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Nurse Anesthesiology Education for Regulators

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Introduction

The Nursing Care Quality Assurance Commission (NCQAC) is a regulatory organization formed to regulate all aspects of nursing in the state of Washington, from nursing technicians, licensed practical nurses, registered nurses, and advanced practice registered nurses, including nurse anesthesiologists (Washington State House Committee on Appropriations, 2022). The NCQAC is comprised of 15 governor-appointed members who are diverse representatives of the nursing profession and the public (Nursing Care Quality Assurance Commission [NCQAC], 2023). The selection process to become a commissioner involves many steps, including applying, interviewing, vetting, and accepting the position after the governor's appointment. The responsibilities of a commissioner include participating in scheduled business meetings, panels, subcommittees, and task forces, as requested by the chair of the nursing commission and the executive director. (NCQAC, 2023). The commissioners participate in various panels and subcommittees, including research, advanced practice, education, legislation, discipline, and licensing (NCQAC, 2023). These activities, organized and facilitated by staff members, are not differentiated by specialty. For example, a topic that reaches the commissioners for an official vote could be dealing with one specialty, like anesthesiology, without having a commissioner with expertise in that specialty. The decisions made by the NCQAC impact nursing activities to include the most advanced nursing specialized procedures of nurse practitioners and nurse anesthesiologists (AANA Board of Directors, 2019).

Nurse anesthesiologists, like other advanced practice providers, are independent practitioners in Washington State (Washington State Legislature, 2022). The American Association of Nurse Anesthesiology (2022) reports that 22 states have opted out of the federal physician supervision requirement. Nurse anesthesiologists practice in various models, like independent practice

models in which CRNAs practice without supervision or direction, and medically directed models in which a physician anesthesiologist bills for the medical direction of multiple nurse anesthesiologists simultaneously. Some other anesthesia models exist, like a collaborative model in which nurse anesthesiologists practice and bill independently while working side-to-side with physician anesthesiologists (Quraishi et al., 2019). There could be a misconception from the non-anesthesiology provider and even some anesthesiology providers about what those models mean clinically and financially. These misconceptions can come from the diverging perspectives that the two primary autonomous anesthesia providers say about the what, the why, and the how of the anesthesiology delivery systems (Quraishi et al., 2019).

An essential part of the purpose of the NCQAC is to regulate the competency and quality of Nurse Anesthesiologists in the state of Washington (Washington State House Committee on Appropriations, 2022). The Washington State Governor appoints two advanced registered nurse practitioners to the NCQAC, but these providers do not need to be Nurse Anesthesiologists (NCQAC, 2023). Due to the complex and specialized nature of the practice, scope, and billing of nurse anesthesia services, especially as it relates to intra-professional collaboration with physician anesthesiologists, an educational module is needed for the commissioners. The Nursing Commission needs to have a way to ensure that the commissioners understand CRNAs and their practice issues.

Aim

This literature review aims to define the education and scope of practice of anesthesiology providers and variations in legislative restrictions, understand the difference between physician and nurse anesthesiologists' practice settings and billing models, and seek current evidence on best practices in educating healthcare industry decision-makers.

Search

The following databases were searched: EBSCO, Google Scholar, and Cumulative Index to Nursing and Allied Health Literature (CINAHL). Only full-text articles written in English and published in academic journals from 2005 to the present were included. Articles greater than five years old were only included if they contained information pertinent to the topic. For the anesthesia-specific portion of this review, the following search terms were utilized: physician anesthesiologist AND nurse anesthesiologist AND anesthesiologist assistant AND scope of practice. Thirty results were obtained from this search. However, only 24 articles were retained after removing duplicates and reviewing the abstracts for relevance to the topic. The search terms for the educational section of the literature review were regulatory bodies, education delivery modes, and informing decision-makers. A total of 15 results were obtained from the initial search. However, only four articles were retained for this section for reasons like the previously mentioned search. The reference lists of the retained articles were further reviewed, and several additional articles were added. Of the 75 articles discovered, 45 abstracts were reviewed, and 32 were included in this literature review.

Results

For this literature review, 24 articles were retained. The Johns Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool was used to determine each article's level of evidence (Dearholt & Dang, 2022). The totals included 2 level one articles, 2 level two articles, 2 level three articles, 4 level four articles, and 22 level five articles.

