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CRNA Decision-Making Within the Anesthesia Care Team

Cindi L. Dabney
University of Tennessee Health Science Center

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Abstract

This research focused on Certified Registered Nurse Anesthesiologists' (CRNAs') perspectives on the value placed on their decision-making skills within the Anesthesia Care Team (ACT). The emphasis of the study was to examine CRNA's perspectives on the strengths, challenges, conflict resolutions, and any other information they were willing to divulge when working with physician anesthesiologists in the ACT model. An electronic survey questionnaire was sent to practicing CRNAs, primarily in the southeast region of the United States, with 171 informants completing the questionnaire. Data analysis included demographic information of the convenience sample that included age, gender, initial educational preparation as a CRNA, and practice settings and arrangements. Four free-test questions were asked regarding their perspectives on decision-making strengths, challenges, conflict resolutions, and any additional information about their practice. The researcher and research advisor jointly analyzed the qualitative data and developed themes and subthemes of the informant's responses. Data analysis revealed CRNAs enjoyed and supported collaboration within the ACT and found the team approach led to efficient patient care while having extra hands to help and minds to problem-solve complicated patient scenarios. They did not believe supervision by physicians over their practice was necessary. They found that supervision generated a lack of respect and a restricted scope of practice for CRNAs. They also reported physician microaggressions that lead to tense workenvironments and role confusion for hospital staff and patients. CRNAs often relied on collaboration, accommodation, or compromise to resolve decision-making conflicts within the ACT. However, many avoid or leave the ACT care model for independent practice when these approaches do not. Many CRNAs who left ACTs stated they were much happier with their profession and would never return to the ACT model. The recommendations from this study include a political call to action, a change in payment structure for anesthesia services, and reformed hospital credentialing. These recommendations would allow CRNAs to have a full scope of practice and work independently to deliver the high-quality anesthesia care for which they trained.

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DOCTORAL DISSERTATION

CRNA Decision-Making Within the Anesthesia Care Team

Author:
Cindi L. Dabney

Advisor:
Michael Carter, DNSc

I dedicated this dissertation to my wife, Ruth Dabney, and our children, Hillary, London, and Georgia. Thank you for being there every step of the way, putting up with my endless stacks of papers and articles, and always allowing me to chase my dreams. I may have pursued my dreams, but I would follow you anywhere. I am so honored to share my beloved nursing profession with Hillary and thank you to London and Georgia for your endless supply of hugs and office visits to retrieve gumballs. I also dedicate this dissertation to Dr. Michael Carter. You taught me that no only means to find another way, and I cannot spend my time looking back because I should always look forward.

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Abstract

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This research focused on Certified Registered Nurse Anesthesiologists' (CRNAs') perspectives on the value placed on their decision-making skills within the Anesthesia Care Team (ACT). The emphasis of the study was to examine CRNA's perspectives on the strengths, challenges, conflict resolutions, and any other information they were willing to divulge when working with physician anesthesiologists in the ACT model. An electronic survey questionnaire was sent to practicing CRNAs, primarily in the southeast region of the United States, with 171 informants completing the questionnaire. Data analysis included demographic information of the convenience sample that included age, gender, initial educational preparation as a CRNA, and practice settings and arrangements. Four free-test questions were asked regarding their perspectives on decision-making strengths, challenges, conflict resolutions, and any additional information about their practice. The researcher and research advisor jointly analyzed the qualitative data and developed themes and subthemes of the informant's responses. Data analysis revealed CRNAs enjoyed and supported collaboration within the ACT and found the team approach led to efficient patient care while having extra hands to help and minds to problem-solve complicated patient scenarios. They did not believe supervision by physicians over their practice was necessary. They found that supervision generated a lack of respect and a restricted scope of practice for CRNAs. They also reported physician microaggressions that lead to tense work environments and role confusion for hospital staff and patients. CRNAs often relied on collaboration, accommodation, or compromise to resolve decision-making conflicts within the ACT. However, many avoid or leave the ACT care model for independent practice when these approaches do not. Many CRNAs who left ACTs stated they were much happier with their profession and would never return to the ACT model. The recommendations from this study include a political call to action, a change in payment structure for anesthesia services, and reformed hospital credentialing. These recommendations would allow CRNAs to have a full scope of practice and work independently to deliver the high-quality anesthesia care for which they trained.

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List of Abbreviations

AANA	American Association of Nurse Anesthesiologists
ACRM	Anesthesia Crisis Resource Management
ACT	Anesthesia Care Team
ANTS	Anesthetists' Nontechnical Skills System
APRN	Advanced Practice Registered Nurse
ASA	American Society of Anesthesiologist
CDC	Center for Disease Control
CMS	Centers for Medicare and Medicaid Services
CRM	Crisis Resource Management
CRNA	Certified Registered Nurse Anesthesiologist
CUS	Concerned, Uncomfortable, and Safety
DNP	Doctor of Nursing Practice
FANA	Florida Association of Nurse Anesthesiologists
IOM	Institute of Medicine
MD	Medical Doctor
NAM	National Academy of Medicine
OR	Operating Room
RRNA	Resident Registered Nurse Anesthesiologist
SOP	Scope of Practice
TeamSTEPPS	Team Strategies and Tools to Enhance Performance and Patient Safety
TEFRA	Tax Equity and Fiscal Responsibility Act
TNAFF	The Nurse Anesthesiology Faculty Forum
USF	University of South Florida
UT	University of Tennessee
VA	Veteran Administration

Chapter 1

Introduction

Nurses have been trained and have successfully provided surgical anesthetics for over 100 years. Currently, nurse anesthesiologists (CRNAs) safely administer more than 50 million anesthetics to patients annually in the United States (AANA, 2022). Physicians did not establish their training in anesthesia until about 50 years after nurses (Ahmad and Tariq, 2017). Having two different professions contending for the same practice area has led to conflict in professional decision-making. For example, the American Society of Anesthesiologists unilaterally declared in 1982 that the administration of anesthesia is the practice of medicine (ASA, 2022). The declaration was not based on evidence of potential harm to patients, improved access to care, or decreased costs of having physicians rather than nurses independently administer anesthesia. Instead, the declaration did not include CRNAs in the process and seemed based on professional prerogative and self-service (Hoyem et al., 2019). As a part of this declaration, the ASA proposed that all anesthetics must be administered under the "anesthesia care team model (ACT)." This model specifies that CRNAs must work under the supervision of a physician anesthesiologist. The ACT mandates that one group of licensed independent clinicians, CRNAs, be subjugated to the over site of another clinician, physicians. As could be expected, this move by the ASA has not been well accepted by the CRNA community and, according to Alves SL, 2005, requires CRNAs to resolve conflicts that arise in decision-making about care with physicians through avoidance, accommodation, competition, and collaboration, or compromise (Alves SL, 2005). Each conflict resolution mode has unique challenges in the busy operating room environment when decisions must be made quickly based on the best clinical evidence and clinical judgment available at the time. This research is focused on understanding the advantages and challenges of practice under the ACT from the perspective of CRNAs, particularly on decision-making. This research takes on more importance since the education of CRNAs has continued to evolve in length and scope with the move to the doctoral degree level.

1.1   History of Anesthesia in the United States

In 1846, William Morton demonstrated the use of anesthesia at Massachusetts General Hospital in Boston (Ray and Desai, 2016). Ether anesthesia remained unpopular and unrefined for the next 50 years because ether is highly volatile and high ceiling extraordinary

architecture for the operating room. Ether administration also tended to result in increased mortality rates secondary to aspiration of gastric contents, asphyxiation due to airway obstruction, and lack of monitoring that led to unrecognized events like low blood pressure and cardiac dysrhythmias (Gunn, 1991). Anesthesia training programs did not exist during the mid-1800s, and the task of delivering anesthesia was often assigned to individuals untrained in anesthetic procedures (Ray and Desai, 2016). Early training programs were hospital-based or under the guidance of the military and ranged anywhere from a few months to a few years to complete (Malina and Izlar, 2014).Malina and Izlar, 2014 outlined the early pioneers in Nurse Anesthesiology and their conflicts in a male-dominated medical profession, as almost all nurses were women. Surgeons hired nurses to become their anesthesia providers. Nuns who managed many hospitals assumed the role of training nurses and providing anesthetics as hospitals developed. Nurses had to overcome initial challenges to win the privilege of selecting and administering drugs. Explanations of early training programs and how the world wars influenced them provided insight into the development of today's professional organizations (Ray and Desai, 2016).

Early educational opportunities were provided by surgeons who selected nurses to train in the administration of anesthesia. Famously, the doctors' Mayo, founders of the Mayo Clinic, were among the first to use readings, discussion, laboratory findings, and clinical experience to train nurses. These teaching methods transitioned into hospital-based programs and university settings (Malina and Izlar, 2014).

Malina and Izlar report that anesthesia training was on-the-job in the beginning and involved more art than the science of anesthesia practice. After World War I, the demand for trained nurse anesthetists was substantial, and many programs were established. During the 1920s, there were legal challenges as physicians attempted to restrict nurses' practice rights. Early on, surgeons supported CRNA's practice abilities and rights. However, some targeted other physicians targeted and threatened, so some entered around the withdrawal of hospital appropriation funding and payments to physicians because of their support for CRNAs (Malina and Izlar, 2014). These physicians were trying to commandeer anesthesia as a medical specialty while creating the first medical specialty board in anesthesiology in 1938 (ASA, 2022). Legislative decisions subsequently affirmed the rights of nurses to continue practicing anesthesia. Since this time, even after many legal wins, CRNAs have continued to have their rights and ability to practice brought into question by physician anesthesiologists with ongoing efforts to block their independent practice (Malina and Izlar, 2014).

1.2   Hospital Deaths and Non-Lethal Injuries

Each year in the United States, an estimated 400,000 deaths are associated with preventable lethal harm to hospitalized patients, and severe harmful events that are not lethal may be between 4 and 80 million (Jones TS and Fitzpatrick JJ, 2009). Annual surgical death rates in the United States are currently reported at 1.13 percent. Therefore, surgery is potentially

hazardous but infrequent (Ruiz, Bottle, and Aylin, 2015). The hospital's operating room (OR) is not a single room but a group of locations that serve as the points of treatment for patients undergoing surgical procedures. One portion of the OR is usually the preoperative area, where specialized care team members prepare patients for generational anesthesia. Patients typically move to where the specific surgery is performed and where supporting equipment and personnel are located. Complex anesthesia machines are located in the surgery location and do not usually move with the patient. Following the surgical procedure, the patient is generally transferred to the post-operative care area, where specialized personnel and equipment are in place to ensure safe emergence from anesthesia.

The administration of various types of anesthesia is a complex procedure. Today, nurse and physician anesthesiologists have been well trained to exercise their expert judgment to minimize harm during anesthesia administration throughout the perioperative experience. The result is a meager rate of mortality and morbidity related to anesthesia today, with no identified deference noted between these two providers of anesthesia care (Hoyem et al., 2019).

1.3 Institute of Medicine (IOM) Recommendation to Adopt the Aviation Model to Reduce Errors

In 1999, the Institute of Medicine (IOM), now the National Academy of Medicine (NAM), identified the need to focus on error reduction in American hospitals. The National Academy recommended adopting aviation's safety and error reduction approach as a model for reducing medical errors. The recommendation followed the landmark study regarding patient safety, To Err is Human: Building a Safer Health System (NAM, 2022). Most of these errors identified result from flawed systems of care delivery that can be made much safer and not by poor personal performance (NAM, 2022). One way to mitigate these errors is by adopting the Crisis Resource Management care model based on the Crew Resource Management model (Sundar et al., 2007). Following implementing Crisis Resource Management, healthcare organizations have shown a reduction in adverse patient outcomes, errors, and lengths of hospital stay for patients; higher nursing retention; and overall improvement in attitudes and actions related to teamwork (Powell and Kimberly Hill, 2006).

Over the past ten years, an emerging body of evidence indicated the contribution of human factors related to errors in high-stakes, high-acuity environments like ORs. The common goal in the OR is to have patients progress through the perioperative period as safely as possible. The perioperative experience brings together many providers with different skill sets and expertise that must work as a cohesive team. Crisis Resource Management has improved communication among providers and reduced patient morbidity and mortality (Wakeman and Langham, 2018). However, work remains to be done. Only some hospital systems use this model. Also, there is evidence that some providers lack being fully engaged in the guiding principles of this model, and the resistance to implementation may only be lost through retirement (Grevenstein et al., 2021).

1.4 Theoretical Background

Crisis Resource Management is a risk mitigation model that fits the OR environment (Wakeman and Langham, 2018). The Crisis Resource Management model was adapted from aviation's Crew Resource Management which the National Aeronautics and Space Administration developed following multiple airplane crashes involving preventable human error. The primary aim of Crew Resource Management is to promote communication and improve team behavior while sharing a mental plan of the impending procedure.

Guiding principles of Crisis Resource Management include situational and self-awareness, leadership, adaptability, flexibility, and decision-making (Grevenstein et al., 2021). Failure to adhere to these principles was the primary reason for fatal errors in aviation. Often the aviation team knew mistakes were being made and needed to speak up, but were fearful of the captain, resulting in flight disasters. The goal of Crew Resource Management is not to abolish leadership but to support crew members in identifying and mitigating potential problems before they occur. The model postulates that a culture of safety and respect is established when a leader acknowledges team concerns during the pre or debriefing, reducing errors and improving team dynamics (Wakeman and Langham, 2018). This is the most critical element of Crew Resource Management and likely the same critical component of Crisis Resource Management.

