

Alternative Considerations for Surgical Training and Funding



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KEYWORDS

• Surgical training • Funding • Graduate medical education • Alternatives

KEY POINTS

- The system of training we use is a minimally modified version of the training systems that were established in the United States in the 1880s.
- The current system of graduate medical education (GME) training we have is paid for largely by federal monies and subjected to oversight of the Accreditation Council for Graduate Medical Education in order to qualify for that financial support; general surgeons are certified by a monolithic certification system.
- Changes in clinical team structure and incorporation of our current GME system into a life-long continuing medical education system within our clinical care environments could give us opportunities to greater diversify the surgical workforce and better distribute the costs of surgical training.

INTRODUCTION

Since the late 1880s surgical residency programs have existed in forms that are similar to our current models. Many important variations have been introduced over time including; transition from an open-ended to time based training models, transition from the pyramidal to the rectangular model, recognition as a national concern during the creation of Medicare including a shift to substantial federal funding, and the creation and modification of work hours regulations from 2003 to present, to name but a few. The distinct model of a medical student who transitions to resident or fellow as student/employee who then finally transitions to independent staff surgeon has been the standard model as well. We have assessed adequacy of training largely by national testing processes such as those offered by the American Board of Surgery

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since its creation in 1937. On aggregate this system has worked remarkably well though as economic, demographic, and cultural changes continue to evolve, one must wonder if we were to change our models how might we do that and what reasoning could we use. This article's focus will be to take a stratospheric view of what could be done, particularly in the United States, rather than characterize what happens in other countries with other health economic systems.

DISCLAIMERS

By way of full disclosure, I have made my living for the past nine years as a program director of a categorical general surgery training program. My salary during that time was largely, though not entirely, supported by funds paid to our sponsoring institutions by the Center for Medicare and Medicaid Services (CMS). I am board certified and recertified in surgery by the American Board of Surgery (ABS). I have served as an Associate Examiner for the Certifying Exam (CE) for the ABS on multiple occasions and serve as an examination consultant question writer for American Board of Surgery In-Training Exam (ABSITE). I have been a member of multiple state and national committees of the American College of Surgeons (ACS) including the joint group on Transition to Practice jointly sponsored by the ACS and Accreditation Council for Graduate Medical Education (ACGME). I have also served as the Designated Institutional Officer (DIO) for our institution as well as Chairman of the Graduate Medical Education Committee (GMEC). Lastly, I served as Associate Dean for the Medical School (an Association of American Medical Colleges (AAMC) approved school) with which we are affiliated. I greatly respect and admire those with whom I have worked and in no way question their qualifications, ethics, or dedication to what they have done. The views expressed in this article, except where directly attributed to a specific source, are solely my own and do not necessarily reflect the views of any of the organizations listed above or otherwise described within the context of this document nor do my views necessarily represent the views of the United States Army, Department of Defense, or United States Government.

FURTHER DISCLAIMER AND EDITORIAL NOTE

The *Surgical Clinics of North America* nearly exclusively publishes material that reviews the existing literature and adds expert perspective and context to our understanding of that body of knowledge. In this issue we are attempting to review issues that span the arc of a surgeon's career from medical school through to retirement. From an editorial standpoint for this issue we felt compelled to also consider ideas that might be outside of current experience to at least stimulate a discussion of paths we might regard that are not simply tweaks of the system we already use. The ideas that are expressed in this article represent considerations that to the best of our knowledge have not been tried. The basis for these proposals come from identifying limitations of our current models encountered during decades of experience in having to solve typical and atypical problems involving both the training of resident and staff surgeons, as well as addressing labor and business issues of small and large medical corporations and/or developing medical capability in austere wartime environments. The concepts given for consideration are speculative by their very nature.

Much of what will follow in this article may be interpreted as a suggestion for complete change in process for the development of surgeons. It is meant to provide alternative constructs to what we are currently doing rather than list condemnations of what we have done. These ideas are not delivered as "tested methods" of what would

work better but rather to stimulate thought about what might work better. I hope it is viewed in that light.

CURRENT STATUS

The education of a surgeon as with all other forms of education has evolved and changed since the beginning of recorded time. Despite much of the hand wringing and condemnations of past practices that we sometimes hear, we are left with one indisputable conclusion: the system as it has evolved has created a powerfully capable surgical workforce. It would be difficult to imagine that a continuation of the current system or continued slow evolution would not continue to create excellent physicians. However, it is not unreasonable to consider whether changes, either large or small, would better address the training of surgeons and the delivery of care to those who depend on them.

