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Practice Management

The Right Child/Right Surgeon initiative: A position statement on pediatric surgical training, sub-specialization, and continuous certification from the American Pediatric Surgical Association

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ABSTRACT

The past 50 years have witnessed profound changes in the specialty of pediatric surgery in North America. There has been a marked increase in the number of both pediatric surgical training programs and practicing pediatric general and thoracic surgeons. Despite this trend, the population of children in the United States and the birth rate have recently remained relatively flat. Some pediatric surgeons have become "super specialists", concentrating their practices in oncology or colorectal surgery. This has the potential to result in a dilution of experience for both pediatric surgical trainees and practicing pediatric surgeons, thus limiting their ability to acquire and maintain expertise, respectively. Coincident with this, there has been a relative paradigm shift in recognition that "quality of life" is based more on maintaining a creative balance in lifestyle and is not "all about work". There has been a parallel growth in the number of practicing pediatric general and thoracic surgeons in urban settings, but we have not appreciated as much growth in rural and underserved areas, where access to pediatric surgical care remains limited and fewer pediatric general and thoracic surgeons practice. This is a complex issue, as some underserved areas are economically depressed and geographically sparse, but others are just underserved with adult providers taking care of children in settings that are often under resourced for pediatric surgical care. This problem may extend beyond the boundaries of pediatric general and thoracic surgery to other specialties. As the premier association representing all pediatric surgeons in the United States, the American Pediatric Surgical Association (APSA) has concluded that the quality of pediatric surgical care will likely decline should the status quo be allowed to continue. Therefore, APSA has initiated a Right Child/Right Surgeon initiative to consider these issues and propose some potential solutions. What follows is a brief statement of intent.

Founded in 1970, the American Pediatric Surgical Association (APSA) now includes more than 1300 pediatric general and thoracic surgeons. The charter members of APSA established core values that embodied the principles of specialization, access to pediatric surgeon and pediatric surgical care, access to quality education for our discipline (both printed and in an appropriate forum for discussion), encouragement of research and scientific progress, and speaking in a common voice for socioeconomic policy development affecting children's interests [1]. The current mission of APSA is to ensure optimal pediatric surgical care of patients and their families, to promote excellence in the field, and to foster a vibrant and viable community of pediatric surgeons. Deficiencies in individual surgeon training, practice volume, hospital volume and hospital resources for children have led to less optimal outcomes for some children undergoing surgery in North America [2]. A child's surgeon, whether a general surgeon or a fully-trained pediatric general and thoracic surgeon, may not have sufficient training or ongoing experience to perform a particular operation or take care of children below a certain age or both, or that surgeon may be capable but lack the appropriate resources at their hospital. All of these issues require recognition and innovative solutions to ensure the appropriate care of the child. APSA must recognize the needed changes in surgical training, health care delivery and workforce distribution. Of paramount importance should be the pediatric surgeon's focus on provision of the optimal care of the individual child.

While APSA recognizes that there are many factors influencing how and where and by whom a child's surgical care is provided, we must continually advocate for the best delivery of pediatric surgical care

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possible. Our mission should include making sure that the providers who render this care, no matter where the child lives, receive adequate education to understand their own capabilities and limitations. This demands a certain level of "pediatric readiness" throughout the continuum of care of a patient's experience for not only medical issues, but also for surgical care and traumatic injuries; this involves the emergency medical services provider, emergency department staff and any hospital inpatient services that exist to benefit children. It also encompasses a network of communication to give advice about local scene care, and transfer and transport guidelines. This may incorporate telehealth services. All of these resources that are currently at least partially nonexistent or inadequate in many parts of the country need input from our specialty. By nature of the gaps in care, this conceptually presupposes the need for different training models.

In response to these challenges, APSA has created the Right Child/Right Surgeon initiative. This initiative is consistent with the early origins of pediatric surgery when Willis Potts said that more appropriately-trained surgeons and adequate facilities are needed to meet the surgical demands of children [3]. APSA is distinguished as a community of providers who add value to each one of their patients. We should extend this value to those that we cannot directly serve by understanding the gaps in care and how we might begin to close these gaps by "training for need".

There are key principles which drive this initiative. First, pediatric surgery should maintain the highest standards in training, certification and continuous certification for its own fellowship trainees and practicing surgeons. Second, we should recognize that different patients and practice environments require different levels of expertise. Third, practice and knowledge gaps exist within environments, as well as among surgeons currently caring for many children – especially those in underserved areas. Fourth, passively allowing political or market forces to effect change will be detrimental to patients and their caregivers. Fifth, we should be the driving force to understand and begin to close the gaps that exist.

Momentum for this initiative has been building for decades [4] but has become more focused on this particular issue recently. Dr. Keith Oldham envisioned the Children's Surgery Verification Program (CSV) with basic, advanced and comprehensive tiers to optimize children's care at a hospital level [2]. In his APSA Presidential Address, Dr. Michael Klein proposed that avoidance of a decline in pediatric surgical expertise would require a reorganization in pediatric surgical training and practice to align with optimal resources for children's surgery (CSV) and the companion evolution of contemporary training in general surgery [5]. Data and expert opinion overwhelmingly demonstrate that systems of care designed for children provide better outcomes [5]. Dr. Mary Fallat proposed a paradigm shift in training of pediatric surgeons [6], envisioning a tiered-approach training model that produces three kinds of children's surgeons: a traditionally trained pediatric surgeon, an acute care pediatric surgeon to include trauma expertise, and a general surgeon with some pediatric expertise. This model would enable more surgeons to be capable in aspects of children's surgical care where they choose to practice and begin to provide optimal general surgical care for more children in the United States. In this position statement, we capsulize the pertinent data illustrating many of the current obstacles that prevent the optimal delivery of pediatric surgical care to all children and outline proposals to be considered in order to effect improvement.

