RUTGERS
School of Nursing

DOCTOR OF NURSING PRACTICE (DNP) PROGRAM

A DNP PROJECT

THE APN-A PROFESSION AND INTERPROFESSIONAL COLLABORATION

STUDENT NAMES: Lara Mendoza and Chad Toughill

DNP PROGRAM CHAIR: Maureen McCartney Anderson, DNP, APN/CRNA

DNP TEAM MEMBER: Thomas J. Pallaria, DNP, APN/CRNA

DATE: January 28, 2020

Rutgers, The State University of New Jersey

Table of Contents

Abstract

In dental offices, certified registered nurse anesthetists (CRNAs) also known as advanced practice nurses in anesthesia (APN-A) in New Jersey are permitted to work under the supervision of a physician. By fostering a healthy interprofessional relationship with [redacted], when policies are adapted in favor of independent APN-A practice in the state of New Jersey, the participating [redacted] students may be more likely to employ APN-As in their professional practice after graduation. Current students enrolled in [redacted] participated in this prospective study, which included an informative presentation on the nurse anesthesia profession, designed to increase acceptance and confidence in the APN-A. Pre-intervention and post-intervention surveys were completed.

Keywords: certified registered nurse anesthetist, CRNA, nurse anesthetists, advanced practice nurse, APN-A, public opinion, public campaign, attitude of health personnel, perception, health personnel, dentistry, dental education, dental students, medical education, medical students

The APN-A Profession and Interdisciplinary Collaboration

Advanced Practice Nurse (APN) is a title bestowed upon a Nurse Practitioner, Certified Nurse Midwife, Clinical Nurse Specialist, as well as a Certified Registered Nurse Anesthetist (CRNA). In addition, a CRNA is also recognized by the title of Advanced Practice Nurse-Anesthesia (APN-A). These terms are synonymous and will be used interchangeably throughout this manuscript. Although APN-As encompass the second largest group of APNs in the United States, approximating 53,000 registered members, APN-A "have historically experienced the most vigorous and organized resistance from outside entities regarding rights to practice to the full scope of their education and experience" (American Association of Nurse Anesthetists [AANA], 2019; Cahill, Alexander, & Gross, 2014; Malina & Izlar, 2014). Within the state of New Jersey, all APNs work with a collaborative agreement, or a joint protocol, with a physician counterpart. However, APN-As are mandated to have a joint protocol with a physician anesthesiologist. This differs from all other APNs, as they can have a joint protocol with any physician in any specialty. In practice, this is interpreted as a nurse practitioner can have a joint protocol with a podiatrist, plastic surgeon, medical doctor, or surgeon, whereas an APN-A must be tied to an anesthesiologist (Pfeiffer, 2013). This practice persists despite the mounting literature that there is no evidence that care delivered solely by an APN-A, without the requirement of anesthesiologist oversight, results in increased complications or death. APN-As can deliver safe anesthesia and work independently without any sacrifice in patient care or patient outcomes (Dulisse & Cromwell, 2010).

Ironically, APN-As have often been lauded as "the best kept secret in healthcare," referencing the unrecognized care nurse anesthetists provide to patients during surgical procedures (Kelly, 2008). However, in keeping that a secret, it has made patients and other

healthcare providers unfamiliar with APN-As, and more importantly, their practice. Across the United States, APN-A scope of practice fluctuates based on legislation limitations. Therefore, this incongruity of APN-A practice further provokes a misconception amongst other healthcare professionals, thwarting the magnitude of APN-A practice. Thus, advocating for the APN-A profession begins with understanding the inherent perception and knowledge of APN-As within the different disciplines of dentistry and medicine. The immediate focus of this project will analyze dental students and their perceptions as a sample population, while providing an exposition on the APN-A profession and advanced airway assessments and skills, in hopes of the dental students recognizing, understanding, appreciating, and ultimately utilizing the APN-A profession in future interdisciplinary collaborations.

Background and Significance

In 1877, Sister Mary Bernard worked as the first nurse anesthetist at St. Vincent's Hospital in Erie, Pennsylvania. The practice of delivering anesthesia was performed by nurses prior to the existence of the first physician anesthetists in 1905 (Matsusaki & Sakai, 2011). In 1908, the National Association of Nurse Anesthetists, the predecessor of the American Association of Nurse Anesthetists (AANA), was founded; however, it was not until 1956 that the title of CRNA came into existence (AANA, 2019a). The ability of APN-A to practice independently has been repeatedly challenged by physicians, more so than all other APN specialties (Cahill et al., 2014).

Historically, the American Society of Anesthesiologists (ASA) has lobbied to limit the scope of practice of the APN-As to physician supervision, which has led to gaps and vacancies of qualified personnel to provide anesthesia (Malina & Izlar, 2014). Currently, the APN-A scope of practice varies across the United States. Pennsylvania and New York do not acknowledge

CRNAs as APNs while 17 states have opted out of the federal physician supervision requirement – Alaska, California, Colorado, Idaho, Iowa, Kansas, Kentucky, Minnesota, Montana, Nebraska, New Hampshire, New Mexico, North Dakota, Oregon, South Dakota, Washington, and Wisconsin (AANA, 2019a). This disparity in scope of practice across the United States promotes additional confusion amongst healthcare professionals, hindering and weakening the argument for expanding APN-A practice (Malina & Izlar, 2014).

In 2002, the American Dental Association (ADA) recommended that a "CRNA should only work under the supervision of a dentist who also has been trained in the sedation and anesthesia procedures that the CRNA will be administering" (Weaver, 2002). Fast forward to the most recent guidelines adopted by the ADA House of Delegates in 2016 – it is recommended that operating dentists who utilize an "independently practicing qualified anesthesia healthcare provider" to administer minimal sedation, moderate sedation, or general anesthesia must maintain current certification in Basic Life Support for Healthcare Providers (American Dental Association, 2016). This is a distinct change in language from the 2002 guidelines by the ADA – the 2016 guidelines do not differentiate APN-As from other anesthesia providers. The current recommendations of the American Academy of Pediatric Dentistry (AAPD, 2018) affirms that if a state law endorses an APN-A to work under the supervision of a dentist, the dentist must have training in general anesthesia, as well as a license or permit for that level of pharmacologic management. Additionally, to err on the side of caution, the AAPD (2018) advocates that the dentist overseeing the APN-A should not also be the same provider of the dental treatment. For example, a dentist that has not been trained in sedation is unable to supervise an APN-A delivering sedation. According to Title 13 of the New Jersey Administrative Code, in the state of New Jersey, if a dentist elects to employ a specific anesthesia (i.e., parenteral conscious sedation,

general anesthesia, and/or enteral sedation) "permit holder or an MD or DO who is a member of the anesthesiology staff of an accredited hospital or who is authorized to perform anesthesia services by the Board of Medical Examiners pursuant to the N.J.A.C. 13:35-4A," the anesthesia provider must remain present during the entire anesthesia period and is responsible for the patient during the entire procedure until the patient has recovered fully and has been discharged (New Jersey Board of Dentistry, 2018). When campaigning for the APN-A profession, one must take into consideration the language used in federal and state regulations concerning APN-A scope of practice. Even in the state of New Jersey, the careful choice of words leaves room for interpretation to the lobbying parties of the ASA and AANA.

Needs Assessment

The state of New Jersey has not opted out of the federal physician supervision requirement for APN-As. Regarding the policy on the employment of anesthesia providers in dental offices, the New Jersey Board of Dentistry defers to the New Jersey Board of Medical Examiners, to which they state that APN-As must work under the supervision of a physician that is "privileged by a hospital or the Board to provide anesthesia" (New Jersey Board of Medical Examiners, 2018). The additional requirement of privileges or anesthesia education and training for office-based surgeons is a major disincentive for those practitioners to utilize APN-As.

The New Jersey Association of Nurse Anesthetists (NJANA) has vigilantly petitioned the courts to amend regulations that hinder APN-A scope of practice. Unfortunately, the New Jersey courts have continued to uphold regulations that limit the practice of APN-As in these settings. Of note, APN-As have been practicing in office-based settings in the state of New Jersey until March 2004, when the Board of Medical Examiners implemented the physician anesthesiologist supervision requirements. In November 2004, the NJANA brought civil action against the New

Jersey State Board of Medical Examiners. In that suit, the NJANA challenged regulations that limited the types of anesthesia a APN-A can administer in a physician-supervised office setting. In a more recent lawsuit filed in 2012, the NJANA brought civil action against the New Jersey Department of Health and Senior Services in which the NJANA argued against the validity of the physical presence of an anesthesiologist during induction, emergence, and change in status of anesthesia in a hospital. Both cases were decided against the NJANA and demonstrated the court's willingness to uphold strict regulations to limit the professional practice of APN-As (Christian & Ciesla, 2016).

In March 2019, the National Commission on Recognition of Dental Specialties and Certifying Boards formally recognized dental anesthesiology as a dental specialty (Solana, 2019). In order to become a dental anesthesiologist, residents must complete three years of postgraduate training, which is mandated by the Commission on Dental Accreditation (Giovannitti, Montandon, & Herlich, 2016). Of note, at [redacted], the extent of anesthesia training is limited to education on local anesthesia in select courses (Rutgers School of Dental Medicine, 2018). Additionally, [redacted] School of [redacted] offers seven postgraduate dental education programs (e.g., endodontics, oral and maxillofacial surgery, orthodontics and dentofacial orthopedics, pediatric dentistry, periodontics, prosthodontics, and general dentistry education in orofacial pain) – dental anesthesia is not offered. Dental educators acknowledge the importance of anesthesia education; however, due to the lack of sufficient resources and competent teaching staff, there has been an underwhelming amount of anesthesia education in the predoctoral curriculum (Giovannitti et al., 2016).

Of all APN specialties, APN-As receive the most challenges to independent practice by medical professionals (Malina & Izlar, 2014). These obstacles are complicated and multifactorial

and are often focused on scope of practice limitations. Malina and Izlar (2014) emphasize educating other health care professionals on the safe and effective care provided by APNs, which may aid in alleviating these hindrances. D'Amour and Oandasan (2005) note the value of collaborative practice environments in interprofessional education. "It is believed by many that if we train competent collaborative practitioners, more collaborative practice settings will be developed over time" (D'Amour & Oandasan, 2005). Providing insight of the role of APN-As to future healthcare professionals, in this instance dental students, will enhance the support of interdisciplinary team members, reassuring the patient of the expertise and competence of APN-A practice (Hensel, Cooper, & Craney, 2018).