When one is contemplating making change, it is always best to understand what the current state of affairs actually is. Describing the entire history of surgical education is well beyond the scope of this article; thus, the discussion is confined to the highlights of surgical training in the United States. Halsted is credited with creating the first surgical residency program in the United States in 1889. Of note, it was pyramidal and there was no guarantee when or if one would complete training.¹ Dr Edward Churchill of Massachusetts General Hospital (MGH) made the first major change to residency structure by creating a rectangular-structured program that was different not only in the proportion of people who would finish but also how long it would take to do so. In the modified structure, 6 residents entered, 4 of whom would do 4 years of training (considered sufficient to learn surgery at the time) and 2 of whom would train for an additional 2 years in order to become a professor or stay on staff at MGH.^{2,3} Of note Churchill was reported to have been opposed to the fixed length of time for a surgical residency, as it did not allow “latitude for interests and proficiencies.”³ The basic rectangular structure set forth by Dr Churchill at MGH has lasted more or less to this day for all our existing general surgery training programs, though in the latter part of the twentieth century calls for changes for flexibility and focused became more prominent.⁴

Regulation and oversight of training programs has also evolved over time. Following the Flexner report in 1910, new focus on recognizing and improving the quality of health care education developed. A Federation of State Medical Boards was created in 1912, and the American Medical Association published a list of hospitals approved to educate interns in 1914. By 1927, the American College of Surgeons published standards for graduate training in surgery, and the American Board of Surgery was founded 1937.¹ Graduate medical education (GME) and funding increased to the level of national debate with the creation of Medicare in the 1960s, and in 1972 the Liaison Committee for Graduate Medical Education was formed that later was renamed as the Accreditation Council for Graduate Medical Education (ACGME). The Residency Review Committees, which predate the ACGME, are now under the regulatory umbrella of the ACGME.

The amount and sources of funding available for GME is difficult to assess with extreme accuracy given the myriad of sources that are involved and the sheer complexity of the systems involved. That said, we can get at least in the ballpark. In a report from the Institute of Medicine on GME financing, estimates of federal spending on GME range from \$12 to \$14 million per year.⁵ This estimate includes funds from Medicare, Medicaid, Veterans Health Administration, and the Health Resources and Services Administration (HRSA). Other sources of funding, such as the Department of Defense, private insurers, other private institutional or philanthropic

sources, and other state funding, are not included in their report.⁵ Data provided by the Center for Medicare and Medicaid Services (CMS) state that total US health care expenditures for 2103 reached \$2.9 trillion, or approximately 17.4% of the gross domestic product.⁶ This amount would place total federal spending on GME at approximate 0.5% of all health care spending in the United States. With that review in mind, we can start to consider options. As always, a high yield place to start is to follow the money.

ALTERNATIVE FUNDING STRATEGIES

One of the major stumbling blocks to reform and progress in the training of surgical residents is the current mechanism of funding. Dollars provided from federal sources to sponsoring institutions are completely contingent on the sponsoring institution being accredited by the ACGME and compliant with ACGME rules and regulations. Although most of the rules and regulations that an institution are subject to are quite reasonable, some are simply either impractical for surgeons in training or actually counterproductive. Independent of one's views on any of the specific rules or requirements, one fact remains inescapable: if we did not depend on CMS dollars, then we would not necessarily have to train surgical residents under the ACGME rules. This concept, of course, causes panic in some who use CMS dollars to pay the salaries of residents who in turn supply work (service) to offset difficulties achieving a satisfactory economic bottom line in clinical service delivery. The panic relates to the question: where else would the money come from? Although that may be a good question for some, it is also somewhat irrelevant. The better questions are as follows: should the US citizens be financially responsible for making training institutions more economically viable by underwriting surgical resident (or other trainee for that matter) education through the tax code? And should those organizations be able to benefit economically from a commodity created by using taxpayer dollars?

