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Received: 18 December 2023 | Revised: 12 February 2024 | Accepted: 18 February 2024

DOI: 10.1111/pan.14873

Pediatric Anesthesia WILEY

PERSPECTIVE

Pediatric anesthesia in Europe: Variations within uniformity

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Section Editor: Dean Kurth

Abstract

Organization of healthcare strongly differs between European countries and results in country-specific requirements in postgraduate medical training. Within the European Union (EU), the European Board of Anaesthesiology has set recommendations of training for the Specialty of Anaesthesiology including standards for Postgraduate Medical Specialist training including a description for providing service in pediatric anesthesia. However, these standards are advisory and not mandatory. Here we aimed to review the current state and associated challenges of pediatric anesthesia training in Europe. We report an important country-specific variability both in training and regulations of practice of pediatric anesthesia in the EU and in the United Kingdom. The requirements for training in pediatric anesthesia varies between nothing specified (Belgium) or providing anesthesia with direct supervision to a minimum of 50 cases below 5 years of age (Germany) to 3–6 month clinical practice in a specialized pediatric hospital (France). Likewise, the regulations for providing anesthesia to children varies from no regulations at all (Belgium) to age specific requirements and centralization

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of all children below 4 years of age to specified centers (United Kingdom). Officially recognized pediatric anesthesia fellowship programs are not available in most countries of Europe. It remains unclear if and how country-specific differences in pediatric anesthesia training are associated with clinical outcomes in pediatric perioperative care. There is converging interest and support for the establishment of a European pediatric anesthesia curriculum.

1 | INTRODUCTION

Geographical Europe is the second smallest continent consisting of 53 countries with a total of 746 million inhabitants. There is a large variation in geographic, demographic, and economic situations amongst Europe. Europe extends from Iceland and Norway in the north to Spain and Greece in the south and from Ireland in the west to Russia and Ukraine in the East. Some countries and regions have a high population density (e.g., the Netherlands, Belgium and suburban regions including Paris and London), whereas other parts are sparsely populated (e.g., the Nordic Countries and regions in Spain). Importantly, there is a large variability in economic wealth; the nominal gross domestic product per capita varies from $95 000 in Ireland and Switzerland to $8000–$3000 in Serbia, Kosovo and Ukraine.

The European Union (EU) is a political and economic union of 27 countries with a single internal market based on standardized legal framework ensuring free movements of people, goods, services, and capital. Not all European countries are members of the EU; for example, Switzerland, Norway, Serbia, and the United Kingdom are not members. The EU aims to align national laws and protection of people's health. Medical practitioners of the EU, including doctors, have the right to practice throughout the EU because of the fundamental freedom of movement enshrined in the European treaties.[1] However, the health care is run and regulated on national levels. Furthermore, the exchange of doctors within Europe is limited because in most countries it is necessary for doctors to be sufficiently proficient in the national language before they can be licensed to work there.

Since 2013, The European Board of Anaesthesiology (EBA) of the European Union of Medical Specialists (Union Européenne des Médecins Spécialistes, UEMS) has described, and regularly updated, the training requirements for the Specialty of Anaesthesiology including standards for Postgraduate Medical Specialist training. The European Exam of Anesthesia and Intensive Care is a measure of minimum theoretical knowledge in basic science and clinical care in our specialty. (https://www.uems.eu/__data/assets/pdf_file/0004/156199/UEMS-2022.12-European-Training-Requirements-in-Anaesthesiology.pdf) Furthermore there is a European Diploma for Anaesthesiology and Intensive Care (EDAIC). For pediatric anesthesia, these requirements include domains of core competencies related to the anatomic features of the neonatal, infant, pediatric, and adolescent airway as well as physiologic characteristics of the different childhood periods including cardiovascular, respiratory, renal, neurologic, and neuromuscular function. It is, however, important to note that these recommendations of the EBA are only advisory and not mandatory. This, in turn, results in a large variation in the organization of anesthesia residency and fellowship programs throughout Europe. In the present work, we aim to highlight the variation in the organization of pediatric anesthesia education and care in European countries represented by the Executive Board of the European Society for Pediatric Anaesthesiology (ESPA).

