



# Academic Surgeons and Surgery— Who, What, When, Where, Why and How?

RICHARD L. SIMMONS, 1981-82

**A**cademic surgeons are, as a rule, a frustrated lot—frustrated by what they chronically see as a group failure of performance and, simultaneously, by the failure of their entrenched basic scientific community to recognize our real accomplishments and our special needs.

If academic surgery as we once dreamed of it is dead—a fact widely acknowledged by those of you who have recently applied for NIH grants—let’s see if we can’t determine what the function of academic surgery was and what the function of the academic surgeon is supposed to be.

I think it is to create and disseminate knowledge relative to the surgeon and his or her patients. In other words, does the surgeon teach? Clearly, the control of rejection, both before it occurs and after, is an important area of study in transplant surgery. This needs to be taught to patients as well as other transplant surgeons.

Let’s look at this generic Presidential Address once more and recognize that, unfortunately, we strive for excellence at all times and in all things, and try to do what we thought our heroes had done—and their accomplishments are frequently exaggerated. I think, herein lies our failure. Too much is expected of us and we expect too much of ourselves. In other words, we may know what our functions are, but we really don’t know who we are.

What is expected of us? First of all, we must be great surgeons. That is, we must operate successfully. People expect surgeons to operate with great skill and quickly, with lots of personality, charm, and good humor. To gain this skill, we must first become general surgeons, that is, dedicate five or more years (unfortunately, at the peak of sexual maturity) to a residency. During this period, we spend as much time as possible in the operating room, assisting at and performing as great a variety of operations as we can, so that we can have a very wide experience with as many difficult sit-

uations as possible, so that we can be prepared for any eventuality in any subspecialty. Everybody agrees that this is an essential requirement for being an academic surgeon. A broad experience is necessary.

During this period of surgical residency, we were taught to concentrate on what we are doing. In fact, concentration may be the characteristic that most often distinguishes the exceptional from the average surgeon. The surgeon who constantly banters about jogging, or, more important for this discussion, about laboratory research, does not get the job done. This is not the time to contemplate molecular interactions. We always advise our academic surgical trainees to shut up and operate.

What else is expected of us? In addition to being great surgeons, we must be experts in complex clinical care. We are expected to be capable of taking care of our patients' needs in cardiac, respiratory, and circulatory physiology, and have a smattering of gastrointestinal endocrinology, nutrition, transplantation, urology, neurology, pharmacology, pathology, gynecology, trauma, and intensive care. The Boards are happy to oblige by insisting that we become head and neck surgeons, even though we cannot visualize the larynx with a mirror, and that we compete with our gastroenterologists by passing a colonoscope through the splenic flexure. And, now that we have to pass a basic science test, clearly, the surgical resident becomes the very model of a modern major general, replete with information (animal, vegetable, and mineral), however superficial that information may be.

So now, all age 32 and Board-certified, we are broadly educated general surgeons and we can disseminate the folklore taught during residency to future generations. We have, in fact, become highly qualified to explain the intricacies of any procedure, operative or otherwise, using the inevitable phrase indicating deep intellectual understanding: "I always do it this way and I never get into trouble."

But a broad education leading to rote performance is not enough. As academic surgeons, we are expected to subspecialize so that we can understand a problem in depth. For this, we need a fellowship. Happily, each of the subspecialties of the past has devised a way to immortalize their knowledge. They have created centers of excellence judged to be capable of teaching the errors of the past. For teaching the errors of the past really well, such programs become qualified to issue certificates of special competence.

I like this statement, written to John Najarian, to address what a certificate of special competence is: "I am really grateful to have had the opportunity to work here and see so many interesting complications."

That is all very good. Now, we are 35 years old and several million brain cells are dying every day. We still cannot call ourselves academic surgeons just because we are skilled at operations and complex patient care, and have special competence in the errors of the past. We must now dedicate ourselves to correcting those errors through deeper understanding. We must become scholars.

We must, in fact, do research, and this also requires training somewhere along the way. This is eminently reasonable. So we apprentice ourselves to someone reputed to be an expert in research, or, by chance, to someone who *is* an expert in research. After a year or two, we have presented abstracts at six meetings of the distinguished surgical

societies, like this one, each of which demands that we publish our manuscript in the society journal, reviewed, of course, by our surgical peers, like this one. Now it is time we get a job.

