

Availability of Pediatric Surgery: Implications for Planning Pediatric Anesthesiology Education

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The pediatric population represents a consequential portion of clinical anesthesia care. It has become axiomatic that safe anesthesia care for children is more assured if provided by an anesthesiologist with pediatric anesthesiology fellowship training. However, both this educational approach and this patient care approach are being challenged by changes in the availability of pediatric surgery.

In this issue of *ANESTHESIOLOGY*, McManus and Franca¹ provide data that characterize the current consolidation trend in pediatric surgical care. They report that nationally, nonambulatory pediatric surgery takes place in a limited group of large specialized referral centers. Of hospitals admitting children, 9% conducted 90% of all pediatric surgical cases. Half of the hospitals reported fewer than 15 pediatric procedures per year, and three quarters reported fewer than 60 such procedures, of which “the vast majority were appendectomies, fracture treatment, minor oral and otolaryngological operations, and cutaneous procedures. . . .” Only 169 of 3,010 hospitals reported more than 1,000 procedures per year. The authors note that the consolidation of pediatric surgical care has a number of important implications ranging from workforce distribution to general access to care.

The investigation of facilities by McManus and Franca, coupled with that of Muffy *et al.*,^{2,3} who described characteristics of pediatric anesthesiologists and their geographic distribution in the United States, serves as a “needs assessment” to help guide planning for pediatric surgery and pediatric anesthesia. In modern medicine, because clinical work and funded research may be prioritized over education because of the financial implications each incurs, educators have become anxious about the potential effects of changes



“Does consolidation of [pediatric] surgical services suggest pediatric anesthesiology fellowship trainees and programs should be consolidated?”

including neonatal surgical emergencies, cardiopulmonary bypass, and congenital disorders . . . [and] must demonstrate competence in patient management and peri-operative care of neonates [and] infants. . . .”^{5,6} These requirements include high-acuity technical scenarios exemplified by abnormal airway management, mechanical ventilation, and vascular access. The expectation is that pediatric anesthesiologists will gain sufficient knowledge and skill in all of these areas during an in-depth and broad-based immersion in pediatric anesthesia patient care during the time-limited 1-yr curriculum with the required minimum case experiences.⁶

We must consider how health services and manpower forces might exacerbate the growing mismatch in pediatric anesthesiology fellowship positions. Over the past 8 yr, there has been a nearly 150% increase in pediatric anesthesiology fellowship positions, accompanied by an all-time low number of filled programs (2019, 58% filled).⁷ Will the

in work flow on the training of pediatric anesthesiologists.

How does the consolidation of pediatric surgery intersect with the best educational preparation of pediatric anesthesiologists? Anesthesia care of children is undoubtedly safer when provided by subspecialty-trained pediatric anesthesiologists.⁴ Current Accreditation Council of Graduate Medical Education Program Requirements for Pediatric Anesthesiology⁵ mandate that fellows devote a “minimum of nine [9/12] months . . . to required clinical experiences. . . . Fellows must manage pediatric patients requiring general anesthesia for elective and emergent surgery for a wide variety of surgical conditions,

Image: C. Broadway, A. I. duPont Hospital for Children.

This editorial accompanies the article on p. 852.

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consolidation of surgical services necessitate consolidation of pediatric fellowships or redistribution of fellowship positions? This may be the force that Cladis *et al.*⁷ suggest is needed to “regulate the number of fellowship programs and positions nationally.”

A substantial assumption exists that the consolidation of surgical services mirrors the geographic distribution of pediatric anesthesiology fellowship programs. Trainees benefit from the presence of other trainees because this encourages a formative clinical learning environment and promotes an environment of inquiry. The Accreditation Council of Graduate Medical Education requires pediatric anesthesiology fellowships to be sponsored by institutions in which a core anesthesiology residency exists. Identifying overlap between high-capability pediatric hospitals, where fellows in pediatric and surgical specialties train, and the nearly 60 U.S. pediatric anesthesiology fellowship programs may give us clearer understanding of the intersection of these learners in the setting of consolidation. Does consolidation of surgical services suggest that pediatric anesthesiology fellowship trainees and programs should be consolidated? This may be a critical next question in the determination of the impact of pediatric surgical consolidation on education and ideal length for pediatric anesthesiology training.