2 | GERMANY

The education in pediatric anesthesia in Germany is described in the curriculum for the specialization to become a board certified anesthesiologist. During the 60 month period of general training, anesthesia residents must, under supervision, provide anesthesia to a mininum of 50 infants and children up to the age of 5 years (see Table 1). Additionally anesthesiologists need to acquire skills in pediatric resuscitation albeit the structure of this training is not fully defined. There is no certified path for specialization in pediatric anesthesia and all board certified anesthesiologists in Germany are allowed to take care of children of all ages. The postgraduate education in pediatric anesthesia is based on individual interests.

For years, the scientific working group of pediatric anesthesia (WAKKA) of the German Society for Anesthesia and Critical Care Medicine (DGAI) meets regularly and initiates guidelines or recommendation in nearly every aspect of pediatric anesthesia. WAKKA also functions as the steering committee for research projects. WAKKA initiates annual conferences focused on pediatric anesthesia and has developed an app-based peer network social media channel that is freely available. Recently, three university hospitals, one large district hospital and two pediatric hospitals initiated a structured fellowship for pediatric anesthesia but these initiatives are currently not officially endorsed by the DGAI.

Anesthetists, surgeons, intensivists, governmental authorities, politicians, and parent organizations are discussing the need for centralization of care of the most vulnerable children. So far, the German health ministry has only set regulations for children with congenital cardiac disorders and neonates weighing below 1500 g. The governmental decreets defined the requirements regarding structure, medical equipment, number of certified medical staff (including doctors and nurses) The level of expertise for anesthesiologists in this structure is defined as “experienced or long year experienced anesthesiologists” without further specifications.

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TABLE 1 Overview of training, accreditation and regulations of pediatric anesthesia in Europe.

Country	Length pediatric anesthesia in anesthesia curriculum	Fellow-ship offered	Acknowledgement Subspecialty pediatric anesthesia	Special regulations for providing care for pediatric anesthesia cases	Relevant regulatory bodies and pediatric societies
Germany	50 cases below 5 years	6 local initiative	No	Congenital cardiac cases in specialized centres and Neonates below 1500 g in "Perinatal center Level1"	WAKKA which is a body of the German Society for Anesthesiology and Intensive care Medicine (DGAI) https://www.ak-kinderanaesthesie.de/
Hungary	3 months	No	No	In development for children below 3 years	MGYAITT www.mgyaitt.hu
Serbia	4 months	1 center, 1 year	Yes	>3 years allowed in general district hospital <3 years only in pediatric centers	UDAIS/SPAIS www.udais-spais.com
The Netherlands	Not specified 3 months minimum	1–2 years 7 local initiatives Not specified	No	4 levels of care are defined: (1) <4 weeks or premature <60 weeks GA (2) <1 years (3) 1–2 years (4) <3 years	NVA-SKA KD_Richtlijn_Def_Beroepsnormenset_kinderen.pdf(anesthesiologie.nl)
Belgium	Not specified	Local initiatives	No	No	BAPA https://www.bapanaesth.be/
Scandinavia	0–6 months	2 years	No	Children <3 years with co-morbidity to some extent	www.ssai.info
United Kingdom	As per Royal College of Anesthetist curriculum	Multiples, 6–12 months	Yes ("*Special Interest Area*")	Centralization of pediatric care in hospitals	Royal College of Anesthetists https://rcoa.ac.uk APAGBI https://www.apagbi.org.uk/
Switzerland	3 months	Under construction	No	3 levels of care are defined: (1) <3 years & ASA >3 (2) <3 years & ASA >1 (3) >3 years	SGKA/SSAP https://www.ssapm.ch/ueber-uns/interessengruppen/sgka
France	3–6 months	No	No	3 levels of care are defined: (1) <1 years (2) <3 years (3) >3 years	e-ADARPEF http://e-adarpef.fr/

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3 | HUNGARY

The Hungarian system combines 2 years anesthesia and 3 years intensive care in one specialty finalized with a written and an oral exam. As part of the 2 years' anesthesia training, 3 months in pediatric anesthesia have to be completed in a neonatal and pediatric tertiary center.