To get a job, as everyone knows, one has to fill a slot. A slot means certain defined duties. Some of them we have to do in the operating room: we operate, perform pre- and postop care. And, of course, there are teaching duties in the OR, on the ward, specifically designed for residents, medical students, and other research fellows. There are also administrative duties: organizing clinics, organizing educational programs, organizing patient referral systems, and organizing follow-up systems. We all have to serve on committees. We have to join societies like this one and become an officer.

Now, we get to the important stuff: we have to make some money. We have to not only practice, but also fill out and sign charts to prove that we are taking care of the patients we are actually taking care of. We have to operate. If we don't have time to operate, we have to at least sign operative notes to justify our salary or to participate fully in incentive plans. Clearly, the incentive is not research-oriented. And, finally, we have to get grants.

Please note that we have hardly mentioned research. Research cannot fit itself on the slot list. Instead, on this list of items defining our slots, it has been replaced by the means and not the end. This is the essence of our frustration: we have let ourselves be judged—and in the end we are judged and we judge ourselves—as successes and failures in academic surgery by our ability to get these grants.

Grants are a good thing. They allow us to do very good research. They allow us to do research that we could not otherwise get money for. They allow us to fool around in the laboratory and maybe discover something. They give us prestige among our peers, as exemplified by the commonly overheard conversation: "What does he do?" "I don't know, but he gets a lot of grants."

In addition, we must respond to pressures from the department head to justify his or her faith in our performance. In fact, in a modern surgery department, it is the only way we can get judged in an esoteric field. An external review committee must tell our boss why he should promote us or why he should pay us more or why he should have hired us in the first place. This is why we get the grants.

Only grants can justify the use of resources—residents and secretaries—because, in fact, grants have become the most important source of overhead for the university. In turn, it's a mechanism for us to gain the attributes of power and prestige exemplified by more space.

Surgeons do not get lots of grants, and we suffer, at least in our own eyes. Surgeons don't get a lot of grants, but they don't apply very frequently either. Applications are seen as poor. Surgeons need better training; the application systems are cumbersome and time-consuming.

Solutions to these problems have been suggested: attract better students, get more training grants, use clinical monies to seed research, develop systems to help prepare for grant applications, lobby the NIH to eliminate antisurgical biases by having surgical applications go to surgeons for peer review. But, these are generally thought to be superficial solutions, like Band-Aids.

The problem, really, is inadequate training. We do not attract students interested in investigation. I think it's our fault. If we were really interested in research, we would attract a different breed of student. Our last major recruiting effort takes place when we try to attract into the internship year. It's worthwhile looking at the criteria we use for this.

First of all, to get investigators, we take graduates from medical school, clearly a bad choice. They have to be tall and thin, play ball, go to Princeton or some other effete institution. They are clean-cut, have no facial hair, are predominantly male, and, of course, get good grades on their clinical rotations. Good grades on surgical rotations, which is why we hire "trained surgical investigators," means they have to come first to the ward in the morning. They leave last. They look eager. They talk about how great it is to be part of the team to really cure people instead of just talk about it. And, of course, how they like to use their fingers—I always suggest they take a knitting class—and they say, "Yes, sir" and "No, sir."

We were selected and we, in turn, continue to select our trainees in academic surgery using people who provide safe service and who will never embarrass their preceptors, their heroes—who, in striving for excellence always, want to avoid embarrassment absolutely the most.

We, in fact, select students who are trainable in the errors of the past, that is, in doing it this way and never getting into trouble. We train surgeons the way we train soldiers: originality of thought is eliminated as a component of the clinical response, and an environment is established in which rethinking is disparaged.

Here is my concept of some of the mistakes made in training academic surgeons.

1. We don't know what we want from academic surgeons, and we have no point of view in training them.
2. We generally choose the wrong people. We do not know whether we want teachers, performers, administrators, or investigators. If we want investigators, we certainly choose the wrong people, because we choose and are chosen by the individuals who are clinically adept and not intellectually curious.
3. We reward the trained response, not the curious or original one.
4. We train them in the incorrect sequence. That is, they are taken from the middle of their residency at which time they are low priced—and that's the principal reason—and they are introduced to research, become competent, sometimes even authoritative. As a reward, they are returned to the residency, which they view as a reward, so that when they emerge, they can no longer capitalize on their expertise and have to begin again.
5. And, finally, as a rule, at least in research and administration, we give them poor training.