Like aviation, teamwork in the operating room is critical to establishing good communication and patient safety, leading to culture change and better patient outcomes (Ricci and Brumsted, 2012). Aviation research (Wakeman and Langham, 2018) showed the link between teamwork and performance by identifying that the cockpit crews' reluctance to question the captain was a root cause of aviation accidents. (Makary et al., 2006) applied the aviation model to medicine and found similar cofactors of intimidation and lack of approachability as barriers to communication and optimal teamwork functioning.

A key aspect of Crisis Resource Management is creating a safe environment through efficient and effective collaboration, particularly in crises. Most healthcare organizations have begun to focus on problem-solving, situational awareness, communication, and leadership in the aviation industry. Healthcare providers can critically analyze and respond appropriately during crises by focusing on the foundational skills of Crisis Resource Management (Lucas and Edwards, 2017).

Many institutions and organizations that have incorporated Crisis Resource Management ideals have reported improvements in the attitudes and hospital staff's attitudes and behaviors while experiencing reduced nursing staff turnover (Powell and Kimberly Hill, 2006). Transformational leadership is a critical component of management and differs from authoritarian leadership (Reed and Carter, 2022); (Ricci and Brumsted, 2012). Transformational leaders allow their team members to function efficiently, promote communication, and enable the team to think critically while effectively working in their role. Environments that do not allow individuals the freedom and the expectation to speak up lead to errors

when a team leader "pulls rank" (Wakeman and Langham, 2018). The outcome for the patient can be disastrous.

To summarize, Crisis Resource Management used in hospitals is an adaptation of Crew Resource Management. Crisis Resource Management requires the guiding tenants of leaders to acknowledge team concerns during the pre or debriefing period to reduce errors and improve team dynamics, promote situationally and self-awareness, leadership, adaptability, flexibility, and shared decision-making to improve patient outcomes and safety.

The ASA called for all anesthesia under the ACT delivery model (ASA, 2022). The ACT is an organizational structure built on the Crisis Resource Model and is postulated to be superior to either type of anesthesiologist – physician or nurse – working alone. Data supporting this postulation are sparse and not convincing. This model is widely adopted, particularly in large, urban hospitals where medical staff bylaws establish the credentials for care provision in their facilities. Several structural elements of this model must be present if the goal is to reduce harm.

The guiding principles learned from experiences in the aviation industry include situational and self-awareness, leadership, adaptability, flexibility, and decision-making (Grevenstein et al., 2021).

The OR is an environment that requires groups of uniquely trained individuals to function as a cohesive team to deliver elements of the safest care possible to surgical patients to ensure the best outcome (Wakeman and Langham, 2018). Nevertheless, reliance on hierarchical dominance tends to continue in some places that report using the ACT model. This is potentially problematic when there is a disagreement in decision-making in the ACT model among providers, particularly between the CRNA and the physician anesthesiologist.

The problem with the ACT as part of the Crisis Resource Management model in the OR is that all elements must be adapted to be maximally effective in reducing patient harm and improving patient safety and outcomes. The guiding principles of Crisis Resource Management used within the ACT need to be clarified, and the imposition of the dominance of one profession over another disrupts the model. Also, there are cost-prohibitive factors of reimbursing two anesthesia providers for one anesthetic.

CRNAs are educated as fully independent anesthesia care providers (AANA, 2022). There are times when practicing in the ACT model, that there is a strained relationship between the CRNA and physician anesthesiologist concerning whose decision should prevail. Physician anesthesiologists believe they are the leader and, therefore, the ultimate decision maker in clinical findings https://www.asahq.org/standards-and-guidelines/statement-on-the-anesthesia-care-team. This means that the ACT is not following the Crisis Resource Management model placing the patient at risk.

This research focused on examining the perspectives of CRNAs regarding their view of anesthesia practice under the ACT. These perspectives can provide evidence to improve

care, minimize challenges, improve access, and better understand the costs of anesthesia delivery.

1.5   The Research Aims and Questions

This study aimed to identify how CRNAs report that they believe their perspective is valued and supported, particularly during the decision-making process within the ACT. To achieve this aim, the following research questions were tested:

1. What do CRNAs identify as strengths of providing care under the ACT?

2. What do CRNAs identify as challenges of providing care under the ACT?

3. How do CRNAs report conflict resolution regarding anesthesia decision-making within the ACT?

4. What additional information would you like to share about your practice within the ACT?

1.6   Summary

More studies are needed to understand the relationship between the role of the CRNA within the ACT and overall decision-making. This study is critical for the future improvement of patient care and for the autonomy of CRNAs, ultimately contributing to full practice authority in the United States. Full practice authority is necessary for CRNAs to ensure the highest quality of care for patients treated in the OR.

Chapter 2

Review of Literature

2.1   Introduction

This study aimed to identify how CRNAs report their perspective of how their decision-making process is valued and supported while practicing within the anesthesia care team (ACT). As background to this aim, relevant literature was reviewed. This literature review was focused on four areas:

1. An overview of the nurse anesthesiology profession from its inception as this provides clues to understanding the origin of the ACT,

2. Different practice models for the administration of anesthesia,

3. The ACT's evolution and cost,

4. The ACT's impact on the scope of practice (SOP) in place today on patient outcomes.

2.2   Background

There have been various attempts to align nursing and medical anesthesia organizations with a shared understanding of the independence of both groups. There is a need for both providers in the field to meet the ever-increasing demand for anesthesia services. Ultimately, CRNAs realized they had come too far to allow physician anesthesiologists professional control of nurse anesthesia education (McAuliffe and Koch, 2011).

Jones and Fitzpatrick discussed that the two professions often work together in teams while competitors are in the field of anesthesia. They described the physician-nurse collaboration as being linked to improved job satisfaction and improved nursing retention, but lacking from their report was empirical data that proved the superiority of the ACT (Jones TS and Fitzpatrick JJ, 2009).

Hoyem reported that each of the two professions views themselves as equally safe, but they remain competitors, and their conflicts are likely to stay politicized (Hoyem et al., 2019). The ASA declaration also lacked any supportive, compelling evidence that the ACT anesthesia model or the ACT provided the best patient outcomes.

Researchers analyzed patient deaths associated with the ACT due to anesthesia. They theorized the dynamics of the ACT, and the combined talents and observational skills provided a synergistic effect that allowed for more effective use of knowledge. They found that the key factor in improved patient outcomes stemmed from having more than one physician or nurse readily available to assist in patient care during a crisis (Abenstein and Warner, n.d.). This study is controversial as having more than one provider available to assist with care could be two CRNAs. There was no evidence to support that the ACT combination of a physician supervising the CRNA was associated with lower morbidity.

2.3 Hospital Deaths and Non-Lethal Injuries

Over the years, there have been several attempts to demonstrate that one type of anesthesia provider is superior to others in terms of morbidity or mortality. Li and associates concluded that anesthesia administration by either CRNAs or physician anesthesiologists was safe due to modern techniques, training, and medications. The team cites that the anesthesia mortality rate is as low as one death per 100,000 anesthetics (Li et al., 2009). Based on several studies, the Centers for Disease Control and Prevention (CDC) concluded that further investigation into anesthesia mortality was not warranted due to the costs of further research. Hoyem and colleagues conclude that anesthesia is extremely safe, and the mortality risk is too difficult to determine causative factors precisely. Despite these reports, there is continued discourse among anesthesia providers and legislators over which anesthesia model is superior and should be mandated in all ORs (Hoyem et al., 2019). The currently available evidence documents that both CRNAs and physician anesthesiologists can practice independently without the supervision of one by the other.

2.4 Institute of Medicine Recommendation to Adopt an Aviation Model to Reduce Errors

The Institute of Medicine explicated that the collaborative culture of medicine and nursing must change to improve patient safety. The IOM took the position that reducing errors in clinical practice required each specialty to respect and recognize each other's knowledge and decisions to cultivate an environment of collaboration (Jones TS and Fitzpatrick JJ, 2009). If the ACT is to be effective in reducing errors, developing a cohesive environment, including the expectation of respect and mutual support, will be required. This respect and support will allow individuals to practice with the assurance that their voices will be considered during the perioperative process and contribute to increased patient safety (Wakeman and Langham, 2018). Still, little research investigates collaboration between CRNAs and physician anesthesiologists, especially ones that provide compelling evidence that the ACT is the superior model of care.

In a report by Makary and associates, a communication breakdown was identified as a root cause for wrong-site surgeries and other sentinel events in the operating room

(OR). Teamwork is one of the most important aspects of good communication. The IOM later emphasized it in their report on medical errors that summarized how hospitals need to promote practical teamwork (Makary et al., 2006). Documenting that collaboration is associated with error reduction in the aviation industry (Helmreich et al., 1986).

Ricci and Brumsted focused on the IOM's study concerning medical errors (IOM Reference here). Reported recommendations focused on incorporating aviation Crew Resource Management into high-risk areas like ORs. Crisis Resource Management was described as a group of behavioral activities associated with teamwork that allows perioperative team members to access all available resources to make the best possible decisions promThe authors concluded that healthcare Crisis Resource Management encompassed aviation techniques. When introduced into the OR, there was a reduction in the incidence of events such as wrong-site surgery and retained foreign bodies. However, refresher training was required to sustain these outcomes, and evidence is lacking to support its sustainability in healthcare (Ricci and Brumsted, 2012). They also reported that the Joint Commission identified effective communication as lacking in 70% of unanticipated events that could cause injury or death to a patient (Ricci and Brumsted, 2012).

The Anesthesia Crisis Resource Management Program that Gaba and colleagues (Gaba et al., 2001) developed is a well-known simulator training program emphasizing Crisis Resource Management concepts. The program focused on leadership, teamwork, communication, and resource management. In addition to this training program for anesthesia providers, the authors reported several programs available centered around crew resource management, but many still need to be independently evaluated. They concluded that empirical studies show positive outcomes after team training, but there is little evidence that these programs improve patient safety and outcomes. Participation in this training is usually done by physician anesthesiologists, including attending and resident needs tons. Still, the report does not identify its incorporation into the ACT or the inclusion of CRNAs (Sundar et al., 2007).

2.5   Aviation's Crew Resource Management Model

Gross et al. described aviation's crew resource management as the most famous example of a shared mental model for team training. These models teach crews their limitations and encourage members to assess their behavior and teammates. Part of crew resource management training involves conflict resolution. This is used when teammates' actions are questioned because the "two-challenge rule" is used in safety aviation. Team members must share a willingness to understand that these challenges are not meant as insubordination or sabotaging tactics but as a non-confrontational way of addressing safety concerns. "two-challenge rule" is used. When a safety concern is being addressed, and the problems are not met or validated, the person raising the concerns is empowered to take over the aircraft's controls. When safety concerns are raised in healthcare, they must be handled in that patient's best interest. As a result of these concepts, many healthcare organizations

have implemented team training programs to model aviation's crew resource management (Gross et al., 2019).

2.6 Hospital-Based Crisis Safety Concerns Must Be Handled in the Patient's Best Interest When Raised in Healthcare

Many healthcare organizations have implemented team training programs to reduce errors meant team training programs to model aviation's crew resource management. Most healthcare providers believe these principles are effective in high-risk and essential to medicine. This training is called crisis resource management (CRM). The authors described a team as having the best persons suited for tasks performed within the group. For example, anesthesia providers are best suited to provide airway support, and surgeons are best for all cutting aspects of the procedure. Constant communication among members of the team and the established consideration is required. JCAHO analyzed sentinel events and reported that the lack of effective communication was the root cause. In comparison, the aviation industry found that 70

A systematic review of crew resource management performed by (Gross et al., 2019) aimed to identify what CRM means in a healthcare context and determine how the training is best delivered and evaluated. The authors recognized that CRM training is a popular way to improve patient safety by considering the human factors involved in healthcare delivery. Human errors have increasingly been identified as a source of medical errors and a severe threat to patient safety. CRM has three main objectives: avoiding errors, catching them before they occur, and mitigating the consequences of committing errors (Gross et al., 2019). Gross and colleagues wanted to identify what is "in the box" of CRM training in healthcare, understand the conditions in which the training is delivered, and understand how training is evaluated. They analyzed the content and practice of CRM training within healthcare settings. They concluded that nearly all published literature reported a positive impact of CRM training, and there was a reduction in major adverse events after CRM training was implemented within healthcare institutions. They decided there was "no easy answer" to what CRM means in healthcare, but their investigation only provided a snapshot of the state of CRM training. They stated that CRM is more than merely simulation training. CRM offers many skills and topics that can be applied to multiple settings for training that strive to define common core values and standards for the training institution (Gross et al., 2019).

