



## Training of general surgical residents: what model is appropriate?

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### Abstract

The training of general surgical residents has been a relatively stable process for the past several decades. However, a variety of forces have caused several recent changes in the education of general surgeons and more potentially radical alterations have been recommended by some surgical leaders. Much of the initiative for changing training is due to the inexorable forces of specialization and the increasingly vigorous competition for qualified trainees in various surgical disciplines. Decisions made within the next few years will likely decide the future of general surgery as a specialty. © 2006 Excerpta Medica Inc. All rights reserved.

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There are many informed physicians and health policy makers who believe that surgical training in the United States is the best in the world. Whether this supposition has basis in reality or is merely self-serving can be debated, but it is clear that trainees in general surgery acquire a tremendous amount of knowledge and operative training over a relatively short period of time. While not perfect, the system is designed to serve and protect the public interest regarding quality surgical care. Despite the overall excellence of surgical training, there are many who believe our method of training general surgeons must be altered—perhaps radically.

Changing general surgical training and subsequent alterations in related surgical disciplines has been and remains, very controversial. While some do not feel that alterations in general surgical training are necessary, many believe it is mandatory. Even among those who agree that training should be altered, the methods of change and the new structure are not universally agreed upon. The views on whether training should be changed may vary greatly depending on numerous perspectives: geographic (rural vs. urban), practice desires (generalist vs. general surgical-based super-specialists) and perhaps among those bound for general surgery versus another specialty.

This discussion will mention the current state of training and its output of trainees, what organizations would need to “buy in” to residency alterations, what forces are driving reform efforts, changes that have already occurred, potential new training paradigms, and issues in post-residency education for practitioners. The opinions expressed are purely those of the essayist.

### Evolution of Residency Training

Residency training began in the early part of the 20th century as trainees lived in hospitals and served variable periods of time in service often in an apprenticeship mode. Training began to be tied to medical schools in a few instances early in that century, but that tendency became much more pronounced as the decades passed. Rotating internships were common, and pyramidal systems to “chief” residency were the norm for the first two thirds of the 20th century.

Multiple training sites were common, and many surgeons trained in that era felt multiple-hospital training was advantageous. The American Board of Surgery (ABS) was established in 1936 and its importance and that of its certification for trainees has increased through the years.

Beginning about 1970, there were many changes in residency training. Consolidations of programs occurred with a decline in the number of training sites often accompanied by an increase in the size of individual resident programs. Pyramidal systems were eliminated, and rotating internships

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became much less popular for surgical trainees. The “straight surgical” internship supplemented the rotating one and then the term “intern” was eliminated as the 5-year training model became the standard. The last quarter of the past century has been marked by the ascendancy of the Residency Review Committee (RRC) for surgery in importance for surgical training. The RRC has attempted to provide uniform training and has promulgated some uniform training standards, e.g., every surgical residency must have endoscopy experience, trauma experience, etc. Additionally, case-counting and detailed documentation of the residents’ operative experience with minimum cases required in certain areas is now necessary for programmatic compliance with RRC requirements.

The current system of training general surgery residents has more than 2300 positions for training preliminary residents in surgery. There are about 1050 categorical residents who are designated for a full 5 years training in general surgery. This yields about 900 to 950 first-time examination participants in the ABS qualifying examination. It is now estimated that about 60% of general surgical trainees seek additional training after core residency. The number of residents obtaining such training has greatly increased in the past few decades.

### Should Residency Training Be Altered?

Despite many satisfactory elements of the current format for training general surgical residents, a number of thoughtful and influential surgeons involved in surgical training believe it should be altered [1,2]. Some believe that the current scheme for residency training should be radically redesigned. Clearly, these discussions often engender heated controversies, and there are legitimate pros and cons on either side of the debate.

Those who favor the current training model or something akin to it make a number of cogent arguments favoring the current system. The present system is time-honored and proven. The products of most American residency programs are strong, particularly if the program is a solid one. The current system ensures a certain basic level of training in a broad number of surgical areas, and such broad-based core training serves the public well even in an era of ever-increasing specialists. Every resident must do a certain number of cases in a variety of diverse surgical fields; they must be declared competent for independent practice by their Program Director, and they must pass two high-stakes examinations for certification.