Pediatric anesthesia is not a registered sub-specialty yet. Pediatric anesthesiologists exclusively take care of neonates and children in pediatric surgical departments or are involved in NICU and PICU. The majority of these "pediatric anesthetists" work in the capital (Budapest) but there are centers in three other cities with medical universities and in large county hospitals.

The lack of centralization in pediatric anesthesia is still an important issue. In city or county hospitals, general anesthetists feel obliged to anesthetize children for trauma, surgical or ENT procedures. We are in the opinion that in many of these hospitals the whole perioperative care might be inferior to up-to-date standards. Recommendations are in preparation appointing that pediatric anesthesia and surgery at least for children under 3 years of age must be performed only in dedicated pediatric centers.

Postgraduate medical education is obligatory and, over a 5-year cycle, 250 CME credits are required to keep the general anesthesia and intensive care license active. In sub-specialties such as pediatric anesthesia, postgraduate education is entirely individual without any official regulations. Attending international congresses and education courses can be difficult due to the high prices since the financial support from the institutions is limited.

The Hungarian Society of Pediatric Anesthesia and Intensive Care (MGYAITT) celebrated its 30th anniversary in 2023 and has around one hundred active members. This increasingly active society offers a scientific platform both for doctors and nurses working in this field. MGYAITT organizes annual national congresses on pediatric anesthesia and intensive care. The society's recently renewed webpage (www.mgyaitt.hu) is kept very up-to-date with information about national and international events with an archive of lectures from previous congresses. There is no dedicated network for pediatric anesthesia trainees or consultants.

4 | SERBIA

The duration of the training for the specialty anesthesiology and intensive therapy is 4 years in Serbia, of which 4 months is required in pediatric anesthesia. In 2016, a fellowship of pediatric anesthesiology of a duration of 3 months was established at the University Children's Hospital, Belgrade. The Ministry of Health of the Republic of Serbia approved a 1-year specialization in pediatric anesthesiology in 2018. After the final exam and thesis defense, the candidates gain the official title of pediatric anesthesiologist. The Society of Pediatric Anesthesiologists and Intensivists of Serbia (UDAIS/SPAIS) was founded in 2017 (www.udais-spais.com). Serbia has four pediatric hospitals which covers surgical patients from birth to 18 years. Pediatric intensive care units for surgical patients are also run by anesthesiologists.

5 | THE NETHERLANDS

The Dutch government and the national organizations that safeguard the training, education, and registration of doctors in the country do not recognize pediatric anesthesia as a separate subspecialty. Contrary to pain or cardiac anesthesia and intensive care for instance, there is no exit exam, or certification that confirm minimum standards of theoretical or applied clinical knowledge.

There is at the same time a drive, supported by the professional organizations, to set minimum standards for the provision of pediatric anesthesia. These are reflected in a minimum case load per age range, with an emphasis on the provision of anesthesia for neonatal surgery. Therefore, a pediatric anesthetist is recognized as someone who delivers anesthesia for a minimum of 10 patients per year in each defined age category. Over the years, this policy has generated a shift in the provision of care from district general hospitals towards tertiary referral centers, with a sometimes undesired impact on the initial care of the acute critically ill child in non-tertiary hospitals (https://werkboeken.nvk.nl/Portals/0/SKA%20protocol%20opvang%20acuut%20zieke%20kind%20%28002%29_1.pdf).

Junior doctors are taught the principles of pediatric anesthesia during their 5 year anesthesia training. They can spend up to 12 months, including 3 months in the pediatric intensive care unit, if they intend to pursue a career in pediatric anesthesia or intensive care. There are no minimum requirements for training in pediatric anesthesia.

