

Surgical residencies:

Are we still attracting
the best and the brightest?

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I've spent the past 20 years as either a program director in general surgery or as chair of a department of surgery. Much has changed during that period of time. Residencies are not what they were—nor should they be.

Patients having cholecystectomies used to spend five days in the hospital; now they spend five hours. Patients with complex surgical conditions would be admitted to the hospital for preoperative preparation; now most are admitted the morning of surgery. Residents used to spend weeks in the hospital; now most residencies limit them to every third night call.

Managed care, with its push to lower costs, has influenced many of these changes. This pressure has led to some improvements and has forced us to reevaluate our training programs. Residency review committees have insisted that residents

have a broader experience that includes preoperative, operative, and postoperative care of patients. Most of our surgical programs have made or are making this wise move. It ensures that residents see a full spectrum of surgical diseases and follow both hospital and outpatient cases.

As dramatic as these 20 years of change have been, the new millennium presents us with challenges that may prove even more difficult to solve. I am concerned about two areas: the medical student environment and the training of residents.

Medical students

Over the past decade, medical schools have changed dramatically. Nearly 50 percent of our graduates are women. Students are more diverse, and many are older and have taken nontraditional paths to medical school (see Table 1, p. 21). How-

ever, applications are down, indebtedness is soaring, and the relative attractiveness of surgical residencies is in question.

Medical school first-year positions have been stable for some time, but the number of medical school applicants has steadily fallen from a high of 46,968 in 1996-1997 to 37,092 in 2000-2001.¹ That is a 21 percent drop.

Why did this decline occur? There are several possible explanations. In the 1990s, the U.S. economy was robust, and the high-tech industry could have been more alluring to undergraduates than medicine. Many college-age entrepreneurs with little experience formed high-tech companies. Others joined start-up companies with little or no capital. Huge compensation at a young age was possible. During this time in medicine, however, we saw incomes in general, and surgical salaries in particular, remain flat or decrease.

Data from the Association of American Medical Colleges (AAMC) shows that the mean salary for associate professors in general surgery actually fell from \$232,200 in 1996-1997 to \$226,100 in 1999-2000.² General surgery incomes vary widely, ranging from \$142,000 to \$274,000, according to recent surveys by several groups (see Table 2, p. 22).

At the same time, data from these groups showed higher salary ranges for radiology (\$163,000 to \$355,000), medical oncology (\$162,000 to \$334,000) and noninvasive cardiology (\$158,000 to \$327,000).³ As a result of these salary decreases and variances, along with a variety of other factors, senior members of the medical establishment often said they would not recommend a medical or, in particular, a surgical career to their children. Virtually everyone in the field felt they were working longer and harder simply to maintain the same level of income. Young people noticed.

Now the economy has changed. Dot-com dreams have been dashed, and as New England's high-tech bubble has burst, the *Boston Globe* has reported a sharp increase in students reapplying to business schools for MBAs.⁴ Medical school applications may also follow this upward trend. I certainly hope so, but we'll have to wait and see.

Another pressing issue for medical students is the huge educational loan debt they carry out of medical school and into their residencies. We have seen a striking increase in this financial burden over the past two decades. The AAMC reports that 83 percent of new graduates are in debt and that their average indebtedness is \$95,000 (see Fig-

Table 1

**Percent of U.S. medical school graduates
from underrepresented minorities, other ethnic groups, and women**

Year	White	Asian	African-American	Hispanic	Women
1979-1980	84.6%	2.7%	5.1%	3.0%	23.1%
1999-2000	66.5	18.1	7.0	6.7	42.5

Source: AAMC.¹

Notes:

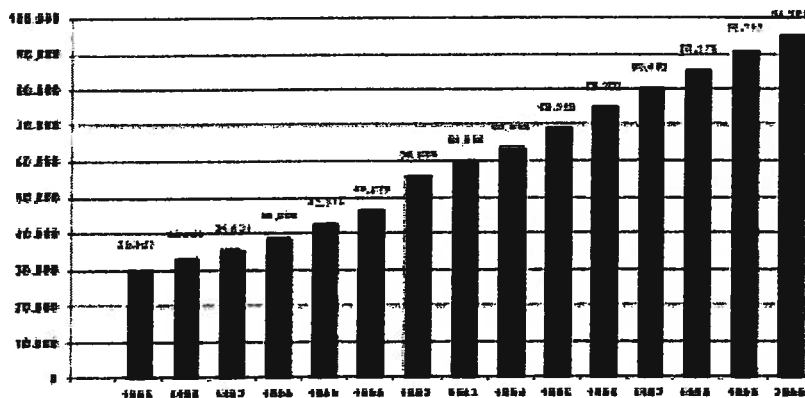
1. AAMC defines "underrepresented minority" to be only U.S. citizens with permanent visa; prior to 1981, only U.S. citizens were included.
2. "Asian" refers to AAMC definition of "Asian/Pacific Islander."
3. "Hispanic" refers to combined AAMC definition of "Mexican American/Chicano," "mainland Puerto Rican," "Commonwealth Puerto Rican," and "other Hispanic."