Those favoring the current system legitimately are concerned about how changes in training will occur. How do we change? What model would be more appropriate? If broad-based training is eliminated, what type of practitioner will emerge to serve the needs of patients who now require the care given by a broadly trained surgeon who has a diverse scope of practice? Several cliches could be used to

Table 1  
Forces driving alterations in general surgical training

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- Economic factors
  - Inefficiency of current training
  - Demographics of trainee pool
  - Lifestyle issues
  - Inexorable forces of specialization
  - Competition for qualified trainees among surgical disciplines
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admonish those who would rapidly and radically alter general surgical training: “Don’t throw the baby out with the bath water” and “change in haste, repent at leisure.”

### Forces Driving Changes in Training

Advocates for alteration in training would note that despite the many positive aspects of today’s residency model, inexorable forces are driving change. These surgical leaders would note that general surgical training and that of its component parts must adapt in response to these forces to meet the demands of the new millennium. Some of these forces are listed in Table 1 and will be discussed briefly.

Several economic factors have combined to make surgical careers appear less attractive. Educational debt is growing for medical school graduates and tuition at both public and private institutions continues to increase at a rate that has likely been matched only by the decrease in reimbursements for those who enter practice. At our university, the average debt is \$48,000 because some students still have generous or wealthy parents and have zero debt. However, for those who have debt (the majority of students), the average was \$130,000 in a recent survey. Surgical residents are rarely able to moonlight unlike residents in many other disciplines. This inability to augment income may extend debt repayment. Financial rewards at the end of training are decreased compared to previous generations, particularly in many surgical disciplines. Competitive pressures, particularly in urban areas, lead residents to believe they must extend training after their 5 years of core training in order to obtain credentials and referrals. Many residents also spend an additional year(s) in the laboratory for a variety of reasons but often to enhance their credentials for further training or because it is required to complete their program. All of these economic factors could in part be responsible for decreased interest in surgical training and has created pressure to alter core training to attract best applicants and be fair to trainees.

Both the demographics of prospective trainees and “lifestyle issues” are frequently cited as reasons for the declining interest in surgical careers. Medical schools in the United States have seen a huge gender shift, and nationally half of the students are women. Surgical training has been less attractive to women, and it is hoped that altered training might be more attractive to women. So-called lifestyle issues

are clearly major factors in career choices. Gender is a factor, but men are increasingly sensitive to “lifestyle” and “quality of life” issues. Advocates for change would argue that training can be more efficient, less service oriented, more user-friendly and still be effective. The recent restrictions in duty hours appears to be viewed in a positive light by most trainees vis-a-vis “lifestyle issues.”

Both the duty hours restrictions and the desire to shorten the total training many residents now receive has led to an examination of the efficiency of training. Many questions are now being posed that would not have been considered a decade ago: Are 5 years of core training necessary? Do general surgery residents need to spend service time on specialty rotations such as otolaryngology, urology, and orthopedics in their first 2 years? Even more fundamentally, should all training be the same or can it be made more flexible, particularly for those with differing career interests? Undoubtedly, training can be made more efficient. Current discussions are focusing on the acquisition of knowledge and skills rather than timed rotations. Discussions are ongoing about the use of various technologies to accelerate and improve training; the Internet, computer-based learning and testing, and simulators for skills acquisition are in use or development.

As important as the aforementioned factors are in driving discussions for change, the most critical, in my opinion, relate to the continued drive toward specialization and the subsequent competition for quality trainees. Specialization in all phases of society is a fact of life and will not only continue, but increase. There are technologic imperatives that drive specialization such as minimally invasive technologies, endovascular procedures, etc. Additionally, the continued debate of the relationship between surgical volumes and outcomes undoubtedly drives surgeons and surgical groups to concentrate cases in fewer hands. Despite the fact that the majority of residents pursue post-general surgery training, there is enormous competition for these trainees. The number and quality of trainees entering general surgery has varied over the past several years, and many surgical educators do not believe the applicant pool is as deep as that of a decade ago. There has been a burgeoning of interest in training not linked to a certificate—particularly in laparoscopic or minimally invasive surgery. Plastic surgery training slots remain very competitive as do those in colorectal surgery. On the other hand many of the specialties traditionally linked to general surgery training are not as competitive as a decade ago. Thoracic surgery has not been able to fill all their positions for several years despite increased numbers of international graduates matched in the discipline. In vascular surgery there are few surplus candidates, and even pediatric surgery has seen a declining applicant pool. Surgical critical care fills only about one third of its allotted positions with US medical school graduates. In my opinion, it is this competitive pressure for trainees that has provided the greatest impetus to alter surgical training.