University hospitals (there are seven in the country) have the opportunity to set up pediatric anesthesia fellowship programs which tend to last for 1 year. There are national guidelines which suggest minimum standards for training, education, research, and exposure to different clinical subspecialties. Not all the university hospitals have all the pediatric surgical subspecialties on site. The process of centralizations of pediatric cardiac surgical services has meant that exposure to this type of surgery is limited to two centers at present in the Netherlands. Maintaining standards of training within the fellowship programs is left to the individual department. There is a national committee that reviews and updates the guidelines on a regular basis. However, there is no provision for statutory visits to individual anesthetic departments to check compliance with the national guidelines within the framework of pediatric anesthesia fellowships.

6 | BELGIUM

Anesthesia training in Belgium lasts 5 years and includes training in general anesthesia, as well as in a wide variety of subspecialties such as loco-regional techniques, cardiothoracic, obstetric, and pediatric anesthesia. The time commitment and extent of each subspecialty training depends on both the institutional facilities and the interests of the trainee. For at least 12 months, the trainees must rotate to affiliated peripheral hospitals and another 12 months on Critical Care Medicine. These institutions must comply with specific requirements according to the rules and regulations that have been established by the members of the Belgian training committee and the Belgian

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Society of Anesthesiology, Resuscitation, Perioperative Medicine, and Pain Management (BeSARPP, https://www.besarpp.be/en/).

Pediatric anesthesia training in the early years of anesthesia training includes anesthetics in ASA I and II children who undergo minor surgeries under the direct supervision of an experienced (pediatric) anesthetist. Several hospitals offer the trainees a specific rotation in pediatric anesthesia practices which vary from 2 to 6 months. In the fifth and last year of the training, the trainees are expected to be able to participate in more complicated and challenging pediatric cases requiring a multidisciplinary approach under the direct supervision of an experienced (pediatric) anesthetist, with the intention of increasing the trainees' exposure to pediatric anesthesia practices.

Training in the subspecialty pediatric anesthesia is only available in large university and academic hospitals. The composition and time commitment for various necessary and essential aspects of pediatric anesthesia are not defined or described. The majority of anesthetists seek additional experience and expertise from the experienced (pediatric) anesthetists in their own institutions. Most of them also follow additional structured training in pediatric anesthesia abroad. There are also some university hospital that offer a training program in collaboration with neighbouring countries.

The Belgian Association for Pediatric Anesthesiologists (BAPA, https://www.bapanaesth.be/) has been established in 1989 and organizes annual meetings, refresher courses, and webinars. The BAPA encourages residents to participate in national and international research projects. The group also has a WhatsApp network to spread the words, opinions, and advice when needed. Finally, each pediatric anesthesia institution also organizes local seminars, postgraduate meetings, and workshops.

7 | NORDIC COUNTRIES

The five Nordic countries are Denmark, Finland, Iceland, Norway, and Sweden. With the exception of Iceland, each national professional society of anesthesia and intensive care has a subsection for pediatric anesthesia. The latter organize annual scientific meetings and courses for anesthesia trainees. Membership in the national societies is usually shared with the Scandinavian Society for Anaesthesiology and Intensive Care (SSAI). For two decades, there has been a still ongoing restructuring, in order to centralize surgical and anesthesia care for neonates and infants at tertiary pediatric centers. This also applies to older children with moderate or severe co-morbidities. Despite this effort, some infants still undergo general anesthesia in county and district hospitals.

Pediatric anesthesia is not an officially recognized sub-specialty in Scandinavia. Nevertheless, in the last two decades, most aspiring pediatric anesthetist have been able to apply to the Scandinavian Society of Anesthesiology and Intensive Care Medicine (SSAI) fellowship program. The fellowship duration is 24 months, comprised of 21 months of training in pediatric anesthesia, and at least 3 months in a pediatric ICU. At least 12 months of training must be completed at a highly specialized center affiliated with the fellowship program. Furthermore, fellows attend theoretical courses, conduct a scientific project and spend 4 weeks at a pediatric center abroad. Both specialists working in pediatric hospitals and colleagues with a mixed adult and pediatric practice in county or university hospitals can apply for the fellowship program if they can make arrangements with a sponsoring clinic.