Education

Physician Anesthesiologist

The education pathway to becoming a physician anesthesiologist is similar to every other specialty. Prospective students seeking to become physicians usually seek healthcare-related experiences during high school and early undergraduate education, like biological and physical sciences. A science-based undergraduate education is an innate benefit because students can organically take most required medical school prerequisite classes. Notably, the second largest group of applicants were classified as "Other" (Murphy, 2021). Medical school has four phases that last about four years, including the foundation phase, which covers years one and two, the patient care phase, the explore phase, and the focus phase (University of Washington, 2023). After completing medical school, a residency program in anesthesiology is completed after one year of transitional clinical education and three years of actual anesthesiology residence clinical education (University of Washington, 2023).

Nurse Anesthesiologist

Nurse Anesthesiology education starts with registered nurses with at least one year of critical care experience and a baccalaureate degree, even though the average years of critical care experience in admitted residents is three and a half (Flesher, 2024). It takes around seven to eight years to educate a nurse anesthesiologist.

Depending on university requirements, nurse anesthesiology programs range from 24 to 51 months. Nurse Anesthesiology graduates have an average of 9,369 hours of clinical experience, including 733 hours during their baccalaureate nursing program, 6,032 hours as critical care registered nurses, and 2,604 hours during their nurse anesthesia program (AANA Board of Directors, 2022).

Anesthesiologist Assistant

Before applying to an anesthesiologist assistant program, applicants must have a bachelor's degree and a complete list of prerequisite courses, such as chemistry, biology, anatomy, physics, English, and composition. There are sixteen Anesthesiologist assistant programs across the country (Purdue University). They last approximately 24 to 28 months, depending on the specific program curriculum (American Association of Anesthesiologists Assistants [AAAA], 2023). Typically, the Anesthesiologist Assistant program's first year is focused on basic science, anesthesiology, and introduction to clinical practice. The second year is more dedicated to specialty rotations like ambulatory anesthesia, cardiovascular anesthesia, intensive care and pre-operative clinic, nerve block, neurosurgical anesthesia, obstetrical anesthesia, pediatric anesthesia, and trauma. (AAAA, 2023).

Scope of Practice

Physician Anesthesiologist

Physician anesthesiologists are medical doctors who specialize in anesthesia, perioperative medicine, pain management, and critical care and practice autonomously (American Society of Anesthesiologists, 2021).

Physician anesthesiologists' scope of practice includes evaluating a patient's medical history, conducting physical exams, and determining appropriate anesthesia care before surgery. They treat patients of all ages and conditions (American Society of Anesthesiologists, 2024). Physician anesthesiologists are trained to administer various forms of anesthesia and analgesia, including general anesthesia, regional anesthesia, and sedation, to ensure patients are comfortable during surgical procedures (American Society of Anesthesiologists, 2024).

During intraoperative management, physician anesthesiologists monitor the patient's vital signs, adjust anesthesia as necessary, and manage any possible complications (American Society of

Anesthesiologists, 2024). Their participation is sometimes done in different modalities, which sometimes does not require a physician anesthesiologist to always be in the room. After surgery, physician anesthesiologists manage pain and ensure the patient is stable and comfortable during recovery (American Society of Anesthesiologists, 2024).

Besides their work in the operating room, physician anesthesiologists are also trained to provide critical care services in intensive care units (ICUs), emergency departments, and other settings. (Yale Medicine, 2022). Overall, physician anesthesiologists are crucial in ensuring the safety and comfort of patients undergoing surgery and other medical procedures (Accreditation Council for Graduate Medical Education, 2020).

Nurse Anesthesiologists

Nurse anesthesiologists are advanced practice registered nurses who specialize in autonomously administering anesthesia to patients in various healthcare settings. Their scope of practice includes pre-anesthetic assessment, intraoperative management, post-anesthesia care, airway management, epidural and spinal anesthesia, and conscious sedation.

Nurse anesthesiologists conduct a comprehensive evaluation of a patient's medical history, medications, allergies, and physical condition to determine the appropriate anesthesia plan. They administer various types of anesthesia, including general, regional, and local, to ensure patients are comfortable during surgical procedures. During surgery, Nurse anesthesiologists monitor the patient's vital signs, adjust the anesthesia as necessary, and manage any complications that may arise. Nurse Anesthesiologists provide pain management after surgery and ensure the patient is stable and comfortable during recovery. CRNAs also provide other anesthesia-related services such as airway management, epidural and spinal anesthesia, and conscious sedation (AANA Board of Directors, 2019).

The scope of practice of CRNAs may vary depending on state laws, regulations, and institutional policies. However, they collaborate independently with other healthcare professionals, including physicians, surgeons, dentists, podiatrists, and other advanced registered nurses, to provide safe and effective anesthesia care (Council on Accreditation, 2021).