Current Obstacles Include:

1. **For children's surgery, less optimal outcomes are seen with surgeons lacking pediatric surgical training, who have lower case volumes and who perform their operations in hospitals without appropriate children's resources.** Today in North America, much of children's surgery is done in a nonspecialized environment (hospital, surgeon or both). This has been true for over a decade. Using the 2009 Kids' Inpatient Database (KID), Ziegler et al. found that 29% of 9668 infants received surgical care in general hospitals in the United States [7]. Similarly, using the same 2009 KID dataset, Chen et al. demonstrated that approximately 20% of all surgical neonates were definitively treated in freestanding children's hospitals, more than one-third were cared for in children's units within a general hospital and 45% of surgical neonates receive care in unspecialized general hospitals [2]. Acknowledging the age of this data, a deeper dive still yields valuable information about specific types of cases and surgical specialties. In fact, 15% of complex cases, such as esophageal atresia repair, congenital diaphragmatic hernia (CDH) repair, Ladd procedure, pull-through procedures for Hirschsprung disease and lung biopsies, were performed in general hospitals in a study published as recently as 2013 [7]. These data are concerning because CDH [8] and other complex pediatric surgical conditions, including congenital heart disease [9], biliary atresia [10] and trauma [11], have been shown to be associated with better outcomes when done in specialized environments. This specialized experience also extends to more common cases, including operations for intussusception [12] and pyloromyotomy [13], where morbidity tends to be higher in less resourced environments or when done by general surgeons rather than pediatric surgeons, as in the case of inguinal hernia repair [14], pyloromyotomy [15–17] and appendectomy [7,18,19]. However, there is also emerging data showing similar or improved outcomes by general or acute care surgeons in children, particularly those over 12 years of age, requiring appendectomy [20] or cholecystectomy [21]. This supports the long-held belief that proper training and experience are also a part of value-based care. Specialized pediatric anesthesia and critical care expertise have been shown to be critical for safe contemporary children's surgery [22] and pediatric trauma patients [23], emphasizing the need for partnership among disciplines caring for children. There is a strong survival benefit for very low birth weight infants with both medical and surgical diagnoses when care is provided in a Level 3 NICU vs a lower resource level NICU [24].
2. **Pediatric surgical training in general surgery residency and pediatric surgical fellowship may not be meeting the needs of future trainees.** The Accreditation Council of Graduate Medical Education (ACGME) approves programs and the American Board of Surgery (ABS) certifies surgeons. Although they work in concert and complement each other, the ACGME is not directly involved in workforce discussions that are unrelated to the quality of the programs they approve. Driven by concerns of quality and safety, compliance with supervision regulations, work-hour restrictions and societal expectations, independence in diagnostic and operative experience has been markedly diminished in general surgery training and further perpetuated during pediatric surgical fellowship [25]. Only 20 pediatric cases are required by the ACGME during General Surgery Residency. Many are done at a junior level early in training when it may be difficult to gain expertise. Overall case load for general surgery residents in pediatric surgery has simultaneously decreased [26]. Research time usually performed between the junior and senior levels of residency, while beneficial to the overall education of the trainee, is often obsolete by the time fellowship is completed and does not address the unmet need of improved technical proficiency. The resulting diminution in autonomy carries over into pediatric surgery fellowship training, as evidenced by the fact that teaching cases performed by fellows have decreased 56% [27]. It is encouraging that pediatric surgical trainees now record more total cases and more minimally invasive surgery cases than ever before [28]. Regrettably, a subset of this increase comes from trainees performing cases previously assigned to general surgery residents [27]. There was a recent increase in the American Board of Surgery (ABS) Pediatric Surgery Certifying Exam failure rate, approaching 20% in 2018 (Fig. 1), although the most recent exam failure rates have improved. Whether this is due to the exponential rise in biomedical information and the requisite increased fund of knowledge required of all physicians,

