



Contents lists available at ScienceDirect

Journal of PeriAnesthesia Nursing

journal homepage: www.jopan.org

Review

Global Scope of Practice of an APN Anesthesia: A Scoping Review

Luzia Vetter, MScN, RN^{a,b,*}, Daniela Maurer^c, Maya Zumstein-Shaha, PhD, RN^{d,e,1},
Balthasar L. Hug, MPH, MD^{b,f,1}^a Department of Nursing, Lucerne Cantonal Hospital, Lucerne, Switzerland^b Faculty of Health Sciences and Medicine, University of Lucerne, Lucerne, Switzerland^c Hospital Library, Lucerne Cantonal Hospital, Lucerne, Switzerland^d Department of Health, Bern University of Applied Sciences, Bern, Switzerland^e Faculty of Health, Department of Nursing Science, University Witten/Herdecke, Witten, Germany^f Department of Medicine, Lucerne Cantonal Hospital, Lucerne, Switzerland

A B S T R A C T

Keywords:

advanced practice
anesthesia
perioperative
scope of practice
scoping review

Purpose: Perioperative care requires health care professionals with more competencies and skills in clinical assessment, patient education, and advocacy to respond to current and future challenges in health care. Advanced practice nurses (APN) in Anesthesia may represent an approach to improve perioperative care. Specialization in anesthesia care already exists in many countries, but rarely on advanced practice level. An APN Anesthesia is an additional role with expanded skills and competencies and is not yet established in all countries. Therefore, defining the role of APN Anesthesia is necessary. To establish the role of APN Anesthesia effectively, the current evidence on the competencies and scope of practice (SOP) of established roles of APN Anesthesia was summarized.

Design: A scoping review according to the framework by Arksey and O'Malley and the JBI reviewer's manual.

Methods: We conducted a scoping review by searching the PubMed, PsycINFO, CINAHL, and Scopus databases. The literature search included papers from 2010 to 2023 dealing with the prerequisites and SOP of APN Anesthesia. Descriptions of APN Anesthesia from the United States of America, Asia, and Europe were assessed.

Findings: A total of 1,749 papers were identified of which 24 were included in this review. There is no uniform SOP for APN Anesthesia. The certified registered nurse anesthetist as an established Advanced Practice role in the United States of America, with a high degree of autonomy, is best described. Some APN Anesthesia focus on specific medical conditions such as dementia or autism. APN Anesthesia also works in postoperative care, outpatient clinics, pediatric day surgery, or palliative care settings. Practice development, clinical assessment, education, and family involvement encompass the expanded role of an APN Anesthesia compared with the specialist nurse in Anesthesia.

Conclusions: The APN Anesthesia is a complementary role in anesthesia because they possess both nursing expertise and advanced medical knowledge. APN Anesthesia provides preoperative assessments with patient and family education, intraoperative care for specific patient populations, and expanded duties in the postanesthesia care unit and palliative care.

© 2025 American Society of PeriAnesthesia Nurses. Published by Elsevier Inc. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

Demographic changes, rising costs, and a significant shortage of well-trained specialists present challenges for anesthesia care.¹ To address these issues, perioperative care must be rethought. Advanced practice nursing (APN) emerges as a solution, contributing to the presence of APNs across various settings in the Swiss health care

system.^{2–6} International literature underscores the positive impact of APNs on health care provision.^{7–13} However, the role of APN Anesthesia remains undefined and insufficiently implemented, indicating a research gap in several countries.

Anesthesia Setting, Nursing Roles in Anesthesia

In anesthesia, the roles of the anesthesiologist (physician) and the anesthesia nurse, that is, the nurse anesthetist, are established. Anesthesia services are usually provided under the delegation of the anesthesiologist. A nurse anesthetist is a nurse who specializes in

* Address correspondence to: Luzia Vetter, Department of Nursing, Lucerne Cantonal Hospital, Lucerne, Switzerland.

E-mail address: luzia.vetter@bluewin.ch (L. Vetter).

¹ Shared last authorship.

the setting of anesthesia. The International Council of Nurses (ICN)¹¹ outlines specialization in nursing practice as specialized nurses. After completing professional training, nurses can acquire further practical training in a designated subspecialty of nursing, for example, anesthesia nursing. The additional training is equivalent to a professional extension. On the other hand, APN Anesthesia acts with independent responsibility for its area of nursing activity. They can therefore provide anesthesia services with extended nursing skills in anesthesia care. Due to demographic changes and advances in health care treatments, also professionals in anesthesia are required to have advanced training. As a result, APN is necessary to provide adequate health care to patients and to promote patient safety in the anesthesia setting. Such APN Anesthesia is used to complement the established roles of nurse anesthetist and anesthesiologists in health care systems.

Definitions and Educational Requirements

In nursing, the nurse anesthetist group is the oldest specialization in nursing. The formal qualification of nurse anesthetists varies from country to country. The formal degree of an APN, on the other hand, always requires a Master of Science in Nursing (MSN). Accordingly, APN Anesthesia must have a formal MSN and a specialization in anesthesia. The education of a certified registered nurse anesthetist (CRNA) in the United States of America (USA) concludes with at least the formal degree of an MSN.¹² The ICN¹¹ defines an APN as “a nurse who has acquired, through additional education, the expert knowledge base, complex decision-making skills and clinical competencies for expanded nursing practice, the characteristics of which are shaped by the context in which they are credentialed to practice.” APNs are therefore highly qualified nursing professionals with advanced clinical skills. The common feature of the various APN specializations is working with patient groups in clinical practice and the formal qualification of a consecutive MSN.^{11,12} The clinical practice of APN roles varies between clinical nurse specialist’s (CNS) and nurse practitioner’s characteristics. CNS focuses on indirect care and supports clinical excellence from a systems approach, whereas nurse practitioner apply their knowledge in direct patient care in a variety of clinical settings. Beyond their specialization, APNs have extended in-depth competencies in expert coaching, counseling, ethical decision-making, and interdisciplinary collaboration. They demonstrate subject-specific leadership and promote research and evidence-based practice.¹²

To introduce the APN Anesthesia with their extended skills in different health care systems, the area of activity and the competencies of an APN Anesthesia for the whole perioperative process must be defined. A scoping review is indicated to obtain an overview about the available evidence on the competencies and scope of practice (SOP) of established APN Anesthesia in the literature.