Problem Statement

The problem was the prevailing perception and knowledge of APN-As by current and future healthcare professionals, in particular the dental profession. The intervention for this predicament was education of dental students via an exposition on the APN-A profession and advanced airway assessments and skills, in comparison to the dental students' current education and understanding of anesthesia and anesthesia providers. The outcome of this problem was increased acceptance and confidence of the APN-NA scope of practice thereby facilitating APN-A practice in a private practice setting without anesthesiologist oversight. Hogan, Seifert, Moore and Simonson (2010) demonstrated that APN-As acting independently provide anesthesia at the lowest economic cost – this can benefit dentists, private practice physicians as well as private paying patients. These components lead to the PICO question: given the present-day perception and knowledge of APN-As by current and future healthcare professionals, will education of dental students via an exposition on the APN-A profession and advanced airway

assessments and skills, in comparison to the dental students' current education and understanding of anesthesia and anesthesia providers, increase acceptance and confidence in the APN-A?

Aims and Objectives

The aim for this project was to educate and enhance the perspective of other healthcare providers (i.e., dental students). This included the understanding of APN-A education, abilities, and scope of practice, demonstrating how APN-As provide safe and more cost-effective anesthesia care to the patient, as well as increased access to said care (Liao et al., 2015; Negrusa, Hogan, Warner, Schroeder, & Pang, 2016). These goals were accomplished by the following objectives:

1. Create and provide an exposition focused on the APN-A profession and advanced airway assessments and skills, integrating evidence-based literature that highlights collaborative relationships between dentists and APN-As and positive patient outcomes.
2. Collaborate with [redacted] to disseminate the information to the dental students.
3. Assess perceptions of interprofessional collaboration and education via pre-intervention survey.
4. Assess perceptions of APN-A practice and collaborative efforts prior to exposition via pre-intervention survey.
5. Evaluate changes in perceptions on interprofessional collaboration and education via post-intervention survey.
6. Evaluate changes in perceptions and determine willingness to adapt to collaborative care with APN-As via post-intervention survey.
7. Disseminate findings.

Review of Literature

A review of literature was performed through the Rutgers University Library website using the following databases: Ovid, CINAHL, PubMed, and ERIC. Principal search terms included “certified registered nurse anesthetist,” “CRNA,” “nurse anesthetists,” “advanced practice nurse/anesthesia,” or “APN-A.” The initial search strategy combined the principle terms with the phrases “public opinion” or “public campaign.” The subsequent search integrated the principle terms with “attitude of health personnel,” “perception,” “health personnel,” or “interprofessional collaboration.” Further expansion on the literature review combined the principle terms with “dentistry,” “dental education,” “dental students,” “medical education,” or “medical students.” An amalgamation of the search terms generated 2,698 articles, and of those articles, 16 were deemed eligible for inclusion in the review of literature (please see Appendix A for the PRISMA diagram and Appendix B for the table of evidence).

APN-A Public Relations Campaign

APN-As have been praised as “the best kept secret in healthcare,” alluding to the undervalued care nurse anesthetists provide to patients during surgical procedures (Kelly, 2008). And it is this secret that has made patients and other healthcare providers unaware to the existence of APN-As and their practice. The introduction of APN-As in many countries has further contributed to the confusion regarding the anesthesia profession, as it has been shown that the public may already be unfamiliar with an anesthesiologist and their responsibilities (Cohen, Ogorek, Oifa, Cattan, & Matot, 2015).

Cohen et al. (2015) conducted a study to assess the magnitude of a marketing campaign to augment public understanding of the significance, as well as raise awareness of the community about the anesthesia profession. The authors have noted that public relations

campaigns are advantageous in cultivating public perception and awareness of anesthesia practice (Cohen et al., 2015). Of note, this study was aimed at improving the public understanding of anesthesiologists in Israel. After a thorough review of literature, a study has not been conducted on enriching the public perception and awareness APN-As in the United States of America.

In addition to the general public's limited understanding of nurse anesthetists and their duties, APN-As have noted the limited awareness of the full scope of practice, as well as the value of nurse anesthesia expertise, in their current place of work (Neft, Okechukwu, Grant, & Reede, 2013). Six focus sessions were conducted by Neft et al. (2013) to gain a better understanding of the full scope of nurse anesthesia practice. To help overcome practice barriers, these focus groups recommended that APN-As should "offer presentations and educational materials demonstrating the value of CRNA care." Furthermore, the AANA (2019b) advocates abetting the public in comprehending the nurse anesthetist's role in anesthesia care, especially in an office-based setting.

Current Perception of the APN-A practice

Despite a thorough review of literature, it is evident that studies exploring the current perception of APN-As amongst other health care providers is lacking. A study using Q-methodology by Hensel, Cooper, and Craney (2018) explored the viewpoints of operating room personnel (i.e., operating room nurses, APN-As, anesthesiologists, surgical technicians, management) concerning nurse anesthetists. Remarkably, 12 out of the 24 participants favored unrestricted practice, and the remaining 12 either favored physician supervision or anesthesiologist practice. Of those favoring unrestricted practice, the participants expressed that

they did not see any difference in patient safety between APN-As and physician anesthesiologists (Hensel et al., 2018).

APN-A Scope of Practice

The disparity in the scope of nurse anesthesia practice across the United States, in addition to the ASA lobbying to limit the scope to physician supervision, interjects confusion amongst healthcare professionals, impeding the case for magnifying APN-A practice (Malina & Izlar, 2014). The AANA and ASA continue to clash as each attempts to establish and preserve their domain in anesthesia practice; Abott (1988) states that these jurisdictional disputes are vied in the legal arena, the workplace, as well as the public opinion (Feyereisen, Broschak, & Goodrick, 2018).

In order to enhance the understanding of the jurisdiction disputes between APN-As and physician anesthesiologists, Feyeresien et al. (2018) conducted a 10-year analysis of the discrepancy in adoption by various states in the US of policies expanding APN-A autonomy. Of note, higher levels of incumbent physician power make it less likely that a state will change jurisdictional boundaries (Feyereisen et al., 2018). This is evident in the State of New Jersey, who has yet to opt out of the federal physician supervision requirement for APN-As. However, Feyereisen et al. (2018) also note that past successes of other challenging healthcare professionals increase the likelihood a state will change jurisdictional boundaries. As mentioned earlier, APN-As are the only APN in New Jersey that are required to have a joint protocol with an anesthesiologist; the other APNs can have a joint protocol with a physician in any specialty. Thus, as other health professionals, such as nurse practitioners in the New Jersey, have found success in their jurisdictional disputes, the likelihood of New Jersey adopting policies in favor of APN-As is not out of the question.

Liao, Quraishi, and Jordan (2015) performed a correlation analysis to determine the association between socioeconomic factors related to geography and insurance type with the distribution of anesthesia providers. These authors express that removing barriers to the scope of practice capitalizes on nurse anesthesia services that are beneficial to vulnerable patients. For example, patients may incur a higher indirect cost with travel expenses and time off work, squandering for an anesthesiologist's care when a APN-A is readily available (Liao et al., 2015). Unruh, Rutherford, Schirle, and Brunell (2018)'s study projecting the health system and economic impacts of reducing restriction for APNs in Florida parallel the findings of Liao et al. (2015). APNs are underutilized in states that limit their scope of practice; therefore, eliminating these restrictions could magnify access to health care, as well as remedy the shortage of physician anesthesiologists (Unruh et al., 2018). A cost effectiveness analysis performed by Hogan, Seifert, Moore, and Simonson (2010) also expresses the importance of increasing the supply of APN-As and authorizing them to practice in the most efficient anesthesia delivery models (e.g., independently) in inpatient, outpatient, and ambulatory surgical settings. By doing so, facilities are able to control costs while preserving quality care as the demand for health care continues to escalate.

The Institute of Medicine (2011) recommends that nurses should practice to the fullest extent of their education and training, and more notably that states should revise and standardize their scope of practice regulations in order to maximize the full breadth of training and knowledge that APNs, including nurse anesthetists, render. Greenwood and Biddle's (2015) study exploring the impact of opt-out legislation on the scope of nurse anesthesia practice further emphasizes that APN-As in opt-out states are experiencing transformations in their practice and

subsequently a more broad scope of practice due to policy revisions – a positive change for the APN-A profession.

APN-As and Patient Outcomes

Despite the ASA's lobbying tactics to limit the scope of nurse anesthesia practice, the AANA (2019b) has continuously promoted high-quality and safe anesthesia care for patients in all settings, including office-based practices. In order to uphold this standard of care, the AANA (2019c) states that the APN-A shall adhere to all pertinent state and federal regulations in regards to licensure and accreditation of an office-based practice.

In a study by Dulisse and Cromwell (2010), no evidence was discovered to support the indication of increased inpatient deaths or complications when opting out of the federal physician supervision requirement. Negrusa, Hogan, Warner, Schroeder, and Pang (2016) have also found that, despite the degree of limitations placed on APN-As by state scope of practice regulations, there is no statistically significant difference in the risk of anesthesia complications, nor is there evidence that the risk of complications varies by delivery model (i.e., APN-A only, anesthesiologist only, physician supervision). A logistic regression of death and anesthesia complications in obstetrical patients, albeit, was performed by Needleman and Minnick (2009). Similar to the later-conducted studies mentioned earlier, hospitals that utilize the APN-A only or physician-supervision models do not have systematically poorer maternal outcomes compared with hospitals utilizing anesthesiologist-only models (Needleman & Minnick, 2009). As expressed by Dulisse and Cromwell (2010), Negrusa et al. (2016), and Needleman and Minnick (2009), APN-As are not associated with increased adverse patient complications, and when adhering to the AANA's standard of practice, APN-As are recognized to provide high-quality and safe anesthesia care for patients in all settings.

Dental Students' Education on Anesthesia

Lack of adequate resources and educators has made anesthesia education a low academic priority in the predoctoral curriculum (Giovannitti et al., 2016; Boynes, S. G., Lemak, A. L., & Close, J. M., 2006). A questionnaire-based survey conducted by Boynes, Lemak, and Close (2006) assessing the quantity and quality of sedation education in dental school in the United States conveyed a low overall contentment amongst recent graduates with the quality of sedation education received in dental schools. Of the recent dental graduates, 58.8% felt that they have not been properly trained nor educated on sedation anesthesia (Boynes et al., 2006). Additionally, the recent graduates surveyed in this study expressed support for increased tuition if their respective dental school offered further training and education on intravenous conscious sedation, nitrous oxide, and oral sedation. Concerning the popularity and patient demand for various sedation techniques, Boynes et al. (2006) state, "the new dentist feels a need for sedation education before graduation." Without providing sufficient training and education on anesthesia, new dentists may feel inadequately prepared to provide and manage anesthesia to their patients.