Anesthesiologist Assistants

Anesthesiologist assistants are healthcare professionals who work under the direction of licensed anesthesiologists to provide anesthesia care to patients (American Academy of Anesthesiologist Assistants, 2023). Anesthesiologist assistants are not able to practice autonomously under any circumstances.

Anesthesiologist assistants perform a comprehensive pre-anesthesia evaluation of a patient's medical history, medications, allergies, and physical condition to assist in developing an appropriate anesthesia plan and post-anesthesia care (American Academy of Anesthesiologist Assistants, 2023). Anesthesiologist assistants assist in administering various types of anesthesia, including general, regional, and local anesthesia, under a physician's direction.

During surgery, Anesthesiologist assistants monitor the patient's vital signs, adapt the anesthesia as necessary, and assist in managing any complications under the direction of a physician anesthesiologist. After surgery, Anesthesiologist assistants assist in pain management and ensure that the patient is stable and comfortable during recovery under the direction of a physician anesthesiologist (American Academy of Anesthesiologist Assistants, 2023).

The scope of practice of Anesthesiologist Assistants does not vary as much as that of Nurse Anesthesiologists state by state based on laws and regulations. In some states, like New York and Pennsylvania, they are not recognized as advanced practice providers. This is usually due to

political opposition from their physician counterparts. However, if they can practice in a state, Anesthesiologist Assistants will always be under the direction of a physician anesthesiologist.

Legislative Restrictions

Physician Anesthesiologists

Physicians generally do not have practice restrictions once licensed in a state.

Nurse Anesthesiologists

The legislative restrictions placed on Nurse Anesthesiology practices vary state by state. There are over 54,000 nurse anesthesiologists across the United States ready to provide safe, cost-effective anesthesia care. (American Association of Nurse Anesthesiology, 2023). Washington state is one of the 33 states where nurse anesthesiologists can practice independently without restrictions (American Academy of Anesthesiologist Assistants, 2021). Practicing independently means there is no need for written collaborative agreements, supervision, or billing models. Based on the National Council of State Boards of Nursing (National Council of State Boards of Nursing, 2022), lack of independence comes from having some written agreement specifying the scope of practice and allowing or prohibiting activities with or without general supervision or directions from other practitioners. Lack of prescriptive authority is another restrictive activity that varies state by state and even between independent states such as Washington and California (National Council of State Boards of Nursing, 2022).

Anesthesiologist Assistants

Licensure of Anesthesiologist Assistants is created by legislation codified into state law. The legislative restrictions in the practice of anesthesiologist assistants are determined by the ability to practice in a state. Unlike nurse anesthesiologists who can practice in any state in the country, Anesthesiologist assistants are only licensed in 15 states and Washington DC. They can also

practice in another four states under the delegatory authority of a physician anesthesiologist (American Academy of Anesthesiologist Assistants, 2023). Delegatory authority is a way to bypass legislation and regulation and still allow Anesthesiologist Assistants to practice under the license of a physician anesthesiologist. This process is usually accomplished by an act or recognition of the Board of Medicine in an isolated manner to allow this practice in the state (American Association of Anesthesiologists Assistants, 2023).

Billing Models

There is a need to understand the different billing models in anesthesia because these models are so intertwined with how anesthesia is delivered. Anesthesia bills go directly to the patient if they do not use an insurer; there is no need for different codes or special billing. Regarding billing anesthesia services for Medicare, Medicaid, and private insurance companies, unique billing codes are used based on the anesthesia model used to deliver those services. The code AA is used for billing anesthesia services when a physician anesthesiologist provides anesthesia care alone and directly (Lewin Group, 2016). The QZ code is used for billing anesthesia services when a nurse anesthesiologist provides anesthesia care alone and directly (Lewin Group, 2016). The code QD is used when a physician anesthesiologist supervises four or more anesthesia care locations (Lewin Group, 2016). The code QK is used when one physician anesthesiologist medically directs two to four concurrent qualified anesthesia providers like a nurse anesthesiologist or an anesthesiologist assistant. (Lewin Group, 2016). The Anesthesia billing code, QY, is when a physician anesthesiologist medically directs one qualified anesthesia provider (Lewin Group, 2016). The code GC is used when a resident is under the direction of a physician anesthesiologist (American Association of Nurse Anesthesiology, 2018). Billing preferences depend on state regulations, hospital-specific regulations, and individual practice

preferences. It is essential to point out because, as health care is a for-profit model, the driver to choose a billing model most often comes down to the most profitable model (Lewin Group, 2016).