Aim

An APN Anesthesia may have different roles depending on the work environment, staff composition, competencies, and health care system. The term “role” refers to the function or position that the APN Anesthesia occupies and refers to the responsibilities, tasks, and knowledge. This scoping review aims to determine the definition, SOP, and the competencies of an APN Anesthesia globally in different health care systems.

Materials and Methods

In this study, a scoping review methodology was used as this design allows for summarizing the available literature for a specific research question on a broader scope. Thus, key concepts from

various relevant literature sources can be reviewed. The scoping review was carried out using the Arksey and O’Malley’s five-step framework.¹⁴

Step 1: Identification of the Research Question

This scoping review aimed to collate the existing evidence in the literature regarding the definition, training, competencies, and SOP of APN Anesthesia.

The research questions were as follows:

- How are the roles of APN Anesthesia defined?
- What are the international requirements (education or training) for APN Anesthesia?
- How are the SOP and competencies of the APN Anesthesia defined?

Step 2: Identification of Relevant Studies

The literature search was carried out systematically with the support of a librarian (DM). The search for publications was conducted in the bibliographic databases Medline via PubMed, PsycINFO via Proquest, Scopus, and CINAHL between January 2010 and the last search update was conducted on September 17, 2023.

There was no restriction to specific document types. Letters, editorials, and commentaries were included in the screening for relevant studies but excluded from the results. The backward citation search was performed manually based on the reference lists of the included studies. The search strategy was based on the population concept and context framework¹⁵ (Table 1).

Population

All reports describing advanced nursing practice in anesthesia care such as APN (APN Anesthesia, CRNA) or equivalent, that is, including nurse specialists, were included.

Concept

The focus was on the SOP, that is, the responsibilities and task profile, competencies, and skills required to perform advanced nursing practice in anesthesia care. Manuscripts on international regulations for APN roles were also included. The added quality resulting from the care provided by an APN Anesthesia was identified.

Context

The search was intended to cover all areas where anesthesia services are provided, including pre-, peri-, and post-inpatient settings.

Table 1
Search for Population, Concept, Context (PCC) Framework¹⁵

Search Component 1 P (Population)	Search Component 2 C (Concept)	Search Component 3 C (Context)
Advanced practice nurse (APN) Clinical nurse specialist (CNS) Nurse practitioner (NP) Certified registered nurse anesthetists (CRNAs)	Scope of practice (field of activity, responsibilities, task profile, and “role”) Staffing model Standard of care Practice model	Anesthesia Perioperative Preoperative Postoperative

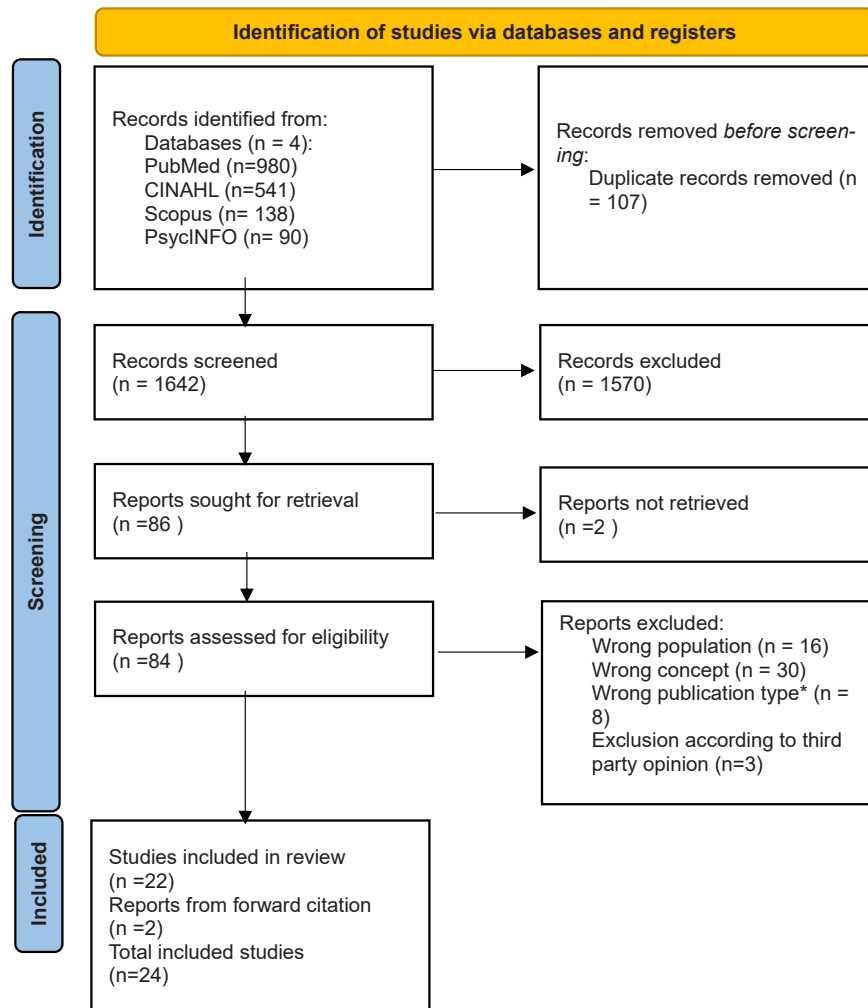


Figure 1. PRISMA-ScR (PRISMA for scoping reviews) flowchart of the results.¹⁷ *Wrong publication type, for example, letter, comment, and editorial. This figure is available in color online at www.jopan.org

Initially, a search was conducted in PubMed. Potentially relevant and known relevant publications were checked for keywords and index terms. They were supplemented with applicable index terms from the controlled vocabulary of the respective database to derive a specific search string for each database (the search string for PubMed is provided in the [Supplementary Data, Appendix 1](#)).

All references were imported into EndNote for deduplication and then exported into Rayyan¹⁶ for deduplication again and screening.