Moore, Boynes, Cuddy, Giovannitti, and Zovko (2009) conducted a five-year outcome assessment of perceived preparedness in dental anesthesia amongst a graduating class. These authors depicted that those who had participated in an anesthesia selective program felt more prepared in matters concerning anesthesia and patient care in comparison to those who only received basic anesthesia training (Moore et al., 2009). Patients are becoming more aware of the anesthesia services available in dental offices, increasing the demand for trained dental anesthesiologists; however, Giovannitti et al. (2016) acknowledges the growing demand for other dental specialties as well, hindering the availability of future dental anesthesiologists.

Interprofessional Collaboration

Educating fellow health care professionals in an interprofessional collaborative setting will pave the way for continued collaborative practices in the future. Training different healthcare teams to work together condenses costs, as well as enhances the quality of care provided to patients (Da Motta & Pacheco, 2014; Coleman, Roberts, Wulff, Zyl, & Newton, 2008). Additionally, interprofessional education further promotes and improves interprofessional collaboration (Christian, MacIver, & Alfieria, 2015). Workshops were conducted in Brazil, where medical and multiprofessional residency programs participated to evaluate interaction and collaborative practices amongst the different disciplines (Da Motta & Pacheco, 2014). Developing a structured program to facilitate interprofessional education and collaborative practice yielded overall positive evaluations from the residents (Da Motta & Pacheco, 2014).

Christian, MacIver, and Alferia (2015) champion "collaborative efforts in health care and the positive impact they have on improving patient satisfaction, coordinated access to resources and reduction of costs associated with redundant medical examinations and clinical errors." A survey conducted to evaluate the impact of interprofessional education in fourth-year optometry students depicted the growing demand for interprofessional collaboration to enhance patient-centered care (Christian et al., 2015). In a longitudinal cohort study, conducted by Coleman, Roberts, Wulff, Zyl, and Newton (2008) in an ambulatory care setting, illustrated similar results to those of Christian et al. (2015). Interprofessional collaboration is touted as a means of providing superior care to patients (Coleman et al., 2008).

Theoretical Framework

The theoretical framework utilized to guide this project was inspired by the Ottawa Model of Research Use by Logan and I. D. Graham (1998). The original theory was initially

developed to create an interactive model and was driven by the lack of frameworks that encompass a holistic approach and account for the various phases of research used and its impact on healthcare outcomes. This theory falls under the interactive model of research use category since it regards the use of research as an ever-changing process that embraces the resulting decisions and actions from each of the key elements (White, 2016). This interdisciplinary model was intended to serve as a guide to implement research findings into clinical practice setting.

The original Ottawa Model of Research Use was comprised of three steps and six essential components. The three steps are assessing the barriers and supports to translation of research, observing the innovation and its degree of use, and evaluating/monitoring outcomes. The six essential components are as follows: the clinical practice setting, the potential adopters, the evidence-based intervention, the strategies for translating evidence into practice, the use of the evidence, and the health-related outcomes of the process (Logan & Graham, 1998). Logan and I. D. Graham strongly believed that evidence-based interventions could indicate the benefits or detriments of a particular practice, warranting its use or disuse in clinical practices respectively. The intention of this knowledge translation model is to be utilized by policymakers who wish to expand the implantation of research in healthcare practices. Components of this knowledge translation model encompass research utilization, the dissemination of interventions, physician conduct adjustment, and the development and application of practice guidelines derived from literature (Logan & Graham, 1998).

The Ottawa Model of Research Use was revised by K. Graham and Logan in 2004, which further details the six major fundamentals that must be taken into consideration when implementing research in a clinical practice environment (White, 2016). The revision is improved in comparison to its original framework because it enhances and expands on the six

essential components. The six key elements were modified and are as follows: practice environment, potential adopters, the evidence-based innovation, transfer strategies, adoption, and outcomes (Graham & Logan, 2004). This framework hinges on the custom of assessing, monitoring, and evaluating each feature during all phases of the implementation of the evidence-based intervention (Sudsawad, 2007). Each of the key features has some bearing on each other, despite the theory's linear depiction in the diagram (please see Appendix C).

The first stage encompasses assessing the barriers and supports to translation of research into practice, while contemplating the following: evidence-based improvement, characteristics of potential adopters, and the clinical practice setting (White, 2016). Evidence-based innovation incorporates the development process and the innovation attributes, and the potential adopters take into account current practices, attitudes, knowledge, and skill (Graham & Logan, 2004). Furthermore, K. Graham and Logan (2004) note the importance of assessing the practice environment such as structure, cultural, social, patients, and economic elements. This first stage identifies factors that could impede or advocate the implementation of the intervention, which is subsequently modified to prevail over the barriers and augment the supports identified (Sudsawad, 2007). For this DNP project, the first step in the Ottawa Model Use of Research was accomplished by gathering knowledge utilizing the processes described in the literature review section.

The second stage of the Ottawa Model of Research Use involves observing the innovation and its degree of use, taking into consideration the implementation of the interventions via transfer strategies, barrier management, and follow-up; and the embracing of the innovation in the practice environment through its intention and use (White, 2016; Graham & Logan, 2004). During this second phase, potential adopters are educated about the evidence-

based intervention as well as what is expected of them. Additionally, continuous observation during this stage also helps identify if alterations to the newly implemented practice is needed (Sudsawad, 2007). In order to fulfill the second step in the Ottawa Model, the authors will present an exposition to the dental students at [redacted] regarding APN-As. This presentation will serve as a public relations campaign and will not just be limited to APN-A scope of practice but will also include the history of APN-A practice, APN-A educational and clinical requirements, current legislation, safe patient outcomes, and benefits to the practitioners, as well as advanced airway assessments and skills. This strategy is directed at creating an educational opportunity for medical and dental students early during their didactic education to ensure awareness of APN-As and their scope of practice, and how it can be beneficial to the dental students' practice after graduation.

The third stage of this framework comprises of evaluating and monitoring the outcomes in relation to patients, practitioners, and financial system results (White, 2016; Graham & Logan, 2004). During the third phase, the evaluation process establishes if the intervention has generated the proposed result or inadvertent effects (Sudsawad, 2007). For the purposes of this project, upon completion of the presentation, adoption and outcomes would be evaluated through surveys.

The Ottawa Model of Research Use is a well-designed methodical framework that encourages research application by healthcare practitioners. This particular knowledge translation framework has unique qualities that are beneficial when implementing an evidence-based intervention in a healthcare setting. The National Collaborating Centre for Methods and Tools (NCCMT, 2010) summarizes three specific advantages to the Ottawa Model of Research Use. In terms of knowledge translation, research is viewed as a dynamic and interactive process

of decision and actions that were interconnected. Additionally, patients and their health outcomes are the primary focus throughout these processes. Lastly, this framework takes into account that external healthcare and social environments influence the knowledge translation process (NCCMT, 2010; White, 2016).

Methodology

This prospective study used quantitative, correlation data to determine if an educational exposition presented to dental students in the form of a PowerPoint presentation, as well as training and education on advanced airway skills and assessments, will foster relationships with APN-As that may translate to greater utilization in the future, thus broadening and enhancing the APN-A scope of practice. The study population was assessed before the exposition for baseline knowledge and understanding of APN-NA education, scope of practice and possible benefit to the dental students upon utilizing APN-As during professional practice. The exposition regarding APN-As was then presented to the dental students followed by a post-intervention survey. The data collected was then analyzed to evaluate if the exposition had any effect on the dental students' understanding of the profession and practice of APN-As.

Setting

The educational intervention took place at [redacted] located at [redacted]. The dental school is one of several professional schools that form [redacted], a division of the university. The educational intervention and data collection occurred in a classroom on campus [redacted].

Study Population

The study population consisted of a convenience sample of dental students that were presently enrolled at [redacted]. The dental students were recruited via a flyer (appendix E) and an email announcement made by the dental program administration. The dental students were asked to observe the educational exposition presented by the authors and participate in a pre-intervention and post-intervention survey. Participation of the dental students was completely voluntary; however, only currently enrolled dental students were eligible to participate in the survey.

Subject Recruitment

Subjects for the proposed study were recruited via a flyer (Appendix E). The flyer was released and posted two weeks prior to the workshop in the common areas of the dental school campus. A dental school program assistant also emailed the flyer to current dental students via their school email account. In addition, a verbal announcement was made to prospective subjects at the conclusion of their class prior to start of the educational exposition.

Consent Procedure

Prior to the start of the educational intervention, a statement was provided to each participant to establish their consent to the educational intervention and the use of data from pre-intervention and intervention survey results. Participation of the dental students in the exposition was considered implied consent. A hard copy of the consent was provided to each individual; however, signatures from the participants were not necessary if the dental students were informed and then chose to participate. A copy of the consent supplied to each participant can be found in Appendix F.

Risks or Harms

The educational intervention involved no risk to the participants. General demographic information was collected on the survey; however, no personal identifiers of the participants or protected health information were collected. Pre-intervention and post-intervention surveys were stapled together to ensure that the same participant completed each set.

Subject Costs and Compensation

The participants in the educational intervention and survey were not financially compensated.

Study Interventions

For this study, the participants were recruited as set forth under "Subject Recruitment". The pre-intervention and post-intervention surveys can be found in Appendix G. They were labeled accordingly and distributed as attached sets to each participant. Each of the attached sets contained a pre-intervention survey and a post-intervention survey for comparison purposes during data analysis. However, the results were de-identified and participants remained anonymous. The educational intervention was presented upon completion of the pre-intervention survey. The educational aspect included a lecture with PowerPoint presentation and encompassed a brief history of the APN-A practice, education requirements, and current scope of practice within New Jersey and the United States. The presentation also included information and studies from the earlier review of literature that support no change in patient outcomes with APN-A practice regardless of supervision from an anesthesiologist. Additionally, the authors highlighted how APN-A practice can benefit the professional practice of the dental students upon graduation. Following the PowerPoint presentation, training and education on advanced airway

skills and assessments was provided by the authors. The entire duration of the educational seminar, including pre-intervention and post-intervention survey, was than 60 minutes.

Outcomes Measured

The data collection was in the form of a survey. A pre-intervention survey was completed immediately prior to the educational seminar. This was performed to gain a baseline understanding of the dental students' perception and knowledge of APN-As and assisted in evaluating how their perspectives might have changed after the educational intervention. After the exposition, the participating dental students filled out a post-intervention survey, which investigated whether the participants have gained a more defined understanding of APN-A scope of practice and if they plan to utilize APN-A in their professional practice after graduation.

Questionnaires assessing the attitudes and understanding of interprofessional collaboration were utilized by D'Amour and Oandasan (2005) and Da Motta and Pacheo (2014), and then used by Christian et al. (2015) to evaluate interprofessional collaboration with optometry students. In order to tailor the questionnaire to the purposes of this study, alterations were made to the questionnaire by Christian et al. (2015). The questions on the pre- and post-intervention surveys were self-reflective, prompting the dental students to assess how much they agreed with each statement on a five-level Likert response scale. Likert response values ranged from 1, resembling strongly disagree, to 5, resembling strongly agree.