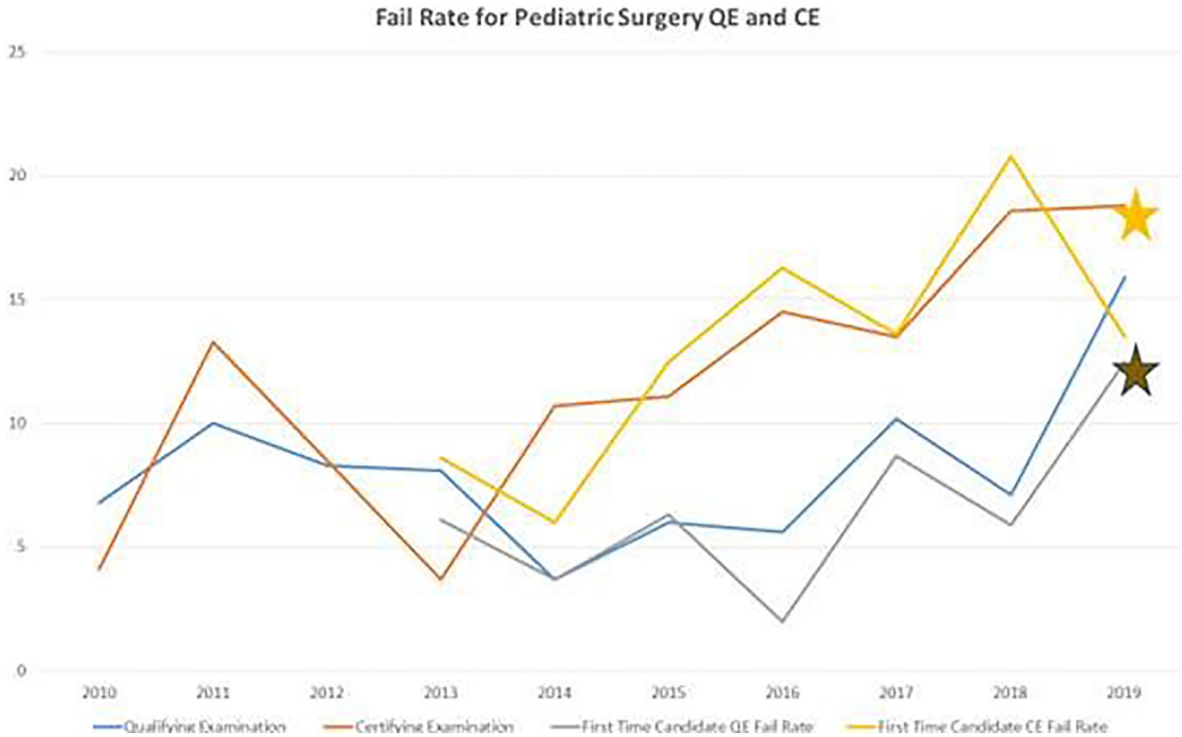
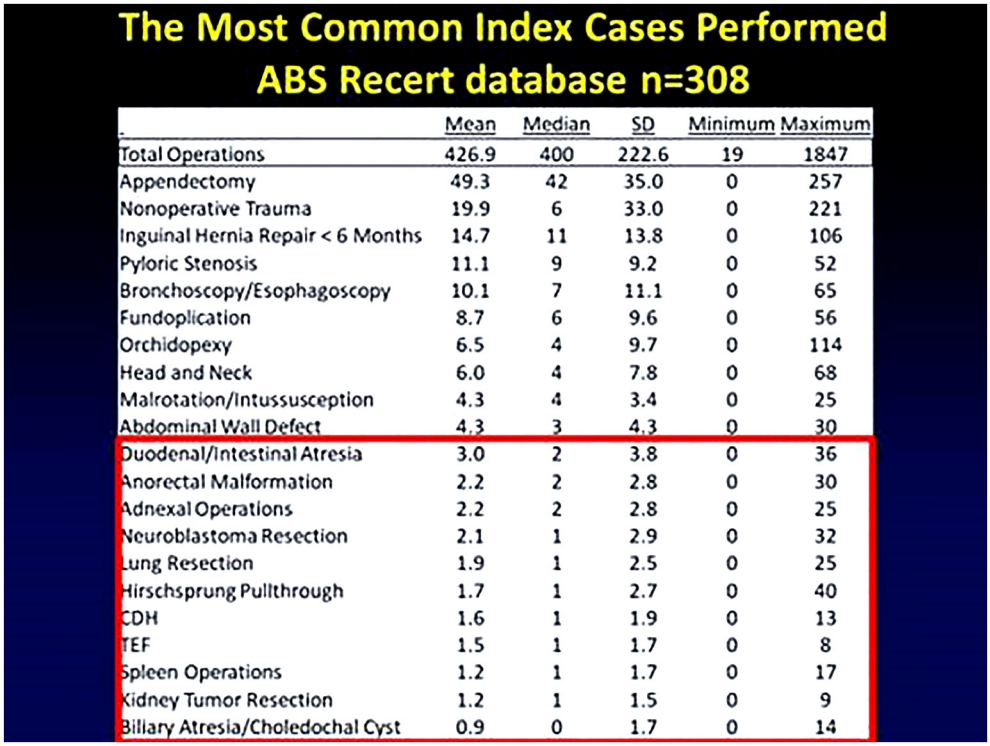


Fig. 1. Failure rates for the ABS Pediatric Surgery Qualifying Examination (QE) and Certifying Examination (CE) from 2010 to 2019.

or to ineffective training program curricula or to any of the other factors mentioned previously is unclear. All may play a role. The ACGME implemented minimum case numbers by case type as a requirement for programs to monitor for dilution of training experience. Recently, the pediatric surgery case log has started to delineate common vs. complex cases to distinguish cases that only a pediatric surgeon should be qualified to perform with adequate training Numbers alone may not indicate competence. In addition to operative experience, an overall understanding of core surgical principles is necessary for a trainee to be ready for autonomous practice [29,30].

3. **The practicing pediatric general and thoracic surgeon is performing fewer index cases across a smaller breadth of children's surgery than in years past.** Many previous reports have indicated that individual surgeon volume once in practice is a strong predictor of patient outcomes, hospital length of stay and cost [13,14,31]. McAteer showed that hospital volumes correlated with improved outcomes for high complexity procedures [32]. Surgeons must perform a sufficient number of operations during their training to develop skill, and a sufficient volume must be maintained over time in practice to ensure quality of care and avoid errors [33,34]. In 2010, Fonkalsrud et al. found that pediatric surgeons were performing an average of 9.5 index procedures per surgeon per year, which was a marked decrease from an estimated average of 18.0 in 1970 [35]. Accomplished surgeons are not accumulating or maintaining experiences in key areas of practice, such as congenital anomalies or cancer. Abdullah et al. [36] performed a review of 5 years of pediatric surgery certification renewal applications submitted to the Pediatric Surgical Board (PSB) between 2009 and 2013. Overall, in 6 of 10 "rare" pediatric surgery cases, the mean number of procedures performed in the previous year was less than 2.0 (Fig. 2). A retrospective review of surgical case volumes at 36 freestanding children's hospitals between 2004 and 2013 using the Pediatric Health Information System (PHIS) database showed a significant downward trend in index cases and a significant upward trend in routine cases, such as appendectomy and abscess drainage [37]. Routine cases increased by 33%, and index cases decreased by 18% [37]. The experience of junior pediatric general and thoracic surgical attendings was evaluated by examining APSA membership applicant case logs from 2006 to 2016. Case types that showed a declining trend included pyloromyotomies, omphalocele, gastroschisis, inguinal hernia, anti-reflux surgery, chest wall deformity, and PDA ligation [38]. On the other hand, laparoscopic appendectomy increased significantly [38]. Also troubling was the observation that total cases decreased from a median of 584 to 398 [35]. Several of the cases a practicing pediatric surgeon is most likely to perform, such as appendectomy, central line and gastrostomy tube placement, are threatened by outside forces, including antibiotic treatment for appendicitis and interventional radiology placement of central lines and gastrostomy tubes. Analysis of the PHIS database between 2005 and 2014 revealed a downward trend in the proportion of otolaryngologic (61.7 to 35.1) and urologic (49.2% to 30.8%) cases performed by pediatric surgeons [39]. During this same time period, pediatric otolaryngology training programs increased 133% and pediatric urology training programs increased 27% [40]. This trend is forecast to continue. The FutureDocs model predicts a very rapid growth of the supply of all types of pediatric surgeons by 2030, including an increase of 34% for general pediatric surgeons barring no change in number of programs and pediatric subspecialty surgeons, which far outpaces the estimated pediatric population 9% growth rate [41]. Accurately estimating the future balance of supply and need for any one specialty cannot be done without understanding what will happen to other specialties with overlapping cases [41].
4. **The current distribution of pediatric surgeons does not meet the needs of children; rather, it heavily favors metropolitan areas with poor penetration into underserved populations (e.g. smaller cities, rural areas).** Many recent graduates have joined academic institutions that contract their services to community general hospitals. The vast case experience at these hospitals involves care for children that used to be provided by general surgeons, including appendectomies, cholecystectomies, abscesses, etc. With this type of coverage comes "windshield time", the time required to travel to another hospital, which has resulted in an unexpected career obstacle, further reducing time for academic pursuits such as teaching and research. The most granular geographic level for which basic