In years of discussions with residents and students from dozens of institutions around the country, I have yet to hear a trainee or prospective trainee articulate the need for change in surgical training (other than work hours) in order to make it more attractive to them or other prospective trainees. Certainly, prospective trainees have voted with their feet, and the decreased desirability of certain disciplines has created pressures for “top-down” educational reforms particularly among those most affected by these changes. It is my belief that the current discussions about altering surgical training would have gathered little momentum if there were a surplus of excellent candidates for all the various residency positions available.

### **Changing Our Methods of Training**

Altering surgical training is not necessarily a simple matter even if consensus exists that it should occur. In many countries a monolithic entity such as a college of surgeons may control all phases of the trainee selection, education, and certification process. However, in this country anti-trust issues and restraint of trade are very real issues that must be of concern when organizations work in concert to achieve goals that might appear to be outside their narrow area of focus. While concerns of anti-trust issues may appear far-fetched, one only has to remember the recent lawsuit against the National Resident Matching Program (NRMP) and hospitals to be reminded of the potential gravity of such considerations.

In fact, there are multiple organizations with separate missions that are involved in various aspects of surgical training and certification. To the uninitiated, and often even to those involved in surgical education, the structure of training may seem a Byzantine alphabet soup of organizations. Each has not only a separate mission but separate staffs, budgets, bureaucracies, and vested interests.

Residents match into programs through the NRMP and have training programs approved by the RRC. In turn, the RRC functions under the aegis of the Accreditation Council for Graduate Medical Education (ACGME) and are guided by that group’s policies and procedures. Following successful completion of training, trainees are eligible for certification by the ABS, which in turn functions under the umbrella of the American Board of Medical Specialists (ABMS) with its particular policies and procedures. The American College of Surgeons (ACS) has the education of post-residency surgeons as one of its many missions. The new lexicon for board recertification is referred to as “maintenance of certification,” and undoubtedly the ACS and ABS will work in collaboration on this important aspect of continuing education. It has been interesting to me how often even relatively sophisticated surgical educators do not understand the specific roles that each of the aforementioned groups perform. It is also noteworthy that surgeons often blame credentialing issues, which are invariably

strictly local matters, on the ABS, the ACS, or some other national organization who has no authority over these parochial matters.

While many surgeons may lament the fact that it is difficult to rapidly change training, there are advantages to the multiple organization structure of training. In addition to the aforementioned legal issues that are avoided, the focus of each organization on a specific aspect of the educational process does allow it to be done well in my opinion. Furthermore, the fact that many organizations must “buy in” to these changes avoids cataclysmic lurches in training, i.e., most changes are done by slow evolution rather than revolution. But, for those groups who desire rapid change, the number of groups that must agree to these alterations can be frustrating.

### Major Changes in Training

Sabastian Junger’s book *The Perfect Storm*, written in 1997, dealt with the convergence of 2 weather systems in 1991 to produce the storm of the century. This phrase “the perfect storm” is now frequently used to describe a coalescence of events that produce radical, and often heretofore, unimagined events. One could argue that “the perfect storm” for changes in training occurred in the early 2000s with declining interest in the general surgery match, issues in thoracic surgery training, pressure for vascular surgery, and changes in leadership of the ABS. Additionally, there was the specter of duty hours restrictions, which would become a reality within a few years. As a result of these factors, several fundamental changes in surgical training have already been approved. These include the Early Specialization Program (ESP) in which residents may complete their Chief Residency program in the fourth year and have accelerated training in vascular or thoracic surgery. This permits the possibility of 2 certifications being obtained in 6 years. All must be done within the same institution.

The American Board of Thoracic Surgery has approved several possible pathways for training, including one that no longer requires general surgical certification. Additionally, the ABS has obtained permission from the ABMS (the alphabet soup again!) for a primary certificate in vascular surgery that does not necessarily require a general surgical certificate.

It is envisioned that there will eventually be several pathways to vascular certification, each with different lengths of vascular training.

While these changes are in their nascent stage at present, and few programs have been approved for such training, the principles involved are dramatically important. The fundamental nature of training that has been present for several decades is no longer applicable. Some residents may be a Chief Resident doing their fourth year while others will have that designation in their fifth year. While the RRC for Surgery has strived to ensure uniform training for all residents, ESP acknowledges that, in fact, training will not be uniform. Flexibility will be watchword in these new training

paradigms, but general surgery program directors are rightfully fearful about their ability to maintain a cadre of residents interested in completing 5 years of core training. Clearly, the genie is out of the bottle.

### Areas of Controversy

While virtually every discussion on altering training has generated controversy in some circles, there are 2 areas that continue to engender the most debate in my opinion. The first of these deals with what core training should entail and goes to the meaning of certification in general surgery. The second area of extreme controversy is whether or not that advanced training beyond the primary general surgical certificate should be formally recognized by the ABS (or other Board) with an additional certificate.