In a home study program authored by Powell and Hill, crew CRM was applied to the OR. They reported that implementing CRM in healthcare reduced adverse outcomes, improved nurse retention, and changed attitudes and behaviors toward teamwork. The authors noted that nurses were often quick to embrace CRM training because of the flattening of hierarchical authority, resulting in more respect and improved quality of their work life. This study program pointed out that the adoption of CRM is slow in healthcare because sentinel events occur one at a time and are considered natural consequences of the practice of medicine. The authors put this fact into terms that seemed much more urgent by

identifying family members who do not feel the occurrence of the only issue when they feel the pain of their loved ones. The accumulation of these losses is like that of a jumbo jet full of people crashing every year. The current estimate is that only 5% of medical errors are reported in health care, along with other harmful elements that affect safety, like the lack of honest discussion about mistakes and the tolerance of negative physician behaviors like illegible handwriting and verbal abuse. Malpractice claims indicate that errors are often kept quiet and unreported. Physicians and nurses are likely to adopt CRM training and skills if they believe sentinel events will be prevented and improved patient outcomes and safety will result from exercise. This study identified effective communication as a critical component of successful CRM training. Operating rooms are busy, noisy, and often chaotic environments with masks that obscure facial expressions, loud music that interferes with hearing, and language barriers for communication failures. This has been compared to airline fires, where pilots must wear oxygen masks and goggles, making communication difficult.

Powell & Kimberly Hill identified another communication barrier, interpersonal communication, which is influenced by internal and external factors. External factors are rank, position, age, gender, and organizational culture. Internal factors include speaking and listening, decision-making, conflict resolution, and advocacy. CRM training consists of using closed-loop communication that allows the exchange of information and acknowledgment that the information has been received. Effective communication relies on error prevention, identification, and mitigation of future errors. This study concluded that organizations that embrace CRM and provide ongoing training programs experience the best results in improving patient outcomes and safety (Powell and Kimberly Hill, 2006).

Jankauskas et al. evaluated the outcomes of implementing CRM within a multidisciplinary team. Aside from the technical skills involved in a crisis, like patient resuscitation, the authors also identified nontechnical crisis management skills. These skills include collaboration, communication, teamwork, task management, and leadership. They described that improving the execution of these non-technical skills could positively impact patient outcomes. CRM programs emphasize these nontechnical skills and place collaboration and leadership at the forefront of course objectives that are imperative to improve the team approach to crisis management. Their study was a nonexperimental pre/posttest design that used a convenience sample of nurses and medical residents. They used the Anesthetists' Nontechnical Skills (ANTS) System to assess non-technical skills within a multidisciplinary team managing critical events. ANTS focuses on four categories: task management, teamworking, situational awareness, and decision-making. Although ANTS was explicitly developed for anesthesia personnel, it was appropriate for this study because it represents the generic competencies of any effective healthcare team (Jankouskas et al., 2007).

The Jankouskas report showed a significant increase in collaboration and satisfaction with care decisions following CRM training. This finding was important (Gross et al., 2019) because collaboration and teamwork have been shown to reduce errors, improve

patient outcomes, and increase staff satisfaction. There was also a substantial increase in the teamwork element of CRM training. The study indicated that CRM training increased perceived team collaboration, satisfaction with care, and practical team skills. The study's outcomes supported the evidence-based value of CRM training for multidisciplinary teams managing a crisis (Jankouskas et al., 2007).

Wakeman and Langham examined creating safer operating rooms through groups, team dynamics, and CRM principles. They identified that there had been improved care and harm reduction across multiple specialties, including the OR, since the adaption of CRM within the healthcare setting. They stated improved communication and morale among the active OR staff and decreased decrease patient morbidity and mortality. They explained that the perioperative experience brings together many people with different backgrounds that require coordination of these various skill sets and individual expertise to see that patient safely through the surgical procedure (Wakeman and Langham, 2018).

Wakeman and Langham described how unconscious and psychological factors affect behavior and impact performance within a team. Teamwork is fundamental in the OR to improve patient safety and create an environment of open communication. Team members affect patient safety and play an essential role in job satisfaction among the perioperative staff. Job satisfaction was improved, and employee turnover was decreased when perioperative safety briefings aimed at enhancing communication and teamwork among the operating room staff. There is less job satisfaction when nurses have low perceptions of collaboration. Lack of job satisfaction contributes to nursing shortages. Leadership within the team is another aspect of job satisfaction and error reduction in the perioperative setting. The authors pointed out that leadership should be distinct from absolute authority or a dictatorial style. Leaders are more effective when they set the team at ease, encourage communication, and allow team members to think critically and function independently within their assigned roles. When leaders "pull rank" or create an environment where they "outrank" other team members, an autocratic mindset leads to increased errors because of fear of speaking up and stifled communication. Human errors, communication failures, and leadership problems are contributors to errors. The goal of an effective team is to eliminate hierarchy, improve support for all team members, and make sure everyone feels they can contribute to problem-solving during a crisis. Teamwork and patient safety are promoted and enhanced when CRM techniques are applied to the perioperative environment, like the aviation industry. Developing a culture of respect and mutual support allows team members to contribute effectively to improved patient safety. This report's preliminary data suggested that CRM training reduces medical errors, improves operating room efficiency, and improves morale among the surgical team (Wakeman and Langham, 2018). These findings do not support the use of ACT as a model of care if the goal is to reduce errors.

In a qualitative study using semi-structured interviews among CRM trainers, Grevenstein and colleagues aimed to compare CRM training courses on didactic components and simulation exercises to determine if the methods used to teach different courses are

interchangeable. The team reported that CRM training courses are diverse and noninterchangeable. CRM training has become a research topic in the surgical and medical fields. The CRM trainers interviewed were from different backgrounds and shared multiple perspectives. Data collection for this study centered around four main themes: trainer background, training characteristics, existing flaws, and future medical CRM training. The trainer's experience included participation in aviation, healthcare, armed forces, or any combination listed as a difference of opinion regarding the trainer's background. The idea that trainers should come from their training environment is needed to be proficient in teaching nontechnical skills to be effective instructors. An increase in CRM trainers available was likely due to recent layoffs in the aviation industry, which could also affect training. Most trainers agreed that the fragmentation of opinions could place the entire CRM training program at risk the entire CRM training program and participants. The CRM courses ranged from a few hours to several days, but all focused on the core CRM principles of awareness of human factors and enhancing patient safety. The participants were taken from intensive care units, trauma centers, ORs, and obstetrics. Anesthesiology was over-represented in the study as this specialty has mandatory CRM training. The most common flaw cited in CRM training was the top-down hierarchy in ORs. This could be the leading cause of a decline in team spirit and could negatively affect patient outcomes and safety. Other flaws included blaming and incident reporting as possible sources of potential problems. The final theme of the future of medical CRM had a unanimous response among trainers that CRM should be incorporated into daily practice. In general, the authors of this study discovered that when healthcare workers completed CRM training, there was an improved culture of safety in their areas of expertise. This could be explained by increased awareness of human factors as the root cause of medical errors. Overall, participants who engaged in CRM training were satisfied with the training (Grevenstein et al., 2021).

Haller and others aimed to assess the effect of CRM interventions designed to improve teamwork and communication skills within a multidisciplinary obstetrical setting. Participants included nurses, physicians, midwives, and technicians from the anesthesia, obstetrics, and pediatric departments, and all took part in the two-day CRM training event. The researchers reported that the participants demonstrated a significant change toward a better understanding of teamwork and shared decision-making at the end of the training program. After one year of implementation, there remained a positive change in the team; a safety climate was instituted within the hospital, and decreased stress among participants was reported. The participants reported being very satisfied with the course's overall content, teaching methods, and outcomes, which confirmed that participants highly value CRM training programs (Haller et al., 2008).

Gaba and colleagues developed a simulation-based training program for anesthesia providers based on aviation crew resource management simulation training. Anesthesia providers emphasize decision-making and teamwork principles like cockpit crews. Anesthesia Crisis Resource Management (ACRM) has highly complex simulations that reflect real-world scenarios and require decision-making and interprofessional interactions. The authors of this study expected simulation-based training to become routine in healthcare

settings and report that thousands of participants, including anesthesia residents, faculty, private practice practitioners, and CRNAs, have undergone the training. The authors state that the response to exercise is highly positive and believe the movement is reflected in their safe anesthesia practice. The respondents reported that the effects of ACRM training were present six months post-course attendance, and the ability to handle technical and behavioral skills were retained due to the training (Gaba et al., 2001).

Gaba's team report that the anesthesia professions are often compared to the aviation industry because of each specialty's complexity and dynamic components. ACRM was developed in 1989 with adaptations for the anesthesia community. The word "teams" and "crisis" replaced "crews" because anesthesia providers are accustomed to working in teams and managing crises. One advantage of ACRM is the ability to work in teams and experience the cross-discipline of other specialties by allowing participants to discuss their views of the same simulation with team members. The combined team training approach involves members from all teams involved in the perioperative setting, including surgeons, nurses, and anesthesia providers, who undergo training together. This training allows for more natural team interaction and reinforces understanding among disciplines. Participants of ACRM training take turns working in different roles during simulations. This enables them to experience from a different perspective what is occurring in the simulation and what is occurring from a different perspective, transfer information, establish leadership, and distributing workload while gaining an understanding and respect for each participant's role in the scenario (Gaba et al., 2001).

Debriefing was identified as one of the most critical components of the training. All participants took place in the debrief, whether they had an active or passive role. This was reported as beneficial because the entire team worked through problem-solving during the scenario. The gold standard to demonstrate the effectiveness of ACRM training would be to test actual patient outcomes. The authors identified several reasons this would be very difficult: many confounding variables among scenarios, variables, and team dynamics. However, it is possible to determine the impact of ACRM training by measuring the "performance" and "ability" of individuals in training. The authors concluded with the IOM's citation in the report "To Err is Human" (Gaba et al., 2001), calling for simulation, CRM, and teamwork training based on the demonstrated record of improved safety within the aviation industry. They concluded that aviation requires CRM training, and CRM should also be possible for health care. They further concluded that CRM is expected to become routine for healthcare personnel over the next decade (Gaba et al., 2001).

The basic concepts for CR, a report by Flin & Maran, identified the basic concepts for CRM and non-technical skills and their impact on anesthesia. They also discussed the training course for non-technical skills, now called CRM. They reported that pilots are taught the psychological factors that influence their training and must undergo CRM routinely. This training is now recognized in various industries and should be routinely taught, especially in high stake professions like anesthesia. The main concepts of non-technical skills education and CRM center around situational awareness, decision-making,

teamwork, leadership, stress, and managing fatigue. These concepts are not foreign to anesthesia providers but are not routinely incorporated into their formal education and training. Evidence indicates that these skills are necessary to maintain the safe execution of anesthesia delivery. Though human error cannot be eliminated, it can be minimized by identifying and mitigating errors and ensuring anesthesia providers have the necessary coping mechanisms and non-technical skills to function within the demanding limits of their work (Flin and Maran, 2015).

The authors found a surprisingly limited amount of literature detailing the decision-making for safe anesthesia practices within the ACT. The authors reported that decision-making could vary due to time constraints, task demands, and the decision-makers level of control and support. Furthermore, the team skills necessary for effective communication, task management, negotiating, and resolving conflict are as essential as decision-making. They identified CRNAs as pivotal in maintaining team harmony and performance using verbal and non-verbal communication. The leadership role is often shared in the operating room, and a crisis can have many leaders equally handle intense situations. Still, the CRNA is recognized as one of the leading roles for leadership within the team. These concepts are fundamental in CRM training (Flin and Maran, 2015).

Teamwork has long been associated with patient safety, yet there has been no evaluation tool to measure collaboration in the operating room. Makary and associates developed a research tool to evaluate teamwork in the active room setting and found significant discrepancies in the perceptions of cooperation, especially between physicians and non-physicians. Their tool was a Safety Attitudes Questionnaire survey adapted from aviation's Flight management Attitudes Questionnaire (Makary et al., 2006).

Teamwork is often recognized differently by different observers. The Makary et al. study reported that foreign observers often recognize partnerships differently. The most critical differences in perceptions of teamwork occurred between physicians and nonphysicians. This study indicated that surgeons and anesthesiologists were more satisfied with collaboration than nurses. The authors speculated that differences in satisfaction could result from fundamental and long-standing differences between physicians and nurses, which are reported as status, authority, gender, training, and patient-care responsibilities. Nurses in their study said that their input was respected and rated collaboration higher. Physicians reported that nurses who followed physicians' orders and anticipated needs were more satisfied with collaboration (Makary et al., 2006). This study is one example of a physician-nurse partnership and how it is linked to job satisfaction. Still, little research investigates collaboration between CRNAs and physician anesthesiologists, especially considering the decision-making aspect of the ACT (Makary et al., 2006).

Additional literature was searched from 1982, when the ACT was declared as the single model of care to understand whether the ACT is superior to other models of anesthesia care delivery and provides safer and better patient outcomes. The goal was to assess the available research supporting the use of the ACT, not opinion. To achieve this, a literature search was conducted utilizing PubMed and Google Scholar from January 1, 1982, through

September 1, 2022, for articles that could provide definitive evidence of the ACT as the superior and safest anesthesia model. No results were found.

In a recent review article by Abstein et. Al., physician anesthesiologists described previous studies that demonstrated adverse events such as death or complications from myocardial infarctions, cardiac arrest, or severe brain injury as far too rare to be used to compare institutions. Therefore, their focus was on patient satisfaction and not safety. The practice of anesthesia includes multiple competing practice models, including services delivered by anesthesiologists, independent practice by CRNAs, and team-based approaches incorporating anesthesiologist supervision or direction of CRNAs. Despite data demonstrating a shallow risk of death and complications associated with anesthesia, professional societies, and policymakers debate the superiority or equivalence among these models (Abenstein and Warner, n.d.).