Training Costs

Let us look at the costs of training first. The more tangible costs of training surgical residents are the salary and benefits that they receive, plus the cost of insuring them for liability and other education-related expenses. Some of the other costs relate to the cost of paying faculty, whether through direct compensation or other means; the cost of administering programs and institutions; the costs of compliance with a myriad of extra rules; and some difficult-to-calculate costs for offsets in individual practitioner and institutional efficiencies. Of course these costs are offset by whatever services the trainee can provide that either create value-added services that are otherwise reimbursed, freeing up others to engage in lucrative activities, or reducing the potential for lost revenue or penalties when problems are headed off. There is also the benefit of professional satisfaction and fulfillment in developing the new generation of thinkers and practitioners. There are benefits to creating the new workforce, though the training institutions do not solely enjoy these benefits. There may be philanthropic opportunities that may directly offset expenses that are uniquely associated with training environments. All in all, though, I suspect most program directors will assure you that their institution probably pays more to educate residents than it receives. What may be less agreed on is whether the net negative on the balance sheet is offset by the other services that did not have to be purchased in lieu of trainee effort. In one report by Meara and colleagues,⁷ the cost to the institution of supporting GME surgical training was calculated at more than \$6000 per resident per year. The author's institutional contribution per resident is higher than that.

Cost of Graduate Medical Education As a Function of the Larger Economy

The amount of money spent on GME by the federal government is actually fairly trivial compared with the overall cost of health care in the United States. To briefly recap, roughly \$12 to \$14 billion is paid to training programs annually. That might seem like a large sum but compared with the roughly \$2.9 trillion spent annually on health care in the United States, it represents slight less than 0.5% of all health care dollars spent. On a grand scale we would be fine in the health care industry if we had to absorb a 0.5% cut across the board; but under the current structure, such an even absorption of loss across the entire spectrum of health care is not what would happen. Most of the health care in the United States is delivered in medial environments that are not involved in GME training, so none of those facilities would see a direct loss if the federal GME money went away. Training centers would, however, suffer disproportionate losses. Furthermore, the more dependent on trainee service for labor supply an organization is, the worse it would suffer the cessation of federal money. This point raises 2 concerns: training centers benefit disproportionately from federal money to supply labor and nontraining environments bear none of the cost of developing the people from whom they will eventually financially benefit. The former concern is further muddled by the fact that leaders of the organizations who benefit most from federal dollars for training also serve in most of the positions in national surgical leadership who interact with government, providing at least the potential for a conflict of interest when they represent the surgical community as whole.

Resident Training As a Commodity

If we take a step back and look at residency training as something other than an educational stepping-stone, perhaps alternatives become available. For instance, let us consider GME as a process that creates a commodity, which it does. Also, let us consider that commodity has a value, which it does, and then the assessment of the cost of training changes. First we have to consider the value of the raw material—interns mostly in this example. The monetary value of an intern in terms of delivering work is pretty minimal really, but it does exist. Subtract from that the level of debt that that person has incurred to achieve his or her initial state of usefulness and you have some sense of the commodity value of a new intern. Even though that value is likely to be substantially negative, the potential for value is what matters. The more trained a resident becomes, the more that he or she can do that will either lead to increasing the efficiency of delivering billable services or serving on a team to increase team efficiency. By the time a resident completes training, he or she can step into roles that require less or no supervision and can provide services that are directly compensated or indirectly compensated through facilities' fees and so forth. Eventually, most surgeons enter into gainful employment that allows them to practice and repay their indebtedness from education as well as make a substantial surplus over their careers and prepare for retirement. Of course there are exceptions, but the rule is still valid. If the rule is valid, then one point becomes inviolate: creating a surgeon as a commodity is an investment with a positive return, likely a highly positive return. A derivative concept, therefore, is that creating a surgeon (or transforming from a graduated medical student into a surgeon) is a value-adding step and is worthy of compensation.

One form of compensating for the value addition mentioned is the current system we have: direct monetary compensation from federal funding and time/effort trade-off for faculty in lieu of effort performed by trainees. In my opinion, that dislocates the cost-benefit equation of training quality and effort. The government pays, and those of us in training take the money and benefit to whatever degree we do on a

transactional basis limited to the duration of training. The subsequent employing environments and the surgeon in training share the long-term financial reward. That system is actually okay in many regards, but it is also lacking. Its main failure is it does not hold the right people to the right responsibilities for assuring the quality of the commodity along the way. Medical schools can dislocate what they charge from the quality of the student whom they graduate (a topic well beyond the scope of what can be addressed in this article). Residency and other GME programs also can finish people who may be more or less valuable than others independent of what we get reimbursed for in the process. Lastly, surgeons and the organizations that hire them are largely responsible for long-term investment in the development of quality and value and are increasingly responsible for correcting deficiencies in the product they initially acquire. The costs are always front-loaded, and the last consumer always bears the responsibility for correcting deficiencies.