Project Timeline

The duration of time for this project was approximately 11 months, beginning with project planning and culminating with dissemination. The project planning began on January 28, 2019, and on May 13, 2019, the proposal was presented to the DNP committee. Once the proposal received final approval from the DNP chair, the IRB approval process began. Upon

completion of IRB approval, the investigators began to prepare for the implementation of the exposition, which required 25 days. The date of the project's implementation of the education exhibition was on August 23, 2019 at [redacted]. The time period of data collection occurred on the day of the exposition via the pre-intervention and post-intervention surveys. Analysis of the data began on August 24, 2019 and lasted 14 days. Once the data was analyzed, evaluation of the analysis began on September 7, 2019 and lasted for 21 days. Finally, the dissemination of research findings will began on September 30, 2019 and lasted approximately two months. The Gantt Timeline for this project can be found and visualized under Appendix H.

Resources Needed/ Economic Consideration

During the educational intervention, the investigators of this study required a lecture room equipped with a computer and a projector for the PowerPoint presentation. Additionally, in order to appropriately train and educate the dental students on advanced airway assessments and skills, the investigators, with approval from the faculty at the [redacted] School of Nursing Anesthesia Program, borrowed advanced airway equipment from the simulation lab.

Approximately $100 was budgeted for this study, which encompassed printing surveys, consents, and flyers. The investigators of this study absorbed every cost.

Evaluation Plan

Data Maintenance & Security

The security and privacy of all project participants were protected at all times. All data collected was anonymous. Any personal identifiers inadvertently included by the participants were redacted or otherwise de-identified. Because all data collected were anonymous and de-identified, student personal information was protected and therefore participation in the study

was unrelated to course grades and voluntary participation was shared with the dental school faculty. Completed forms were stored in a locked cabinet in the office of the faculty advisor and DNP Team Member, Dr. Thomas J. Pallaria. Access to the data was only granted to the authors, as well as DNP Chair Dr. Maureen McCartney Anderson and DNP Team Member Dr. Thomas J. Pallaria. Information was not distributed or released to any other individuals and the paper surveys remained in a locked file cabinet in Dr. Pallaria's office. All communication with [redacted] was carried out utilizing the official [redacted] email server. Once data was analyzed and distributed, all responses were permanently eliminated.

Data Analysis

The data was entered into SPSS and analyzed using various methods. The data consisted of responses obtained by replies from the pre-intervention and post-interventions surveys, and were evaluated for any changes that occurred after the implementation of the educational seminar. The quantitative data from the pre-intervention and post-intervention surveys were obtained utilizing the Likert scale. An item analysis was conducted to determine significant change from pre-intervention survey to post-intervention survey. This was accomplished using descriptive statistics to determine the mean, median, mode, and standard deviation. Upon processing the data, changes and trends were focused upon to draw conclusions.

Results

A total of 88 dental school students completed pre- and post-intervention surveys. The majority of the students were men (n = 39; 44%) and under the age of 30 (n = 77; 95%). Average score of pre- and post-intervention survey items 1-10 were computed. Students reported an average score of 3.41 (SD = 0.51) pre-intervention. Higher average scores were reported on the

first five survey questions (M = 2.25, SD = 0.25) compared to the last five survey questions (M = 1.16, SD = 0.40).

A paired-samples t-test was conducted to compare summary total score at pre- and post-intervention. There was a significant difference on survey questions pre-intervention (M = 3.41, SD = 0.51) and post-intervention (M = 4.33, SD = 0.47); $t(84) = 18.28$, $p < .001$, with an average change of 0.93 points, SD = 0.47, 95% CI [1.03, 0.83], following the intervention. A bar graph depicting the means scores pre- and post-intervention can be found in Appendix I.

One-way ANOVA tests showed no significant differences in pre- or post-intervention scores by gender (pre-intervention: $F(1,72) = 0.40$, $p = 0.53$; post-intervention: $F(1,72) = 0.42$, $p = 0.52$). Both men and women reported similar scores pre-intervention (men: M = 3.38, SD = 0.54; women: M = 3.45, SD = 0.49) and post-intervention (M = 4.29, SD = 0.58; M = 4.36, SD = 0.35).

Most of the students (n = 71, 81%) were interested in attending additional workshops on anesthesia-related skills. When asked which topics were of interest, more students selected "forms of anesthesia" (n = 63, 72%) compared to IV insertion (n = 55, 63%) and advanced airway management (n = 54, 61%). Most of the students selected two or more (n = 58, 66%) topics and nearly half (42%) selected all three topics. One student wrote in an "other" response suggesting "monitoring patient vital signs" as a topic. Semester break was most commonly selected as preferred time for additional workshops (n = 21, 24%) followed by after class (n = 20, 23%) and weekends (n = 11, 13%). A total of 23 students (26%) selected two or more time preferences. Three other responses were written-in by students: lunch break, summer, and Monday mornings.

Discussion

Implications for Clinical Practice

Independent-practicing APN-As have been shown to provide anesthesia care at the lowest economic cost, which will in turn have a positive influence net revenue, ultimately benefiting dentists, private practice physicians, and private paying patients (Hogan et al., 2010). In the state of New Jersey, regulations limiting the types of anesthesia APN-As can administer in a physician-supervised office setting continue to be upheld. With the current scope of practice of APN-As in dental offices in New Jersey, it is not economically beneficial for dental offices to employ APN-As, as they would need to employ physician anesthesiologist as well. By fostering healthy interdisciplinary relationships with [redacted], when policies are amended in favor of independent APN-A practice in the state of New Jersey, the participating dental students will utilize APN-As in their professional practice after graduation with alacrity. Thus, APN-As will be able to provide more cost-effective anesthesia care to the patient in dental offices.

Implications for Healthcare Policy

The Institute of Medicine (2011) recommends that states should amend and regulate their scope of practice regulations in order to maximize the full breadth of training and knowledge that APN-As execute. Exposing dental students to the nurse anesthesia profession early in their healthcare education will strengthen the support of and confidence in APN-As, so that when policies are amended in favor of independent APN-A practice, the dental students may be more eager to employ nurse anesthetists in their professional practice. Further, this exposure to nurse anesthetists may aid in the transition of dental students that practice in other states in which APN-As are already permitted to practice independently in dental offices.

Implications for Quality and Safety

As part of the educational seminar, the dental students learned that APN-As are not associated with increased adverse patient complications, and that APN-As are recognized to provide high-quality and safe anesthesia care for patients in all settings (Dulisse & Cromwell, 2010; Needleman & Minnick, 2009; Negrusa et al., 2016). Furthermore, permitting APN-As to practice to their full scope of practice will help meet the demand of the growing vulnerable populations in need of access to health care (Liao et al., 2015). This newly acquired knowledge and understanding will strengthen the dental students' support of and confidence in APN-As.

Plans for Future Scholarship

As this was the first collaboration between [redacted] and the Nurse Anesthesia Program at [redacted], it would be beneficial to both healthcare professions to continue to cultivate a positive interdisciplinary relationship. Plans for sustainability could include interdisciplinary training, such as shared simulation lab time for nurse anesthesia residents to demonstrate advanced airway skills to the dental students.

This doctoral project specifically focused on dental students; however, it can also be applied to medical students. Since this project serves as a guide to collaborating with other interdisciplinary professions in an effort to increase acceptance and confidence in the APN-A, other nurse anesthesia programs may adopt it in order to foster relations with their respective schools of dentistry and medicine, thus furthering the education and enhancing the perspective of more future healthcare providers.

Professional Reporting

Outcomes of the educational seminar, as well as data demonstrating noteworthy changes in the perception and knowledge of dental students of APN-As, was presented at a professional

lecture at the Fall 2019 NJANA meeting on October 5, 2019. It will also be provided at the authors' final DNP presentation. This DNP presentation, as well as a professional poster presentation, will be during the Spring 2020 semester at the Stanley S. Bergen building at Rutgers Health Sciences in Newark, New Jersey. There will also be a poster presentation at the New Jersey Association of Nurse Anesthetists (NJANA) Spring Meeting on April 4th, 2020.

Conclusion

The state of New Jersey has yet to opt out of the federal physician supervision requirement for APN-As. In a dental office, APN-As in New Jersey are authorized to work under the supervision of a physician. By educating and enhancing the perspective of dental students via an educational seminar on the nurse anesthesia profession, the dental students will learn how APN-As provide safe and more cost-effective anesthesia care to the patient. By fostering a robust interdisciplinary relationship with [redacted], when policies are adapted in favor of independent APN-A practice in the state of New Jersey, the participating dental students may be more willing to employ APN-As in their professional practice after graduation.

References

Abbott, A. D. (1988). *The system of professions: An essay on the division of expert labor*. Chicago, IL: University of Chicago Press.

American Academy of Pediatric Dentistry. (2018). Use of anesthesia providers in the administration of office-based deep sedation/ general anesthesia to the pediatric dental patient. *Recommendations: Best Practices, 40*(6), 317-320. Retrieved from http://www.aapd.org/media/Policies_Guidelines/BP_AnesthesiaPersonnel.pdf

American Association of Nurse Anesthetists. (2019a). *Certified registered nurse anesthetists fact sheet* [PDF document]. Retrieved from https://www.aana.com/docs/default-source/pr-aana-com-web-documents-(all)/crna-fact-sheet.pdf?sfvrsn=c5f641b1_10

American Association of Nurse Anesthetists. (2019b). *CRNAs: We are the answer* [PDF document]. Retrieved from https://www.aana.com/docs/default-source/marketing-aana-com-web-documents-(all)/crnas-we-are-the-answer.pdf?sfvrsn=b310d913_4

American Association of Nurse Anesthetists. (2019c). *Office based anesthesia: Position statement* [PDF document]. Retrieved from https://www.aana.com/docs/default-source/practice-aana-com-web-documents-(all)/office-based-anesthesia.pdf?sfvrsn=503136ab_2

American Dental Association. (2016). *Guidelines for the use of sedation and general anesthesia by dentists* [PDF document]. Retrieved from http://www.ada.org/~/media/ADA/Education%20and%20Careers/Files/anesthesia_use_guidelines.pdf

Boynes, S. G., Lemak, A. L., & Close, J. M. (2006). General dentists' evaluation of anesthesia sedation education in U. S. dental schools. *Journal of Dental Education*, *70*(12), 1289-

