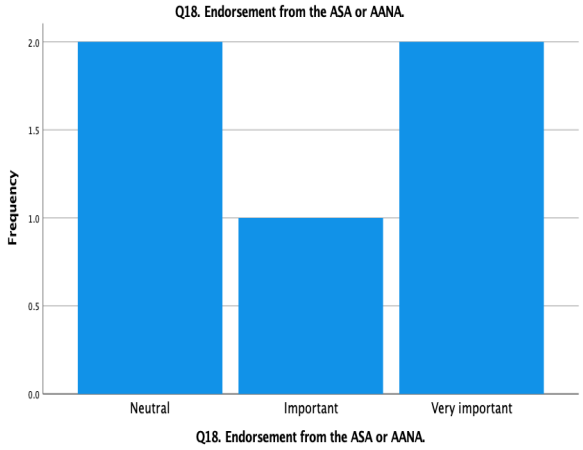



Figure 18a

**Q18. Endorsement from the ASA or AANA.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Important | 2 | 40.0 | 40.0 | 40.0 |
| | Very important | 3 | 60.0 | 60.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

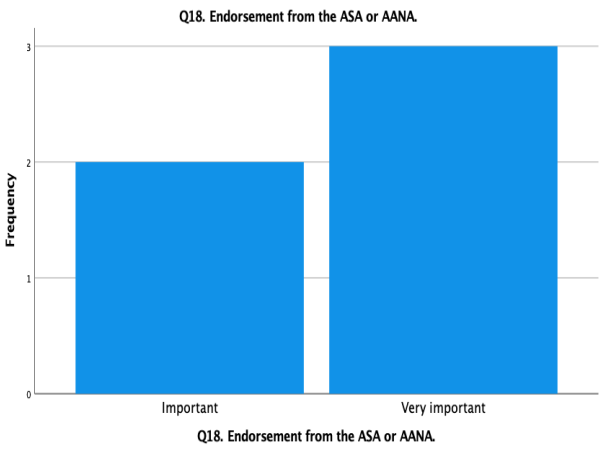



Figure 18b

**Q19. Endorsement from the majority of anesthesia providers and professional champions.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 16.7 | 20.0 | 20.0 |
| | Important | 4 | 66.7 | 80.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

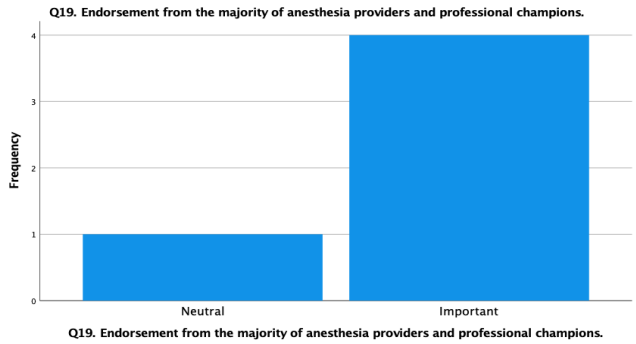



Figure 19a

**Q19. Endorsement from the majority of anesthesia providers and professional champions.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 20.0 | 20.0 | 20.0 |
| | Important | 3 | 60.0 | 60.0 | 80.0 |
| | Very important | 1 | 20.0 | 20.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

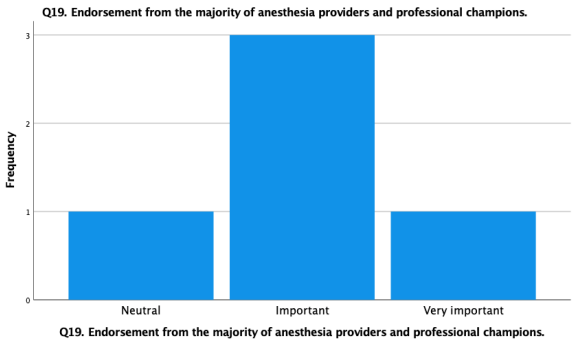



Figure 19b

**Q20. Early integration into anesthesia curriculum.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 16.7 | 20.0 | 20.0 |
| | Important | 3 | 50.0 | 60.0 | 80.0 |
| | Very important | 1 | 16.7 | 20.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