Step 3: Selection of Studies

Two authors (LV/DM) independently performed title-abstract screening. The studies were discussed in case of eligibility disagreements, and a third author (MZS) served as an arbitrator. In the full-text selection process, any uncertainties regarding eligibility were discussed with the arbitrator (MZS). Studies were included if they met the following criteria: (1) studies describing APNs working in the anesthesia setting (including premedication and pain management), (2) studies describing nurse anesthetists performing expanded roles and functions (eg, CNS), (3) studies describing skills and competencies of APNs, (4) studies describing policies for APNs, (5) full-text studies published in English or German, and (6) published between 2010 and 2023. Studies describing the APN outside the setting of anesthesia services or

describing the roles of anesthesiologist assistants and sedation nurses were excluded as these professions do not include nursing education.

Step 4: Collection, Summary, and Reporting of the Data

For this step, a thematic structure according to Colquhoun et al,¹⁶ was used to provide an overview of the breadth of the literature. The included works are presented alphabetically in [Appendix 2](#).

Step 5: Presentation and Description of the Results

The data collection form for scoping reviews from JBI reviewer's manual was used to summarize the essential information about the included studies (title, author, year, country, task profile, and setting).¹⁵

Results

In total, 1,745 records were identified, of which 86 articles were assessed in fulltext. A total of 22 articles met the inclusion criteria and were included in the review. After a forward citation search, two additional articles were included in the scoping review ([Figure 1](#)). The 24 included studies described APN Anesthesia in America

Table 2
Scope of Practice of APN Anesthesia in Different Countries

Country	Preoperative	Intraoperative	Postoperative
Iran	Assessments, anesthesia plans	Anesthesia management (under the supervision of an anesthesiologist)	Pain therapy, also at home
Japan	Assessments, anesthesia plans	Anesthesia management (under the supervision of an anesthesiologist)	Acute pain therapy
North Europe (Finland, Iceland, Norway, Sweden, and Denmark)	Assessments, anesthesia plans	Anesthesia management (under the supervision of an anesthesiologist)	Acute pain therapy
South Korea	Assessments, anesthesia plans	Anesthesia management (under the supervision of an anesthesiologist)	Acute pain therapy
Spain	Assessments, anesthesia plans	Anesthesia management (under the supervision of an anesthesiologist)	Acute pain therapy
USA	Assessments, anesthesia plans	All intraoperative anesthesia procedures on own responsibility, central venous catheters	Pain therapy (acute and chronic), PACU, and palliative sedation
G7 countries (Canada, France, Germany, Italy, Japan, UK, and USA)	Assessments, anesthesia plans	Anesthesia management (under the supervision of an anesthesiologist)	Acute pain therapy
Germany	Perioperative care for the designated population (people with dementia)	Perioperative care for the designated population (children with autism, palliative surgery)	

APN, advanced practice nurse; PACU, postanesthesia care unit; UK, United Kingdom; USA, United States of America.

(n = 13), Europe (n = 6), Asia (n = 4), and G7 countries (n = 1) and were published between 2010 and 2023. We analyzed three reports (reports on education), two qualitative papers, two papers with a mixed-methods approach, one Continued Medical Education article, two book chapters, seven reviews, two Delphi studies, four cross-sectional studies with one survey, and one observational study with a pre-post comparison (Appendix 2).

Education

Only manuscripts describing nurses with a formal MSN degree and specialization in anesthesia as well as APN Anesthesia were included in this review. The roles of nurse anesthetists describing a speciality of anesthesia nursing without a formal Master's degree were excluded. In the USA, all CRNA are educated at least at Master's level with a specialization in anesthesia. They represent advanced practice registered nurses and are the oldest organized speciality. Education and training are nationally regulated, and the designation "CRNA" was introduced in 1956. The educational program lasts 2 to 3 years, and includes theory classes as well as clinical training in anesthesia. In addition to the specialization in anesthesia, most CRNA programs include APN courses on evidence-based practice, physical exams, statistics, and health promotion. Clinical training includes at least 1,694 hours and more than 550 anesthesia procedures. After graduation, a CRNA must recertify every 2 years.¹⁸

All study programs for APN Anesthesia have in common that a Bachelor of Science in Nursing is required, followed by at least 1 year of practical work in an acute care setting. There are advanced practice roles in anesthesia in Japan,^{19,20} South Korea,²¹ Iran,²² France,²³ Spain,²⁴ and in European Nordic countries.²⁵ A university degree in anesthesia nursing is offered in Estonia, Poland, and the Slovak Republic,²⁶ but there is no further description about the formal degree of the nurse anesthetists and advanced practice roles in these countries. These programs comprise nursing theory, research skills, and clinical components in anesthesia.

In Japan, implementation of an APN Anesthesia at Master's level is underway.²⁰ This role is additional to nurse anesthetists. The Japan's Master's program in anesthesia lasts for 2 years and builds on a Bachelor of Science in Nursing as well as 3 years of practice in intensive care, emergency departments, or operating theaters. This MSN covers practical nursing, nursing theories, research methods, and ethics and offers a specialization in anesthesia. In South Korea, the APN Anesthesia education is based on the CRNA curriculum in the USA.²¹ In Europe, the university MSN with a specialization in

anesthesia nursing is offered in Spain,²⁴ Estonia, Poland, Slovak Republic,²⁷ France,²³ Sweden, Norway, and Iceland.²⁵

SOP of APN Anesthesia

In general, the SOP of an APN Anesthesia in the USA, the so-called CRNA, covers the whole perioperative domain. The CRNA carries out preoperative assessments, defines anesthesia plans, and performs all intraoperative anesthesia procedures (general, regional, local anesthetics, and sedation) by itself. Procedures such as inserting central venous catheters or regional anesthesia are also performed by CRNAs. There are also CRNAs acting in postanesthesia care units (PACUs). The CRNA acts as the main point of contact in emergencies for airway management, administering emergency medication, and performing cardiac life support techniques in hospitals. In some cases, CRNAs are implementing acute and chronic pain management modalities.¹⁸ Performing to the fullest extent of the SOP has a positive influence on CRNA's job satisfaction.²⁸ Due to the COVID-19 pandemic and resulting staff shortages, many government restrictions were lifted. Subsequently, many CRNAs were able to perform to the fullest extent of their SOP. Outside operating theaters, CRNAs took care of airway management, insertion of central venous accesses by themselves, and the skills they acquired through their degrees.²⁹ However, the CRNA's SOP varies across the United States. The SOP of CRNA also differs between rural and urban areas.^{30,31}