1293. Retrieved from http://www.jdentaled.org/content/70/12/1289

Cahill, M., Alexander, M., & Gross, L. (2014). The 2014 NCSBN consensus report on APRN regulation. *Journal of Nursing Regulation, 4*(4), 5-12. https://doi.org/10.1016/S2155-8256(15)30111-3

Christian, B., & Ciesla, F. (2016, April). The new frontier: Expansion of non-physician practitioner scope of practice. *New Jersey Lawyer*, 69-73. Retrieved from http://www.ghclaw.com/65C0C8/assets/files/News/TheNewFrontier.pdf

Christian, L. W., MacIver, S., & Alfieria, M. (2015). Evaluation of interprofessional education and collaboration in Optometry. *The Journal of the Association of Schools and Colleges in Optometry*, *40*, 3. Retrieved from https://journal.opted.org/article/evaluation-of-interprofessional-education-and-collaboration-in-optometry/

Cohen, B., Ogorek, D., Oifa, S., Cattan, A., & Matot, I. (2015). Smart marketing may improve public understanding of the anesthesia profession. *Israel Journal of Health Policy Research*, *4*(16), 1-7. doi: 10.1186/s13584-015-0011-1

Coleman, M. T., Roberts, K., Wulff, D., Zyl, R. V., & Newton, K. (2008). Interprofessional ambulatory primary care practice-based educational program. *Journal of Interprofessional Care*, *22*(1), 69-84. doi: 10.1080/13561820701714763

D'Amour, D., & Oandasan, I. (2005). Interprofessionality as the field of interprofessional practice and interprofessional education: An emerging concept. *Journal of Interprofessional Care*, 8-20. doi: 10.1080/13561820500081604

Da Motta, L., & Pacheco, L. (2014). Integrating medical and health multiprofessional residency programs: The experience in building an interprofessional curriculum for health professionals in Brazil. *Education for Health*, *27*(1), 83. Retrieved from

http://link.galegroup.com/apps/doc/A416342544/PPNU?u=new67449&sid=PPNU&xid=122c28da.

Dulisse, B., & Cromwell, J. (2010). No harm found when nurse anesthetists work without supervision by physicians. *Health Affairs, 29*(8). https://doi.org/10.1377/hlthaff.2008.0966

Feyereisen, S., Broschak, J. P., & Goodrick, B. (2018). Understanding professional jurisdiction changes in the field of anesthesiology. *Medical Care Research and Review, 75*(5), 612-632. https://doi.org/10.1177/1077558716687889

Giovannitti, J. A., Jr., Montandon, R. J., & Herlich, A. (2016). The development of dental anesthesiology as a discipline and its role as a model of interdisciplinary collaboration. *Journal of Dental Education, 80*(8), 938-947. Retrieved from https://search-proquest-com.proxy.libraries.rutgers.edu/docview/1808601802?accountid=13626

Graham, K., & Logan, J. (2004). Using the Ottawa model of research use to implement a skin care program. *Journal of Nursing Care Quality, 19*(1), 18-24. Retrieved from https://eds-a-ebscohost-com.proxy.libraries.rutgers.edu/eds/pdfviewer/pdfviewer?vid=2&sid=0c5080e7-641d-4d83-833c-c1040da150be%40sessionmgr4010

Greenwood, J. E., & Biddle, C. (2015). Impact of legislation on scope of practice among nurse anesthetists. *The Journal of Nurse Practitioners*, *11*(5), 498-504. http://dx.doi.org/10.1016/j.nurpra.2015.03.004

Hensel, D., Cooper, R., & Craney, N. (2018). Operating room personnel viewpoints about certified registered nurse anesthetists. *Western Journal of Nursing Research, 40*(2), 242-256. doi:10.1177/0193945916682730

Hogan, P. F., Seifert, R. F., Moore, C. S., & Simonson, B. E. (2010). Cost effectiveness analysis of anesthesia providers. *Nursing Economics, 28*(3), 159-169. Retrieved from https://www.aana.com/docs/default-source/research-aana.com-web-documents-(all)/nec_mj_10_hogan.pdf

Institute of Medicine (2011). *The Future of Nursing: Leading change, advancing health*. Washington, DC: National Academies Press.

Kelly, K. (2008). Nurse anesthetists: Demand is up and the secret is out. *American Nurse Today, 3*(7). Retrieved from https://www.americannursetoday.com/nurse-anesthetists-demand-is-up-and-the-secret-is-out/

Liao, C. J., Quraishi, J. A., & Jordan, L. M. (2015). Geographical imbalance of anesthesia providers and its impact on the uninsured and vulnerable populations. *Nursing Economics, 33*(5), 263-270. Retrieved from https://pdfs.semanticscholar.org/7711/2f1f7ca09a86142b4f5e7c065ae9a073dec2.pdf

Logan, J., & Graham, I. D. (1998). Toward a comprehensive interdisciplinary model of health care research use. *Science Communication, 20*(2), 227–246. https://doi.org/10.1177/1075547098020002004

Malina, D. P., & Izlar, J. J. (2014). Education and practice barriers for certified registered nurse anesthetists. *The Online Journal of Issues in Nursing*, *19*(2). doi:10.3912/OJIN.Vol19No02Man03

Matsusaki, T., & Sakai, T. (2011). The role of certified registered nurse anesthetists in the United States. *Journal of Anesthesia*, *25*(5), 734-740. doi:10.1007/s00540-011-1193-5

Moore, P. A., Boynes, S. G., Cuddy, M. A., Giovannitti, J. A., Jr., & Zovko, J. (2009). Education experiences and preparedness in dental anesthesia: Five-year outcome assessment and conclusions. *Journal of Dental Education, 73*(12), 1379-1386. Retrieved from https://www-scopus-com.proxy.libraries.rutgers.edu/record/display.uri?eid=2-s2.0-73449140508&origin=inward&txGid=b69c64a93a0d601f8cba09476f1d2f36

National Collaborating Centre for Methods and Tools. (2010). *Ottawa model of research use: A framework for adopting innovations* [PDF document]. Retrieved from http://www.nccmt.ca/registry/resource/pdf/65.pdf

Needleman, J., & Minnick, A. F. (2009). Anesthesia provider model, hospital resources, and maternal outcomes. *Health Services Research*, *44*(2), 464-482. doi: 10.1111/j.1475-6773.2008.00919.x

Neft, M., Okechukwu, K., Grant, P, & Reede, L., (2013). The revised scope of nurse anesthesia practice embodies the broad continuum of nurse anesthesia services. *AANA Journal*, *81*(5), 347-350. Retrieved from www.aana.com/aanajournalonlines

Negrusa, B., Hogan, P. F., Warner, J. T., Schroeder, C. H., & Pang, B. (2016). Scope of practice laws and anesthesia complications: No measurable impact of certified registered nurse anesthetist expanded scope of practice on anesthesia-related complications. *Medical Care 54*(10), 913-920. doi:10.1097/MLR.0000000000000554

New Jersey Board of Dentistry. (2018). New Jersey Administrative Code: Title 13: Chapter 30 [PDF document]. *Law and Public Safety*. Retrieved from https://www.njconsumeraffairs.gov/regulations/Chapter-30-New-Jersey-Board-of-Dentistry.pdf

New Jersey Board of Medical Examiners. (2018). New Jersey Administrative Code: Title 13: Chapter 35 [PDF document]. *Law and Public Safety*. Retrieved from

https://www.njconsumeraffairs.gov/regulations/Chapter-35-Board-of-Medical-Examiners.pdf

New Jersey Hospital Association. (2012). New Jersey Administrative Code: Title 8: Chapter 43G [PDF document]. *Hospital Licensing Standards*. Retrieved from http://www.njha.com/media/302738/2012-June-NJ-Hospital-Licensing-Standards-2.pdf

Pfeifer, G. M. (2013). New Jersey Superior Court upholds joint protocol for APN/As. *American Journal of Nursing*, *113*(4), 13. doi: 10.1097/01.NAJ.0000428725.31395.4d

Quraishi, J. A., Jordan, L. M., & Hoyem, R. (2017). Anesthesia Medicare trend analysis shows increased utilization of CRNA services. *AANA Journal*, *85*(5), 375-383. Retrieved from www.aana.com/aanajournalonline

Rutgers School of Dental Medicine. (2018). *Course catalog: Academic years 2018-2020* [PDF document]. Retrieved from http://sdm.rutgers.edu/catalog/catalog.pdf

Rutgers School of Dental Medicine. (2015). Graduate dental education programs. Retrieved from http://sdm.rutgers.edu/admissions/postdoctoral/index.html

Solana, K. (2019). *Anesthesiology recognized as a dental specialty.* ADA News. Retrieved from https://www.ada.org/en/publications/ada-news/2019-archive/march/anesthesiology-recognized-as-a-dental-specialty

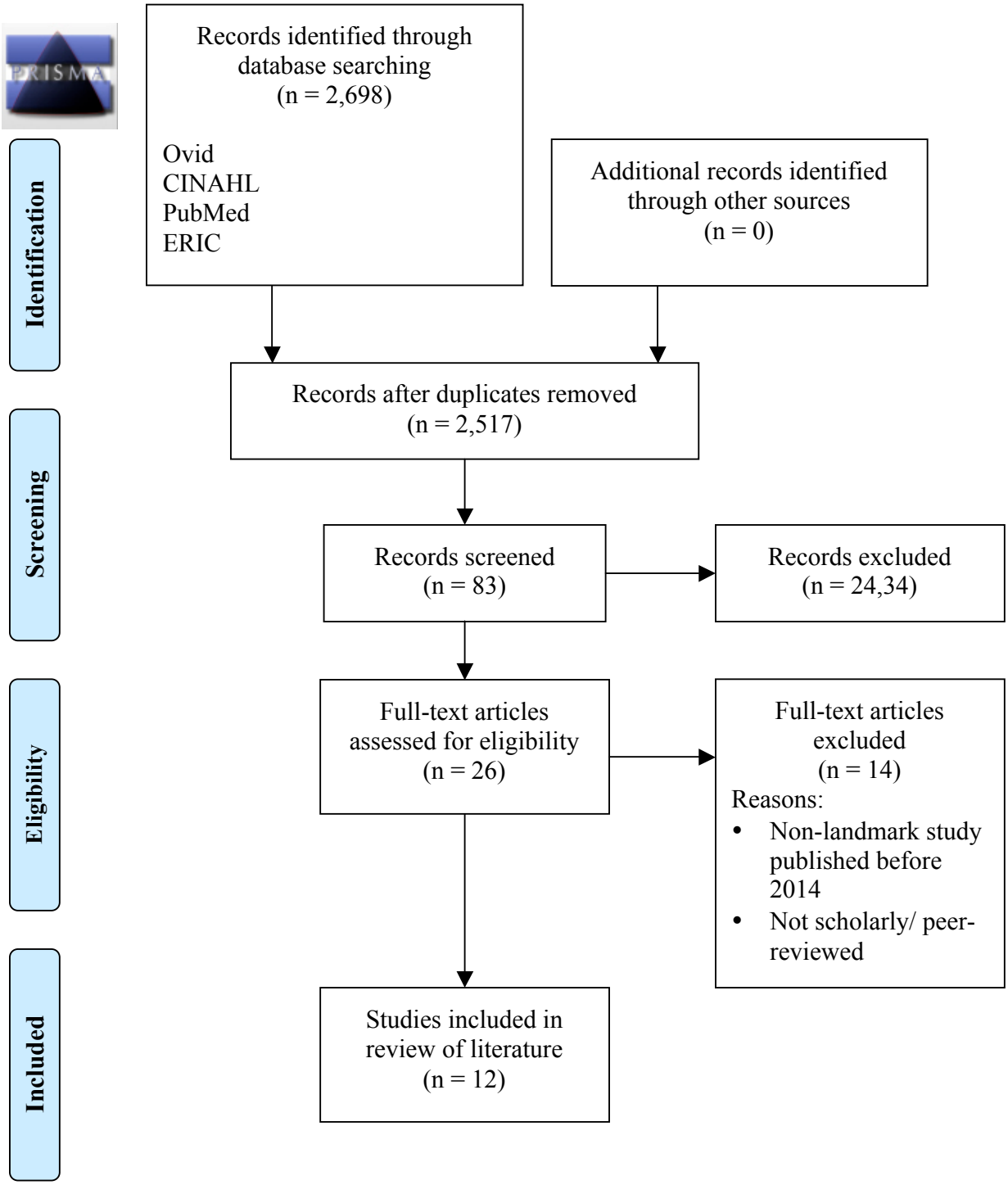
Sudsawad, P. (2007). *Knowledge translation: Introduction to models, strategies, and measures* [PDF document]. Retrieved from http://ktdrr.org/ktlibrary/articles_pubs/ktmodels/