Alternatively, though, we could consider something very different. Let us consider that that phase of training between medical school and practice is a product in and of itself to be sold. We could sell it to the trainee; that would be called tuition. Although that argument could be made, I think it would be stillborn in today's economic market. Most people coming out of medical school are sufficiently in debt that further deferring income production and increasing debt for multiple years would be a nonstarter on the grand scale. We could, however, defer the cost and provide supplemental income to be recouped at a later time. For example, we could pay a resident a salary of \$150,000 per year while he or she was a resident with \$50,000 being the base salary and \$100,000 being advanced compensation. Also, we could agree that on graduation, the advanced compensation would either have to be worked off as an employee of the training institution or be paid off either by the surgeon or an acquiring company that would employ the surgeon. The specific numbers listed are not relevant but are simplified for example. Such a scheme would do several things. First, it would allow the trainee to repay any previous educational debt at an accelerated pace. Second, it would make the training program more directly accountable for producing a quality product that was worth a future employer paying to acquire the contract. It would also make the training program desirous of producing a high-quality surgeon because the default would be to repay the cost of training by employing the surgeon directly. Lastly, it would diffuse the overall cost of training to all components of health care delivery because every entity that employs surgeons would eventually have to pay some cost for acquiring practitioners. The net result would be to diffuse the costs of training surgeons among all payer sources, including the government through Medicare and Medicaid, the private insurance payers, the self-payers, and any other revenue source. Also, if economic theory holds true, it would make the hirers of new surgeons more demanding and critical of the product they acquired, thus, forcing training programs to reconsider their training practices and standards.

The process of transitioning to such a payment/compensation model would present issues, but in the long run the benefits would probably outweigh the costs and difficulties. Such a model would place the accountability and reward for training at the same level. It would also put training environments in a position to more carefully consider the quality of medical school graduates or trainees that they desire and recruit. It would allow those of us who claim we know better what conditions under which to train surgeons (and we do claim that) to do so without being beholden to the current level of regulation by the ACGME. We would all have to deliver better training and surgeon product rather than rely on reputation to succeed if we had economic skin in the game for substandard training.

The up-front costs of doing this would be substantial: at least \$12 to \$14 billion dollars if we are actually using the current federal funding we receive for what it is intended. Given the overall economic return on investment for creating the average surgeon, it is reasonable to expect that we could find private, or even public, funding partners to work with us to get the system running. Also, as in other matters of public need, there is nothing to prohibit local, regional, state, or federal programs from providing funds on the back end to allocate surgical resources to areas of high need with marginal resources. Such an alteration in funding from beginning of training to completion of training would, however, allow public spending for types of training to address areas of greater need rather than front-load spending and subsidize training in areas that are already adequately resourced. This change could have the added benefit of addressing the distribution, or misdistribution, side of the problem with critical surgical access in some areas. Lastly, if we couple the funding changes with modification of training paradigms, then we can even better tailor delivering surgical capability to our communities, which brings us to the next topic: what surgeons need to know.

CERTIFICATION DRIVES TRAINING MODELS

According to the American Board of Surgery's "Booklet of Information,"⁸ residency training in general surgery requires experience in all of the following content areas in order to be admissible for examination leading to board certification: alimentary tract (including bariatric surgery), abdomen and its contents, breast, skin and soft tissue, endocrine system, solid organ transplantation, pediatric surgery, surgical critical care, surgical oncology (including head and neck surgery), trauma/burns and emergency surgery, and vascular surgery. Although it is a lofty goal to have all trained general surgeons achieve this experience and have all accredited programs manage to provide some kind of training education that meets these goals, we have to ask: is it necessary? If there is a surgeon out in practice in the United States who actually does all of the listed components of general surgery or even a substantial fraction, I am not aware of that person. I absolutely agree that exposure to all these areas of training can be extremely helpful when one finds himself or herself isolated from other resources. I can personally attest that in austere environments, such as I found myself in in Iraq and Afghanistan, a broad-based surgical education was useful. However, in the less austere clinical environments within North America, including rural environments, one almost never finds oneself in a position where there is neither additional local resources available nor the ability to transfer a patient to a more greatly resourced environment. Although there will always be a few exceptions that one could point to, we cannot and should not build a system to handle extreme outlier exceptions. So this begs the question: why such a broad required experience for ABS certification? Also, should certification be modular or monolithic?