8 | UNITED KINGDOM

The vast majority of healthcare in the United Kingdom is delivered via the National Health Service (NHS) and governed by individual nations: England, Scotland, Wales, and Northern Ireland. A comprehensive activity survey of UK practice revealed 90% of pediatric patients were ASA 1 and 2, two thirds day-case procedures with 1 in 6 occurring outside the operating theater and approximately 40% in district general hospitals. The sickest (ASA-PS 4 or 5) and youngest (infants) were anesthetized in specialist hospitals (89% and 92%, respectively).[2] Over the last decade, the NHS has seen a steady annual growth of general pediatric surgery in specialist centers by around 6%, with fewer procedures performed in district general hospitals, particularly in children younger than 4 years old. This increased workload for specialist pediatric centers cannot easily be solved with bed space expansion due to lack of qualified staff. Consolidation of centers is also not feasible due to travel times for families and the inherent costs of creating super centers. The aspirational solution is currently the development of a flexible, functional national network, with some unavoidable central movement and the creation of a counter outreach service which delivers remote and on-site support in pediatric emergency situations to nonspecialist centers.

The Royal College of Anesthetists (RCoA) issues Guidelines for the Provision of Anesthetic Services (GPAS) with a chapter dedicated to pediatric anesthesia (https://www.rcoa.ac.uk/gpas/chapter-10). Pediatric anesthetists are guided and educated by specialist societies such as the Association of Pediatric Anesthetists of Great Britain and Ireland (APAGBI), their Link-Network, and local meetings. An active Pediatric Anesthesia Trainee Research Network (PATRN) has been successfully established over the past decade to provide network and research opportunities under the umbrella of the APAGBI and monitor pediatric anesthesia practices in the UK.

In 2021 the RCOA published a new anesthetic curriculum, moving away from documented competencies, logbooks and minimum required numbers, instead focusing on building judgment and wisdom for complex clinical decisions. It is intended to provide competency for all anesthesia trainees to care for children from the age of 1 year in an attempt to maintain the safe delivery of anesthesia for healthy children in nonspecialist centers and reverse the drift of nonspecialist activity to specialist centers due to age rather than co-morbidities. In pediatric populations, the trainees should learn the knowledge, skills, values, and behaviors to perform safe perioperative anesthetic care independently (https://www.rcoa.ac.uk/sites/default/files/documents/2022-12/21-131-Curriculum%20FINAL.pdf). This skillset varies depending on the goal of a district general setting versus a specialist pediatric setup, whether that be in a large mixed hospital, or solely pediatric center. For the latter, the anesthetist must learn safe perioperative anesthetic care

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for complex pediatric and neonatal surgeries independently, with a wide range of analgesic strategies during a 1 year fellowship.

9 | SWITZERLAND

Postgraduate training for the title of specialist in anesthesiology in Switzerland should enable students to acquire the knowledge and skills, enabling them to practice under their own responsibility in the entire field of anesthesiology. Postgraduate training is based on the guidelines of the Swiss Society of Anaesthesiology and Perioperative Medicine (SSAPM). Postgraduate training lasts at least 5 years: 4–4½ years of anesthesiology (specific training) and 6–12 months of intensive (nonspecific) training. Throughout the course of their training, residents are progressively achieving the required level of competence in nine general core competencies and eight areas of specific skills ("specific core competencies") including pediatric anesthesia during a 3 month period. The minimum level of expertise for the competence statements in each domain is defined in the Swiss catalogue of objectives in anesthesia and reanimation (SCOAR). At the end of general training, a Swiss anesthetist should be able to provide induction, maintenance and emergence of general anesthesia and manage perioperative care (pain, PONV, emergence delirium) in pediatric patients (including regional anesthesia) in otherwise healthy children ≥3 years and ASA I/II undergoing routine procedures, under distant supervision, and in children <3 years or ASA >II, under direct supervision (supervisor present in the room). As the pediatric caseload in Switzerland is insufficient to train and maintain pediatric expertise for all anesthetists sufficiently, regionalization of treatment of younger children in centers with experienced staff and appropriate infrastructure is mandatory. Likewise, older children should be cared for by anesthetists with regular practice in these age groups.