Educational Delivery

Educational delivery methods have inevitably changed due to the limitations placed by the pandemic across our society. Virtual, digital, and non-presential education was available and possible but not generally utilized prior to the pandemic (Yatigammana & Wijayarathna, 2021). Delivery modes like traditional face-to-face are still available, meaningful, and relevant. During the pandemic, educational institutions turned to different education modes to minimize the spread of the disease.

Online once education is a delivery mode provided online that is not recorded (Yatigammana & Wijayarathna, 2021). Online repeatable, which is real-time content plus a recorded version. Self-paced is a pre-recorded version that students can take at their own pace (Yatigammana & Wijayarathna, 2021). Lastly, blended education is pre-recorded content followed by an active face-to-face activity. Educators will blend these modalities into whatever fits their institutions and target audience. Our society has changed in many ways in the years following COVID-19. Adapting to a world where education and work can be done over a device is one of the most significant and lasting changes (Yatigammana & Wijayarathna, 2021). The delivery method planned for this project will utilize a combination of online and face-to-face education because some attendees will be on-site and some will attend in a virtual format. This combination was the second (32.2%) most preferred method after the online repeatable (58.8%).

Decision-Making

Decision-makers are part of organizations in every aspect of our society. These groups are in the form of committees, boards, directors, or informal groups of people tasked with making decisions. For these groups to make significant decisions, they need to be formed by a diverse group of people who are accountable for their actions, focus on the root of problems, not just symptoms, balance short-term and long-term impacts, and can communicate those decisions appropriately (Moore, 2022).

Members of this group can have a low or very high level of knowledge of a topic and still be required to participate in the decision-making process. The task of operating and making decisions and the level of uncertainty are part of why regulators, board members, and directors are in those positions. Understanding this part of the job would give them some perspective and expectations on the required preparations to be successful. These resources and education will fill some gaps and inform them, but the decision will always have risk and uncertainty (Frame, 2013).

Discussion

In the literature review, professional organizations and certifying bodies have demonstrated how intricate and complex anesthesiology professionals can be. Two anesthesiology providers can practice independently in the country: Nurse anesthesiologists and Physician Anesthesiologists. Anesthesiologist assistants are other anesthesiology providers who practice under physician anesthesiologists' direction in a limited number of states.

Nurse Anesthesiologists are doctoral-educated anesthesia providers who complete a nurse anesthesiology program after obtaining a bachelor's degree and one to three years of critical care experience. Physician Anesthesiologists receive a medical doctorate from an accredited medical school and then complete an anesthesiology residency program. These two providers have

healthcare experience before specializing in anesthesiology as graduate physicians and critical care nurses. The fact that anesthesia has a variety of providers with different educational backgrounds, scope of practice, and billing practices makes understanding the specialty a problematic task for non-anesthesia providers and sometimes for many anesthesia providers (MacKinnon, 2017).

Once licensed, physician anesthesiologists do not have any practice restrictions. Nurse anesthesiologists do not have federal restrictions to practice or are obligated to collaborate with physician anesthesiologists. However, the restrictions imposed on Nurse Anesthesiology practice are state-by-state regulations. There are 33 states in the country where nurse anesthesiologists can practice independently.

Anesthesia billing and practice models are sometimes chosen due to financial benefits over cost-efficiency and safety. There are three primary billing modalities in current practice: physician anesthesiologist alone (AA), nurse anesthesiologist alone (QZ), and a physician anesthesiologist medically directing up to four rooms of either nurse anesthesiologists or anesthesiologist assistants (QD). All of these models have an immediate effect on the bill that patients receive, the overall cost of healthcare in facilities, and the healthcare system as a whole.

The Nursing Care Quality Assurance Commission (NCQAC) is the Washington State Nursing Commission or Board of Nursing. It is composed of thirteen members from different areas of the nursing workforce and the general public. As such, it must regulate the entire nursing profession, including nurse anesthesiology.

Conclusion

The literature suggests that anesthesiology is a complex and unique area in the broad spectrum of healthcare. The different providers, their educational pathways, backgrounds, scope of practice,

and legislature restrictions make it quite difficult for leaders in regulatory bodies, like the Nursing Care Quality Assurance Commission, to understand, which could impact decision-making. Commissioners, pro-temps, and staff could benefit from a blended short session of nursing anesthesiology education, the scope of practice, and the overall implications of billing and practice models. Based on these results, there is a strong indication that members of a regulatory body like the Board of Nursing should enable yearly education about nurse anesthesiology education, practice, and basic billing practices to better serve the public.