Good training consists of working for an established, competent investigator who is productive and publishes in basic sciences, as well as clinical journals, and recognizes that the important thing about peer review is that it is critical in every sense of the word, that is, essential for improvement. The preceptor, I think, should present the student with very big questions—Why do wounds heal? Why do infections occur?

Why do grafts reject? Why do patients die?—and help them focus on achievable answers.

A good laboratory is one in which there is a continuity of approach. That is, the laboratory's been dedicated for a long time to a single question or group of questions that are related to one another and that are adequately supported by funds, so that research and teaching can take place in a comfortable environment. There is usually a critical mass of collaborators involved, so that many ideas are heard.

I think it's important to provide a suitable problem to the student with critical research training in which ready data can be obtained early, so that there is some kind of satisfaction, postponing the big questions for the very difficult solutions until later.

But instead, very frequently what we do in our laboratories is introduce students to a new problem that we would like to have solved. It's merely an impossible job. By the time they have solved it, it's time to leave. Surgical training tends to have an inadequate time period, a year or two with mandatory middle-of-the-residency training. There is no opportunity to cut it short if one is no good, or to lengthen it if one is talented. This inflexible schedule and set of guidelines is enforced by the Boards. The Boards, for example, will only permit a certain number of residents to be trained per year. If fewer are trained one year, picking up more the next is not allowed.

In addition, there are all those slots to fill during the residency. The preceptor is generally a surgeon who is generally behind the cutting edge of raw biomedical research, generally poorly funded, and preoccupied with other duties. Much time is spent on obtaining funds and less on doing the research. There may very well be big questions, but the projects are frequently out of focus.

The investigators tend to be isolated, by and large, from the basic science investigators from the same school or from biological leaders in the same community. Rarely is there continuity for a number of reasons, one of which is that each resident wants his or her own project. Therefore, one does not learn from errors in the past.

Nonetheless, surgeons have, in fact, made enormous contributions. These areas of achievement are listed as the Top 4 of the last decade:

1. Organ transplantation
2. Parenteral nutrition
3. Cardiopulmonary bypass and the whole field of cardiac surgery
4. Vascular reconstruction

There is nothing here to be ashamed of. These are very great surgical advances, indeed. But they are of a certain type. Such surgical advances, by and large, emerged in the minds of the surgeons without grants. They just did it. The problems were self-evident. The solutions were technical. The biological rationale came as an after-thought, or somebody else think it.

If this is true, our academic colleagues see us for what we are. We are a kind of necessary, temporary, soon-to-be-obsolete weapon platform against disease, like an aircraft carrier, full of high-tech apparatus, but rather dysfunctional when it comes down to winning a war. We are susceptible, in fact, to the next generation of missile design.

Scientists know full well that a truer technology will naturally follow a clearer basic understanding. All they need to do, in fact, is to keep us literate, so we are able to adapt new principles to the engineering task at hand. There is a bigger problem. With our focus on false technology, our very mode of thinking is foreign to that necessary for good science. If the essence of science is to garner the necessary information to prove a hypothesis, the essence of surgical judgment is to guess right with minimal information. We teach this day and night. In other words, in the eyes of the grant givers, we really do not qualify as grant getters, except when a practical solution to a clinical problem is in view.

Thus, we are not rewarded or appreciated by our clinical colleagues, whose reward system consists of big operational lists and big money.

We do not really have to live up to the criteria of other people. The grant givers properly have to set the priorities in grant getting. Our priority is, like engineers, to adapt the knowledge they create for more practical goals, and to stay literate in what they are doing so we can make the appropriate adaptations. Our mistake and our frustration is to assume that the grant getting is the measure of our work, while really it is only the means to a certain end.

Most surgical contributions have been and are made by surgeons without grants and, in fact, without suitable training for grant getting. Well-funded research is a full-time job. We are lucky to be doing part-time Ph.D. work for full-time surgical wages.