The American Society of Anesthesiologists uses published findings as evidence for claims that anesthesia is safer when anesthesiologists lead in providing care. The American Association of Nurse Anesthetists cites its research on safety and cost-efficiency outcomes to defend against these claims. Review and critique studies of the safety outcomes and cost-effectiveness of anesthesia delivery that have been cited in the Federal Trade Commission comment letters related to competition in health care, where each profession has laid out their case for how they ought to be recognized in the market for anesthesia services. The Federal Trade Commission has a role in protecting consumers from anticompetitive conduct that has the potential to impact the quality and cost of health care. Thus, evaluating the evidence used to make claims about these topics is essential. Research in this area is sparse, but the strong safety record of anesthesia in general and CRNAs suggest that politics and professional interests are the main drivers of supervision policy in anesthesia delivery and the mandate of the ACT model of care (Hoyem et al., 2019).

Hoyem and associates (Hoyem et al., 2019) attempt to critically evaluate the studies of safety that the Federal Trade Commission has cited regarding the safety record for each organization, the AANA, and the ASA. The study recognized that each group presented cases and evidence that supported their view of which was the safest anesthesia provider, yet they found both had flawed supporting evidence. The strong safety record of anesthesia outcomes indicated that their opposing views were based on politics, professional interests, and personal economic gain. The debate between the two organizations has been bitter over the independent practice of CRNAs since the 1970s when the ASA withdrew its agreement to work together and endorsed the ACT that placed anesthesiologists in a position of leadership and control. When anesthesiologist practice within the ACT model, they usually direct four cases at once and collect 200 percent of the revenue generated compared to practicing alone. This is a significant financial gain for physician anesthesiologists who pay CRNAs a low to moderate wage from this income. The ASA releases a statement every five years about the ACT that lays out their philosophy of how anesthesia should be practiced and places anesthesiologists singularly in control of the team; the flaw of this statement lies in the fact that the AANA is not included in this discussion as a deciding factor.

The rising health care costs place the ASA in the position to provide evidence that they are the safest provider and should remain in control of CRNAs to justify the higher fees they recover. Naturally, the AANA staunchly opposes this view and advocates their members to be permitted at their full scope of education and training. The available research cannot dispute the overwhelming safety record of anesthesia, and the question of which organization provides the safest care still needs to be resolved or relinquished. Hoymen et al. cited many studies that determined no definitive evidence that one provider was safer. There were no significant reported differences in complications between the two professional providers. This study pointed out that independently practicing CRNAs directly threatens physician anesthesiologists' revenue. This threat was a significant reason to use political tactics to question CRNAs' safety records. The study summarized the need for CRNAs to remain vigilant and critical of the ASA's attempts at skewing scientific evidence for their financial gain and political interest. Further, there is likely no end to the ongoing debate between the two political organizations (Hoyem et al., 2019).

2.7 Summary

In summary, research evidence is not available that supports the ACT as the single model for anesthesia care compared to the independent practice of CRNAs. What is clear is that there is a strong safety record for anesthesia administered by both providers. The available evidence further supports the need for CRNAs to continue advocating for independent practice, allowing them to practice to the full extent of their training and education. Hogan and associates point out that the demand for CRNAs will continue to grow as healthcare costs continue to rise, as independently practicing CRNAs are the most cost-efficient care model sustainable under the broadest range of circumstances (Paul F. Hogan et al., 2010). In addition to cost containment, political debates are spurred by the ASA trying to restrict and control the AANA. Of concern is the evidence cited by Alves et al. that reported that the primary source of occupational stress for CRNAs was their relationship with physician anesthesiologists who attempt to limit their decision-making through conflict and role ambiguity. The study's conclusion indicated that further studies are needed that clearly define a consensus for roles and optimal productivity between physician and nurse anesthesiologists functioning within the ACT model (Alves SL, 2005).

There is potential harm to CRNAs by restricting their scope of decision-making, leading to decreased access to anesthesia care and increased healthcare costs. This results from imposing its philosophy on another group for financial control and political gain without evidence that their perspective is the safest anesthesia care model.

Chapter 3

Methods

3.1 Introduction

This study focused on CRNAs and their practice under the ACT model of care. This research aims to focus on how CRNAs report their practice under the ACT, with a particular focus on how CRNAs solve conflicts that arise in decision-making. The published literature failed to identify a decision-making measure within the ACT. Therefore, this study was designed to capture the qualitative experiences of CRNAs practicing under the ACT. A descriptive, non-experimental focus group design will be used to address the following research questions: 1. What do CRNAs identify as strengths of the ACT? 2. What do CRNAs identify as challenges of the ACT? 3. How do CRNAs most commonly report conflict resolution regarding decision-making within the ACT? 4. What additional information would you like to share about your practice within the ACT?

3.2 Design of the Study

This study was a descriptive, non-experimental design using demographic and qualitative data from practicing CRNAs. The design plan was to survey to CRNAs to collect data.

3.3 Sample

Approximately 200 informants were anticipated to participate in this study. The informants were drawn from a convenience sample of former students that are now CRNAs, colleagues, committee participants, and state association acquaintances. The researcher used a snowball technique to request CRNAs to refer other CRNAs whom the researcher sent a survey invitation.

3.4   Research Tool

A research tool was created using the platform Survey Monkey®. Demographic data were obtained to describe the CRNA respondents and their practices. The demographic items include:

1. Employment status

2. Practice arrangement

3. Type of setting

4. Location of Setting

5. The way the CRNAs practice, including medically directed, non-medically directed, supervised, or independent practice

6. CRNA/anesthesiologist ratio

7. Age

8. Gender

9. Years of experience as a CRNA

10. Education level

The informants were asked to provide free text answers to the following:

1. Please describe what you identify as strengths of ACT

2. Please describe what you identify as the challenges of the ACT

3. Please identify how you most frequently resolve decision-making conflicts within the ACT

4. What additional information would you like to share about your practice within the ACT?

This tool was reviewed by members of the research committee and by five practicing CRNAs. They were asked to judge the items on the tool for completeness and the following criteria to assess the trustworthiness of the tool:

1. Credibility – are the results an accurate interpretation of the participants' means accurately interpreting different voices – is there a critical appraisal of all aspects of the research

2. Integrity – are the investigators self-critical?

3.5 Procedure

The study began following institutional review board approval. The population for the study was derived from all active, practicing CRNA members of the American Association of Nurse Anesthesiologists (AANA) residing in various states in the southeast region of the United States. The decision to obtain a sample from different states on the desire to preserve heterogeneity, multiple forming of those practicing primarily in medically directed ACTs throughout the southeast region. This research used SurveyMonkey® (https://www.surveymonkey.com). SurveyMonkey® which is an electronic platform that gathers feedback and information from informants and automatically analyses the results with powerful analysis features. The research tool, accompanied by an explanatory letter explaining the study's aims, stated that voluntary completion of the questionnaire would serve as informed consent. Informants were requested to complete the questionnaire by a specified date. The digital platform Survey Monkey provides assurances of anonymity. Reminder emails will be sent three weeks after the initial email.

3.6 Analysis of Responses

The demographic data was presented in grafts. The researchers will initially read all free-text responses and make first impressions. The responses were reread line by line by the researcher and research advisor. Upon saturation of responses, the remaining responses were placed into the developed theme and subtheme categories.

Question three concerning conflict resolution will be specifically identified using modes of CRNA conflict resolution identified by Alves: avoidance, accommodation, competition, collaboration, and compromise. Connections between these modes will be described as well (Alves SL, 2005).

3.7 Protection of Human Subjects

Before implementing the study, the researcher obtained approval from the institutional review board. The survey was emailed to CRNA's email addresses to which the researcher had access through personal contact or acquaintance through a professional association. Informed consent was obtained via SurveyMonkey. Anonymity was ensured as the survey responses were submitted to the electronic database and blinded to the researcher. No personal health information was collected. The survey results were viewed on a locked, password-protected computer backed on the cloud service OneDrive. The estimate was approximately 200 informants.

Chapter 4

Results

4.1 Introduction

The results of this research included quantitative demographic and qualitative data. Quantitative data was gathered from 171 responses, including the informant's age at their last birthday, gender, initial preparations as a CRNA, years in practice, employment status, practice arrangements, and primary practice locations. Qualitative data were gathered through four free-text questions. The first three questions asked about strengths, challenges, and conflict resolution within the ACT. The final question allowed the informants to tell researchers anything else they would like to share about their practice.

The study was conducted using SurveyMonkey® software. A link for the survey was distributed through social media platforms and directly to email addresses. The social media platforms included Facebook, Instant Messenger, Twitter, and What's App. Facebook pages included The Nurse Anesthesiology Faculty Forum (TNAFF), the Florida Association of Nurse Anesthesiology (FANA), and the investigator's personal Facebook page. Email list-serves used were Sound Anesthesia; Life Linc; FANA; University of South Florida (USF), University of Tennessee (UT) Faculty, and personal email. This resulted in the return of 171 completed Survey Monkey surveys between January 23, 2023, and February 28, 2023.

The SurveyMonkey software provided the analysis of the sample's demographic data. The researcher and research advisor jointly analyzed the qualitative data.

4.2 Demographic Data Analysis

The results of the analysis of the demographic data are shown in the figures. The informants varied in age from 25 to 75, with an average of 46.4 and a standard deviation of 11.

They reported their gender as female (67.3%) or male (31.6%), with 1.1% reporting other or preferred not to answer **Figure** 4.1.