	Mean	Median	SD	Minimum	Maximum
Total Operations	426.9	400	222.6	19	1847
Appendectomy	49.3	42	35.0	0	257
Nonoperative Trauma	19.9	6	33.0	0	221
Inguinal Hernia Repair < 6 Months	14.7	11	13.8	0	106
Pyloric Stenosis	11.1	9	9.2	0	52
Bronchoscopy/Esophagoscopy	10.1	7	11.1	0	65
Fundoplication	8.7	6	9.6	0	56
Orchidopexy	6.5	4	9.7	0	114
Head and Neck	6.0	4	7.8	0	68
Malrotation/Intussusception	4.3	4	3.4	0	25
Abdominal Wall Defect	4.3	3	4.3	0	30
Duodenal/Intestinal Atresia	3.0	2	3.8	0	36
Anorectal Malformation	2.2	2	2.8	0	30
Adnexal Operations	2.2	2	2.8	0	25
Neuroblastoma Resection	2.1	1	2.9	0	32
Lung Resection	1.9	1	2.5	0	25
Hirschsprung Pullthrough	1.7	1	2.7	0	40
CDH	1.6	1	1.9	0	13
TEF	1.5	1	1.7	0	8
Spleen Operations	1.2	1	1.7	0	17
Kidney Tumor Resection	1.2	1	1.5	0	9
Biliary Atresia/Choledochal Cyst	0.9	0	1.7	0	14

Fig. 2. Pediatric Surgery Board key operative cases from 2009 to 2013 as reported by practicing pediatric surgeons on applications for the ABS Recertifying Examination in Pediatric Surgery.

demographic data are available is the Census block [42]. At the time of the 2010 Decennial Census, almost 60 million people lived in rural America, defined as open countryside and any municipality with less than 2500 people [43]. Rural Americans occupied 80% of the total US landmass, but they only constituted 20% of the population [43]. Nearly a quarter of those living in rural areas as of 2016 were children under 18 years [43]. In a study by McEvoy et al. [44], the median distance in miles of all rural blocks to the closest pediatric surgeon was 44.43 compared to 11.11 for all urban blocks. While this distance has decreased in some locations, it still remains significant for much of the country. More than 10 million children live more than 60 miles from care [44]. Increasing the number of classic fellowship programs has been unsuccessful in distributing fully trained pediatric surgeons to underserved areas of the US and is not a worthwhile strategy to pursue. Although it is more difficult to find positions consistent with their investment in training, exceedingly few elect for positions in underserved areas, despite the continued dilution of experience among practicing pediatric surgeons in better served areas. One of the most glaring needs in underserved areas is the presence of a provider with pediatric trauma expertise. Regrettably, 42% of practicing pediatric surgeons don't take care of trauma patients at all [6]. They have the skill set, but many do not have the desire or resources to care for injured children [6].

5. **Pediatric surgical sub-specialization is commonly undertaken at the wrong time. Other barriers result in few pediatric surgeons entering formal additional subspecialty training programs.** There is no efficient pathway for pediatric surgeons to expand their expertise. An increasing number of surgeons are subspecializing to meet the needs of the most complex patients. When and how this is done remains haphazard and often counterintuitive. Many subspecialty fellowships are filled by general surgery residents who have not yet matched let alone entered their pediatric surgery specialty fellowship; they lack training in the core principles of pediatric surgery. If these surgeons do not subsequently match in an approved pediatric fellowship, their subspecialty training may be wasted time, because they will not be able to use it in what will likely be a non-pediatric surgical practice. For those who must complete additional training after pediatric surgery fellowship in order to meet subspecialty-training requirements, successful matching into these programs and the additional length of training are formidable barriers. Positions for these highly trained individuals are scarce. The overall effect is that other subspecialties have become providers of pediatric specialty care, as exemplified by the workforce in transplant surgery.

Recommendations:

1. **Training and ongoing certification in pediatric surgery require careful study by those organizations that are most able to effect changes.** These changes must continue to promote the excellence in training and certification of the pediatric surgeon of the future. This may require strategies that are difficult to conceive and implement, and ultimately may include more than one training model, but eventually will prove to be in the best interests of the populace that we serve.
   We need to redefine what it is to be a pediatric surgeon, considering three categories: *basic, fundamental, and advanced* pediatric surgeons. The Workforce and Practice committees should define the positions to fill these categories.
   - Every child should have nearby access to *basic* pediatric surgical expertise, including the initial resuscitation and stabilization of all children and the management of straightforward disorders and injuries. This *basic* category includes two of Dr. Fallat's proposed positions: an acute care pediatric surgeon to include trauma expertise, and a general surgeon with some pediatric expertise.
   - Those children who require it should have manageable access to *fundamental* pediatric surgical expertise, which includes the management of more complex disorders such as congenital anomalies, cancer and those requiring critical care. This *fundamental* category contains Dr. Fallat's third position: the traditionally-trained pediatric surgeon.

- Those few children who require it should have access to *advanced* subspecialized pediatric surgical expertise, such as with the treatment of Stage IV neuroblastoma or cloacal exstrophy. This *advanced* category was not previously described by Dr. Fallat. It is being proposed to offset the diluted experience in the workforce associated with rare, complex conditions. A specific strategy to implement this recommendation may be as simple as inclusion of a senior partner. On the other hand, transfer to a more specialized center may be necessary. Families may need to sacrifice geographic proximity to their home for improved outcomes for their children. At the present time, both strategies occur daily throughout parts of the country. Other innovative solutions should be discussed and considered.