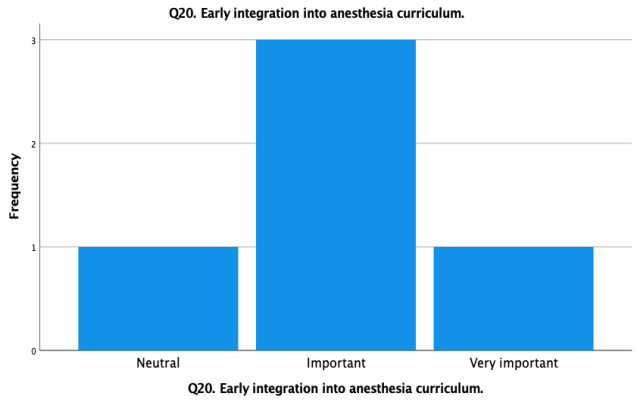



Figure 20a

**Q20. Early integration into anesthesia curriculum.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Important | 3 | 60.0 | 75.0 | 75.0 |
| | Very important | 1 | 20.0 | 25.0 | 100.0 |
| | Total | 4 | 80.0 | 100.0 | |
| Missing | System | 1 | 20.0 | | |
| Total | | 5 | 100.0 | | |

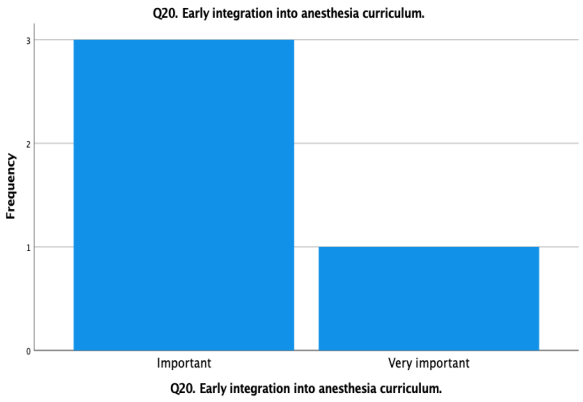



Figure 20b

**Q21. Thoughtful integration (design (electronic, paper, or both) into the anesthesia workspace.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 16.7 | 20.0 | 20.0 |
| | important | 3 | 50.0 | 60.0 | 80.0 |
| | Important | 1 | 16.7 | 20.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

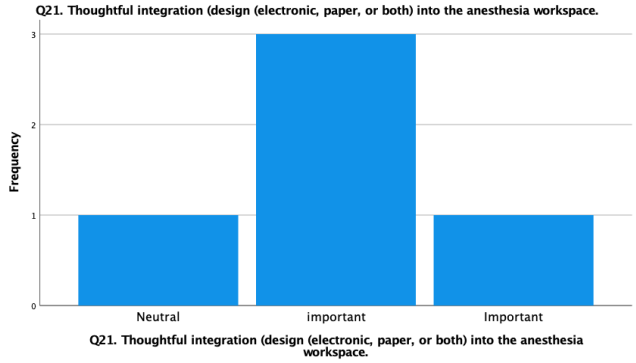



Figure 21a

**Q21. Thoughtful integration (design (electronic, paper, or both) into the anesthesia workspace.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Important | 4 | 80.0 | 100.0 | 100.0 |
| Missing | System | 1 | 20.0 | | |
| Total | | 5 | 100.0 | | |

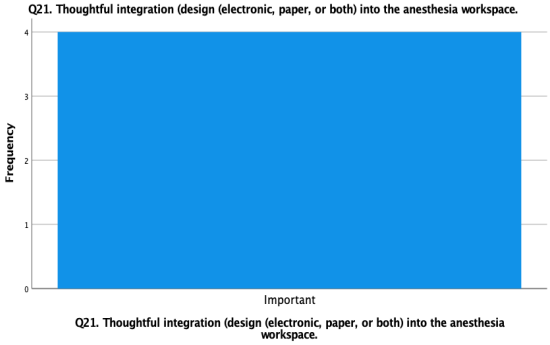



Figure 21b

**Q22. Routine training and simulation sessions.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 16.7 | 20.0 | 20.0 |
| | Important | 4 | 66.7 | 80.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