Figure 4.2 illustrates that most of the informants reported that their initial preparation as a CRNA was in a master's degree program (71.4%), followed by a doctoral degree program (22.2%), certificate program (2.9%), bachelor's degree (1.8%), and other (1.8%).
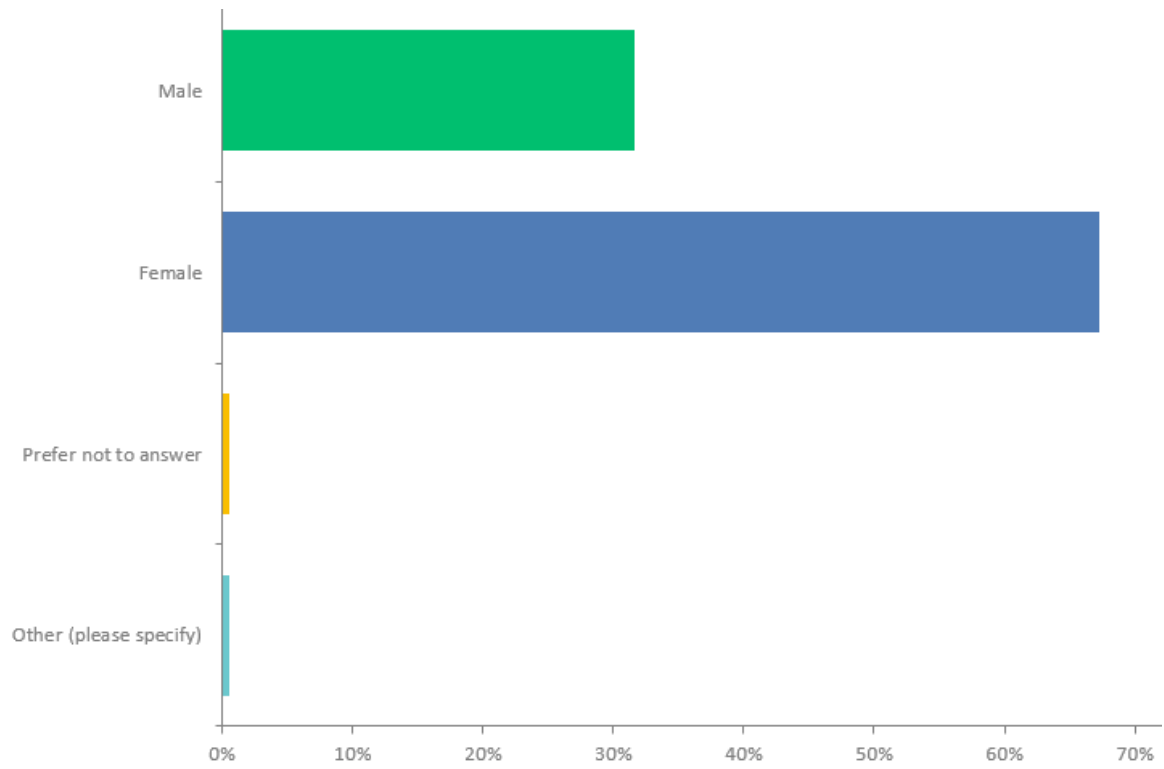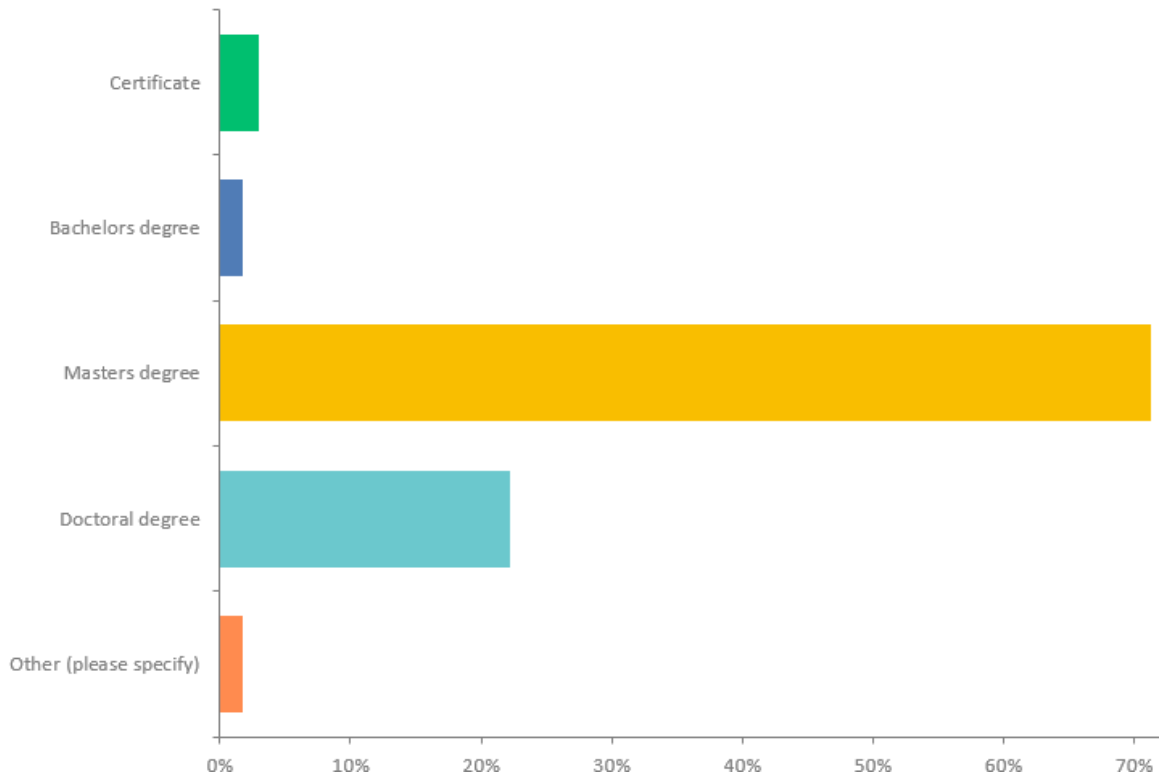
Figure 4.1: Gender.
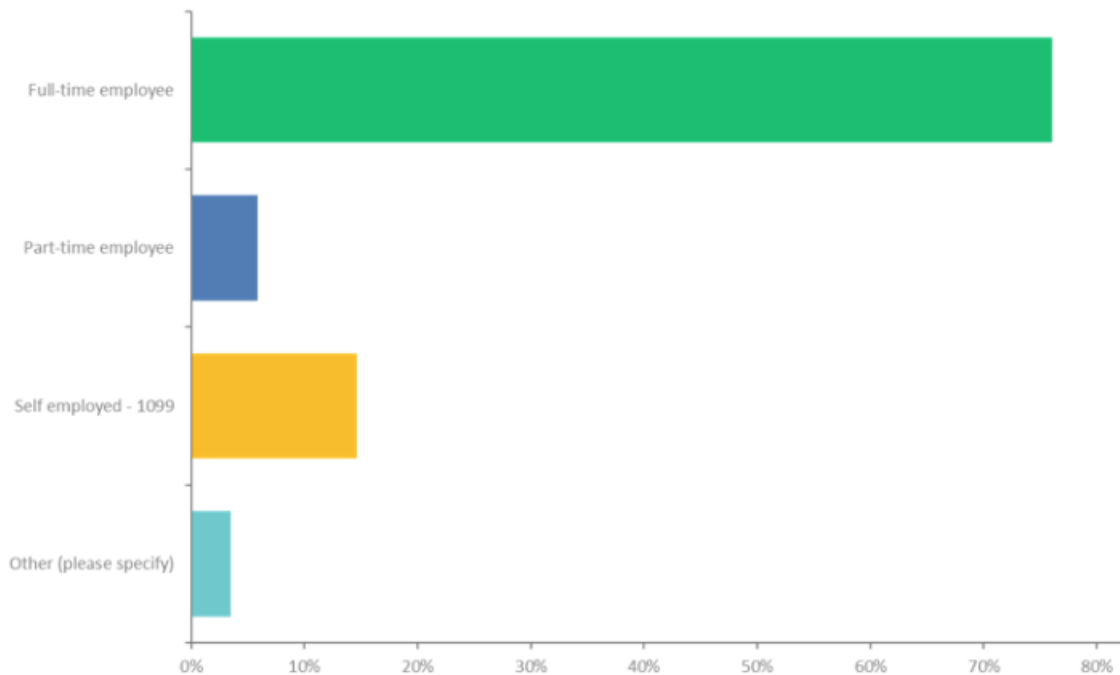
Figure 4.2: Initial Preparation.

Figure 4.3: Employment Status.

The informants reported that they had been in practice for 1 to 50 years, with a mean of 14.4 years with a standard deviation of 10 years.

Employment status **Figure** 4.3: Most of the informants (75.9%) reported that they were full-time employees. The remainder were part-time (6.0%), self-employed (15.7%), or had another arrangement (2.4%).

Practice arrangements **Figure** 4.4, were more varied. Informants reported that 71.3% practiced under the ACT scheme, 52.6% had an ACT ratio of four CRNAs to one physician or less, and 18.7% said they had more than four CRNAs to one physician ratio. The remaining 21.1% were in independent practice, or 7.6% had other arrangements.

Practice setting **Figure** 4.5 Approximately half of the informants (41.5%) reported working in urban hospitals, 26.3% in community hospitals, 11.1% in surgery or gastrointestinal centers, and the remaining 21.1% in various practice settings. These other settings included rural and critical access hospitals, dental and medical offices, and other areas.
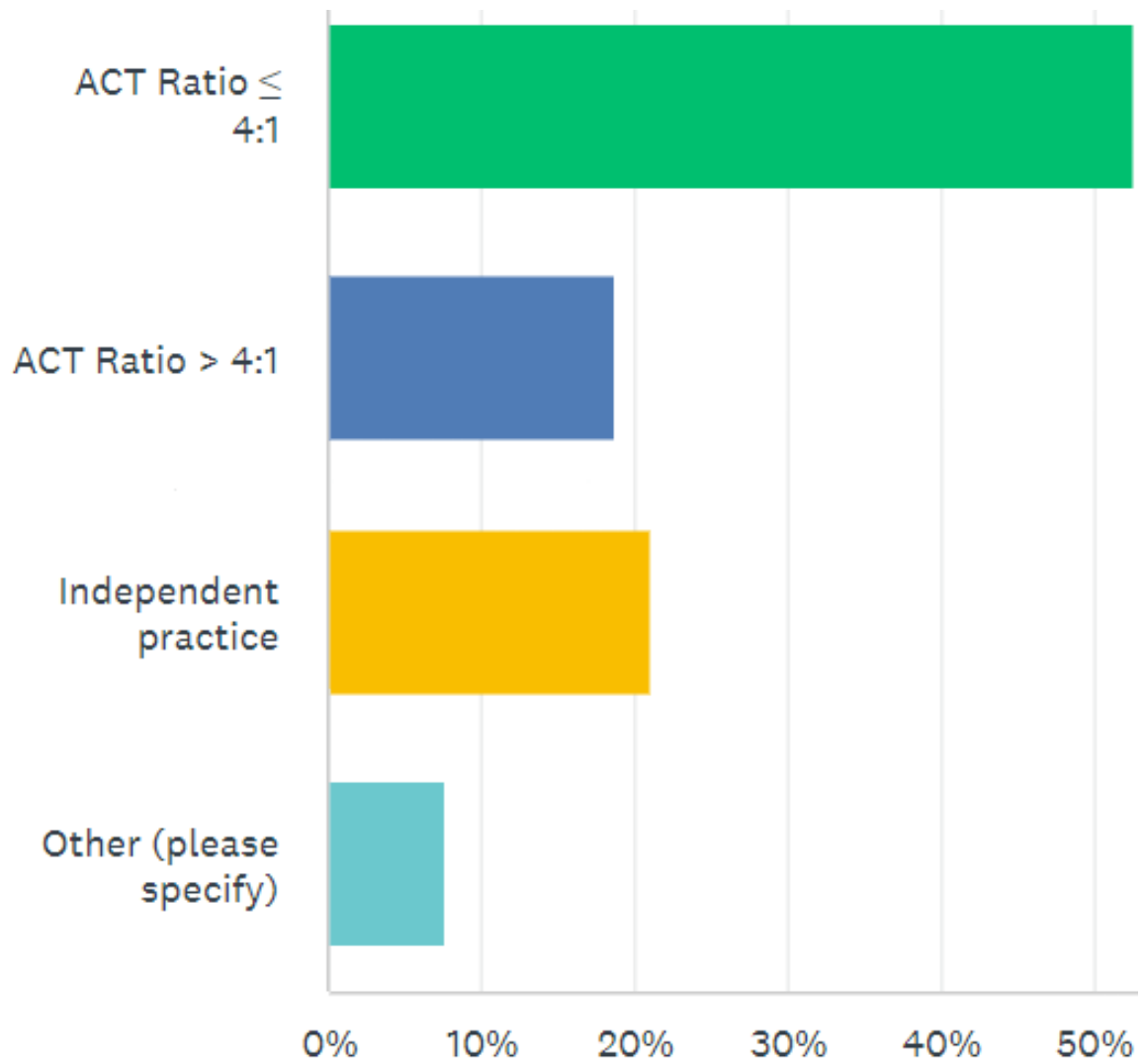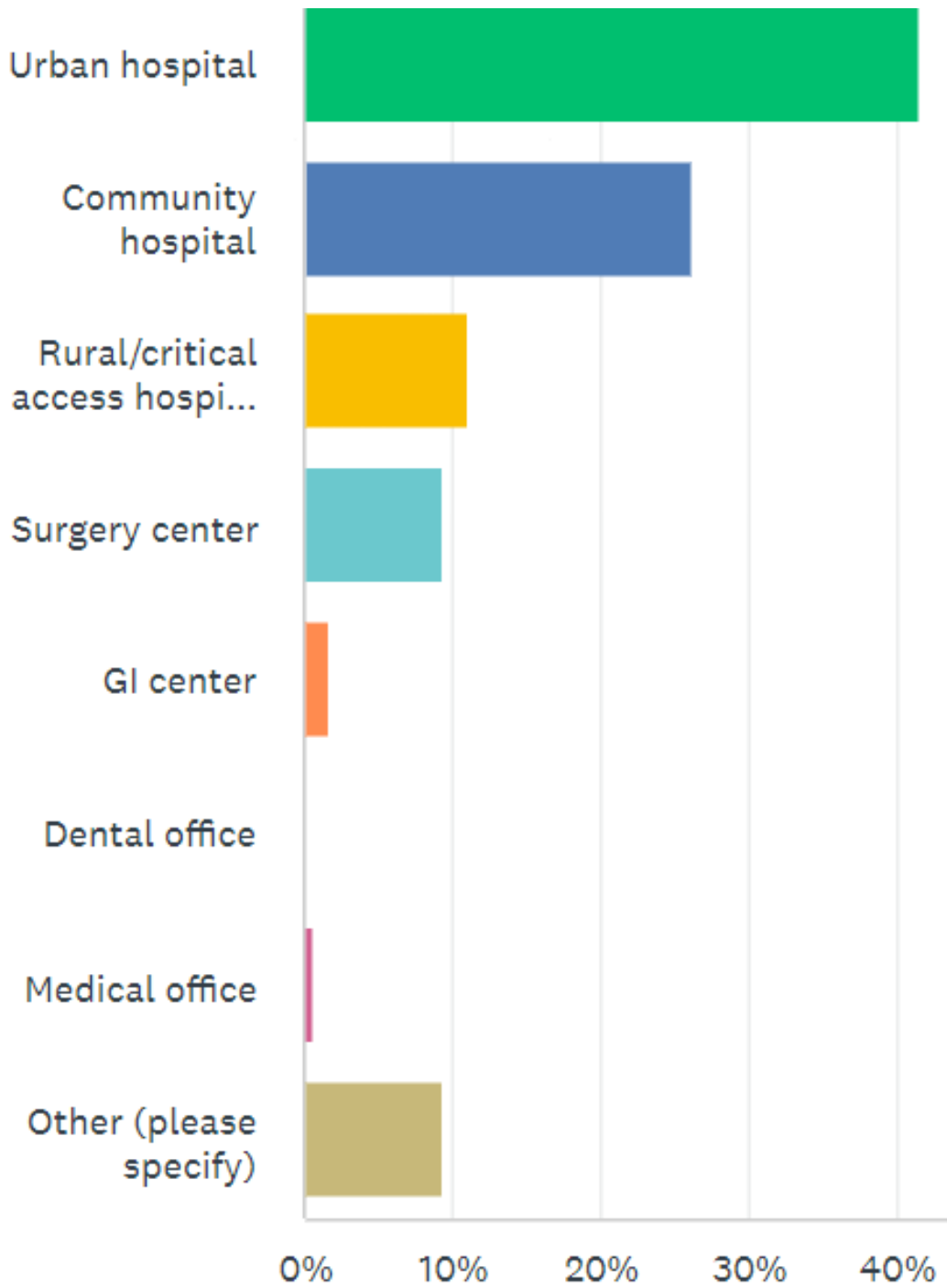
Figure 4.4: Practice Arrangement.