The first area of controversy deals in large part with the nature and structure of general surgical training and what a certificate by the ABS should mean. How will training be accomplished, and should all training be roughly similar? Should the training for a surgeon who desires to do vascular or thoracic surgery be the same as for a trainee who wishes to pursue broad-based general surgery in a small town? There are those who argue that all training should not be uniform and a program should not “waste good cases” on residents going into plastic or cardiac surgery even though they wish to receive a general surgery certificate. The public, on the other hand, could legitimately expect that a holder of a general surgery certificate should have at least basic knowledge about breast disease, for example, and be able to resuscitate a trauma victim at a minimum if the need arose. In other words, should the ABS certificate have the same meaning for all and is that even possible in today’s complex medical system? Further, there are many well-informed surgeons who believe that all trainees should have 2 or 3 years of core training and then pursue specialty fields in surgical oncology, hepatobiliary, bariatric, trauma surgery, etc. One panel [1] even proposed a rural and urban tract although those were not defined by content or geography. Suffice it to say, there are many proposals and a lack of consensus on what needs to be done and how it could be accomplished.

The second area of controversy is whether there should be formal recognition of additional training. If one pursues additional training in surgical oncology or hepatobiliary should there be a “certificate of added qualifications” given by the ABS to acknowledge this fact? If an added certificate is given, does this become a franchise for those certificate holders to exclude non-certified surgeons from certain areas of practice? What area should be awarded as additional certificate? Should there be a trauma certificate? Should those who focus on bariatric procedures have a special certificate? These are legitimate questions, and bright, well-meaning surgeons often vehemently disagree on the answers. It seems clear to me that this controversy will not fade but will likely increase as specialization increases.

## Strategies for Change

Most of the current efforts on altering training are focusing on the development of a core curriculum. Representatives of the alphabet-soup organization are presently at work on the development of such a change. There are many proposals to radically alter general surgical training and perhaps this will eventually occur. There are many unanswered questions in all these discussions: Is general surgery as now constituted the umbrella group for all primary content areas such as surgical oncology, endocrine, trauma, etc. or is it a subspecialty in itself? If it is the latter, what does it constitute? If the training continues to be fragmented, will there be an adequate workforce to provide access to general surgical care (the old-fashioned stuff!) that is still desperately needed in many parts of the country?

The ABS is now examining the issue of post-residency fellowships and whether training provided in these venues should be codified, regulated, certified, etc. It is certainly too early to speculate on the outcome of these deliberations.

## Education After Residency

The ABS requires recertification every 10 years by a high stakes examination after validation of annual continuing medical education. However, all ABMS boards are moving to “maintenance of certification” (MOC), and each board must develop a plan for MOC that is more direct and current than a once in 10-year examination. Such a process could involve case review, use of web-based learning modules with frequent low stakes evaluations, and an emphasis on ongoing learning or retraining. Additionally, most boards are monitoring for certain types of sentinel events such as licensure actions and adverse hospital decisions against certified practitioners.

## Assurance of Competence

The public and hospitals are much less concerned about the vagaries of the training and certification process than in

being assured their surgeons are competent. All of us realize, at times, that there is a disconnection between certification and competence. This disconnect is often heightened by the rapid acceleration of technologic advances. There are great needs for surgeons who have already completed their training to be retrained in areas where new procedures are developed or new technology must be mastered. Methods are needed to train such surgeons in emerging procedures and technology. Further, there must be a method to verify that surgeons have these skills. Additionally, there must be methods to assure public safety in high-intensity areas of care such as bariatric surgery. The ACS is assuming several of these roles in skills training and verification for individual surgeons and in verification of programs similar to the current trauma center verification processes. Such efforts will be difficult to achieve, will be financially costly, and may be controversial, but in my opinion, they must be done.

In all likelihood, general surgery training will undergo radical changes in the next decade. I urge all groups and individuals with opinions on these issues to become part of the dialogue on training and communicate their thoughts to the ABS, ACS, RRC, etc. It is my belief that core general surgical training should be preserved for all who will be eligible for ABS certification. If surgeons are interested in pursuing dual certification after additional training, that should be encouraged and made as convenient as possible. However, the steps toward primary certification should continue to be rigorous for those individuals as it is for those desirous of a general surgical career, albeit in a different time frame. Clearly, core training can be made more efficient and likely can be strengthened in the process. That is the great challenge for those who will decide the future of general surgical training.

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