The consolidation of pediatric surgical care also calls into question what defines the “right” subspecialty education of anesthesia generalists. Current Accreditation Council of Graduate Medical Education program requirements mandate that core residents “demonstrate competence in anesthetic management . . . [through] experience . . . [caring] for . . . 20 children . . . younger than three years of age, including five younger than three months. . . .”⁸ Do these numbers assure “competence in anesthetic management”? Why must future generalist anesthesiologists care for 5 children younger than 3 months of age? Might the consolidation of pediatric surgical services to high-capability centers justify changing requirements to better suit the generalist who may likely never care for an infant again?

No doubt the implications of health service forces can be profound. Their consequences for the education of future pediatric anesthesiologists are critical to consider. The full impact of McManus and Franca’s work raises the fundamental question of whether the best medical care requires subspecialty-trained anesthesiologists. This same question must be generalized to all anesthesiology education as these issues apply to all of our subspecialties.

Research Support

This work was supported by the Department of Anesthesiology and Pain Management, University of Texas Southwestern Medical Center (Dallas, Texas) and by the Department of Anesthesiology and Critical Care Medicine, Children’s Hospital of Philadelphia (Philadelphia, Pennsylvania).

Competing Interests

Dr. Ambardekar is the current chair of the Accreditation Council of Graduate Medical Education Anesthesiology Review Committee (Chicago, Illinois). The views and opinions expressed in this work are those of Dr. Ambardekar and do not represent those of the Accreditation Council of Graduate Medical Education. Dr. Schwartz declares no competing interests.

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References

1. McManus ML, Franca UL: Availability of inpatient pediatric surgery in the United States. *ANESTHESIOLOGY* 2021; 134: 852–61
2. Muffy M, Scheinker D, Muffy T, Singleton M, Agarwal R, Honkanen A: Practice characteristics of board-certified pediatric anesthesiologists in the US: A nationwide survey. *Cureus* 2019; 11:e5745
3. Muffy MK, Medeiros D, Muffy TM, Singleton MA, Honkanen A: The geographic distribution of pediatric anesthesiologists relative to the US pediatric population. *Anesth Analg* 2017; 125:261–7
4. Hanley G: Summary of the evidence volume–outcome relationship in pediatric surgery, 2013. Available at: https://childhealthbc.ca/sites/default/files/surgery_and_volumes_full_report_final_june_2013.pdf. Accessed January 31, 2021.
5. Accreditation Council of Graduate Medical Education: ACGME program requirements for graduate medical education in pediatric anesthesiology. Available at: https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/042_PediatricAnesthesiology_2020_TCC.pdf?ver=2020-06-18-141721-520. Accessed January 31, 2021.
6. ACGME Review Committee for Anesthesiology: Pediatric anesthesiology fellowship minimum case numbers. Available at: https://acgme.org/Portals/0/PFAssets/ProgramResources/042_Peds_AN_Minimums.pdf?ver=2020-07-24-133529-153. Accessed February 10, 2021.
7. Cladis FP, Lockman JL, Lupa MC, Chatterjee D, Lim D, Hernandez M, Yanofsky S, Waldrop WB: Pediatric anesthesiology fellowship positions: Is there a mismatch? *Anesth Analg* 2019; 129:1784–6
8. Accreditation Council of Graduate Medical Education: ACGME program requirements for graduate medical education in anesthesiology. Available at: https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/040_Anesthesiology_2020_TCC.pdf?ver=2020-06-18-133042-890. Accessed January 31, 2021.