Figure 4.5: Practice Setting.

4.3   Qualitative Data Analysis

The second part of the survey consisted of four questions answered in free text. These questions asked their views of

1. The strengths of providing care in the Anesthesia Care Team practice model

2. The challenges of providing care in the Anesthesia Care Team practice model

3. How they resolved decision-making conflicts regarding anesthesia while providing care in the Anesthesia Care Team practice model

4. Additional practice information they wanted to share

The responses to these questions underwent qualitative analysis by the researcher and the research advisor, an experienced qualitative researcher.

The analysis used the following steps to ensure the trustworthiness of the data:

1. Bracketing was conducted before data analysis. This consisted of identification and temporary setting aside of the researchers' assumptions

2. All responses were quickly read for a general impression and familiarization

3. The responses were read again and journaled in an Excel spreadsheet, examined for commonalities, and formulated meanings

4. The responses were then clustered into themes and some subthemes, producing a fundamental structure

5. The interviews were analyzed in the context of all the data submitted with a consistent iterative process

There was continuous use of bracketing to maintain the audit trail.

The researcher and advisor did this work independently for the first 30 cases and then collaborated to see where there was agreement and differences. At this point, there was complete agreement on each theme and subthemes developed for each question. Data saturation was achieved after these first 30 surveys. The researcher placed the remaining responses into the themes, with the research advisor independently reviewing at least one of every ten additional responses. There was no disagreement between the researcher and research advisor, nor were any new themes or subthemes identified with the addition of the subsequent surveys. This process sought to ensure the credibility of the findings (Lincoln and Guba, 1986).

The ratio of CRNAs to physician anesthesiologists was collected in the survey, but this topic did not emerge in any of the free-text discussions. There were comments about the lack of availability of physicians, but the informants did not link this to the ratio in any of their responses.

4.4   Strengths of the ACT

The first qualitative question concerned the informants' views of the strengths of the ACT. Informants described team collaboration as an essential component of the ACT, but the supervision requirement element of the current ACT was specifically and universally rejected. No informant reported any strengths of the ACT's supervision requirement of their practice. However, the informants were very optimistic about collaboration. They reported having extra hands and minds when an anesthetic situation or emergency presented itself, gaining different perspectives on anesthetic problems, and the flexibility and efficiency the ACT afforded practitioners.

4.4.1   Collaboration

Consultation within the ACT was noted several times, especially with complex cases. Most informants cited one element of the ACT, collaboration, as a strength, especially if shared among a strong group of CRNAs who communicate easily and share the workload and decision-making. One informant described collaboration's strength as "especially beneficial when caring for ASA 4-5 patients undergoing complex procedures". Another informant echoed the same thought by identifying that the team approach allowed "more eyes on the patient when collaborating with difficult cases." Some informants identified collaboration as a strength with physician colleagues if they "demonstrate respect and provide autonomy when appropriate." Another stated, "as a practicing CRNA at a level one trauma center with high acuity patients, I would say that the strengths of providing care under the ACT model are limited to the clinical judgment, competence, and respectful collaboration from our physician counterparts. When a 'good team' exists, each member can be a valuable resource in providing excellent patient care".

An interesting subtheme emerged regarding novice nurse anesthesiologists as several comments centered around the ACT being possibly suitable for inexperienced providers. One new graduate said, "it is nice to have backup when you are struggling with a difficult patient." Another added, "good for new grads to get the guidance, sometimes less stress because someone else is making the more difficult clinical decisions, nurses less likely to argue with MD decisions." Others thought the ACT worked better when "seasoned" (experienced) staff were there. With experience, actions occur due to repetition".

Many informants indicated that collaboration meant having extra hands and minds working together as a primary strength of the ACT. Some stated that a second pair of hands and a second brain were often helpful, while others elaborated that this could bring someone else into the ACT that may have knowledge that others do not. A reoccurring subtheme was identified as beneficial if the team was encountering something new. Having a second opinion during unusual circumstances was an added benefit of the ACT, especially during emergencies. Many stated that extra hands and support are always welcomed during emergencies, especially if the physician anesthesiologist is busy in another operating room. Several informants said the additional support is often another CRNA and did

not identify the need for the physician. When discussing handling emergent or critical situations, many informants referred to having extra hands as "trained hands" and did not specify whether this could be a physician or nurse.

Having different clinical perspectives within the ACT was another reoccurring subtheme within collaboration and focused on having more than one anesthesia provider on the team. Informants defined different perspectives as having different backgrounds and experiences that could be helpful in various patient care situations. The ACT was more recognized for second opinions, and collaborative minds could work together to benefit patients. ACT members bring different strengths to the team; having someone to confer with or gain beneficial insights is often helpful. As this subtheme emerged, it was explicitly defined as useful to have someone to discuss ideas with or have a sounding board for ideas; this could be a nurse-to-nurse or nurse-to-physician, and neither was identified as more valuable than the other. However, one informant said having a physician colleague backup for canceling cases is helpful as surgeons can be challenging to navigate due to complaints about "nurses making decisions."

Many described the strength of the ACT as being flexible and efficient when everyone works together. One stated, "having additional providers can help with facilitating comprehensive histories and performing the pre-operative nerve block while the other provider turns over the OR to get the patient back to the OR quicker" as a valuable resource of the ACT. This was further specified as having the opportunity for breaks, leaning on each other, and task management. Task management was defined as getting preoperative evaluations for the next day performed promptly or early. However, informants recognized that having excellent anesthesia staff is required to offer this flexibility and efficiency.

4.4.2 Physician Collaboration, Not Supervision

A second theme regarding physician supervision within the ACT was identified. Almost all informants reported no need for physician supervision while describing team collaboration's strengths. Instead, the informants described the usefulness of physician involvement as accomplishing tasks like complex airway assistance, extra help during an emergency or regional anesthetics, or general consultation. Several informants identified that an added value of having a physician anesthesiologist came in handy when dealing with surgeons, as the culture of different facilities functioned on a physician peer-to-peer model. Other strengths of physician anesthesiologists were help with completing preoperative evaluations. The strength was further defined as CRNAs not having to take calls on weekends and having an extra person to perform a preoperative assessment to keep the daily operations of the surgical suites running smoothly. Many stated that this could also be accomplished with an all-CRNA team. No informants said the strength was because of physician status, but because they are inherently on the anesthesia team, the identified strengths defaulted to them.

4.4.3   No Strengths of Physician Involvement

A third theme that came forward for the perceived strengths of the ACT was informants who identified no perceived strengths. These informants clarified this theme as they felt the current ACT had significantly few benefits and chose not to work in this anesthesia care model. A few informants elaborated on this theme by saying "supervising" does not enrich the team, while others stated that power struggles are often placed above patient safety. Still, another added collaborative practice model should not put one provider in a "supervising" or "directing" role over another, as this negates the concept of collaboration.

4.5   Challenges of the ACT

This question generated substantial discussion. The overall emergent theme for reported challenges of the ACT was categorized as discounting CRNA expertise. This included subthemes of lack of respect, micromanagement, the restricted scope of practice, "too many cooks in the kitchen," aggression, and role confusion.

4.5.1   Lack of Respect

The front-running subtheme in this area was the lack of respect. One of the informants stated they "feel like I am asking for permission to provide the care I think is appropriate. My skills, experience, and knowledge are not appreciated or valued. Working with incompetent docs, yet staff reveres them". Another echoed a similar sentiment by further explaining that physician anesthesiologists often do not consider CRNA's care opinion based on evidence, coupled with refusing to collaborate or agree on the safest patient care plan. This stems from the overall perception that the physician anesthesiologist's opinion is the only one that matters and overrules CRNA's decisions without consideration of facts and patient presentation. One informant further described this as being driven by a way to keep CRNAs "in their place by showing they are in charge, simply because they have MD behind their names." Others described a collateral feeling of needing to double-check the anesthesia plan with physician anesthesiologists. There were reports that CRNAs are often seen as someone who can only take orders, with physicians refusing to acknowledge CRNA's skill level and expertise. This can lead to a disrespectful environment within the ACT.

Several informants cited a lack of autonomy and not being recognized as an essential part of the team. Sometimes there is a disregard for the CRNA's plan even though the CRNA provides the anesthetic. Other examples included a lack of autonomy despite being fully trained, a lack of respect for our doctoral degree and qualifications, and a general lack of respect from physician anesthesiologists and surgeons. One expounded on this set of examples by stating, "I do not enjoy someone grabbing a syringe, giving a medicine, then walking out." They found this very difficult to navigate and described one action as a physician anesthesiologist as "pushing esmolol 50 mg, walking out and leaving me there to watch the heart rate decrease". These actions convey to the CRNA and operating room staff that they are not essential to the team and that feelings are being "looked down upon." One

informant recognized that collaboration and respect for each other are critical to the success of the ACT. It is often misconstrued as "I know more than you, so do what I tell you."

Some informants reported that there needs to be more recognition of the quality of care they provide because of the illusion of supervision. One informant said physicians think "CRNAs need their supervision and expertise." These challenges lead to physician-centric decision-making and CRNAs being treated as expendable commodities. Often CRNAs are treated like hired hands and cannot sit on boards of physician groups.

While the informants viewed physicians as enjoying absolute power, there are no checks and balances on bad behavior, which is challenging. One form of this behavior was identified as an intrusion by physicians in mentoring new nurse anesthesia interns and demonstrating absolute disregard for the CRNA's expertise and input. Many reported that a lack of recognition and respect creates an environment of differing opinions, power struggles, and tension among physicians, nurses, and auxiliary staff. One informant said, "since I do not work under a medical direction model, I sometimes remind the (physician anesthesiologists) that they are there as a resource and not to dictate my practice. In addition to the incidents described above, it has recently come to my attention that new graduate male CRNAs do not experience the same opposition from our newer physician counterparts as many female CRNAs with years of experience". While some physician anesthesiologists demonstrate these behaviors, it was reported that others treat CRNAs as though they are not capable of handling cases solo.

Other reports included the idea of differences of opinions and disagreements between physicians and nurse anesthesiologists regarding case management. This can lead to restrictive and regimented practices for CRNAs. One informant said, "more often than not, collaboration and respect are absent in the ACT. The relationship between CRNAs and (physician anesthesiologists) is the worst I have experienced in my career. I have recently had numerous experiences where the (physician anesthesiologist) attempts to push their anesthesia plan with the sole intent of going against what the CRNA has suggested. I am lucky to have gained the respect and support of many surgeons and their OR teams. This support (and EBP) has allowed me to continue doing what is right for the patient when disagreements take place". Another summarized by stating, "the ACT provides no benefits to safety and working with multiple physician anesthesiologists that all want something different makes for the unneeded stressful work environment. I choose never to work in ACT practice anymore".

4.5.2 Micromanagement

Micromanagement emerged as a subcategory of the lack of respect theme. Informants said there was unnecessary physician oversite, and most said this was micromanagement as CRNAs were prohibited from practicing at their full potential within the ACT. One informant stated this created a "decision-making hierarchy with some physicians at the apex of the decision tree who have not sat their cases for years."

4.5.3   Restricted Scope of Practice

The restricted or limited scope of practice was another subcategory identified regarding lack of respect. Some described situations that limited their independent thinking and complete exclusion from performing specific procedures such as regional anesthesia. Physician anesthesiologists were identified as limiting CRNAs from using all their training in the traditional ACT model. Informants reported that CRNAs get placed in roles similar to anesthesiologist assistants in that model. One informant said, "an anesthesia care team could be defined in a much more beneficial way if all providers within the team collaborated by practicing to the full extent of their training." Another informant said, "many ACT models refuse to allow all providers to practice to the top of their licensure, which results in patients not being offered blocks appropriate to their case because a physician is unavailable or does not know how to do the proper block. Due to a fear of change, they are slow to implement newer modalities, such as opiate-free or opiate-sparing analgesia. I have witnessed failed neuraxial attempts and horrifically botched intubation attempts by physicians, who then refused to let an experienced and highly trained CRNA attempt the procedure out of concern for their ego and title".

The facilities that choose to comply with the Tax Equity and Fiscal Responsibility Act (TEFRA) often overcharge for unnecessary OR time while waiting for a physician, and patients receive midazolam at a higher rate than is appropriate so that they will not remember the long delay. Additionally, there were reports that medical direction models must choose daily between committing Medicare fraud or delaying case starts to comply with TEFRA. This general sentiment was repeatedly echoed by informants that reported the same limitations on their scope of practice. Recurrent descriptive terms like restriction, ego, lack of respect, artificial regulation, and control were used to describe the pressure many felt with the limited scope of practice within the ACT.