APN Anesthesia is involved in the whole perioperative process in Asia and Europe.^{19–22,24,26,27,32,33} They act as a link to PACU and ward nurses to optimize perioperative care. APN Anesthesia is involved in research and practice development. However, the SOP of an APN Anesthesia does not include autonomous cardiac-, pulmonary-, or anesthesia for patients under 2 years of age.¹⁹ APN Anesthesia in South Korea performs local anesthesia in patients.²¹ In Iran, APN Anesthesia provides pain therapy to home-dwelling patients and engages in research activity in the patient's home.²² In Norway, APN Anesthesia is implemented in preoperative anesthesia evaluation as well as the operating theaters.²⁶ Additionally, APN Anesthesia is included in the PACU and acute pain therapy.²⁷

Some APNs focus on specific settings or populations such as preoperative patient evaluation and education, for example, in preoperative evaluation clinics for orthopedic procedures.³⁴ In pediatric outpatient day surgery, APNs provide preoperative evaluation of children and patient education with the family.³⁵ Similarly, CRNAs also provide specialized care in perioperative settings to children with autism disorders or patients with dementia. In these areas, APN Anesthesia is regarded as a benefit.^{33,36}

APN Anesthesia may also work in the role of the adult-gerontology acute care nurse practitioner. This particular role is often found in the PACU.³⁷ The role of an adult-gerontology acute care nurse practitioner is seen as a bridge between anesthesiologists and downstream departments. In palliative care, APN Anesthesia may be included to provide pain management and palliative sedation. In particular, APN Anesthesia may be able to administer and prescribe palliative sedation medication independently.

Besides bedside practice, APNs possess clinical skills to facilitate practice development by implementing new evidence or conducting research,^{32,33,36,38} thus acting like CNSs (Table 2).

Regulation

Until 2001, all CRNAs worked under medical supervision in the USA. Subsequently, each state in the USA was free to require CRNAs to work under medical supervision, or independently. In a system, where CRNAs work under medical supervision, they provide “hands-on” care (anesthesia care providers who constantly attend to the patients under anesthesia) along with anesthesiology-resident physicians in university hospitals. An attending anesthesiologist (a board-certified or eligible anesthesiologist) concurrently supervises two to four hands-on care providers (CRNAs or anesthesiology-resident physicians). Supervision does not necessarily have to be carried out by an anesthesiologist but can be performed by a surgeon or dentist.¹⁸ Some CRNAs work independently, without a supervising anesthesiologist, in dermatology clinics to provide sedation for minor interventions.³⁹ In Asia and Europe, advanced practice nursing in anesthesia is not as clearly defined as in the USA.

Discussion

This scoping review provides an overview of the broad SOP of APN Anesthesia. In addition to the operating theater, APN Anesthesia works in postoperative care, outpatient clinics, pain therapy, pediatric day surgery, or palliative care settings. Some APN Anesthesia are focused on specific medical conditions such as dementia or autism.

An APN is a nurse who has acquired expert knowledge and skills for in-depth nursing practice through in-depth training and has at least a consecutive MSN degree in nursing.^{11,12,40} APNs have extended clinical knowledge associated with more autonomy and responsibility.⁴⁰ This autonomy offers added value for patient care in areas where nursing issues predominate over acute physiological problems. Examples of APN Anesthesia include palliative care, palliative sedation,^{41,42} or gerontology in the PACU.³⁷ In contrast, specialist nurses have obtained a specialization in one field after basic training. Any nurse with an honorary degree or degree may specialize in anesthesia care after basic training. These are usually called nurse specialists.^{25,27} This particular training involves theoretical and clinical training for anesthesia care and is often on the secondary level of education. Advanced nursing practice topics such as patient education, nursing theories, leadership, and research knowledge are not the focus of this training. They do not complete a consecutive MSN. Therefore, specialist nurse anesthetists are not equivalent to APN Anesthesia. However, choosing one or the other is dependent on the respective educational and health care systems of each country. In the USA, for example, anesthesia nursing education leads to the formal degree of an MSN or, by 2025, a Doctor of Nursing Practice.⁴³ No other country has implemented the tertiary educational level tied to anesthesia nursing.

APN Anesthesia is trained in nursing and focuses on holistic patient care. They consider themselves to be advocates for patients

during anesthesia.⁴⁴ Nurses have a holistic view on patients and their living environment. APN focuses on patient education, research and evidence-based practice, quality improvement, communication, counseling and mentoring, leadership, interprofessional collaboration, and ethical consideration.⁴⁵ In contrast to anesthesiologists, APN Anesthesia is more focused on living with a disease than on the disease and its implications for anesthesia. APNs have proven to be beneficial to patient care and experience. At the same time, the workload of medical staff is reduced, optimizing the cost-effectiveness and efficiency of health care services and improving overall patient satisfaction. Emerging evidence shows that the APN can provide a comparable level of care and achieve similar outcomes to physicians (both junior and senior clinicians) and in some cases even achieve better outcomes in terms of patient satisfaction, waiting times, chronic disease control, and cost-effectiveness.^{46,47} In many countries, APN Anesthesia already acts as employed in preoperative patient assessment and education.^{32,34,35} Using the preoperative anesthesia consultation in the pediatric setting with family involvement³⁵ allows for preoperative patient and family education for outpatient procedures. An APN Anesthesia seems to be an ideal candidate in this setting due to their nursing background and extended medical knowledge. The use of APNs in the preoperative consultation of patients undergoing orthopedic surgery has led to fewer cancellations of surgical procedures and better coordination among the service providers.³⁴ CRNAs acting in dermatology practice have shown added quality to patient care.³⁹ With a CRNA present, the dermatologist can perform minor procedures with anesthesia instead of analgesia alone. Patients greatly appreciate this option.