Unruh, L., Rutherford, A., Schirle, L., & Brunell, M. L. (2018). Benefits of less restrictive regulation of advance practice registered nurses in Florida. *Nursing Outlook*, *66*(6), 539-550. https://doi.org/10.1016/j.outlook.2018.09.002

Weaver, J. M. (2002). Medical anesthesiologists keep CRNA supervision rules intact: What are the implications for the dental profession? *Anesthesia Progress, 49*(2), 41-43.

White, K. M. (2016). The science of translation and major frameworks. In K. M. White & S. Dudley-Brown (Eds.), *Translation of Evidence into Nursing and Health Care Practice* (2nd ed., pp. 25-55). New York, NY: Springer Publishing Company.

Appendix A


Identification
Screening
Eligibility
Included
Records identified through database searching (n = 2,698)
Ovid
CINAHL
PubMed
ERIC
Additional records identified through other sources (n = 0)
Records after duplicates removed (n = 2,517)
Records screened (n = 83)
Records excluded (n = 24,34)
Full-text articles assessed for eligibility (n = 26)
Full-text articles excluded (n = 14)
Reasons:
• Non-landmark study published before 2014
• Not scholarly/ peer-reviewed
Studies included in review of literature (n = 12)

Appendix B

Article #	**Author & Date**	**Evidence Type**	**Sample, Sample Size, & Setting**	**Study findings that helps answer the EBP Question**	**Limitations**	**Evidence Level & Quality**
1	Dulisse, B., & Cromwell, J. 2010	Quantitative	Hospitalizations (n = 481,440), hospitalizations in non-opt-out states (n = 412,696), hospitalizations in opt-out states (n = 68,744)	Despite shift to more anesthetics performed by APN-As, no evidence to support increased inpatient deaths or complications concerning opt-out of federal physician supervision requirement	Medicare data limited to years 1999-2005	III B
2	Feyereisen, S., Broschak, J. P., & Goodrick, B. 2018	Quantitative	State-year observations (n = 190)	Higher levels of relative power by challenging APN-As, past successes of other challenging health professionals, state labor market deficiency, and proximity to other adopting states, increase likelihood state will change	Data collection limited to 2001-2010	II B

				jurisdictional boundaries Decisions based on rationality (i.e., labor deficiency & cost savings) occur alongside others based on social pressure		
3	Hensel, D., Cooper, R., & Craney, N. 2018	Qualitative & quantitative: Q-methodology	Operating room personnel (n = 24) from four institutions in a state in the Midwest that utilizes CRNAs with physician oversight	12 participants favored unrestricted practice, 5 favored supervision, 7 favored MD-A practice Participants generally agreed with the following statement: "It's not the initials you get after your name, it's the experience and what you can do in a crisis situation" Participants generally disagreed with the statement: "CRNAs are difficult to	Explored attitudes of operating room personnel in only one state	III B

				work with” Favoring unrestricted practice – participants had most favorable attitudes and did not see any difference in patient safety between APN-As & MD-As		
4	Hogan, P. F., Seifert, R. F., Moore, C. S., & Simonson, B. E. 2010	Quantitative – cost effectiveness analysis	Analysis of claims data comparing the cost of providing anesthesia by provider type & by anesthesia & model (n = 52, 636) Public & private insurance claims were used to estimate costs in inpatient & ambulatory surgery settings	Demand for health care escalates – increasing number of APN-As and allowing them to practice in most efficient delivery models, will be vital to containing costs while maintaining quality care Similar analyses conducted for the outpatient and ambulatory surgical center settings – efficiency and economic viability comparable to those for	AANA funded research	III B

				inpatient setting		
5	Liao, C. J., Quraishi, J. A., & Jordan, L. M. 2015	Quantitative – correlation analysis	3,143 counties with total population of 308,745,538	Removing barriers to APN-A scope of practice to maximize APN-A services will facilitate meeting demand by vulnerable populations Placing unnecessary restrictions via limiting scope of practice for APN-As may hinder patient access to a readily available workforce where patients may incur a higher indirect cost	Correlation analysis could not determine those populations or providers that may cross county borders for care or work respectively Correlation between anesthesia provider and population limited to counties with radius under 26 miles	II B
6	Negrusa, B., Hogan, P. F., Warner, J. T., Schroeder, C. H., & Pang, B. 2016	Quantitative	Health care claims of anesthesia-specific procedures (n = 5,740,470) occurring in an outpatient setting (n = 4,273,122) and in an inpatient setting (n = 1,467,348)	No statistically significant difference in risk of anesthesia complications based on degree of restrictions placed on APN-As by state scope of practice laws, nor is there	Findings based on privately insured population – publicly insured and uninsured populations are underrepresented	II A

				evidence that the risk of complications varies by delivery model		
7	Greenwood, J. E., & Biddle, C. 2015	Quantitative – correlational	National sample of CRNAs (n = 1,202)	APN-As in opt-out states are experiencing changes in their practice as a result of policy modifications, leading to a more broad scope IOM recommends using all APNs to fullest extent of their education and training – it is essential change necessary to ensure continued access to quality care for all health care consumers	Limiting database for solicitation of subjects to members of AANA	III B
8	Institute of Medicine 2011	Position statement – report	N/A	Regulatory and institutional obstacles (i.e., limits on nurses' scope of practice) should be removed so	None explicitly stated Funds for committee ’s work provided by the	IV A

				health system can reap full benefit of nurses' training, skills, and knowledge in patient care APNs should be able to practice to full extent of education and training	Robert Wood Johnson Foundation	
9	Needleman, J., & Minnick, A. F. 2009	Quantitative	Obstetrical patients (n = 1,141,641) from 369 hospitals that reported at least one live birth in 2002 in CA, FL, KY, NY TX, WA, & WI	Hospitals that use only APN-As, or a combination of APN-As & anesthesiologists, do not have systematically poorer maternal outcomes compared with hospitals using anesthesiologist-only models	Study results limited only to maternal outcomes	II B
10	Unruh, L., Rutherford, A., Schirle, L., & Brunell, M. L. 2018	Quantitative – utilization of economic models	Data obtained for the baseline year of 2013 in FL No explicit sample size stated	APNs are underutilized in states that restrict their practice – removing restrictions could expand access to quality health care, cost effectively relieve the	Data for predicting 2025 values obtained either by outside source or authors' own projections	III B