  The APSA Education Committee should work with the ABS, Association of Pediatric Surgery Training Program Directors (APSTPD) and Fellowship Council, a body that accredits programs outside of the ACGME, to help determine what is required to certify surgeons in each of the defined categories, who should do it and then determine how. APSA should create memberships categories to foster relationships with those who might train outside of a traditional pediatric surgery fellowship in order to establish and support educational opportunities for each of the defined surgical categories.

2. **Pediatric surgeons should be the propelling force behind the creation of the curriculum and training involved in any training model and these models will ideally be incorporated into the framework of existing residency and fellowship training.** Finishing 5th year general surgery residents do not have the same breadth of experience in pediatric surgery as their predecessors [45]. An increase in the time spent on pediatric surgery is recommended during more senior years of training by those who will incorporate some children's care into their practice. An integrated 4/3 residency program is one solution and will be piloted in the near future. Experience with early specialization in Cardiac and Vascular Surgery have been associated with increased ABS Board Examination passage rates compared to the more traditional "5 plus 2" training [46]. A third year in pediatric surgical training would allow more time for exposure and instruction in critical care, trauma and oncology, the domains currently most challenging for fellowship graduates on their board exams. Other recommended educational initiatives include the increased use of Flexibility in Surgical Training (FIST) as already approved by the ABS. This allows trainees and program directors to tailor residencies to accommodate those interested in specific areas of surgery. Flexibility in training will be a key initiative and opportunity as more of our trainees come from the millennial generation and have greater desire for personalized attention and training regimens [47]. In addition, the use of structured processes to increase autonomy, such as the Zwisch App [48], the SIMPL App [49], the Competency-Based Training championed by the University of Michigan or structured operative autonomy used at the Massachusetts General Hospital [50] are promising approaches. Promoting the role of the teaching assistant should be encouraged as well as the use of realistic simulators to enable trainees to perform "deliberate practice" on the most difficult parts of complex operations, as championed by Dr. Hirschl [51]. Surgical trainees participating in simulation-based education have already been shown to demonstrate improvements in operative time, technical skills and patient-centered outcomes [36,52–58].
3. **APSA should continue to support the work of the ACS-CSV to optimize the hospital infrastructure component of the environment of children's surgical practice, study its return on investment, and help guide centers achieve this goal.** This will increase the reach of the capability and capacity for children's surgical care.
4. **APSA should begin to study and provide guidance on which children could be cared for in rural and underserved environments, help define scope of practice to meet the need, and recommend/develop the curriculum and educational process to meet this need. APSA should likewise help define those children who need to be referred and to develop the network of care that facilitates this.**
5. **APSA should work with the American Academy of Pediatrics (AAP) and other surgical subspecialty organizations with the goal of engaging our surgical and anesthesia counterparts in a similar gap analysis of their workforce in rural and underserved areas. APSA should encourage a communal effort in improving access to care, training, and networking along the continuum.**
6. **There should be more focused training of general and rural surgeons to perform basic (non-index) pediatric surgery cases and care for pediatric trauma patients where pediatric surgeons are not practicing.** Potential avenues to impart this training include additional pediatric surgery rotational experience at a senior resident level as part of current ACGME-approved rural general surgery or general surgery residency programs, the American College of Surgeons (ACS) Mastery of Surgery Program, and working with the American Association for the Surgery of Trauma (AAST) to incorporate more pediatric exposure in the existing Acute Care Surgery fellowship. New models of training are also possible and might include combining 1 year of pediatric critical care or trauma training with 1 year of pediatric general surgery training to create an "Acute Care Pediatric Surgeon". These various levels of training must necessarily be linked in the future to scope of practice and credentialing at a local level to avoid professional creep beyond training [7].
7. **The incorporation of additional pediatric trauma training into courses, such as the Rural Trauma Team Development Course (RTTDC) [59,60], could be explored with the American College of Surgeons or APSA could develop its own rural pediatric trauma course.**
8. **There should be enhanced effort to develop remote based education and patient consultations using telehealth services.** The Project ECHO model, as adapted by the University of Wisconsin, is an example of telehealth services with the potential to extend the reach of tertiary subspecialty surgical and trauma care for children in rural and underserved areas [43]. Telemedicine can be used for education, protocol sharing and administrative oversight [43] as well as for home management of surgical conditions [61,62]. Telemedicine support has reduced the need to transfer up to 85% of potential patients and shortened the time to definitive transfer of more critical patients [63,64]. Improved ICU outcomes with decreased mortality and shorter length of stay were reported following telemedicine neonatal and pediatric ICU support [65,66]. Teleradiology has been shown to decrease repeat imaging, cost, delays in care and radiation exposure [67]. Remarkably, one silver lining resulting from the Covid-19 pandemic has been the rapid increase in the availability of telemedicine throughout the country.
9. **Although these resources are described in the context of the United States, the principles are applicable to meeting global pediatric surgery needs, including in the military.**

1. Conclusions

The workforce blueprint in pediatric surgery will require deliberate study and strategic reform to maintain the highest standards of care that are and always have been the hallmark of our specialty. The issues surrounding pediatric surgical training, sub-specialization and continuous certification are complex and involve multiple challenges and stakeholders, including the APSTPD, the Review Committee-Surgery, the ACGME, the Pediatric Surgery Board of the American Board of Surgery and APSA. These stakeholders have diverse responsibilities, agendas and priorities. In order to move forward with the recommendations outlined in this white paper, APSA should sponsor a Pediatric Surgery Summit comprised of leaders from each of the major stakeholders (Review Committee-Surgery, American Board of Surgery, Association of

Pediatric Surgery Training Program Directors, Section of Surgery American Academy of Pediatrics, APSA Workforce and Practice Committees, American Society of Program Directors, ACS Advisory Council for Pediatric Surgery and other key specialties, such as Pediatric Anesthesia) with the purpose of discussing how best to fill the practice gaps in the surgical care of children. This meeting is urgently needed with the requisite momentum and decisional authority to positively impact the future of children's surgical care.