Further roles of APN Anesthesia are reported in palliative care and complex pain therapy.^{22,32,42} These therapies often require specific knowledge. On the one hand, an APN Anesthesia can be part of the postoperative pain management team. On the other hand, they can also provide education and clinical leadership for the postoperative care unit to facilitate complex pain therapies in the home environment. In Iran,²² pain therapy in the home environment is supervised by APN Anesthesia. The APN Anesthesia can close another gap in care by supporting patients and care teams when palliative sedation is used.^{41,42}

There is also evidence that APN Anesthesia promotes practice and professional development in the perioperative setting.³⁸ These competencies are practiced in direct collaboration with and empowerment of nurse anesthetists. Thus, a positive work environment is fostered. This improvement of the clinical staff experience is the fourth pillar of the quadruple Aim of Healthcare⁴⁸ and is, therefore, fundamental to the future of health care. Practice development projects can improve care of patients with special needs in the perioperative setting.^{33,36} APN Anesthesia is essential for the development of specific care models, as illustrated by the examples of dementia³³ and children with autism.³⁶

To introduce the role of APN Anesthesia as an additional role in the health care system, it is important to identify patients who may benefit from this role. For countries where APN Anesthesia has not yet been introduced, it is also important to determine the value added by APN. If a role with a SOP analogous to that of anesthesiologists emerges, there is a risk of competition between anesthesiologists and APN Anesthesia.¹⁸ Clarification of such a new role is essential. There is a risk that the role emphasis is on physician replacement and support rather than on the patients, their health, or holistic nursing. Thus, the nursing components of the role can become less valued and invisible.⁴⁹ Role definition of APN Anesthesia needs to be collaborative between anesthesiologists and nurse anesthetists.

Limitations

This scoping review outlines the SOP and some of the roles of the APN in anesthesia. However, there are several limitations. The education systems in different countries vary. Therefore, comparing APN Anesthesia in different health care settings is challenging. There are countries where the role of a nurse anesthetist is established but does not yet provide for a formal MSN qualification.²⁷ These nurse anesthetists can be formally classified as specialist nurses, and not as advanced practice nurses according to the ICN. These roles should be distinguished from APN Anesthesia because they have different competencies and skills. This review described only the roles of APNs with extended competencies and autonomy. As the difference between APNs and nurse anesthetists is not always reflected in the literature, not all APN Anesthesia roles may be represented in this review. In particular, the SOP may not have been reported to its full extent in all reports. In addition, the added value to the health care system provided by the APN Anesthesia may not have been covered in depth. The latter might be of particular interest as it would underpin the case for further implementation of this role. Furthermore, only full-text reports in German and English were included in this scoping review. The majority of the studies were conducted in North America, Europe, and Japan and only a single report covered the Eastern European countries. Thus, descriptions of APN Anesthesia roles from other geographic regions may be under-represented in the literature assessed by this scoping review. The heterogeneity of the various manuscripts limits comparability of the described roles. Therefore, our attempt to assess the SOP globally might have been biased in this respect. Moreover, the literature search was conducted to be as comprehensive as possible to address the broadness of the topic but did not include gray literature search. Searching additional sources may have identified further potentially relevant reports.

Conclusion

The APN Anesthesia is an additional role to nurse anesthetists and anesthesiologists because these professionals possess both advanced nursing expertise and medical knowledge. Their SOP includes a focus on patient-centeredness and holistic nursing, and can span the entire perioperative process. This includes preoperative patient assessments as well as patient and family education, intraoperative care for specific patient populations, and expanded duties in the PACU and palliative care. Due to their expanded competencies and skills, APN Anesthesia may pose a potential benefit to quality of care in health care systems where this role is not yet established.

Declaration of Competing Interest

None to report.

Supplementary Materials

Supplementary material associated with this article can be found in the online version at [doi:10.1016/j.jopan.2024.07.016](https://doi.org/10.1016/j.jopan.2024.07.016).