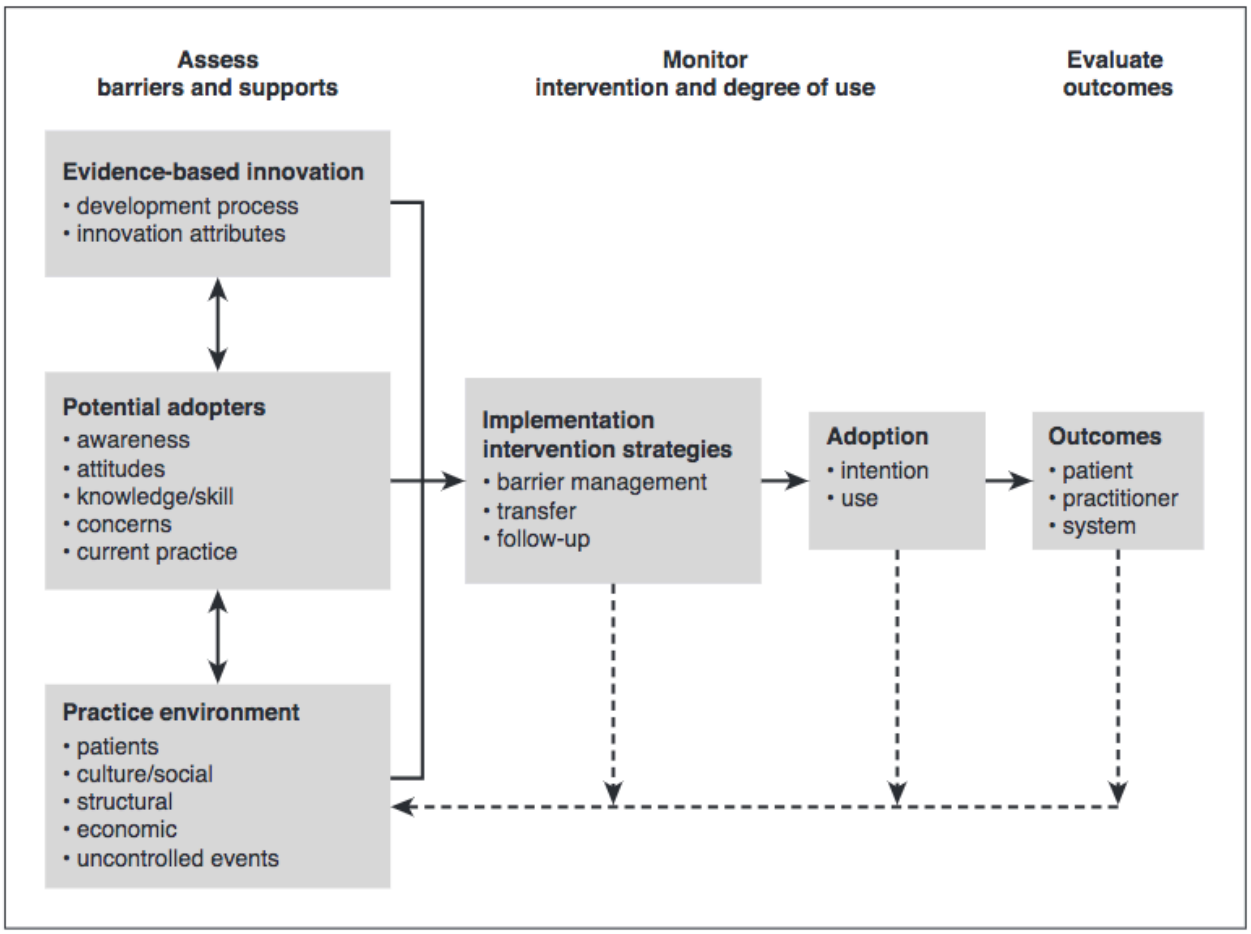
				physician shortage, and contribute economically		
11	Cohen, B., Ogorek, D., Oifa, S., Cattan, A., & Matot, I. 2015	Quantitative	Adult subjects (n = 500) from the general population – five hundred questionnaires handed out in public places (i.e., market, gym, shopping mall, university, hospital)	Public campaigns may be extremely efficient in improving community understanding of anesthesia practice & awareness of MD-As duties	Population and information biases – survey was conducted in person, using a convenience sample in public places	II B
12	Neft, M., Okechukwu, K., Grant, P, & Reede, L., 2013	Mixed methods – quantitative and qualitative (systematic review of literature, focus groups, survey were conducted)	Participants (n = 55) in the six focus sessions were randomly selected from attendees of the AANA Assembly of School Faculty and Mid-Year Assembly (i.e., AANA Board, Practice Committee, clinicians, educators, SRNAs) The Scope of Nurse Anesthesia Practice Survey was disseminated to recertified AANA members & received responses from a total of 4,200	Most frequently identified full scope of practice barriers – medical staff, facility, health system restrictions, limited awareness of the robust scope and value of nurse anesthesia services Recommendations from focus group participants for APN-As to overcome practice barriers include: offer presentations and educational	Population bias – focus groups were conducted at the AANA Assembly of School Faculty and Mid-Year Assembly	III B

			CRNAs	materials demonstrating the value of APN-A care		
13	American Association of Nurse Anesthetists 2019	Position statement	N/A	AANA advocates high quality, appropriate standards of care for all patients in all settings (i.e., office based practice) Standards for care in the office based setting are intended to support the delivery of patient-centered, consistent, high-quality, and safe anesthesia care and assist the public in understanding the APN-A's role in anesthesia care APN-A shall comply with all applicable state and federal rules relating to licensure, certification, and accreditation	None explicitly stated Population bias – written by AANA	IV B

				of office practice		

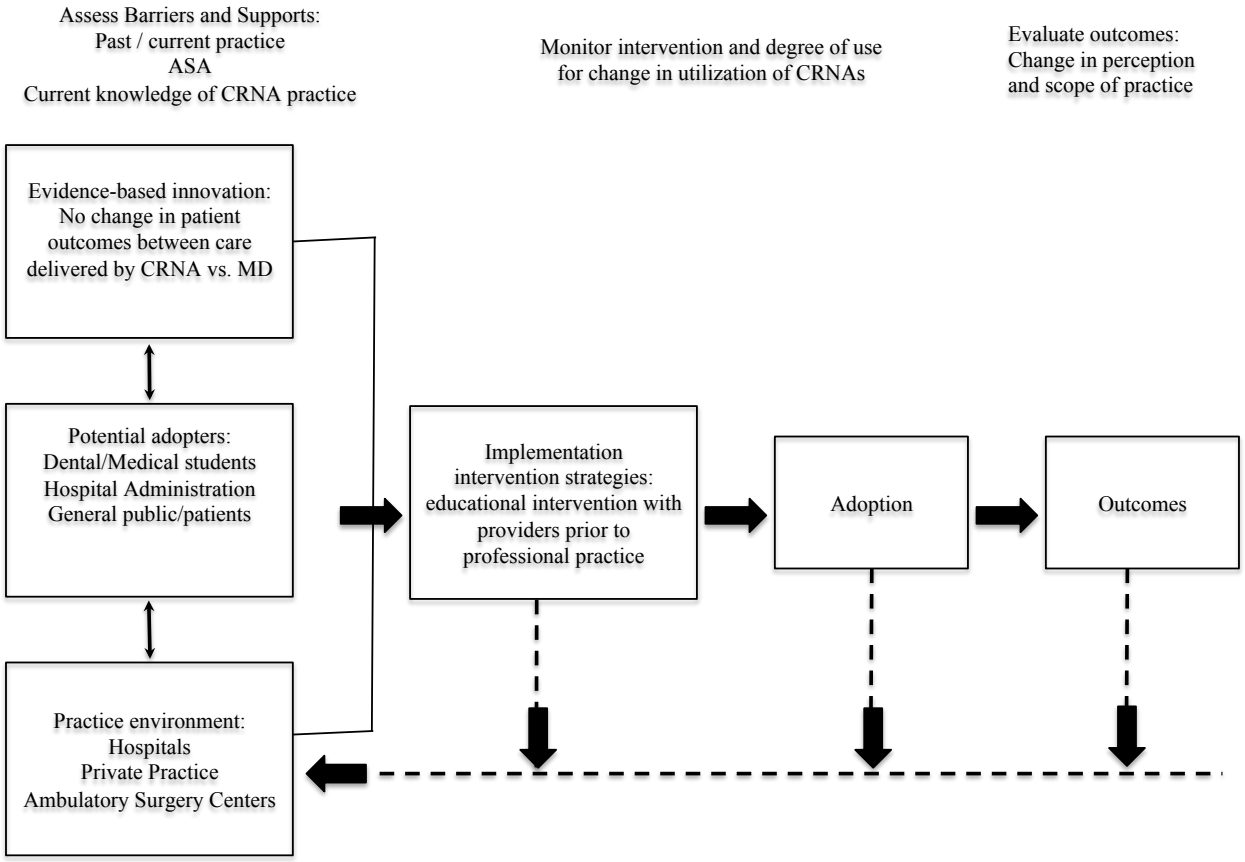
Appendix C

Ottawa Model of Research Use



Appendix D

Revised Ottawa Model of Research Use



Appendix E


THE APN-A
PROFESSION
+
INTERPROFESSIONAL
COLLABORATION
YOU ARE INVITED
to the first-ever
collaboration between the
[redacted]
and the
[redacted]
AUGUST 23, 2019
8:00 - 9:00 AM
[redacted]
Co-Investigators:
Lara Mendoza
[redacted]
Chad Toughill
[redacted]
Principle Investigator:
Maureen McCartney Anderson
[redacted]
Please join us for an exposition on Advanced Practice Nurses-Anesthesia (APN-As) & their collaborative relationship with dentists. Training on advanced airway assessments and skills to follow!
In order to participate, you must be [redacted] Participation is voluntary.
RUTGERS
School of Nursing
Reserved for IRB Approval Stamp
v1
06.30.19

Appendix F

RUTGERS

Rutgers School of Nursing
Stanley S. Bergen Building
Rutgers, The State University of New Jersey
65 Bergen Street
Newark, NJ 07101-1709

CONSENT TO TAKE PART IN A RESEARCH STUDY

TITLE OF STUDY: The APN-A Profession and Interprofessional Collaboration

Principal Investigator:
Maureen McCartney Anderson, DNP, APN/CRNA
[redacted]

Co-Investigators:
Lara Mendoza, BSN, RN, CCRN, SRNA
[redacted]
Chad Toughill, MSN, RN, CCRN, SRNA
[redacted]

This consent form is part of an informed consent process for a research study and it will provide information that will help you decide whether you want to take part in this study. It is your choice to take part or not. After all of your questions have been answered and you wish to take part in the research study, participation in the study will be considered implied consent. You will be given a copy of the signed form to keep. Your alternative to taking part in the research is not to take part in it.

Who is conducting this research study and what is it about?
You are being asked to take part in research being conducted by Dr. Maureen McCartney Anderson, who is a faculty member of the Doctor of Nursing Practice in Anesthesia program at Rutgers University. The purpose of this study is to advocate for the Advanced Practice Nurse-Anesthesia Nurse (APN-A) profession by understanding the perception and knowledge of APN-As amongst various healthcare providers, such as dental students. A seminar on APN-A education, abilities, and scope of practice in dental offices, as well as an exposition on advanced airway assessments and skills will be provided.

What will I be asked to do if I take part?
The entire duration of the educational seminar including pre-intervention and post-intervention surveys will be less than 60 minutes. We anticipate 90 subjects will take part in the study.

What are the risks and/or discomforts I might experience if I take part in the study?
This study contains no foreseeable risks, harms or ethical consideration. If you decide to quit at any time before you have finished the survey, your answers will NOT be recorded.

Are there any benefits to me if I choose to take part in this study?
By participating in this study, you will receive knowledge on APN-A education, abilities, and scope of practice in dental offices, as well as advanced airway assessments and skills. You will also be contributing to knowledge about the current perception of APN-As amongst various healthcare providers.

RESERVED FOR IRB APPROVAL STAMP

Will I be paid to take part in this study?
You will not be paid to take part in this study.

How will information about me be kept private or confidential?
All efforts will be made to keep your responses confidential, but total confidentiality cannot be guaranteed. We will not collect any information that can identify you or other subjects. Completed forms will be stored in a locked cabinet controlled by the investigators. Responses may be converted to digital format and stored on a password-protected computer that can only be accessed by the study team. Paper copies will then be destroyed. No information that can identify you will appear in any professional presentation or publication. Because all data collected will be anonymous and de-identified if need be, student personal information will be protected and therefore participation in the study is unrelated to course grades and voluntary participation will not be shared with the dental school faculty.

What will happen to information I provide in the research after the study is over?
The information collected about you for this research will not be used by or distributed to investigators for other research.

What will happen if I do not want to take part or decide later not to stay in the study?
Your participation is voluntary. If you choose to take part now, you may change your mind and withdraw later. You may leave without turning in a completed form or by turning in a blank or incomplete form. However once you turn in the form, you can no longer withdraw your responses, as we will not know which ones are yours.