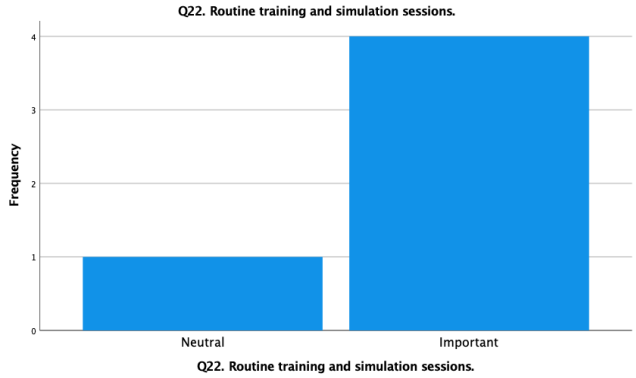



Figure 22a

**Q22. Routine training and simulation sessions.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 2 | 40.0 | 40.0 | 40.0 |
| | Important | 2 | 40.0 | 40.0 | 80.0 |
| | Very important | 1 | 20.0 | 20.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

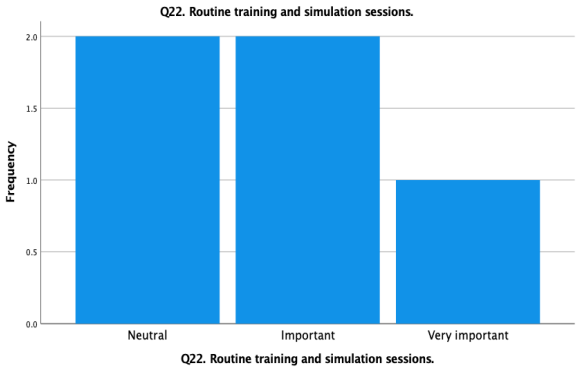



Figure 22b

**Q23. Policies and litigation issues.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 16.7 | 20.0 | 20.0 |
| | Important | 2 | 33.3 | 40.0 | 60.0 |
| | Very important | 2 | 33.3 | 40.0 | 100.0 |
| | Total | 5 | 83.3 | 100.0 | |
| Missing | System | 1 | 16.7 | | |
| Total | | 6 | 100.0 | | |

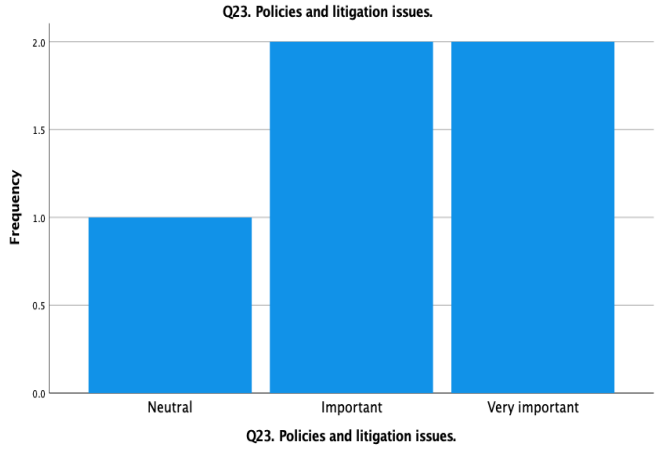



Figure 23a

**Q23. Policies and litigation issues.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 1 | 20.0 | 20.0 | 20.0 |
| | Important | 3 | 60.0 | 60.0 | 80.0 |
| | Very important | 1 | 20.0 | 20.0 | 100.0 |
| | Total | 5 | 100.0 | 100.0 | |

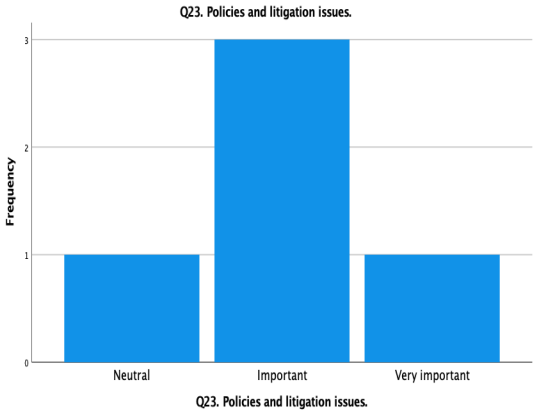



Figure 23b