The results of the 2001 National Internship and Residency Matching Program for general surgery raised alarms for every surgeon and surgical organization involved in resident education, but it was especially concerning to surgical program directors. In the 2001 match, there were 68 unfilled postgraduate year 1 (PGY-1) categorical surgical positions and 425 unfilled PGY-1 preliminary positions. Many of these eventually filled after the match, but the implications of having this many initially unfilled slots, combined with the trends of decreasing applicants for categorical surgical positions (down 14%) and increasing attrition rates for surgical residents (now 25%), point to upcoming short- and long-term crises. This realization led to concerns being raised at the October 2001 meeting of the Association of Program Directors in Surgery and at other presentations and discussions at the American College of Surgeons.

Statements about how today’s medical students and surgical residents have a poor work ethic and less dedication are heard frequently, implying that a generation gap between surgeons and surgical trainees is responsible for this looming crisis. Proposals to dramatically change surgical training have been made because of this perceived gap in interest in, and commitment to, surgical training. However, before we make far-reaching changes as a response to these problems, further examination needs to occur, and other remedies should be considered. We need to look at the present criteria for medical school admission, the extent and timing of surgical participation in medical student education, resident recruitment, surgical training, and our style as medical educators before simply reacting by changing resident training paradigms.

Empirical evidence shows that college students are becoming less interested in attending medical school. The number of applicants to medical schools in the United States has dropped approximately 20% during the last 10 years. There are many possible causes for this decreased interest—the perception of increasing and less reasonable demands; disillusioned practitioners; decreasing income with increasing workloads; and the availability of many other attractive career opportunities. The interest in the 1990s in mandating a shift to primary care led many medical schools to conform to self-imposed, and even legislated, targets of 50% to 60% of graduates pursuing careers in primary care. This expectation caused some schools to “profile” their admittees for characteristics thought to make them likely to select primary care. These characteristics included a nonscience college major, a period of time elapsing between college graduation and medical school matriculation, and a previous career in a nonscientific field. This profiling has persisted in some schools despite reasonable evidence that there is not, after all, a need to proportionally produce more primary care physicians.

An additional sway from surgical careers for medical students is the convention of surgeons having little contact with them before their third year. Furthermore, when students finally get to the third year, they spend less time on surgical rotations since in many medical schools the surgical curriculum had to be shortened to accommodate the primary care initiative.

Second-year medical students at the University of North Carolina (Chapel Hill) were polled about their career interests in surgery and what influenced their interest. With a 35% response rate, the results are summarized in the Table. The results do not indicate a profound lack of interest in surgery, and some of the disinterest de-
The number of unfilled surgery positions in the 2001 match has several important implications:

- The number of senior medical students interested in surgery is low and approaching a critical level.
- A continued reduction of fourth-year medical students in the categorical surgery match will lead to an incomplete training matrix and/or an increased demand for offshore and international medical graduates. Although some of these candidates make excellent residents and surgeons, the consistency in their education and performance has been quite variable.
- That there are many unfilled preliminary positions means that there will be fewer candidates available to fill the open postgraduate year 2 (PGY-2) and PGY-3 positions that will result from the increasing attrition rate. This will lead to a reduction in the number of finishing surgeons in subsequent years.
- If the number of students interested in surgical careers continues to decrease, there will not only be problems staffing the available residencies of today, but also the surgical suites of tomorrow.

The potential effect of training fewer residents will first be felt in the areas of patient care and service coverage. Requirements have been imposed by the American Council of Graduate Medical Education and the Resident Review Committees that limit the number of hours surgical residents can work. A decrease in the number of residents working in the hospitals will result in a decrease in available personnel for care of surgical patients, which cannot be made up by the already decreasing numbers of nurses or simply by attending surgeons, who often have workloads comparable with those of their residents. This is especially problematic because hospitals with large surgical training programs usually offer surgeon-intensive programs such as transplantation and trauma. These services could not be supported with fewer residents because of the practical demand for surgeon activity that tertiary patient care requires, and the externally set accreditation standards that must be met to provide it.

The next effect on general surgery program directors will be the inability to fill positions at the senior resident level when residents leave early for other training options. This will compound the effect of increasingly losing residents through attrition at the PGY-1 and PGY-2 levels.

Slightly later, the subspecialty residency programs that require general surgeons for entry (ie, cardiothoracic surgery, pediatric surgery, vascular surgery, and surgical critical care) will feel the effect. These subspecialties may experience an increasing number of unfilled positions, which would be caused by fewer residents completing general surgery residencies, thereby qualifying for subspecialty training. Furthermore, many of the negatives about general surgery careers are compounded in these subspecial-

---

The UNC surgical clerkship was perceived by students ahead of me as:
- Good 36
- Bad 21
- Indifferent 16
- Better than expected 10
- Worse than expected 2
- Don't know 6

My impressions are based on:
- Information from other medical students 52
- Information from teachers/advisors/mentors 4
- Common knowledge 3
- General reputation/urban legends 4

My encounters with surgeons at UNC up to this point have been:
- Positive 36
- Negative 5
- No impression 4
- Infrequent 16
- None 2

I am interested in a surgical career:
- Yes 13
- No 21
- Maybe 13
- Waiting to see what the rotation is like 20

I am turned off to a surgery career by:
- Reputations of the specialty 10
- Reputations of surgery department at UNC 0
- Lifestyle concerns/time demands 39
- Preference for other specialties 19
- Personal experiences 19
- Mentors/advisors 0
- Other 1

Should there be more interaction with surgeons during the first 2 years of medical school (eg, anatomy)?
- Yes 48
- No 4
- Uncertain 12

---

*UNC indicates the University of North Carolina, Chapel Hill.
ties, with even, proportionately, greater reductions in reimbursement and increasing time demands.