There are many good arguments for monolithic training models and certification. One board is easier to manage and oversee than many boards or subboards. One board certification provides a broader-based certified surgeon who can fill multiple needs. Global retesting and recertifying requires fewer processes than multiple modular recertifications. Even if all that were stipulated to be true, it probably pales in strength to one counterargument: nobody, or virtually nobody, actually does all the things ABS certification states one is certified to do.

The arguments for modular certification are pretty much the opposite as for monolithic certification. One would only certify in areas in which they practiced. One would

not need to spend time reviewing or relearning material solely for the sake of taking an examination that will not alter one's practice patterns. More focused certification may lead to certifying examinations actually having greater credibility on assuring quality practitioners.

It is quite difficult to make the argument that my junior partner who has a practice based exclusively on breast surgery and provides no coverage to general surgery colleagues should require the current monolithic recertification by the ABS. It is just as difficult to make the argument that a trauma surgeon needs to be tested on endocrine surgery or a surgical oncologist benefits from being tested on the principles of trauma and burn surgery. Even if we move away from the aforementioned component-related issues, let us examine something like endoscopy. The ABS has added a requirement that all graduates of accredited general surgery programs who complete their residency training in the 2017 to 2018 academic year will be required to show completion of the Fundamentals of Endoscopic Surgery (FES) curriculum. This latest requirement was added by the ABS despite the fact that at the 2015 Association of Program Directors in Surgery's (APDS) annual meeting representatives of the ABS informed us that only approximately 20% of ABS-certified surgeons practice any form of endoscopy (direct communication, breakout sessions on FES, APDS annual meeting, Seattle, Washington, 2015). This figure implies that 80% of graduates of categorical training programs will now have to take a high-stakes examination for something they will not do in clinical practice, at their or their program's expense, in order to become admissible to the ABS qualifying examination. Although this preserves monolithic certification, it really begs the question of whether this best certifies the surgeon or protects the public interest.

On the other hand, one can certainly make the argument that broad-based surgical training confers certain benefits to all who practice surgery: one develops a greater skill set by learning from multiple disciplines and subdisciplines, is better able to communicate with other surgical disciplines when patients require poly-disciplinary care, and is better able to communicate with other surgeons when handing off care to someone with a differing specialty. All that being accepted as true, is it worth the redundancy of effort and expense in training every surgeon that way? And if one feels that initial certification may require this very broad training experience, should it be the standard for recertification?

One of the more commonly used arguments for maintaining monolithic surgical certification is the need to maintain broad-based certification to address the shortage of general surgeons in the United States. Modular certification would further reduce the number of trained general surgeons in remote areas. This argument is a little hard to support. One problem with the construct is that we do not really have a definition of what a general surgeon is. Frequently one sees comparison of numbers of general surgeons in practice now compared with the numbers of general surgeons practicing in the late 1980s. I suggest we agree that premise is nonstarter. In the late 1980s, general surgeons did the lion's share of thoracic, vascular, oncologic, foregut, hepatopancreaticobiliary, breast, colorectal, and trauma surgery and wound care. Although it is really difficult to get exact data, it seems likely that if we included all the specialties that currently cover work previously done by general surgeons and added those who currently hold themselves out to be general surgeons, we would probably have a significant increase in surgical capacity compared with the late 1980s. That is not to say that we would not have a shortage of surgical capacity for the needs of today. It does, however, raise the question of how much of our shortages are due to inadequate numbers of surgeons and how much is related to the distribution of surgical capacity. Most likely the answer will be some of both. The

solution to the absolute number part of the problem is to train more people, whereas the answer to the distribution problem may be generating greater capacity of those who are in lower-demand environments. That is where modular certification perhaps has its greatest potential. We already see the use of general surgeons to provide endoscopic capability in areas where there are limited gastroenterology resources. Adding modular certification for some orthopedic, obstetric, head and neck conditions, as well as other areas may make it more efficient to keep some resources local in austere environments. That said, adding on capability in one area of someone's practice usually means subtracting it in another. Customizing capability to local needs by modular certification may be a solution to disparate local needs. It may also decrease the amount of time required to train someone to serve the local needs of a community, which brings us to the next point: how long should we take to train a general surgeon?