References

- Haller G, Heim C, Meier K, et al. Physician anaesthesia providers in Switzerland today and tomorrow: results of the National Anaesthesia Workforce Study (NAWOS). *Swiss Med Wkly*. 2021;151(33-34):1–12.
- Spirig R. 10 years advanced nursing practice in Switzerland: retrospect and prospects. *Pflege*. 2010;23(6):363–366.
- Weber C, Fierz K, Katapodi M, Hasemann W. An advanced practice nurse-led delirium consultation service reduces delirium severity and length of stay in orthopedic patients: a nonrandomized posttest only evaluation study. *Perspect Psychiatr Care*. 2020;56(4):804–810.
- Josi R, Bianchi M, Brandt SK. Advanced practice nurses in primary care in Switzerland: an analysis of interprofessional collaboration. *BMC Nurs*. 2020;19:1.
- Gysin S, Sottas B, Odermatt M, Essig S. Advanced practice nurses' and general practitioners' first experiences with introducing the advanced practice nurse role to Swiss primary care: a qualitative study. *BMC Fam Pract*. 2019;20(1):163.
- Beckmann S, Schmid-Mohler G, Spichiger E, et al. Mapping advanced practice nurses' scope of practice, satisfaction, and drivers of role performance. *Pflege*. 2024 Online ahead of print.
- Casey M, O'Connor L, Cashin A, et al. An overview of the outcomes and impact of specialist and advanced nursing and midwifery practice, on quality of care, cost and access to services: a narrative review. *Nurse Educ Today*. 2017;56:35–40.
- Kilpatrick K, Carter N, Bryant-Lukosius D, Charbonneau-Smith R, DiCenso A. The development of evidence briefs to transfer knowledge about advanced practice nursing roles to providers, policymakers and administrators. *Nurs Leadersh*. 2015;28(1):11–23.
- Bryant-Lukosius D, Carter N, Reid K, et al. The clinical effectiveness and cost-effectiveness of clinical nurse specialist-led hospital to home transitional care: a systematic review. *J Eval Clin Pract*. 2015;21(5):763–781.
- Gabbard ER, Klein D, Vollman K, Chamblee TB, Soltis LM, Zellinger M. Clinical nurse specialist: a critical member of the ICU team. *Crit Care Med*. 2021;49(6):e634–e641.
- Schober M, Lehwaldt D, Rogers M, et al. *Guidelines on advanced practice nursing, 2020*, International Council of Nurses. Available at https://www.icn.ch/system/files/documents/2020-04/ICN_APN%20Report_EN_WEB.pdf. Accessed 8/23/24.
- Tracy MF. A definition of advanced practice nursing. In: O'Grady T, ed. *Hamric & Hanson's Advanced Practice Nursing-E-Book: An Integrative Approach*. Elsevier Health Science; 2022:74.
- Stewart D, Horton BJ, Madsen RL, et al. *Guidelines on Advanced Practice Nursing - Nurse Anesthetists - 2021*. International Council of Nurses. Available at: https://www.icn.ch/sites/default/files/2023-06/ICN_Nurse-Anaesthetist-Report_EN_WEB.pdf. Accessed August 24, 2024.
- Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol*. 2005;8(1):19–32.
- Peters MD, Godfrey C, Mclnerney P, Munn Z, Tricco AC, Khalil H. Scoping reviews. In: Aromataris E, Munn Z, eds. *Joanna Briggs Institute Reviewer's Manual*. Joanna Briggs Institute; 2017:1–24; 2015.
- Colquhoun HL, Levac D, O'Brien KK, et al. Scoping reviews: time for clarity in definition, methods, and reporting. *J Clin Epidemiol*. 2014;67(12):1291–1294.
- Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med*. 2018;169(7):467–473.
- Matsusaki T, Sakai T. The role of Certified Registered Nurse Anesthetists in the United States. *J Anesth*. 2011;25(5):734–740.
- Akanuma Y. First in Japan: training curriculum for perianesthesia nurses and their clinical practice. *J Perianesth Nurs: Off J Am Soc PeriAnesth Nurses*. 2023;38:535–538.
- Tsumura H, Broome ME, Taki M. Advancing nurses' role to address issues facing Japanese anesthesia practice. *AANA J*. 2020;88(6):453–458.
- Rayborn M, Jeong G, Hayden S, Park S. The future of certified registered nurse anesthetist practice in South Korea: fading into the sunset or breaking of a new dawn? *AANA J*. 2017;85(5):361–368.
- Yousefi MR. The clinical competencies of nurse anesthetists in response to community needs: a Delphi study. *J Clin Basic Res*. 2017;1(4):13–19.
- Tenedios C, O'Leary S, Capocci M, Desai SP. History of anaesthesia: nurse anaesthesia practice in the G7 countries (Canada, France, Germany, Italy, Japan, the United Kingdom and the United States of America). *Eur J Anaesthesiol*. 2018;35(3):158–164.
- Sevilla Guerra S, Salmerón JM, Zabalegui A. Profile of advanced nursing practice in Spain: a cross-sectional study. *Nurs Health Sci*. 2018;20(1):99–106.
- Jeon Y, Lahtinen P, Meretoja R, Leino-Kilpi H. Anaesthesia nursing education in the Nordic countries: literature review. *Nurse Educ Today*. 2015;35(5):680–688.
- Kristoffersen EW, Opsal A, Tveit TO, Fossum M. Knowledge, safety, and teamwork: a qualitative study on the experiences of anaesthesiologists and nurse anaesthetists working in the preanaesthesia assessment clinic. *BMC Anesthesiol*. 2022;22(1):309.
- Meeusen V, van Zundert A, Hoekman J, Kumar C, Rawal N, Knappe H. Composition of the anaesthesia team: a European survey. *Eur J Anaesthesiol*. 2010;27(9):773–779.
- MacKinnon MA. Relationship between population density and scope of practice for certified registered nurse anesthetists in Arizona. *AANA J*. 2021;89(4):325–333.
- Callan V, Eshkevari L, Finder S, et al. Impact of COVID-19 pandemic on certified registered nurse anesthetist practice. *AANA J*. 2021;89(4):334–340.
- Vitale CM, Lyons KS. The state of nurse anesthetist practice and policy: an integrative review. *AANA J*. 2021;89(5):403–412.
- Neft M, Okechukwu K, Grant P, Reede L. The revised scope of nurse anesthesia practice embodies the broad continuum of nurse anesthesia services. *AANA J*. 2013;81(5):347–350.
- Sanclémente-Dalmau M, Galbany-Estragués P, Palomar-Aumatell X, Rubinat-Arnaldo E. Defining competencies for nurse anaesthetists: a Delphi study. *J Adv Nurs*. 2022;78(11):3696–3709.

33. Zöllner R. ANP-Rollenentwicklung in der Anästhesie-Pflege. *Advanced Practice Nursing in der klinischen Pflegepraxis*. Kohlhammer; 2022:177–186.
34. Sebach AM, Rockelli LA, Reddish W, Jarosinski JM, Dolan Jr CL. Development of a Nurse Practitioner-Managed Preoperative Evaluation Clinic Within a Multispecialty Orthopedic Practice. *J Nurse Pract*. 2015;11(9):869–876.
35. Frisch AM, Johnson A, Timmons S, Weatherford C. Nurse practitioner role in preparing families for pediatric outpatient surgery. *Pediatr Nurs*. 2010;36(1):41–47.
36. Bevan S, Harris K, Maeder-Chieffo S, Reswebber E, Lanahan D, Souders M. Positive healthcare encounters for children with autism spectrum disorder: accommodations during surgical procedures. *J Perianesth Nurs: Off J Am Soc PeriAnesth Nurses*. 2023;38(1):6–11.
37. Joyce E, Johnson L. Redesigning care in the PACU with an adult-gerontology acute care nurse practitioner (A-GACNP). *J Perianesth Nurs: Off J Am Soc PeriAnesth Nurses*. 2018;33(4):407–411.
38. Fencel JL, Matthews C. Translating evidence into practice: how advanced practice RNs can guide nurses in challenging established practice to arrive at best practice. *AORN J*. 2017;106(5):378–392.
39. Miller J, Pflederer R, Reece L, Cappel J, Harmon C. Using advanced practice anesthesia providers for intravenous sedation in a high-efficiency dermatologic surgery practice. *Dermatol Surg*. 2021;47(7):1027–1028.
40. Schober M. Differentiation of international advanced practice nursing roles: NP and CNS. In: Thomas SL, Rowles JS, eds. *Nurse Practitioners and Nurse Anesthetists: The Evolution of the Global Roles*. Springer; 2023:59–67.
41. Wolf MT. Palliative sedation in nursing anesthesia. *AANA J*. 2013;81(2):113–117.
42. Faircloth AC. Anesthesia involvement in palliative care. *Annu Rev Nurs Res*. 2017;35(1):135–158.
43. Burns SM, Bonanno LS, Dixon-Lee C, et al. Scholarly work for practice doctorate nurse anesthesia programs: current state and guidance. *AANA J*. 2021;89(1):53–61.
44. Sundqvist AS, Carlsson AA. Holding the patient's life in my hands: Swedish registered nurse anaesthetists' perspective of advocacy. *Scand J Caring Sci*. 2014;28(2):281–288.
45. Walker JA. Core clinical nurse specialist practice competencies. In: Debout C, ed. *Clinical Nurse Specialist Role and Practice: An International Perspective*. Springer; 2021:37–52.
46. Kleinpell RM, Grabenkort WR, Kapu AN, Constantine R, Sicoutris C. Nurse practitioners and physician assistants in acute and critical care: a concise review of the literature and data 2008–2018. *Crit Care Med*. 2019;47(10):1442–1449.
47. Egerod I, Kaldan G, Nordentoft S, et al. Skills, competencies, and policies for advanced practice critical care nursing in Europe: a scoping review. *Nurse Educ Pract*. 2021;54:103142.
48. Sikka R, Morath JM, Leape L. The Quadruple Aim: care, health, cost and meaning in work. *BMJ Qual Saf*. 2015;24(10):608–610.
49. Bryant-Lukosius D, DiCenso A, Browne G, Pinelli J. Advanced practice nursing roles: development, implementation and evaluation. *J Adv Nurs*. 2004;48(5):519–529.

