

VIEWPOINT

The Future of General Surgery Residency Education

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Over the past 3 decades, there have been many changes in surgical care, but relatively few modifications to general surgery training. The training of future surgeons must adapt to account for the current climate of duty hours, supervision, and technological changes. In some ways, change has begun, but it will accelerate. This Viewpoint addresses the current changes in care and training and details future directions for residency training in general surgery.

There have been myriad changes in technology over the past 3 decades.¹ Advances in image-based technologies have allowed for nonoperative management of traumatically injured patients through improved diagnosis and treatment using noninvasive means; in prior decades, these injuries required exploratory laparotomy. While the advances have improved patient care, they have also resulted in fewer operative trauma cases than experienced by prior generations of resident trainees. The advances in minimally invasive surgery have similarly represented improvement for patients, but have resulted in residency graduates with very different case distributions than in the past.² Similarly, less biliary tract and portal vein surgery is done today. Gastric surgery is also less common (except for bariatric) because of increased understanding of ulcer pathogenesis and treatment of *Helicobacter pylori*. Interventions for vascular disease are now commonly done by percutaneous means. In total, these changes have presented new challenges in preparing modern graduates to be proficient in open surgical techniques, as the surgeon in practice is often faced with urgent conditions that require such proficiency, even in this era of increased technology.

At the same time that changes in technology and management of conditions evolved, duty hour limitations were instituted. By rough calculation, 10% to 20% of time has been eliminated from surgical training by duty hour restrictions.¹ Importantly, it is not just time that has been lost; evening and overnight hours where increased independence and autonomy were possible have been marginalized. Thus, graduates have a very different training experience today than did residents 3 decades ago.

In partial response to these issues, 2 pilot programs in surgical training have evolved, with early success. The Early Specialization Training program, a focused experience in either vascular or cardiothoracic surgery, has been in existence for over a decade.³ Residents interested in these specialties are given the opportunity to spend focused time during senior residency in these areas and transition to fellowship training at the same institution. These pilot programs have trained 26 residents in 16 programs and have been very successful, with strong first-time pass rates and trainee satisfaction.

In acknowledgment of the success of these pilot programs, in 2011, the American Board of Surgery (ABS) began allowing residents 4 to 6 months in each senior residency year (for a total of 12 months over the final 3 postgraduate years) focused in a single area of specialization. The Flexibility in Surgical Training Consortium has studied satisfaction in the early phase of implementation and has shown that trainees and program directors find this training paradigm to be superior, with increased autonomy, mentorship, and clinical experience compared with traditional general surgery training.⁴

All of these factors have been the subject of numerous discussions and debates among stakeholder groups in residency education. The American College of Surgeons has convened a "Fix the Five" working group to address current challenges in surgical training. At the same time, the ABS has undertaken a planning process to outline how surgical training can be revamped and improved. Members of the Residency Review Committee for Surgery have taken part in discussions at both the American College of Surgeons and ABS.

The ABS discussions have focused on reinforcing and improving core surgical training, followed by specialization in general surgery (recognized as a specialty of surgery) or any of the surgical subspecialties currently mastered by fellowship training. A recent consensus statement endorsing the preparation for internship courses taken during the senior year of medical school was produced by the ABS, American College of Surgeons, Association for Surgical Education, and Association of Program Directors in Surgery⁵ and intended to strengthen and provide consistency to the skills possessed by an incoming intern. In doing so, a solid foundation on which to build a core surgical training experience is realized.

To strengthen the core surgical training, several changes in current training are likely. Entrustable professional activities, increasingly used in undergraduate medical education, show promise as a method to quantify and document achievement of "hard stop" milestones within junior residency.⁶ Operative performance rating scales, introduced by the ABS to residency programs in 2011 with a minimal requirement in number for board eligibility, will likely increase significantly in number and specificity. Increased use of digital learning platforms for self-study, with specific expectations in fund of knowledge at each postgraduate year, will likely become new requirements in core training. In addition to skills assessed by entrustable professional activities and operative performance rating scales, setting minimum requirements for ABS in-training examination performance before advancement to senior residency should also raise the bar for trainee performance.

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Setting clear goals for trainees, with clear performance expectations, should result in increased homogeneity and add rigor to the product of training. Finally, increasing case requirements in certain content areas will focus the experience in core concepts in surgical care, ensuring a more competent and proficient surgeon on completion of core training.

Following core training, residents would spend the final phase of training in either general surgery or in any of the subspecialties that currently have fellowship-level experiences. General surgery would thus also become a "specialty" of surgery and be recognized as such. Given the current workforce projections, a crisis shortage of general surgeons is predicted. Currently, more than 85% of trainees pursue fellowship training. With this increase in subspecialization, there are fewer graduates to populate the growing deficit of general surgeons needed to serve the public. This trend has resulted in fewer general surgeons in practice today, with a 25% decline over the past 2 decades and an additional projected 18% decline over the coming 2 decades.⁷ Elevating general surgery to a specialty may aid in creating greater appeal to this field of practice than is currently realized. Ensuring consistency of the terminal training, whether general surgery or a currently configured Accreditation Council for Graduate Medical Education or non-Accreditation

Council for Graduate Medical Education fellowship, will be critical to the success of this residency redesign process. Discussions have occurred in the past 12 months regarding these principles by the Advanced Surgical Education Committee of the ABS and all fellowship stakeholder groups, including the component boards of the ABS (pediatric surgery, surgical critical care, complex general surgical oncology, and vascular surgery), the Fellowship Council, and specialty societies that oversee fellowship training. Whether certificates for training in these specialty areas might change in the future is uncertain and dependent in part on the American Board of Medical Specialties discussions regarding recognition of non-Accreditation Council for Graduate Medical Education fellowship training experiences.

In summary, duty hours and changes in technology have resulted in challenges to surgical training. Taking these challenges as an opportunity to radically revise and rethink surgical training have led to multiple conversations on a national level. The initiatives of the ABS will likely coalesce with those of other stakeholder groups to bring about meaningful changes to surgical trainee education over the coming decade.

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