LENGTH OF TRAINING FOR GENERAL SURGERY

The idea of 5 years being the appropriate length of time to train a general surgeon is pretty arbitrary when one really thinks about it. Going back to the first time-bounded residencies established by Churchill, the fixed length was questioned.² If one wants proof its arbitrary, then all one has to do is consider the years 2003 and 2014. In each of those years the ACGME implemented changes that would curtail the amount of time residents could spend working per week, effectively reducing their training opportunity exposure per week; but we did not increase the number of weeks of training per year or the number of years of training. We still considered 5 years the correct length of time to train a surgeon. One has to wonder why not change the length of training. Were we overtraining surgeons beforehand? It is doubtful. Did we become more efficient in our training afterward? That is also doubtful, yet at least one could try to make the argument that better-rested residents are more efficient learners. Sadly, every metric we have that might showed improved learning with diminished work hour requirements, such as the ABS qualifying examination and certifying examination results does not bear that out. In fact performance on these exams declined to the point that the ABS modified the examinations as a response. So why not change? The most plausible explanation goes back to money. Training institutions receive federal funding for residents on a per-year basis. If we increased the number of years of training per residency program, then we would effectively increase the amount of money the federal government would need to spend on at least the direct medical expenditure portion of GME, assuming they continued to support residency training at similar dollar levels per year. If general surgery training only increased by 1 year to offset the diminished learning opportunity per week, we would need at least a 20% increase in federal spending or the extra costs would have to be absorbed by the training institutions. Alternatively, we could have reduced the amount of spending per resident per year; but, as mentioned earlier, that would unlikely be acceptable to students graduating from medical school with increasing amounts of educational debt. So the most likely reason we decreased work hours but did not increase years of training was political: it is revenue neutral for the government and incoming residents could make the previously expected pay for fewer hours worked, thus, leaving only the institutions to financially suffer by getting less service from residents for the same amount of money. Couple the aforementioned information with the a shift in focus for resident training to be educational over service, though both are quite related in many cases, and the institutions are left without a significant political argument to garner sympathy for their being wronged.

Although economics and politics might explain why we did not change the length of training after the work hours restrictions became part of our culture, they do not address the correctness of the length to begin with. The length of 5 years is most likely a historical accident of sorts. The introduction of a residency program as previously described was in response to moving away from apprenticeships. It is most likely that then as now most people learn at different rates and are ready to accept different level of responsibilities at different rates. There have to be natural boundaries to lengths of training that are both learner and training system dependent; too short of a period of time and the learner cannot be exposed to enough material and the instructors do not have enough time to assess consistency of performance and too long of a period of time and both the learner and the instructors are wasting one another's time and valuable resources. Knowing that these boundaries exist is easy, but knowing what the boundaries should be is not easy.

When a chef was asked how long to cook something I heard him reply, "You cook it until it is done." It is difficult to argue with such logic. So when is a surgeon done? When he or she can do what he or she has to do safely and efficiently. The amount of time for that to take place is highly likely to be variable and dependent on the learner, the instructors, the number of patients one encounters, the depth and breadth of clinical problems to be addressed, and a long list of less tangible variables. Suffice it to say it will be variable. Historically, we eschewed assessment of an individual trainee's readiness because there was too arbitrary of a nature to the assessment and/or it was too much work to do it correctly. That is probably still true to some degree, so we are left with the conundrum of how to solve the puzzle. That brings us to our last topic.

DO AWAY WITH RESIDENCY TRAINING AS WE KNOW IT

This last topic may be difficult for some readers. I apologize. Let me suggest we do away with residency training as we know it. Now some of you may think of this as a murder of sorts, but allow me to defend myself: it was dead when I found it.

Allow me to back up slightly. If residency training were a viable concept in the here and now, we would not worry about its length, its completeness, its ability to turn out a globally functional surgeon, or the economics of training. As previously mentioned, all of the factors are concerns and have been for a very long time. We have been running a code on general surgery residency training for decades (at least) and its time to call: time of death: some time ago already. Residency died of a disease of self-delusion, and that delusion can be summed up in one word: autonomy.