Supplementary Materials

Appendix 1.

Search String for PubMed

((("advanced practice nursing"[MeSH Terms] OR ("advanc*" [Title/Abstract] AND "practic*" [Title/Abstract] AND "nurs*" [Title/Abstract]) OR "nurse clinicians"[MeSH Terms] OR "nurse clinician" [Title/Abstract] OR "certified registered nurse" [Title/Abstract] OR "nurse anesthetists"[MeSH Terms] OR "nurse anesthetist" [Title/Abstract] OR "nurse anaesthetist" [Title/Abstract] OR "pflegeexpert*" [All Fields] OR "nurse practitioners"[MeSH Terms] OR "nurse practitioner" [Title/Abstract] OR "clinical nurse specialist" [Title/Abstract]) AND ("anesthes*" [Title/Abstract] OR "anaesthes*" [Title/Abstract] OR "anesthesia"[MeSH Terms] OR ("anesthetics"[MeSH Terms] OR "anesthesiology"[MeSH Terms]) OR "anesthesiologists"[MeSH Terms])) AND (2010/1/1:2023/8/18[pdat])
Filter 01/01/2010 to 08/2023

Appendix 2.

Table A1

Studies Included in the Scoping Review

Author	Year	Region	Title of Paper	Research Design	Main Findings
Akanuma ¹⁹	2023	Japan	First in Japan: Training Curriculum for Perianesthesia Nurses and Their Clinical Practice	Report (on curriculum)	Start with an APN Anesthesia program in Japan. They contribute to the quality of perianesthesia care and patient safety in collaboration with anesthesiologists. The position is involved with patients seamlessly from preoperative evaluation in the outpatient clinic to biological control and safety management in surgical anesthesia, and even postanesthesia pain management.
Bevan et al ³⁶	2023	USA	Positive Healthcare Encounters for Children With Autism Spectrum Disorder: Accommodations During Surgical Procedures	Qualitative study (thematic analysis) with case reports	This article describes the development of a program and the perioperative care of children with autism spectrum disorders and their special needs. APN Anesthesia plays a key role in development and perioperative caring for these children.
Callan et al ²⁹	2021	USA	Impact of COVID-19 Pandemic on Certified Registered Nurse Anesthetist Practice	Mixed method	CRNA was assumed to take responsibilities different from their traditional role during COVID. Practice expansion was reported, especially in insertion of central venous catheters or arterial lines or managing patients on ventilators on Intensive Care Unit or Critical care services. Not all CRNA used their full scope of practice because of state and institutional restrictions.
Faircloth ⁴²	2017	USA	Anesthesia Involvement in Palliative Care	Book chapter	CRNAs have a specialized knowledge of pharmacology and physiology that perfectly complements the multidisciplinary palliative care team. CRNAs may become involved with or consult on palliative sedation, medical management, interventional pain management, terminal wean/extubation, and organ donation. Additionally, CRNAs need to understand the unique needs of this patient population so that they can appropriately care for palliative care patients presenting to the operating room for palliative surgery.
Fencel et al ³⁸	2017	USA	Translating Evidence Into Practice: How Advanced Practice RNs Can Guide Nurses in Challenging Established Practice to Arrive at Best Practice	CME article	APNs in the perioperative setting bring evidence into practice for improving health care quality. APNs have the skills for critical appraisal with asking the right questions knowing the clinical setting. They empower the nursing staff and do patient education preoperatively and postoperatively.
Frisch et al ³⁵	2010	USA	Nurse Practitioner's Role in Preparing Families for Pediatric Outpatient Surgery	Review with role description	Pre-op education programs provided by NPs are beneficial in decreasing the anxiety state among children and parents before surgery.
Jeon et al ²⁵	2015	North Europe	Anesthesia Nursing Education in the Nordic Countries: Literature Review	Scoping review	The Nordic countries have different types of post-registration anesthesia nursing education. There is ANP Anesthesia with a master's degree in Norway, Sweden, and Iceland.
Joyce and Johnson ³⁷	2018	USA	Redesigning Care in the PACU With an Adult-Gerontology Acute Care Nurse Practitioner (A-GACNP)	Review with role description	APN Anesthesia can become a role as an adult-gerontology acute-care nurse practitioner (A-GACNP) in the setting of postanesthesia. The specialty-educated A-GACNP may significantly impact postanesthesia care by reducing cost, increasing quality and efficiency, positively impacting patient safety, providing educational opportunities for the perioperative team, and improving communication within the health care team.
Kristoffersen et al ²⁶	2022	Norway	Knowledge, Safety, and Teamwork: a Qualitative Study on the Experiences of Anaesthesiologists and Nurse Anesthetists Working in the Preanaesthesia Assessment Clinic	Qualitative study (thematic analysis)	Description of the work in preoperative patient evaluation before anesthesia. The preoperative assessments with APN Anesthesia led to better opportunities for patients to be involved in decision-making, in addition to improving patient safety and outcomes through a structured assessment.