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APSA Workforce Committee: Stephen P. Dunn (Chair), Samuel M. Alaish (Vice-Chair), Adela Casas-Melley, Graham Cosper, Anthony Deross, Claudia Emani, Brian W. Gray, Patrick Healey, Richard T. Hendrickson, Sarah Jones-Sapienza, Kimberly Lumpkins, Abigail Martin, Michael Phillips, Faisal Qureshi, Shawn Stafford, Stefan Scholz, and Manuel Torres.

APSA Board of Governors: Joseph P. Vacanti, President; John H.T. Waldhausen, President-Elect; Ronald B. Hirschl, Immediate Past-President; Max Langham, Secretary; Michael K. Chen, Treasurer; Governors: Edward M. Barksdale, Jr., Peter W. Dillon, Jessica J. Kandel; Strategic Project Officer: David M. Powell.

Commentary

The Right Child/Right Surgeon initiative

The American Pediatric Surgical Association Board of Governors Perspective

The American Pediatric Surgical Association (APSA) Board of Governors strongly supports the Right Child/Right Surgeon initiative and the White Paper written by the Workforce Committee. The Board of Governors believes that every child should have access to optimal pediatric surgical care in an appropriately resourced environment. APSA is distinguished as a community of providers that add value to each one of their patients. The Board of Governors believes that APSA should relentlessly pursue efforts to improve the practice and delivery of pediatric surgical care and that includes assuring that each child receives the right care from an appropriately trained surgeon with access to the appropriate resources. There are certainly challenges that confront our specialty and the solutions to these may be controversial, but we believe that by focusing on what is best for the child, together we can move this initiative forward.

Our specialty must acknowledge and confront issues relating to training, distribution of pediatric surgical coverage and ongoing competence of practicing surgeons who care for children. We believe that APSA is best positioned to take the lead in meeting many of these challenges because our mission is to provide for the optimal care for the child. Partner organizations such as the Association of Pediatric Surgery Training Program Directors (APSTPD), Review Committee Surgery (RC-Surgery) or the Pediatric Surgery Board of the American Board of Surgery (PSB-ABS) have by design more limited mandates, either to train fellows, accredit programs or certify candidates respectively. Operation outside of these mandates is often legally impossible. Because of limitations on what these other organizations can do however, only APSA can look at the complete picture of pediatric surgical care in the United States. Only APSA can acknowledge all of the issues across the spectrum of pediatric surgery including research and training, accreditation, certification, workforce distribution and the on-going practice of our members. APSA must evaluate this spectrum and devise solutions to the problems in some cases on its own but often in partnership with other key organizations. It is clear that large areas of the nation have inadequate access to pediatric surgical care. Our current methodology of adding training programs has not been able to close this gap nor is it likely to and rather than add more programs, we need to find another solution. Other means of providing an appropriately trained surgeon to take care of children in underserved areas of the nation is needed as suggested by Dr. Mary Fallat in her presidential address. It is likely that creating training positions within our current framework of the traditional pediatric surgical fellowship is possible and needs further exploration. Additionally APSA must recognize that the data shows that increasing numbers of fellowship trained pediatric general and thoracic surgeons has diminished individual case load raising concern for the fidelity of on-going competence especially for rare and more complex procedures. As noted in the White Paper, this must be addressed to ensure on-going high quality care for these children.

The Board of Governors firmly believes that surgeons with the proper education, training and experience must direct the surgical care of children. We must maintain the highest standards of patient care as expected by the public and ourselves. We believe that as the leading surgical association for children and representing essentially ALL pediatric general and thoracic surgeons in the in the United States, APSA is uniquely positioned to both lead and partner with other key organizations to bring the Right Child/Right Surgeon initiative to fruition. We must not passively allow political or market forces to effect needed change as this will be detrimental to our patients and to the specialty of pediatric surgery. As a community of pediatric surgeons we must work together to accomplish this. The time to act is now.

All in good time

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The influences of pediatric surgeons from the bedside to the American Pediatric Surgical Association (APSA) boardroom are very well outlined by the “white paper” analysis and proposals by Alaish et al. With a thorough outline that provides some definition to the care gaps they have identified, the authors attempt to put their shoulder to the wheel of a Right Child/Right Surgeon initiative to align pediatric surgical care delivery with what they perceive to be the training and access issues that have accompanied the growth of our specialty and other surgical specialties, as well as changes in general surgery training.

Throughout the development of pediatric surgery, the capabilities of both the institutions caring for children and the surgeons who worked in them have allowed for different experiences of trainees both in pediatric surgery and general surgery programs. Early on, this led to unique but sometimes individualized expertise for pediatric surgeons in newborn and pediatric critical care, trauma programs, pediatric surgical oncology, transplants, pediatric urology and cardiothoracic surgery, and many other focus areas by systems or organ differentiation. Over time, this expertise has followed the inevitable paradigm shifts and potential erosion to some degree of what we have considered the purview of pediatric general and thoracic surgery. The growth and formalized fellowship programs of other surgical and pediatric specialties in both children's and adult care have inevitably affected our discipline. Examples include the increase in pediatric urology and otolaryngology fellowships and adult colorectal fellowships that decrease the experience of individual trainees and surgeons once they are in practice. Another example is the critical care experience that has been embraced by many stakeholders as case or critical care experience volumes in the absence of individual programs striving and innovating to meet exactly the achievement that the authors propose.

At the threshold of the competency's era of training, the American Board of Surgery and the Pediatric Surgery Board struggled to understand whether an expansion of the Certifying Examination would give a better picture of the pediatric surgery candidate's preparation by using case scenarios across 5 expanded areas of content. The current Board passage rates reflect the application of this extended exam that was both redesigned and delivered by the most specialized subject matter experts. It remains uncertain whether performance in this new

structure truly represents the deficiencies or experience in training that the authors are basing their recommendations upon. The authors assert that "Driven by concerns of the quality and safety, compliance with supervision regulations, work hour restrictions and societal expectations, independence in diagnostic and operative experience has been markedly diminished in general surgery training and further perpetuated during pediatric surgical fellowship". Despite these assertions, autonomy and procedural competency are the leading objectives for training at both levels. Understanding that there are now more "rules" to abide by, it is still important to recognize that oversight by the faculty and the Program Directors is required to work within the constraints but also meet these requirements and to prevent a negative impact on the trainee.