4.5.4   Too Many Cooks in the Kitchen

This term was a catchphrase that occurred several times. Many informants said this created an environment of different perspectives with too many competing personalities, which led to awkwardness if there was a difference of opinion regarding patient care. This could be problematic if the results were multiple methods or ideas without effective communication or collaboration within the ACT. Informants reported that this problem could lead to care confusion, creating opportunities for mistakes and decreased patient safety. Some informants shared scenarios of physician anesthesiologists misleading patients by telling them they would administer anesthesia, creating confusion when the CRNAs are introduced into the anesthetic plan. Patients were often confused by patients as to who provides anesthesia, and the CRNA role is perceived as "helper." The patients were confused by the time they met the CRNA.

4.5.5 Microaggression

Microaggression was reported, and animosity between physician and nurse anesthesiology and several informants used the term "turf war" to describe this subtheme. Some stated that having so many physicians and nurses working together within the ACT created an "unnecessary stressful work environment" because physicians exhibit complex professional traits like not helping or undue tension when nurses disagree with them. One informant said they left the ACT model for this reason, and another said physician-nurse anesthesiologists' relationships were the worst they have experienced during their careers. Examples of this noncollaboration and respect spitefully pushing care plans for no other reason than to disagree with the CRNA said they noticed new male graduates do not experience the same amount of opposition from newer physicians as female graduates. Another informant echoed that physicians actively did not participate in patient care while leaving the CRNA to complete all tasks from preoperative to postoperative care without help and said this directly defeats the purpose of the ACT and creates a hostile work environment.

4.5.6 Role Confusion

Role confusion was reported as creating animosity between physicians and nurse anesthesiologists, which becomes problematic if they disagree on a care plan. One informant said, "the ACT provides no benefits to safety, and working with multiple physician anesthesiologists who want something different makes for an unneeded stressful work environment. I choose never to work in ACT practice anymore". Several more informants used terms like tension involving politics between physician and nurse anesthesiologists, egos, and different expectations within the ACT as reasons contributing to lack of respect and role confusion, all leading to decreased provider happiness.

4.5.7 Lack of Availability and Increased Costs

The second theme to emerge regarding the challenges of the ACT was identified as a lack of physical availability and increased cost. Comments about availability and costs were often joined. Most informants who identified lack of availability as a challenge stated that physician anesthesiologists do not do anything to contribute to the care of patients, nor are they physically present for care. Several said they could not "get in touch with the (physician anesthesiologist) 85% of the time. They do not come when needed. They do not participate in preops, postops, or intraops 99% of the time. Then they want to 'thank you' for the help today". Another informant who identified lack of availability as a challenge said physician anesthesiologists are "making twice as much income and are reluctant to do the minimum work required." Others gave examples of physicians sleeping on the job and watching movies on an iPad. One reported many delays to case starts due to waiting for a physician anesthesiologist to arrive at the OR suite for induction, which is problematic with simultaneous case starts, especially at the beginning of the day. Another situation that arises due to lack of availability is that the team dynamics become "flustered when the other members of the model do not help

at all to keep the flow going." Another clarified this scenario by stating, "things would run smoothly if anesthesiologists would see patients to keep the flow moving." Lack of availability was further defined as physician anesthesiologists being "lazy, not participating in care, preoperative or postoperative evaluations, not giving breaks, absent between cases, unhelpful and just taking up space in the room." These behaviors are by many of the informants, and this is particularly offensive if a surgeon says, "call your staff in here," when they become frustrated with delayed starts and slow turnover times due to lack of availability.

The cost of care was cited repeatedly by informants as a part of availability. They described the ACT as financially inefficient because most physician anesthesiologists are not working team members and see themselves as "supervisors." One informant said this "allows for perceived subordination of other team members." Some informants said there is "pressure not to report billing fraud on all team members, as there is documentation stating the physician anesthesiologists are participating in care when the reality is they are not." One informant said this leads to "decreased pay because of splitting anesthesia reimbursement between providers" when there is "unnecessary duplication of roles."

4.6 Resolution of Conflict

Alves proposed four conflict resolution techniques for CRNAs: avoidance, collaboration, compromise, and accommodation; developing themes for how informants resolved conflict within the ACT supported all four techniques he identified Alves SL, 2005.

4.6.1 Avoidance

Avoidance included standing one's ground or simply leaving the ACT care model. One informant mentioned avoidance and described this conflict resolution technique as "knowing I have the patient's best interest in mind, I proceed without consultation and update after the fact, but only when asked. If there is a rebuff to my proceeding, I tell them they should have made themselves available when they wanted to participate in the patient's case. Sometimes I proceed forward without talking to them". Others reported that they stood their ground if they could not avoid the situation and proceeding with a case was unsafe by refusing to participate. They stated that if disagreements were with the physician anesthesiologist, they would bow out and let them do the case alone. Others reported little recourse in disputing how the case should be executed. Still, ultimately if a resolution could not be reached, the CRNA should refuse to accept the patient, and the physician anesthesiologist would have to proceed alone or find someone else to do the case.

Avoidance was evident in that many informants had worked within the ACT model but now work in CRNA-only practices or independently. Reasons for this ranged from leaving the traditional ACT because the physician anesthesiologists choose only to do the "fun parts of anesthesia such as peripheral nerve blocks, central venous lines, or fiber optic intubations while leaving routine care of patients to the CRNAs." CRNAs that work

in CRNA-only practices describe their team approach as having the freedom to "bounce questions off each other when needed" and share the workload equally. Many others described their ACT environment as contentious as the physician anesthesiologists have meetings to discuss limiting CRNA scope of practice, especially by limiting or restricting their ability to perform peripheral nerve blocks. Many of these CRNAs expressed a desire to avoid this situation and leave their current practice for a CRNA-only practice but are limited geographically or by family situations. One CRNA stated they "feel restricted to the point that I would need additional training to regain lost skills (regionals, central lines), which is upsetting." While another cited reason for wanting to abandon the traditional ACT for CRNA only or independent practice included "there is very little recourse for lazy or bad (physician) anesthesiologists. They typically enjoy absolute power wherever they work. It is typically swept under the rug if they make mistakes or bad decisions".

Another informant described their young academic physician colleagues as "gunner" types. At the same time, another stated, "the newer (physician anesthesiologists) do not appear to be as trusting and supportive of CRNAs or Resident Registered Nurse Anesthesiologists (RRNAs)." Our group has often claimed that a hospital policy prevents CRNAs from performing regional blocks, which is untrue. They do not want to allow CRNAs to perform regional blocks. In addition, the (physician anesthesiologists) have been very obstructive, uncooperative, and unsupportive of RRNA DNP projects at our facility. The previous anesthesia director said the DNP degree was "a desperate attempt for nurses to call themselves doctors." Under her leadership, we were also notified that RRNAs could no longer be left alone while caring for a patient. Except for the regional blocks, all these changes began after APRNs were granted full practice autonomy during the pandemic. Of note, the only anesthesia providers that independently performed all intubations of surgical patients at the beginning of the pandemic at the facility were CRNAs. "Still, some (physician anesthesiologists) insist they must be present for induction."

Those informants who identified as "independent" or "solo" CRNAs said they loved it and would not return to the ACT model. Reasons they gave for loving independent practice included "following the patient from start to finish" and getting "to use my brain and skills and think independently." Another said being a solo provider was the "best decision to work as a full-service independent practicing CRNA." One CRNA said, "coming from a heavily controlled ACT setting, I think patients receive the emergent interventions quicker as an independent provider because you are not having to call (physician anesthesiologists) to handle events that you are rigorously prepared for in training."

4.6.2 Collaboration

Collaboration was identified as discussing the conflict, pros, and cons of decisions and treatment plans, and what benefits the patient most. These techniques included talking with physician colleagues and thoroughly reviewing the case. Hence, there is no question for all care providers about what is going on to achieve the best safety outcomes. Some informants stated they listen to options and, if reasonable, will proceed with the agreed

plan. Otherwise, they express concerns and document the discussion. Others said open communication between professionals and sharing knowledge of each other's care plan is a technique to resolve conflict. One informant explained, "through communication and inquiring as to why they have a specific opinion on a case that may differ from mine."

Other informants cited that listening and adapting while allowing for constructive input from others is often beneficial. One informant revealed that "very few decision-making conflicts, but they can often be resolved by presenting current literature to guide a resolution." Another stated, "If I am the one providing the anesthesia for the duration of the case, I make the final decision on what I do. I have no problem listening to other options or receiving objective feedback. My license is mine to lose, so I am willing to compromise nothing as the conflict does not jeopardize patient safety or my comfort. The ACT model may be a team approach, but the ultimate care provides care throughout the case".

One informant acknowledged that each CRNA handles conflict differently, but "most provide a rationale for reasons their plan differs and often the anesthesiologist compromises with CRNA plan or agrees with CRNA's plan of care. Again, we find the greatest resistance to collaboration with the junior anesthesiologists". Other informants cited patient safety as a driving force behind decisions. They used the Concerned, Uncomfortable, and Safety issue (CUS) method from TeamSTEPPS as a helpful tool for conflict resolution within the ACT (Garrett, 2016).

The informants identified a part of the collaboration as interdependent and independent decision-making. CRNAs frequently reported wishing to work together and collaborate with physicians and nurses. Still, none of the participants stated they needed supervision to perform their job safely within the standard of care. Some CRNAs described their practice within the ACT as collegial and respectful. Some CRNAs said they would work within the ACT with the provision that their physician colleagues demonstrate respect and work as a team. Another described that "CRNAs are trained and educated, especially CRNAs training in the last decade. That said, I believe the ACT model works well at our facility if the anesthesiologist allows the CRNA to practice to the fullest scope of practice. The majority of patients have very complex medical histories. In cases like cardiothoracic, the collaboration works well". Another example was given of a facility that "pushes 'collaborative anesthesia care team' practice that works exceptionally well as their scope of practice is not limited within the model and believes others who are frustrated with limitations in their practice would benefit from this concept."

4.6.3 Compromise

Three informants described the compromise as listening to the other provider's rationale. If it is within the standards of care, they will amend their plan and proceed with the alternative method. One informant clarified this technique as "knowing how to choose battles." This informant stated that being agreeable and having a noncontrarian attitude earns respect and finds others listening when they feel strongly about patient care.

4.6.4 Accommodation

Other techniques employed were calm discussions if there was a disagreement while explaining the rationale as professionally as possible, deferring to the supervising anesthesiologists, or suggesting a different treatment plan or medication, depending on the patient care scenario.

Overall, the informants reported that the ACT is inherently flawed by the physician-imposed supervision requirement and that this often resulted in conflict. All informants identified that they wanted to collaborate but did not express the need or desire for supervision or dictation of their decisions or use of skills.

4.7 Additional Information – Interdependent Collaboration/Independent Decision-Making

The final question of additional information regarding the ACT themes was categorized as interdependent collaboration and independent decision-making. CRNAs wish to work together and desire to collaborate with physicians and nurses. Still, no practitioners stated they needed supervision to perform their job safely within the standard of care.

Some CRNAs said they would work within the ACT with the provision that their physician colleagues demonstrate respect and work as a team. An example was given of a facility that pushes "collaborative anesthesia care team" practice that works exceptionally well as their scope of practice is not limited within the model and believes others who are frustrated with limitations in their practice would benefit from this concept. Some CRNAs described their practice within the ACT as collegial and respectful. At the same time, one believes understanding "emotional intelligence" and developing trust and a good reputation as a provider goes a long way in minimizing workplace conflicts.

Some informants reported working within the ACT model but now work in CRNA-only practices or independently. Reasons for this ranged from leaving the traditional ACT because the physician anesthesiologists choose only to do the "fun parts of anesthesia, i.e., peripheral nerve blocks, central venous lines, or fiber optic intubations while leaving "routine care of patients" to the CRNAs. CRNAs that work in CRNA only practices describe their team approach as having the freedom to "bounce questions off each other when needed" and share the workload equally. Many others described their ACT environment as contentious as the physician anesthesiologists have meetings to discuss limiting CRNA scope of practice, especially by limiting or restricting their ability to perform peripheral nerve blocks. Many of these CRNAs expressed a desire to leave their current practice for a CRNA-only practice but are limited geographically or by family situations. One CRNA stated they "feel restricted to the point that I would need additional training to regain lost skills (regionals, central lines), which is upsetting." While another cited reason for wanting to abandon the traditional ACT for CRNA only or independent practice included "there is very little recourse for lazy or bad anesthesiologists. They typically enjoy absolute

power wherever they work. It is typically swept under the rug if they make mistakes or bad decisions." Another described their young academic physician colleagues as "gunner" types. Others stated, "the newer (physician anesthesiologists) do not appear to be as trusting and supportive of CRNAs or RRNAs. Our group has often claimed that "a hospital policy prevents CRNAs from performing regional blocks, which is untrue. They do not want to allow CRNAs to perform regional blocks".

Those who answered this question and identified as "independent" or "solo" CRNAs said they loved it and would not return to the ACT model. Reasons they gave for loving independent practice included "following the patient from start to finish" and getting "to use my brain and skills and think independently." Another said being a solo provider was the "best decision to work as a full-service independent practicing CRNA." One CRNA said, "coming from a heavily controlled ACT setting, I think patients receive the emergent interventions quicker as an independent provider because you are not having to call MDA to handle events that you are rigorously prepared for in training."