(continued on next page)

Table A1 (continued)

Author	Year	Region	Title of Paper	Research Design	Main Findings
MacKinnon ²⁸	2021	USA	Relationship Between Population Density and Scope of Practice for Certified Registered Nurse Anesthetists in Arizona	Descriptive study with survey (cross-sectional)	CRNA scope of practice and population density: There was no association between CRNAs' scope of practice and geographic location or population density. Scope of practice of a CRNA and job satisfaction: There was a statistically significant difference between CRNAs' scope of practice and job satisfaction. As the mean score of CRNAs' scope of practice increased, their level of satisfaction also increased.
Matsusaki and Sakai ¹⁸	2011	USA	The Role of Certified Registered Nurse Anesthetists in the United States	Review narrative	In the United States, at least a Master's degree including advanced practice nursing courses is desired. CRNAs have a scope of practice almost similar to physician anesthetists. In some states, CRNAs work independently and in some they work under supervision (also by a surgeon or dentist).
Meeusen et al ²⁷	2010	Europe	Composition of the Anesthesia Team: a European Survey	Cross-sectional study (-survey)	The education system in Europe is very heterogeneous. Only in Sweden, Czech republic, Estonia, Poland, and Slovak Republic, education for nurse anesthetists is at university level. Their scope of practice is in preoperative patient evaluation, anesthesia under supervision of an anesthetist, acute pain service, and work in postanesthesia care units.
Miller et al ²⁹	2021	USA	Using Advanced Practice Anesthesia Providers for Intravenous Sedation in a High-Efficiency Dermatologic Surgery Practice	Report (role)	The utilization of a CRNA in dermatologic surgery practice has improved the satisfaction and experience of patients. The observed benefits of this technique include reduced anxiety and pain with local anesthesia, reduced blood pressure and heart rate, amnesia regarding the surgery, and overall increased patient comfort.
Neft et al ³¹	2013	USA	The Revised Scope of Nurse Anesthesia Practice Embodies the Broad Continuum of Nurse Anesthesia Services	Mixed methods	Of the 4200 CRNA survey respondents, 44.6% are not permitted to practice their full scope of practice. In rural areas, CRNAs work more often independent than in urban areas. Most of the CRNAs work in an anesthesia team.
Rayborn et al ²¹	2017	South Korea	The Future of Certified Registered Nurse Anesthetist Practice in South Korea: Fading Into the Sunset or Breaking of a New Dawn?	Cross-sectional study (-survey)	The training and scope of practice are based on the CRNA in the USA: preoperative assessments, anesthesia plans, anesthesia guidance, regional anesthesia, and post-operative pain therapy. Close cooperation with anesthesiologists.
Sanclemente-Dalmau et al ³²	2022	Spain	Defining Competencies for Nurse Anaesthetists: a Delphi Study	Delphi study	Health education and the empowerment of the patient and family are fundamental pillars in the practice of APN Anesthesia. Especially in pre-anesthetic assessment and pain care.
Sebach et al ³⁴	2015	USA	Development of a Nurse Practitioner-Managed Preoperative Evaluation Clinic Within a Multispecialty Orthopedic Practice	Observational study pre-post	There are less surgical cancellations rates when a NP makes preoperative evaluation. With NP evaluation, there is a better preoperative coordination within the providers.
Sevilla Guerra et al ²⁴	2018	Spain	Profile of Advanced Nursing Practice in Spain: a cross-Sectional Study	Cross-sectional study (-survey)	APN Anesthesia is described in Spain. The roles and their scope of practice are not clearly described and, like many APN roles in Spain, have yet to be defined. APN Anesthesia has an activity in expert care planning and integrated care.
Tenedios et al ²³	2018	G7 countries	History of Anaesthesia: Nurse Anaesthesia Practice in the G7 Countries	Report (history of anesthetists)	In the United States and Canada, nurse anesthetists are described as an advanced practice nursing role. In Canada, it is a role as a nurse practitioner.
Tsumura et al ²⁰	2020	Japan	Advancing Nurses' Role to Address Issues Facing Japanese Anesthesia Practice	Report (about education of nurse anesthetists)	APN Anesthesia is a young role. They perform pre-anesthesia assessment, anesthesia care for surgical and other procedures, which include intubation. Intraoperatively, they work under the direction of an anesthesiologist. Perform pre-anesthesia assessment. Activities vary from one institution to another.
Vitale and Lyons ³⁰	2021	USA	The State of Nurse Anesthetist Practice and Policy: an Integrative Review	Systematic review	There is no difference in patient outcomes when a CRNA works independently and their full scope of practice. Depending on state regulation, CRNAs work under supervision or independently. Under supervision, not all CRNAs use their full scope of practice.
Wolf ⁴¹	2013	USA	Palliative Sedation in Nursing Anesthesia	Narrative review with case report	By understanding the concept and ethics of palliative sedation and providing nursing care that is theory-based, the author argues that the involvement of nursing anesthesia is appropriate within the scope of practice. Palliative sedation should be understood, embraced, and utilized as an area of expertise suited for nursing anesthesia.
Yousefi et al ²²	2017	Iran	The Clinical Competencies of Nurse Anesthetists in Response to Community Needs: a Delphi Study	Delphi study	APN Anesthesia is trained in preoperative assessment, anesthesia management, and postoperative pain management. Decision-making for care planning and organizational management planning and research are also essential. Ethical decision-making and pain management (acute and chronic) in the home setting is attributed to APN Anesthesia.

(continued on next page)

Table A1 (continued)

Author	Year	Region	Title of Paper	Research Design	Main Findings
Zöllner ³³	2023	GER	APN Role Development in Anesthesia Care	Book chapter	The development of an APN Anesthesia for patients with dementia as a link and coordinator in the interprofessional perioperative area is described. The inclusion of relatives and intraoperative care with patient orientation are the focus.

CME, Continued Medical Education; CRNA, certified nurse anesthetists; NP, nurse practitioner; PACU, postanesthesia care unit.