There are also multiple levels of complexity involved in understanding why some finishing pediatric surgery fellows are challenged to pass their qualifying and certifying examinations. Inherent in this equation is the appreciation that not all candidates for pediatric surgery training arrive technically prepared to operate on infants and children or leave fellowship training as fully competent surgeons with the universal mastery aspired to by program directors and faculty. We believe that this is as much a reflection on the innate capabilities of the trainee as it is on the fulfillment of the requirements by the programs and their faculty.

The well outlined deficiencies the author's propose have foundations much deeper than training program requirements and case volumes. The core of the question is locked into local and national health policy and economics. A real-world question for both pediatric surgeons and APSA, as it is for all surgical specialties, is whether individual surgeons and institutions have the moral and ethical insight to recognize and accept their own deficits and defer to greater, or specialty resourced expertise for each individual patient's care. Additionally, a critically important core solution for their proposals will be the will, ability, and capability to redesign access and regionalization while balancing income and cultural differentials. As stated by L.D. Britt MD "Without access there is no Quality!".

APSA and its leaders clearly recognize and celebrate the rich spectrum of challenges to access that also present opportunities. They are appropriately driven to eliminate any contemporary poor-quality outcomes that are the consequences of those differences. We are also privileged in this era to be the recipients of a new vision of safety and quality that has been embraced by the many generations of surgeons and has allowed for incremental improvements in quality and outcomes. One example of this is the American College of Surgeons Children's Surgical Verification (CSV) Program championed by Keith Oldham. The program has been highly successful at well-resourced children's hospitals and has been able to show the greatest opportunity around anesthesia, newborn care and nursing capabilities. However, perhaps the greatest weakness thus far has been the inability to verify other than Level I facilities, which requires an investment in workforce and infrastructure that has been a higher reach for hospitals and systems where pediatric patients account for a much smaller fraction of the admissions. Successful regionalization ultimately requires tiering and organized systems of care. But just like the development of the ACS Trauma programs, this does not necessarily imply that all pediatric surgical patients need or will seek care at a Level I facility or even from pediatric surgeons. Understanding that there are always growing pains in any program and an inevitable evolution of progress, there is also clear validity in understanding training at more than the pediatric surgeon level. The ideal system will acknowledge that children live everywhere, that the social determinants of health are more important than ever in health outcomes and will affect where children receive their care, and that some basic general surgery care could be optimized at the local level with the help of pediatric surgery leadership and the will to succeed. But this also will require a paradigm shift in our perspective of training and a recognition that we must be more involved in the training of not only pediatric surgeons but in those who are in every sector of the continuum of care. We are the experts, but we will never own the entire populace of children with surgical disease. They are everywhere and we are not, but this does not mean that we cannot be influential.

The Right Child/Right Surgeon initiative: A timely call for a paradigm shift

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The *Right Child/Right Surgeon* initiative is a set of proposals from the American Pediatric Surgical Association (APSA) to help address issues of access to pediatric surgical care, training, and workforce distribution in the US.[1] These are matters of fundamental concern to the Association of Pediatric Surgery Training Program Directors (APSTPD), representing pediatric surgery training programs in the United States and Canada that are approved by the Accreditation Council for Graduate Medical Education (ACGME).

The principal role of the APSTPD is to provide an exchange of information and discussion related to post-graduate training in pediatric surgery and set high standards for residency training in pediatric surgery by improving graduate education in the specialty. The APSTPD partners with APSA, ACGME, the Pediatric Surgery Board of the American Board of Surgery (PSB) and the Section on Surgery of the American Academy of Pediatrics as important stakeholders to ensure optimal training of surgeons who primarily care for children.

With advances in technology and socioeconomic changes in society, the practice of medicine is constantly evolving, with consequences for the specialty of pediatric surgery. As such, it is vital that pediatric surgical training responds to current demands and meets the needs of future trainees. Fundamentally, as program directors we need to prepare trainees to provide excellent care to infants, children, and young adults who have surgical disease.

We are encouraged by several ideas that have emerged that could represent a paradigm shift in how we train pediatric surgeons in the next several decades, while recognizing the potential for certain curricular changes to produce unintended consequences.[2] We hope that as the curriculum further develops it will focus on providing trainees with a cognitive toolbox, stocked with a systematic approach to addressing unknown problems, and a strong foundation of knowledge and skills with which to continually develop ("life-long learning").

The *Right Child/Right Surgeon* initiative represents a thoughtful analysis of the current and potential future surgical care of children in the US. A We look forward to being involved in this project with other stakeholder organizations to engage the next generation of pediatric surgeons.

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Right Child, Right Surgeon: Response from the Pediatric Surgery Board of the American Board of Surgery

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The Pediatric Surgery Board (PSB) of the American Board of Surgery (ABS) would like to thank the authors of "Right Child, Right Surgeon" for the opportunity to respond to this important statement. The mission of the PSB is to serve children and families by advancing the subspecialty of pediatric surgery through leadership in surgical education and practice, by promoting excellence through rigorous evaluation, examination, and

continuous certification to maintain the highest standards for professionalism and supporting lifelong learning for pediatric surgeons in practice.

In 2017, PSB acknowledged the collective concerns of the pediatric surgery community regarding the current state of fellow training. The rising fail rates on the Pediatric Surgery Qualifying Examination (QE) and Certifying Examination (CE) served as a clarion call to engage in a critical self-assessment of our discipline.

In recent years, the PSB recognized significant heterogeneity in training that existed among the increasing number of fellowship programs, where fellows' experiences were undoubtedly impacted by local institutional practice and constrained by local case mixes and referral patterns. We reached out to partner organizations such as the Accreditation Council for Graduate Medical Education (ACGME), Review Committee (RC) for Surgery, and the Association of Pediatric Surgery Training Program Directors (APSTPD) to help address these training issues. The changes in regulations that were necessitated by federal requirements created initial confusion among program directors who were tasked with effecting them. It has become evident that clear expectations regarding the knowledge and skills commensurate with the graduation of an ethical, proficient and safe pediatric surgeon are even more critical when faced with requirements that at times seem restrictive. Furthermore, it requires the standardization of surgical training experiences that meet a contemporary definition of pediatric surgery that is held by all stakeholders, including the public, and which acknowledges the evolution of our specialty. To this end, the PSB sponsored the first annual Pediatric Surgical Summit in 2018 that included leaders from each of these four organizations where a consensus definition of our specialty was created. This definition serves to guide the educational and training expectations for pediatric surgery certification, regardless of institution/training program.