Conceptual Framework

The Nursing Commission is not a regulatory body unique to Washington and, as we mentioned before, is formed by a combination of staff employees, appointed commissioners, and pro-tem members. Connectivism states that knowledge and learning are not in one place specific (Goldie, 2016). Connectivism insists that education is not unique to one place or entity. It is an ongoing process and depends on the exposure and interaction of the community, which, in this case, is the Nursing Commission. Based on the connectivism educational model, the setting would be the nursing commission, which includes staff, full commissioners, and pro-teams.

The Nursing Commission functions as the community to distribute knowledge. The nodes forming a network are the other groups in the Nursing Commission, like the governor-appointed commissioners, who include the permanent board or the staff members who can access the information as needed. Once this presentation is delivered, links and resources will be accessed, creating a permanent source of information that can be used from the intranet or the internet.

Methodology

The first step will be to research the literature on topics related to nurse anesthesiology, anesthesiologist assistants, physician anesthesiologists, the practice of anesthesia, billing

practices, and regulatory differences. A formal presentation utilizing PowerPoint will be created. This presentation will occur at an educational session in a Nursing Care Quality Assurance Commission business meeting in September 2023.

The effectiveness of this research will be gauged through pre and post-knowledge questionnaires, which will assess the depth of nursing anesthesiology knowledge among non-anesthesiology regulators. Individual interviews will also be conducted to gather in-depth perspectives and recommendations. The ultimate goal of this process is to equip the current Nursing Commission with fundamental knowledge and potentially create a permanent resource for future commissioners. A pre-test will be administered to measure knowledge before the presentation, and a post-test will be conducted after the education to evaluate the knowledge gained from the intervention.

This project will be presented at the Washington State Nursing Commission Business Meeting, and after approval, it will rest in the archives, accessible to members and staff. Resources connected to the most reliable anesthesia sources will be available.

Evaluation

In the pre- and post-assessment from the educational lecture, there were 12 respondents. The first question was, "When was the first ever documented Nurse specializing in Anesthesiology?" There were ten correct responses and two incorrect responses in the pre-test, while there were ten correct responses and two incorrect in the post-test. The second question was, "Agatha Hodgins founded the Lakeside Hospital School of Anesthesia in Cleveland, Ohio, open only to nurses." There were two correct responses and ten incorrect responses in the pre-test, while there were four correct responses and eight incorrect in the post-test.

	Pre		Post		Change	
Question 1	83	%	83	%	**0 % increase**	
Question 2	17	%	33	%	**94 % increase**	
Question 3	42	%	83	%	**97 % increase**	
Question 4	42	%	75	%	**79 % increase**	
Question 5	33	%	92	%	**179 % increase**	
Question 6	17	%	83	%	**388 % increase**	
Question 7	67	%	83	%	**24 % increase**	

For the question " Nurses must have only one of the following to be able to apply for a Nurse Anesthesiology Program, and the options were "prior experience in the area of anesthesiology," "Minimum of one year of critical care nursing experience," and "a master's degree in health care related field. There were five correct responses and six incorrect responses in the pre-test, while there were ten correct responses and one incorrect in the post-test.

For the question, "Nurse Anesthesiologists (CRNAs) are advanced practice providers who take care of patients of all ages in all settings under the supervision of a physician anesthesiologist." This was a true or false question; there were five correct responses and seven incorrect responses in the pre-test, while nine correct responses and three incorrect in the post-test. For the question, "The Medical Direction of Nurse Anesthesiology Providers is a practice model used due to its high safety record." Four correct responses and eight incorrect responses were recorded in the pre-test. In comparison, eleven correct responses and one incorrect response were recorded for the following questions," In Washington, Nurse anesthesiologists are the following practice models." The following choices were provided as answers: "independently," "supervised by a

physician anesthesiologist," "in collaboration with a physician anesthesiologist," "medically directed by a physician anesthesiologist," and other options combined two options. There were two correct responses and ten incorrect responses in the pre-test, while there were ten correct responses and two incorrect in the post-test. The last question in the test was, "The practice of anesthesiology is a nursing practice as well as a practice of medicine." There were eight correct responses and four incorrect responses in the pre-test, ten correct responses and two incorrect in the post-test. The graded percentage for the pre-test was 34%, while the post-test was 79%, which showed a significant improvement and surpassed the 70% pre-set benchmark. There was an evident appreciation from the attendees and a general realization that this information was complex but needed. The limitation experienced during this project was the low number of participants. There is a future opportunity to expand the knowledge assessment using this type of information with different sets of participants, either from different years or different boards. This possible expansion could be done utilizing a pre-recorded lecture instead of a physical and live delivery method.

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