Table 2
Compensation for general surgeons—2001

Group	Compensation
Medical Group Management Association	\$274,037
Hospital & Healthcare Compensation Service	265,431
American Medical Group Association	257,139
Martin, Fletcher & Associates	250,000
Sullivan, Cotter & Associates	235,210
Warren Surveys	220,804
Merritt, Hawkins & Associates	216,000
Goddard Healthcare Consulting	210,000
Hay Group	190,400
Health Care Group	142,000

Source: *Modern Healthcare*.³

Figure 1
Average indebtedness of medical students



Source: AAMC.¹

ure 1, this page); only 17 percent have no debt.

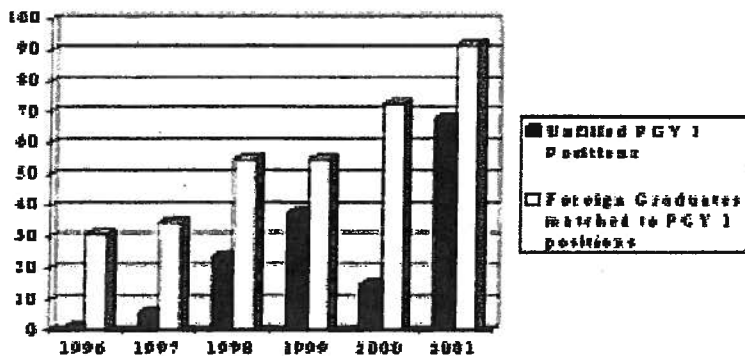
Saddled with this burden, students are asked to consider entering low-paying surgical residencies that last five to 10 years. Although the mean first-year house staff salary is only \$35,728, residents are asked to start repaying their loans immediately upon graduation.¹ Directly or indirectly, the disparity between loan payments and potential income must affect career decisions.

It is only anecdotal information, but medical schools are reporting a higher number of students leaving the profession to enter entirely different careers. Similar reports about surgical residents were offered during recent meetings of the Association of Program Directors in Surgery. Students and residents don't leave medicine solely for financial reasons, but money worries certainly contribute to their decision.

Last year, the National Residency Matching Program sounded a wake-up call for all of the country's surgical residency program directors.⁵ For a long time, general surgery residencies have been among the most competitive programs. In 1996, there was only one unfilled position in general surgery. The number used to be virtually zero because there were always more students interested in surgery than there were surgical positions. By 2001, however, the number of unfilled positions surged to 69 even though the number of first-year spots remained stable at approximately 1,000.

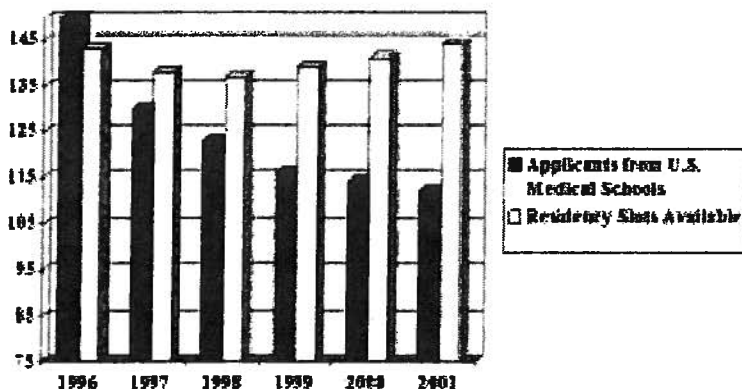
In addition, a lack of U.S.-trained applicants has led to an

Figure 2
First year positions in general surgery



Source: AAMC.⁵

Figure 3
Matches to cardiothoracic residency positions



Source: AAMC.⁵

increase in graduates of foreign medical schools filling PGY-1 categorical positions (see Figure 2, this page). This change is even more dramatic among applicants for cardiothoracic training positions (see Figure 3, this page). Not long ago, cardiothoracic surgery positions were the most

competitive surgical positions available. Now, there are fewer U.S. applicants than positions available, and there is an almost one-to-one ratio of total applicants (foreign and U.S.) to positions in the 2001 match (total number of applicants equals 149 and total number of positions equals 144).⁶

The number of entering medical students has dropped in other specialties as well. Anesthesia is a particularly distressed specialty, and most programs do not fill through the match. Last year, the total number of unmatched anesthesia positions rose again.

The cause of this descent isn't clear, but there does appear to be a shift away from surgery and anesthesia toward specialties that afford more controllable lifestyles. Two residency programs that are becoming increasingly popular and that have fewer unfilled positions are diagnostic radiology and emergency medicine. This trend may represent medical "market forces" or a desire for a controlled professional environment, particularly during early family-raising years.

Residents

State and federal governments hear the seductive call: Limit the number of hours a surgical resident can work, and limit the amount of call. Debate on this issue was sparked by the Institute of Medicine's November 1999 report on medical errors.

Suddenly, the public was more aware of health care mistakes. Many concerned parties have tried to link errors to work hours and conditions, prompting the call to curtail the time residents spend in the hospital.