Finally, there will be fewer trained surgeons to meet the increasing demand for surgical procedures as the population ages. Unfortunately, it is only at this point, probably 5 to 10 years from now, that this effect will be realized. If we don’t work to avert this possible future, the patients of tomorrow will be severely disadvantaged.

There have always been generation gaps between surgeons and trainees, even among different levels of trainees. We all remember being told how easy we had it compared with our predecessors. Each generation of surgeons feels that the present trainees have it easier. However, what in fact is more accurate is that the experiences of each generation of surgeons and surgical trainees have differed because each generation has had to adapt to master new challenges created by quickly evolving circumstances. For example, residents in each generation of surgery have taken care of different patient populations. Presently, few people are permitted by their insurance carriers to be admitted to the hospital the night before surgery; a higher proportion of inpatients are critically ill; and the paperwork required of residents as well as of faculty, by regulators and third-party payers, makes the present residents as busy as any previous generation, just busy doing different things.

Examination of resident work activity and direct participation with residents has shown that the only major change has been a slight reduction in the number of nights residents spend in the hospital. Retrospectively, the need to have a separate resident for each service in-house was convenient, but this has been replaced by an organized call system with good communication and accountability.

When we think of our present residents do not work as hard as we did, we should reflect on whether we are as committed to teaching them as our predecessors were to teaching us. We feel that we worked as hard as the generation before us when we were residents, but are we spending the time teaching that our teachers did? If not, why not? For the same reason the residents seem to us to be doing less but in fact are just as busy doing different things, as today’s teachers, we are doing different things. An increased demand for clinical productivity in a time of declining reimbursement, along with the added administrative burdens associated with compliance directives, have changed what we must spend our time doing, but this does not reflect a decline in our own commitment. Similarly, the change in what our residents do does not mean that they are less committed.

Are there changes in what medical students expect from their careers and life in general? Yes, and that reflects many things; mostly the change in the preferences of students who are accepted to medical school. It does not necessarily reflect a general decline in commitment. The present medical students do notice the long work hours and relative decline in income being experienced by general surgeons and their related subspecialists, but in most cases, hours and income are not their sole or major motivation. There are many students ready to be interested in surgical careers, but attracting them will require our working to recruit them, not just waiting for them to come to us.

What can we do? Before dramatically altering surgical training to “appeal” to students by decreasing expectations, we can do many things to address these problems. We need to take these steps now if we are to preserve an adequate core of practicing surgeons for the future.

- Participate in medical school admission committees. Emphasize the need to admit the brightest and most dedicated students. If we can attract them to medical school and then present an interesting career option, we will meet the future needs for surgeons.
- Get involved in teaching medical students during their first 2 years, especially during their first year. This can be done by being involved in teaching courses such as anatomy and physical diagnosis. An earlier introduction would enable students to see surgeons in a positive light, while providing us an opportunity to present ourselves early in their medical education as mentors and role models.
- Take time to teach, even if it is only a 1-minute vignette during rounds or in clinic. Students will recognize your commitment and develop their own.
- Learn the students’ names. This effort will help them appreciate your personal interest in them. Bring them along on unique experiences, such as discussing termination of life support with a patient’s family or seeing a “VIP” patient.
- Help students do 1 or 2 of the simplest things in the operating room.
- Consider your own behavior. Nothing will turn a student or potential resident off more than seeing someone acting inappropriately (ie, constantly griping about other people, other specialties, or the health care system in general); acting unethically; being dishonest; or not treating patients or other health care professionals and hospital staff with respect. Not all students will like surgery or surgeons, but if we fulfill their worst stereotype of surgeons, we will have a hard time attracting the best and the brightest. In fact, we will be more likely to attract students with behavioral problems who will constantly cause difficulties as residents and, if able to graduate, as surgeons. We each have our own style of teaching, but we must present positive experiences and role models to our students if we expect them to become interested in surgery.

The program director’s goal is to produce skilled, dedicated, ethical surgeons who will care for patients, assume leadership roles in health care, and train the next generation of physicians and surgeons. We need to commit to doing this by being active in the medical school selection process, in the students’ early curriculum, and throughout their residency training.

Generational changes do not necessarily mean reduced commitment. There are medical students now and in the future who can be educated to become great surgeons and surgical leaders. We can attract or repel them, and we must choose which we wish to do.

Corresponding author and reprints: Anthony A. Meyer, MD, PhD, Department of Surgery, University of North Carolina, 136 Burnett Womack, Campus Box 7050, Chapel Hill, NC 27599-7050 (e-mail: Anthony_Meyer@med.unc.edu).