On the national level, we have been banging the drum of *we must restore autonomy* in the lament of our surgical training decline. It has been opined that if we just give our residents more autonomy, they will be as awesome as we were. There are 2 main problems with that argument: the first is that there was never any real autonomy to restore, and the second is that we were not that awesome. Surgeons may have been great leaders, may have been great innovators, and may have been great clinicians; but they were never autonomous. If you want to test this, see how successful you are at operating on patients who are not anesthetized or tying knots and removing your own clamps. See if your postoperative instructions get followed without a nurse or your prescriptions get filled without a pharmacist. It should not take too long to figure out that we surgeons are part of teams; nearly by definition we are not autonomous. So please let us finally let that concept go.

If one is willing to take heed to my suggestion to abandon the idea that we surgeons are autonomous, then we start to get the idea that we really do not need residency

training as we know it. After all, residency training is really a lower-paid combination of a student/employee position that is a spacer between the concept of medical student and autonomous surgeon; rid us of the latter and we do not really need residency training. Instead we need to make people functioning members of the team. That is not equivalent to saying that graduating medical students do not need additional training, they do as do we all over the entirety of our career.

If we combine the observation of all the earlier sections in this article and the logic incorporated into each, perhaps we can create a model that could be an alternative to what we are currently doing. First, let us leave the CMS, HRSA, and other federal money out of the front end of training. After all, it is not that much money, as a percentage of health care spending, and it comes with far too many strings attached. Second, let us move to not just modular certification but also stratified certification (more on that shortly). Lastly, let us move those who would have been residents into the clinical teams and incorporate their services and educational requirements into the clinical elements of organizations that have the capacity to develop talent. We would not be the only professionals to do this; in fact we might be late to the game. Lawyers, bankers, the military, and even the clergy already do it and have been for a very long time.

If we were to focus on taking medical students after graduating and giving them training and opportunities to play the various positions on the team while gaining formal education before allowing them to be significant supervisors or top-tier leaders, perhaps we might be better off. We could remediate gaps in undergraduate medical education (though we should not have to) and provide testing and certification of basic fundamental milestones before allowing junior colleagues to engage in independent billable services. We could create metrics to be met in terms of documented experience as well as fact-based and judgment-based training and assessment before one could advance to providing less supervised care and greater supervision of junior personnel. We could allow greater flexibility in training/work schedules to reflect the variable needs of addressing other personal goals, such as having children or dealing with other family issues, something historically we do not have a great track record for. We could allow more tailoring of acquisition of advanced or additional skill sets to meet local and regional needs not just for those who would be in the current training window but also for those who need to incorporate new technology or knowledge, or simply refresh, into their practices at any time during one's career. We do not have to look too far in the rearview mirror to see how helpful that could have been with new technology, such as videoscopic surgery.

We could use the board certification for initial certification with or without modular modification. Perhaps we could use modular certification for recertification and/or maintenance of certification. Take it a step further and we could use actual quality and outcomes data and indication/utilization review for maintenance of certification. If you really want to make life easier push for either federal medical licensing or absolute reciprocity between states for medical licensing and mandatory transfer of all state verifications of medical practitioner information to the Federal Credentials Verification Service. If we were serious about protecting patients instead of fiefdoms, we would have done that already.

The National Labor Relations Board may have ruled that residents were both students and employees, but in reality so are fellows and attending surgeons. To artificially separate one group of worker-learners (residents) from another group of people who are also worker-learners (fellows and staff surgeons) one does at one's own peril. The introduction and emphasis of lifelong learning has blurred the distinction between resident, fellow, or staff surgeon to the point of irrelevance.

SUMMARY

The system of training we use is a minimally modified version of the training systems that were established in the United States in the 1880s. The current system of GME training we have is paid for largely by federal monies and subjected to oversight of the ACGME in order to qualify for that financial support. General surgeons are certified by a monolithic certification system. Changes in clinical team structure and incorporation of our current GME system into a lifelong continuing medical education system within our clinical care environments could give us opportunities to greater diversify the surgical workforce and better distribute the costs of surgical training. Although moving funding to the completion of training and incorporating residency training into the standard workforce environments may seem radical to some, it does not change the goals of what we currently do; in fact, it may advance some of them. Getting the right patient to the right people in the right place with the right resources at the right time is how we improve quality, efficiency, and value for patients. It may be how we improve, protect, and preserve our discipline as well. Our ultimate goal is to provide the people and communities we serve with the best medical care and resources we can create. We should neither toss our history and traditions aside lightly nor should we be slaves to them. This time, as all others, is a good time to consider whether we can do better.

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