4.8 Summary

The quantitative demographic data results demonstrated that the informants' average age reflected the same average age as the national data, 46 years. Gender was the same as the national CRNA population, with 67% females and 32% males. Remaining congruent with the national CRNA population, the informants were initially prepared with master's degrees and doctoral degrees in second place. National data for years of experience, full-time vs. part-time employment, and CRNA to physician ratio were unavailable. This research showed that the CRNA informants had an average of 14 years of experience, most were employed full-time and within the ACT model with a nurse-physician ratio of < 4:1, and primarily practiced in urban hospital settings (AANA, 2022).

Qualitative data provided the primary themes that CRNAs enjoyed the collaborative practice and having extra hands available during emergencies but did not demonstrate that physician supervision was necessary. Challenges identified centered around physicians discounting the CRNA's role and lack of respect within the ACT. A restricted scope of practice was determined as a challenge of the ACT, and the CRNA informants also reported instances of physician micromanagement and microaggressions. Many informants reported these occurrences; some stated that this increased costs and decreased patient safety. These identified themes, in combination with role confusion, were said to lead to hostile work environments in the form of physicians outwardly not participating in patient care or being utterly unavailable for consultation or patient care.

Conflict resolution results were overwhelmingly collaborative. Most CRNAs reported collaboration, listening, and open discussion as ways to resolve conflict within the ACT. Many reported avoidance and accommodation and other ways to resolve conflict, while others said they prefer to work in all CRNA arrangements or independently as ways to avoid conflicts. Were gathered through four free-text questions. The first three questions

asked about strengths, challenges, and conflict resolution within the ACT. The final question allowed the informants to tell researchers anything else they would like to share about their practice.

The final themes shared by CRNA informants were that many left the traditional ACT model due to the challenges within the team and resulting conflicts while stating they loved collaborative practice but loved their independent decision-making and lack of restriction on their scope of practice too much to ever return to the physician-nurse ACT practice model.

Chapter 5

Conclusion

This research found that CRNAs could identify strengths of the ACT, but these were often overwhelmed by the physician-required supervision of their practice. The informants could identify the value of collaborative practice through the complete anesthesia and perioperative team. The informants reported that the ACT works best when communication is accessible between team members and makes patient care more efficient and safer. Good communication is invaluable for those who can discuss complicated patients and seek advice when encountering unusual circumstances. Others described teams with "seasoned" or experienced staff as invaluable for those new to practice and inexperienced.

Discussing ideas and using team members as sounding boards was echoed by the CRNA informants many times. They enjoyed shared decision-making and found each other's insight helpful, especially when "struggling with a difficult patient." The highly valued collaborative efforts identified in this research indicated that it did not matter if the collaborative partners were physician-nurse or nurse-nurse; the overall theme of collaboration had another trained anesthesia provider; these were a resource, a backup, but never a supervisor.

While collaboration among the informants was greatly valued in practice, this research discovered that CRNAs dislike being devalued within the team. Several informants described being discounted, disregarded, and disrespected while practicing within the ACT. They were often placed in positions of "feeling like I have to ask permission to provide appropriate care." A typical response to this sentiment was that the CRNA is a licensed professional with the necessary skills, education, and training to care for patients. They often have to defend their decisions to physicians with less experience and competence than their own. Other acts of being devalued were given as examples as physician counterparts "snatching syringes and giving medications then walking out." This places CRNAs in the undesirable position of being left to "clean up their messes" by dealing with the consequences of giving induction drugs or other medications that render a patient hypotensive, bradycardic, hypertensive, or tachycardic for several minutes to hours after these described occurrences. One informant said these acts are "often misconstrued as I know more than you, so do what I tell you to do," leaving them with feelings of not being a valued team member. Several others described similar scenarios and said there is a general disregard for

CRNAs being actual team members, and their plans are often overlooked or ignored. Most informants gave these examples and the subtheme of not being respected as a colleague who provides evidence-based care while practicing in the ACT. These devaluing acts were often evident as physician anesthesiologists behave as though CRNAs are "incapable of handling cases solo" and do their best to restrict their scope of practice.

CRNAs do not believe that the restrictions they experience are related to expertise but to professional dominance, misogyny, economics, and archaic rules. This was evident when informants discussed not being "allowed" to perform peripheral nerve blocks. The scope of practice came from limited practice, particularly with regional anesthetics. One informant said, "physician anesthesia providers do all our peripheral regional anesthesia and central line placements" for no other reason than control of their practice. Several described this as "limited autonomy and inability to practice at the top of my license." Other informants described the restriction of the scope of practice in the form of "micromanagement," "microaggression," and the creation of "tension within the ACT" due to turf wars and physician dominance of the ACT. Several informants said these issues must be fixed, and CRNAs allowed to practice to their full scope of education. Informants who have left the ACT model for all CRNA or independent practice stated they would never return to the traditional physician-nurse ACT for the above reasons, nor would they consider returning until these issues are corrected. Many informants found this unfortunate because they liked being part of a collaborative team but could not be part of the system that generated so much disrespect for their role as anesthesia providers. Many informants discussed other factors than discounting and disrespect they faced within the ACT. However, they stated that restricting our scope of practice also restricts access to care for patients who need anesthesia services. This creates an inefficient and unsafe anesthesia care environment due to a lack of autonomy and increases patient costs.

Recommendations from some informants were ideas of how to "fix" the ACT model and stated that all federal restrictions on CRNA practice and payment needed to be removed. Several examples were given regarding the 2016 final ruling granting advanced practice registered nurses (APRNs) full practice authority while excluding CRNAs. Since this ruling, there have been multiple examples of decreased access to anesthesia care for veterans. This must be reversed as CRNAs are underutilized within the VA facilities causing excessively long wait times for anesthesia care. Several informants self-reported as veterans and gave examples that CRNAs have full practice authority during combat in every military branch. Therefore, they should be granted full practice authority to alleviate these excessive wait times, increase access and decrease costs for our veterans. Others cited the AANA statement, "The VA needs to make full practice authority for CRNAs permanent throughout the VA. Department leadership strongly recommended that CRNAs be granted full practice authority in the VA during the COVID-19 health emergency because they are uniquely trained, educated, and positioned. All without the need for physician supervision. We believe that full practice authority for CRNAs needs to be made permanent. Removing unnecessary supervision and allowing CRNAs to practice to the full extent of their education

and skills will help the VA address staffing shortages and long wait times in the most cost-effective manner possible." (AANA, 2022).

Efforts must be directed to the states restricting CRNA practice and eliminating these restrictions to CRNA practice and payment. A study by the Lewin Group shows that a CRNA practicing without supervision is the most cost-effective method of anesthesia delivery. Additionally, a study comparing educational costs showed that CRNAs are more cost-effective to educate than other anesthesia professionals. The ability of CRNAs to provide high-quality care, even under the most challenging circumstances, has been recognized by every branch of the U.S. military. CRNAs have full practice authority in the Army, Navy, and Air Force. They are the predominant anesthesia provider on forward surgical teams and combat support hospitals, where CRNAs staff 90% of forward surgical teams. CRNAs have demonstrated that they can independently deliver care to active-duty military members on the battlefield. There is no reason they should not deliver that same care to our veterans under much safer circumstances in VA facilities. (AANA.com 2022). These battles must be fought on the federal and state levels and within the physician-controlled hospital systems. Granting full practice authority to CRNAs in the VA system would increase access to veterans. The majority of states currently provide independent practice for CRNAs in which there is no requirement for a written collaborative agreement, no supervision, and no conditions for practice, according to the National Council of State Boards of Nursing. These changes need to be also expanded to the remaining states.

CRNAs will need to challenge all credentialing restrictions in hospital systems or other places that prohibit the full independent practice of CRNAs, including areas such as regional anesthesia and pain management. The American Academy of Nursing's position on full practice authority is that health care is a human right. Therefore, access should be increased, and cost diminished is of utmost importance to the communities we serve. For these goals to become achievable, Congress must create a neutral language that encourages the restructuring of private and public payment systems and allows for optimal reimbursement for all APRN services.

The American Association of Nurse Anesthesiology (AANA) is a professional organization representing about 59,000 CRNAs nationwide. According to their website, CRNAs administer approximately 50 million anesthetics annually, representing more than 80% of the anesthesia providers in rural counties. Rural and critical access hospitals rely on independently practicing CRNAs AANA, 2023). Numerous independent studies report the safe, high-quality, cost-effective care CRNAs provide. Hogan et al. pointed out that their research and analysis CRNAs are more cost-effective to train and provide more efficient care than their physician colleagues. They reported that physician and nurse anesthesiologists perform the same skill sets and provide the same anesthesia services. The research summarized the need for permitting CRNAs to practice to the full scope of their training to accommodate the increasing demand for health care services. CRNAs are specifically skilled and capable of providing anesthesia services and maintaining the quality of care while containing costs (Hogan et al., 2010).

The finding of a study performed by Hoyem et. Al. found a strong safety record for anesthesia services and general and concluded that politics and professional interests are the driving forces behind the continued supervision of CRNAs (Hoyem et al., 2019). A primary finding of a study done by Negrusa et. Al, the is no statistical difference in anesthesia risks or complications when performed by a CRNA. Therefore, there is no empirical evidence that their scope of practice should continue to be limited. The study involved a huge commercial payor database that included patients and cases in various healthcare settings. Their study concluded that the restrictions placed on CRNAs should be lifted to improve patient access to anesthesia services, especially in rural or underserved areas, while diminishing costs to these patients (Negrusa et al., 2016).

A study regarding the impact of legislation on the scope of practice among nurse anesthesiologists was done by Greenwood & Biddle. The outcome of this study highlighted that CRNAs' scope of practice is often limited, even with proven quality outcome metrics for no supervision. These researchers echoed the IOM's call for APRNs to be used to the fullest extent of their education and training and how essential this is to ensure access to care for all healthcare consumers (Greenwood and Biddle, 2015). Other studies focused on whether harm to patients increased when a CRNA with an expanded scope of practice was involved in anesthesia care—a study by Yin et. Al. concluded that patient care was not jeopardized, patient safety was not impacted, and the care CRNAs provided decreased recovery room times and diminished hypothermia (Yin et al., 2021). Dulisse and Cromwell suggested that CMS allow CRNAs to practice in every state without a restricted scope of practice. They reported that their data did not support that patients are at an increased surgical risk if CRNAs worked independently without physician supervision (Dulisse and Cromwell, 2010).

There is no measurable difference in the quality of care a CRNA provides compared to physician anesthesiologists (Paul F Hogan et al., n.d.). There is no duplication of services, which promotes efficiency and reduced costs when CRNAs are not supervised or practiced independently. All CRNA models can provide cost-effective options for anesthesia services compared to the ACT, as many competing factors limit resources (AANA, 2022).

In conclusion, nurse anesthesiologists work in many settings, including hospitals, doctor's offices, surgery centers, and the military (AANA, 2022). CRNAs are in support of collaboration and want to work together. Still, they do not support being discounted, disrespected, or supervised. CRNAs are prepared to practice independently; therefore, there is no reason to be supervised or dictated to on administering anesthesia services, especially considering the evidence in numerous studies to substantiate this position statement. Independent practice will mean we have to stop being tied to a physician within the ACT.

The qualitative data from this study reflect and indicate that the ACT is a political and financial arrangement for the sole benefit of physician anesthesiologists, not CRNAs. The ACT does not improve the quality of anesthesia care, and quality can be decreased due to moral distress caused by discounting and disrespect. The ACT does not improve access to care and is more costly to consumers.

Recommendations from this study include a political call to action, a change in payment structure for anesthesia services, and reformed hospital credentialing.

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Vita

Cindi was born in Portsmouth, Virginia, in 1969. She was raised in a military family and frequently moved throughout her childhood until settling in Panama City, Florida. She graduated from Rutherford High School in 1987. She attended Gulf Coast State College and graduated with an Associate of Arts and Associate of Science in general education and nursing. She then attended Florida State University and earned a Bachelor of Science in Nursing in 1996. She then attended the Gooding Institute of Nurse Anesthesia and graduated with a Master of Science in Nurse Anesthesia in 2001. In 2013, she enrolled at the University of Tennessee Health Science Center and graduated in 2014 with a Doctor of Nursing Practice degree.

Cindi performed graduate research under the tutelage of her advisor Dr. Michael Carter. Cindi's research topic stems from her passion for Certified Registered Nurse Anesthesiologists to have Full Practice Authority without limit to their scope of practice. During her graduate work, Cindi collaborated with fellow CRNAs and was involved with the Tennessee Association of Nurse Anesthesiologists, the Florida Association of Nurse Anesthesiologists, and the American Association of Nurse Anesthesiologists to advocate for CRNA's rights and lobby legislators for Full Practice Authority.

Cindi has led and contributed to several publications central to CRNA practice involving simulation, airway management, pain management, and Covid protocols to help decrease transmission in the operating room. Along with professional advocacy, Cindi has a robust academic career that began at the University of Tennessee Health Science Center in Memphis, Tennessee. She served as the Assistant Director of the Nurse Anesthesiology Concentration for seven years before relocating to Florida. She advises DNP students on scholarly projects, teaches multiple didactic and simulation courses, and performs administrative functions as a faculty member at the University of South Florida. Cindi expects to receive her Ph.D. degree in April 2023.