Who can I call if I have questions?
If you have questions about taking part in this study, you can contact the Principal Investigator, Dr. Maureen McCartney Anderson at [redacted] If you have questions about your rights as a research subject, you can call the IRB Director of Newark Health Sciences at (973)-972-3608 or the Rutgers Human Subjects Protection Program at (973) 972-1149.

Please keep this consent form if you would like a copy of it for your files.

AGREEMENT TO PARTICIPATE

1. Subject consent:
I have read this entire consent form, or it has been read to me, and I believe that I understand what has been discussed. All of my questions about this form and this study have been answered. I agree to take part in this study.

Subject Name (printed):_____

Subject Signature:_____ Date:_____

2. Signature of Investigator/Individual Obtaining Consent:
To the best of my ability, I have explained and discussed all the important details about the study including all of the information contained in this consent form.

Investigator's Signature:_____ Date:_____

RESERVED FOR IRB APPROVAL STAMP

Appendix G

RUTGERS

Rutgers School of Nursing
Stanley S. Bergen Building
Rutgers, The State University of New Jersey
65 Bergen Street
Newark, NJ 07101-1709

Please answer the following demographic questions.

Gender:	Male	Female		
Age:	< 30 years	30-50 years	50-60 years	> 60 years

Pre-Intervention Survey

Circle the response that best characterizes how you feel about the statement, where: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree Nor Disagree, 4 = Agree, and 5 = Strongly Agree.

	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
The growing complexity of health problems is increasing the demand for interprofessional collaboration.	1	2	3	4	5
Due to this increased demand, it is important to get a better understanding of interprofessional education.	1	2	3	4	5
Working in an interprofessional collaborative environment would allow you to share your expertise, as well as allow you to learn about other health professions' expertise.	1	2	3	4	5
You feel that more training in interprofessional collaboration would make you more comfortable interacting with other health professionals.	1	2	3	4	5
Knowing more expertise outside dentistry would allow you to work more comfortably in an interprofessional collaborative environment.	1	2	3	4	5
You know what APN-A or CRNA stands for.	1	2	3	4	5
You know and understand the training and education that is needed to become an APN-A.	1	2	3	4	5
You know the role and responsibilities of an APN-A.	1	2	3	4	5
You feel comfortable with your airway assessments and management skills.	1	2	3	4	5
If barriers to APN-A scope of practice were removed, you would collaborate with an APN-A in your professional practice.	1	2	3	4	5

RESERVED FOR IRB APPROVAL STAMP

Post-Intervention Survey

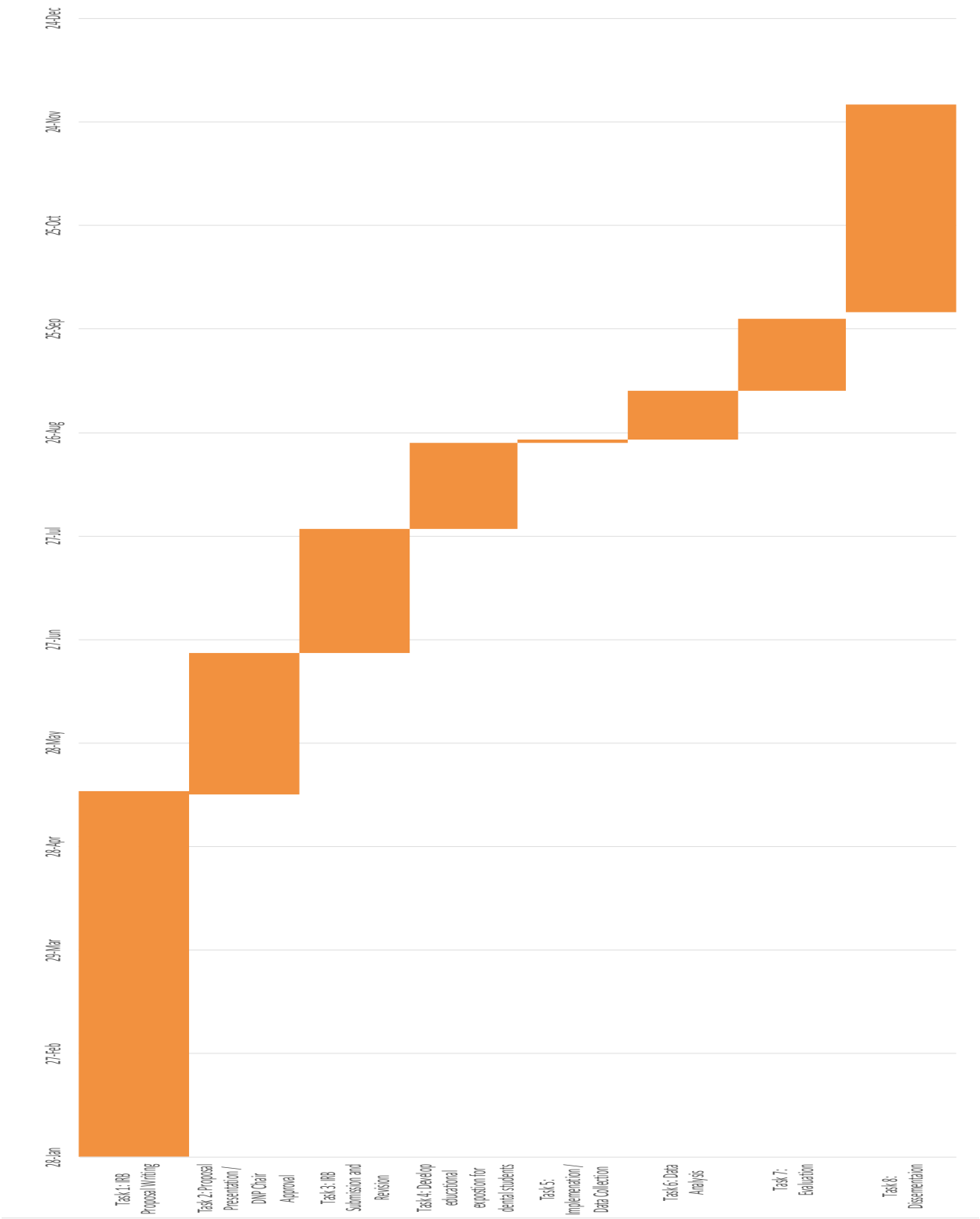
Circle the response that best characterizes how you feel about the statement, where: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree Nor Disagree, 4 = Agree, and 5 = Strongly Agree.

	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
The growing complexity of health problems is increasing the demand for interprofessional collaboration.	1	2	3	4	5
Because of the increased demand, it is important to get a better understanding of interprofessional education.	1	2	3	4	5
Working in an interprofessional collaborative environment would allow you to share your expertise, as well as allow you to learn about other health professions' expertise.	1	2	3	4	5
You feel that more training in interprofessional collaboration would make you more comfortable interacting with other health professionals.	1	2	3	4	5
Knowing more expertise outside dentistry would allow you to work more comfortably in an interprofessional collaborative environment.	1	2	3	4	5
You know what APN-A or CRNA stands for.	1	2	3	4	5
You know and understand the training and education that is needed to become an APN-A.	1	2	3	4	5
You know the role and responsibilities of an APN-A.	1	2	3	4	5
You feel comfortable with your airway assessments and skills.	1	2	3	4	5
If barriers to APN-A scope of practice were removed, you would collaborate with an APN-A in your professional practice.	1	2	3	4	5
If nurse anesthesia residents provided additional workshops on anesthesia-related skills, would you be interested in attending?	Yes	No			
If so, what topics would you be interested in learning about? Check off all that apply.	___ IV insertion ___ Advanced airway management		___ Forms of anesthesia (i.e., inhalational/ local anesthetics, IV sedation) ___ Other: _____		
When would you be interested in attending additional workshops? Check off all that apply.	___ After class ___ Weekend		___ Semester break ___ Other: _____		

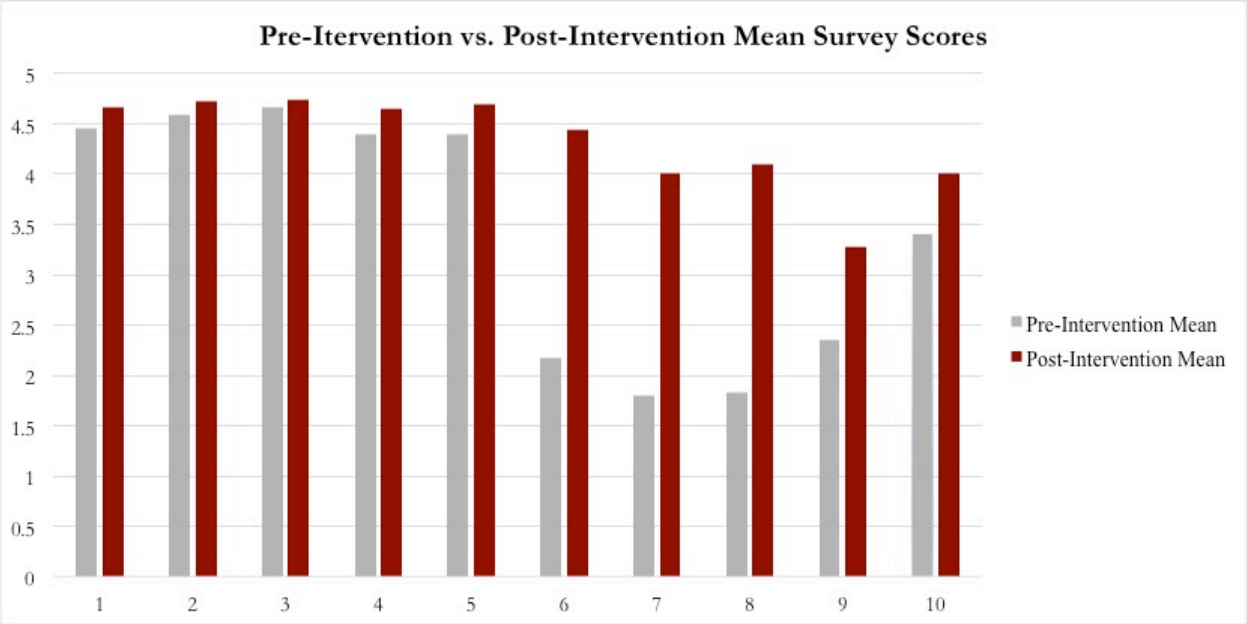
RESERVED FOR IRB APPROVAL STAMP

Appendix H

Gantt Timeline



Appendix I


Pre-Itervention vs. Post-Intervention Mean Survey Scores
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1
2
3
4
5
6
7
8
9
10
Pre-Intervention Mean
Post-Intervention Mean