Given the PSB's role in certifying pediatric surgeons and with this definition in mind, the PSB has initiated a comprehensive and systematic plan to revamp and revitalize pediatric surgical training:

1. The PSB has revised the application requirements for the American Board of Surgery QE, which ensures that every trainee seeking certification has been provided an operative experience with the breadth and complexity needed for the expert execution of our discipline. Previously, admissibility for the QE required a minimum of 800 operative cases. The PSB has reclassified operative cases as either common or complex, and requires a 265-minimum complex case requirement, along with an additional 30 endoscopies, and 90 non-operative trauma/critical care cases. There is also a requirement for 50-100 teaching assistant cases to cultivate trainee autonomy. The ACGME approved these requirements, which will be enforced for the 2021 graduating class. The PSB will assess the effect of these case requirement changes on the results of both the QE and CE.
2. The PSB created a "standards setting" for the QE in 2018 that was performed by a diverse focus group of pediatric surgeons reflecting differences in practice type, age, race/ethnicity and gender. The results of this standard setting procedure led to a systematic revision of the examination blueprint for the QE and In-Training Examinations. This comprehensive evaluation of the exam will occur every 5–7 years as part of a continuous assessment of the quality of our QE. With the input of many stakeholders, the PSB is currently in the process of completely rewriting in detail the training and educational expectations for our fellows to address the identified concerns of variations in training across the spectrum of North American programs. This blueprint will be socialized with all of the identified stakeholders in order to ensure a cohesive voice to our peers regarding training and standards of practice in pediatric surgery.
3. In 2019, PSB has implemented a 2-year continuous certification (CC) assessment to replace the 10-year recertification examination for practicing pediatric surgeons. APSA's Professional Development Committee (PDC) collaborates with PSB to ensure that the topics covered for the CC are pertinent and timely to the practice of a pediatric surgeon.
4. Stemming from the 2018 Pediatric Surgery Summit, the PSB acquired approval from the ACGME-for an Early Specialization Program (ESP) for pediatric surgery in the near future, with the hope of improving on the efficiency of our training platforms. This program will be listed as the Joint Surgery/Pediatric Surgery Program (4 + 3 program) in Pediatric Surgery.
5. The 2019 Pediatric Surgical Summit introduced the concept of Entrustable Professional Activities (EPA) within pediatric surgery, a training paradigm based on competence, rather than numerical metrics or temporal limits in training. New methods of teaching such as simulation, video-based assessments, as well as enhancing the utilization of PedSCORE are being explored with program directors. APSA leadership was invited to participate in the 2019 Summit. Continued collaboration among PSB, APSA, AGCME, RC and APSTPD will help in improving the quality of education for trainees and practicing surgeons alike.
6. Since 2018, PSB has provided APSTPD and APSA with topics identified in the ITE, QE, and CE that have been identified as knowledge gaps.

Over a relatively short 2-year period, the abovementioned changes have translated into some positive results. The 2019 QE failure rate was 3.9%, (compared to 18.8% in 2018) with a 2.2% fail rate among first time examinees The 2020 CE failure rate was 16.1% compared to 18.8% last year. While it is presumptuous at this stage to associate the changes we have implemented to QE/CE fail rates, we are encouraged. We believe that continued collaboration amongst stakeholders can result in sustained improvements in ABS exam performance.

We believe that the PSB's aforementioned efforts underscore our commitment to uphold the highest standards for certifying qualified and safe pediatric surgeons, and for the maintenance of that certification. It is not in the PSB's purview to influence where pediatric surgeons practice. Similar to the American College of Surgeons' Children's Surgical Verification, the intent of the 'Right Child, Right Surgeon" paper should be to provide guidance for hospitals to establish minimum safety standards within their environment for children with surgical needs. The PSB firmly believes that this begins with establishing training standards that ensure the provision of comprehensive and broad-based pediatric surgical expertise. Although the delivery of trauma, neonatal, and pediatric critical care, as well as expertise in endoscopy, ENT and urology procedures is often fractionated among subspecialists in large referral centers, access to such expertise can be invaluable in many communities where some of our graduating trainees might practice. Notwithstanding the potential advantages of universal subspecialization within pediatric surgery, it comes at the expense of broad access to care, particularly in rural and underserved communities. The PSB urges APSA to recognize this balance of competing interests, and that many families are limited in resources and desire to remain in their communities.

The authors' recommendation to have specialties such as anesthesia and other surgical specialties investigate the lack of services for the pediatric population falls short of any realistic solution. The notion of having general surgeons be more apt with pediatric care has been explored for the last decade, but there has been little interest from general surgery training programs or associations. Incorporating pediatric surgery in rural surgery training programs, having pediatric surgical courses in the ACS, and having pediatric surgical topics in ABS continuous assessment for general surgery are laudable but would likely have a very limited effect. A more comprehensive program would be needed for the "Right Child, Right Surgeon" vision to be realized. Of note, the COVID-19 pandemic has forced us all to consider different methods of delivering care for all patients. Communities formed unprecedented relationships during this crisis. COVID forced our communities to share information to enhance care. We encourage APSA to leverage these

newly formed networks and novel communication and education systems to help improve children's surgical care moving forward and redefine the execution of "regionalization" of surgical care.

PSB welcomes the opportunity to be at the table to help provide the best surgical care for children and support for their families.

"Pediatric surgery is defined as the diagnostic, operative, and postoperative surgical care for children with congenital and acquired anomalies and diseases, be they developmental, inflammatory, neoplastic or traumatic. The scope of this discipline would focus especially on surgical problems in utero, infancy, childhood, adolescence, and sometimes, young adulthood. Certain diagnoses would require extended involvement of the pediatric surgeon during adulthood as the patient transitions to adult surgeons and providers."

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