The Swiss Society of Pediatric Anesthesia (SGKA/SSAP) considers itself a Swiss organization of anesthesiologists who are specifically interested in the field of pediatric anesthesia and/or work in pediatric anesthesiology. Its goal is to promote pediatric anesthesia practically and scientifically, to organize and promote continuing education events, and to develop quality standards. A working group from the SGKA/SSAP and the SSAPM established a framework of Swiss National guidelines in 2019 as a first step in the harmonization of practice in pediatric anesthesia. In 2020, the members of the SGKA/SSAP accepted the Swiss National Guidelines 2020 with description of 3 levels of care: *Level 1* requiring dedicated pediatric anesthetists for children below 3 years of age and ASA III and higher, or congenital diseases, special care, major surgery; and *Level 2* requiring dedicated anesthetist and staff with regular exposure for children below 3 years of age and ASA 1 or 2 undergoing routine or minor surgeries; and *Level 3* centers with general anesthetists for children from 3 years upwards and can be performed in district hospitals and office-based units. The second step of harmonization will focus on training and education: a certification of Specialized Pediatric Anesthesiology Subtitle for certified general anesthesiologists is in discussion as a solution to provide structured education in pediatric anesthesia (definition of a 1–2 year fellowship, definition of structured courses, continuous education after certification).

10 | FRANCE

In France, anesthesia is provided by doctors who have completed 5 years of theorical and practical training, with regular written, oral, and practical assessments. Pediatric anesthesia is not recognized as a separate sub-specialty, but at least 3 months training in a pediatric hospital is required. There is also a pediatric intensive care option in the curriculum. There is no specific evaluation for pediatric anesthesia skills at the end of the training and any graduated anesthesiologist can legally practice pediatric anesthesia. Most academic pediatric departments and the French Pediatric Anesthesia Society (ADARPEF) consider this 3-month period insufficient, and are willing to increase the mandatory duration of initial training to 6 months, at least for doctors intending to practice pediatric anesthesia on a regular basis. Postgraduate medical education is normally required for all anesthesiologists, but not specifically in pediatric anesthesia.

Pediatric anesthesia is provided in pediatric and non-pediatric units in France, with three levels of care defined by the French Health Authorities, depending on age (<1 year old, <3 year old and over), facilities (presence or absence of dedicated pediatric surgery department or recovery room for example) and medical staff (presence or absence of dedicated pediatric surgeons, anesthesiologists, and pediatric nurses).

The French Pediatric Anesthesia Society is very active in promoting high standards in the specialty through education and research, by organizing an Annual National Congress, and pediatric sessions during the National Congress of the French Anesthesia Society (SFAR) each year (www.e-adarpef.fr). There are also several postgraduate training courses in France about advance pediatric anesthesia, most of them in the main tertiary pediatric centers. None of these courses are required to practice pediatric anesthesia.

National guidelines about pediatric anesthesia have been updated this year, suggesting minimum standards to increase security of care in children. These guidelines cover facilities, equipment, educational topics and minimum requirements for the practice of pediatric anesthesia, particularly for children under 3 years of age, and insist on regular practice, skill maintenance, and experience in pediatric anesthesia.

A network of French experienced pediatric anesthesiologists has just been set up by the French Pediatric Anesthesia Society, to enable any physician to contact an expert for advice or to share experience about pediatric anesthesia. As tertiary centers in France cannot provide all pediatric anesthesia, it is therefore important to maintain standards of training in non-dedicated pediatric departments, where regular practice of pediatric anesthesia must imperatively be done.