Current proposals to limit house staff work hours

draw inspiration from the report of the Bell Commission, which investigated the 1984 death of an 18-year-old woman admitted to New York Hospital with agitation and a high fever. She was taking an antidepressant, Nardil, and was given Demerol for sedation. Her reputed cocaine use was not reported. She died eight hours after admission. The family attributed her death to house staff fatigue and lack of supervision. Because her father was a well-known journalist for the *New York Times*, the case received a great deal of publicity. An ad hoc government advisory committee, chaired by Bertram Bell, MD, was formed to investigate the issue and advise the state. The committee made these recommendations:

1. Residents should be on call no more than 80 hours per week.
2. Residents should work no more than 24 hours in a row.
3. Residents' stints on duty should be separated by at least eight consecutive hours.
4. Residents should have one 24-hour period of nonwork time per week.

These suggestions were written into New York State regulations issued in 1986. After a professional disciplinary board had censured the residents who treated the patient, a state appeals court exonerated them. In a separate civil case, a jury found the physicians involved were negligent but split the negligence between the patient and the doctors.⁷

After the "405 Regulations" were first issued, training programs varied in their level of compliance until a series of investigative articles in the *New York Times* reported that many hospitals were not abiding by the rules. In March of 2000, the New York State Department of Health sent 12 teams of investigators into hospitals to do spot checks.⁸ They interviewed residents, paged attendings, and reviewed charts on the wards. Fines were levied against institutions that failed to meet the requirements. Not surprisingly, nearly all of New York State's residencies were in compliance by the following year.

This past year, other state and federal regulatory agencies have shown increasing interest in work hours. In Washington, the Occupational Safety and Health Administration (OSHA) is holding hearings on resident work hours. Last year Ralph Nader's consumer and health advocacy

group, Public Citizen, joined the OSHA petition to limit work hours for residents. Recently the AMA Board of Trustees weighed in, announcing that it, too, is looking into resident work hours. A succession of policies and bills followed. The new AAMC policy was published in October 2001 and was nearly identical but added "no more than 12 hours of continuous duty in high-intensity settings (that is, emergency rooms and critical care units)." In November 2001, Rep. John Conyers, Jr. (D-MI), introduced the Patient and Physician Safety Protection Act of 2001 into the House of Representatives, which included the same list of restrictive hours. Finally, at the end of November 2001, the Massachusetts Medical Society adopted the same policy to limit hours and called for drafting state legislation that would enforce hourly limits.

Unfortunately, it is overly simplistic to think that legislated work hours will solve all of the problems, including the occurrence of medical errors. No surgical residency director builds fatigue into his or her program as a rite of passage. What we do build into our programs is the crucial principle of continuity of care for one's own patients.

There is almost universal "pride of ownership" and high esprit de corps among surgical residencies. Many of the most vocal opponents to external limitations on surgical residencies are the residents themselves. Although we as educators teach judgment and a skill set about surgical diseases, the most important quality we impart is a sense of responsibility for the total care of our patients. This is the cornerstone of every surgical training program and must not be left out of the debate. When we limit work hours and convert care to shift work, we build in multiple hand offs between physicians.

Lost in public discussions is the link between these multiple hand offs and the possibility of errors. This discontinuity is a real problem. One of the few studies that addresses this key issue is by L.A. Petersen and others; its results are reported in "Does housestaff discontinuity of care increase the risk for preventable adverse events?"⁹ This case-controlled study of more than 3,000 patients in an urban teaching hospital showed that yes, increasing hand offs increase errors. Researchers concluded that "patients who had potentially preventable adverse events were more than twice as likely to be covered by an intern from another team or the night float resident...as were matched con-

trol patients in adjacent beds (26% compared to 12% $p < 0.05$).” The problem of errors and cross covering has received very little attention from our own profession, and systems need to be developed to deal with this.

Limiting residents’ work hours to 80 per week is not the definitive answer. It is only part of the solution. Work at my institution tells us that error reduction in surgery is a complex problem and that fatigue is only one of several factors. Cutting hours does not change the sad fact that residents are stuck performing noneducational and nonclinical tasks, such as unnecessary clerical work, scheduling patients, and drawing blood. We need to add hospitalwide systems, such as computer order entry, electronic medical records, and electronic signouts to reduce some of the administrative burdens.

Time for fresh approaches

Our profession has a long history of attracting the best and the brightest, and I think we still do. However, as surgical leaders we simply cannot ignore the changing environment. We must improve residents’ work environments. We must add other health care professionals to handle nonmedical tasks, offering more time flexibility in our residency programs, and designing more integrated residencies in areas of added qualifications. These changes are going to be controversial, and in some cases costly, but are necessary.

The American College of Surgeons and the American Surgical Association set up the Study of Surgical Services for the United States (SOSSUS) 31 years ago to study the future of the profession.¹⁰ The goal was to “objectively and dispassionately evaluate the distribution of services, the problems of manpower, and the interaction of surgery with other fields.” It is time once again to act, to study the state of the profession, and to plan its future before someone else tries to do it for us. □

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