11 | DISCUSSION

The present overview highlights some of the most important differences in pediatric anesthesia training in Europe. These differences

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primarily stem from the important variation of health care systems between European countries which, in turn, has a major impact on medical specialty and, even more, on medical subspecialty training. As uniformization of health care accros European countries is highly unlikely in the foreseeable future, it is difficult to define a roadmap aimed to harmonize pediatric anesthesia training in Europe. Laying the grounds of such a roadmap; however, is necessary to deliver state-of-the art high quality care for all children across the Continent.

The present overview is not complete and the selection of countries is based on those countries represented in the Executive Board of the European society for pediatric Anesthesia. All anesthesiologists with an interest in pediatric anesthesia from Europe can become members of ESPA and can stand as a candidate for the Board. The Board is voted by members of the society without restriction for countries (albeit no more than two members from one country can be represented in the ExBo). Consequently, some countries with many inhabitants (e.g., Italy, Spain, and Russian Federation) are not included in the present overview. Do we really need to harmonize the requirement for pediatric anesthesia training in Europe? One way to approach this question is to determine if country-specific differences in pediatric anesthesia training result in country-specific differences in perioperative outcomes in pediatric populations. The APRICOT and NECTARINE Study, prospectively evaluating the incidence of severe critical events in children undergoing anesthesia, showed important country-specific differences in the distributions of these outcomes throughout the 33 participating European countries.[3,4] As this study was not designed to answer the effects of country-specific pediatric anesthesia training on outcome, these results should be interpreted with caution and cannot be used as a proof of superiority of one system over the other. They, nevertheless, support the possibility that the quality of training may contribute to influence patient outcomes. Designing prospective studies addressing the effects of pediatric anesthesia subspecialty training on pre-defined patient-specific outcomes will be a crucial step to argue in favor of this possibility. However, there are many other factors in Europe which probably have a much larger influence on the quality of healthcare which cannot be changed (e.g., the large difference in nominal gross domestic product per capita).

In most but not all European countries, there is an increasing trend to centralize the care of neonates and other high-risk pediatric populations in a limited number of centres. While this approach is highly reasonable from multiple perspectives, it raises the question of how competence in pediatric anesthesia can be maintained outside these specialized centres. Maintaining knowledge and clinical skills in airway management for neonates and infants in acute situations for acute respiratory tract infections and insufficiency is an important issue in most countries. One strategy for continuing medical education for anesthetists that have completed a training in pediatric anesthesia but not working in specialized centers is to offer them rotations of 2–4 weeks per year at their regional tertiary center. However, a majority of county hospitals do not take this opportunity, often due to staff shortages locally. The overall ambition is to be able to provide expert level care when and where it is needed as well as offering state-of-the-art general pediatric health care for the entire population. To balance these factors against a limited case load should be a priority for stakeholders in each country. Another strategy is to setup a network for consultation and or even outreach services by helicopter of pediatric anesthesia specialists to nonspecialists centers (UK and France). These services might be effective to provide specialist care in emergency situations, but are also very time and cost intensive.

What future steps should be taken to improve education and training of clinicians in pediatric anesthesia in Europe? Given the major country-specific differences in health care over Europe, a one-size-fits-all European pediatric anesthesia curriculum may seem a far-fetched endeavour at present. However, we believe that defining the minimum amount of education, competencies and training required for pediatric anesthesia under the umbrella of the European Society of Anaesthesiology and Intensive Care and the European Society for Pediatric Anaesthesiology is necessary.[5] In turn, these recommendations may influence training and certification processes at the national level in each country. There is clearly space for improvement and we owe this to the future generations.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

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How to cite this article: de Graaff JC, Frykholm P, Engelhardt T, et al. Pediatric anesthesia in Europe: Variations within uniformity. *Pediatr Anesth*. 2024;34:919-925. doi:10.1111/pan.14873

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