I have proposed a tentative list of individual solutions for individual people who are interested in individually competing with basic scientists for the appropriate grants. To this end, I suggest we take another look at selling the Boards and the residency review committees on a special track for academic surgical training that would eliminate the middle year, the G-3 year, of clinical training. The third year is generally a waste. There is not much new material and there is no new responsibility. We have to encourage at least 2 to 3 years of full-time research, because it takes that long to get started and develop real independence. We have to be much more careful about the proper choice of research preceptor. We have to provide, through junior faculty positions, research continuity in career training. This is the critical point in my mind. Whatever time has been spent in research training is frequently lost in the middle of residency, because so much time intervenes between the research training and the assumption of an academic job. Everyone needs time to get back in it. The most common frustration for young surgical investigators who have been very successful is that the project they started in the residency years has already been completed by the time they are ready to take a faculty job.

One of our serious mistakes is to have a cottage industry approach to research. In other words, we think in terms of bench research only. Very few of us have developed or taken on or understand the problem of clinical trial planning, data management, computer use, ethics, and statistics related to surgery. Recently, I was struck by the fact that I had ignored, my entire life, the major work of individuals like Bernard Fisher and his group, who revolutionized cancer research simply by sitting in their offices and developing clinical trials. We very seldom participated. We have to encourage and reward multiinstitutional trials in surgery.

ASTS made a good start in this regard several years ago in forming a Scientific Studies Committee designed to foster collaborative research. But it is just the beginning. A few worthwhile cooperative multicenter projects emerged. The scientific studies committee of a society should be designed to foster collaborative research. Necessary travel must be funded by ASTS, the committee made to stand yearlong, and its members kept in office for at least five years. Its progress should be periodically read, not as part of the membership meeting, but as part of the scientific program.

It is important to take the Band-Aids seriously. We should lobby for three things: reinstitution of the NIH academic training grants in surgery, creation of a studies section to review only grants from surgeons, and NIH support programs for prospective cooperative trials in surgery and for data management centers for certain disease states. Unfortunately, this does not draw a lot of publications to support the grants and, therefore, has not been supported. In fact, the cooperative clinical trial is always in trouble.

Throughout this polemic, I have tried to suggest that surgery faces some inherent problems. In addition, I think we have trained too long and too broad. Really, who needs to defend so much turf all at once? Our everyday tasks do not require scientific thinking. In fact, scientific thinking is generally discouraged in the urgency of clinical care. Our scientific training and exposure tends to be meager.

I think we distrust science. Ours is a very ambivalent discipline. While loving new techniques, we distrust basic research deep down. We feel that any improvement might well lead to our obliteration. Think about the dissolution of gallstones. Lithotripsy has recently come of age. What would happen to us? What resistance have you seen in your own practice to percutaneous drainage of abscesses or angioplasty? What if, God forbid, one could prevent atherosclerosis someday?

I believe that there is a deep-seated fear that such fundamental advances will put surgeons out of business. If research is ultimately going to put us out of business, we really have to pay it only lip service.

This distrust is echoed by the surgical establishment: the residency review committees, the Boards, and the American College of Surgeons. All of them are ideologically committed. They allocate their resources to education and to the errors of the past and to the current standards of practice—a practice which is largely folkloric—supported by the experience of our heroes and, by and large, weakly supported by scientific study.

We justify our failure to restudy our favorite habits on the basis of ethical concerns for patient welfare. But just look back a few years. Pick up an old journal and see how often good ethics of the past are now equated with discarded operations and indications.

Just as international organizations raise standards—the Olympics led gradually to improved athletic performance—a reorganization of the surgical establishment, a real slight one, might well lead to better science performed by surgeons.

A very thoughtful pamphlet has been published by an “add hope” committee that addresses all of my concerns and more. This “add hope” organization deserves a permanent place in the surgical establishment, obviously, as part of the American College

of Surgeons. There it can serve, not only as a clearinghouse (on grants and contracts from public and private agencies, on joint ventures with industry, on multiinstitutional research projects) but also as an educational center (on clinical research, statistics, and grant preparation). Based within the college and nowhere else, it would have visibility, prominence, and access to vast communication resources. Of most importance, with a permanent staff on behalf of surgical research, it would serve as a constant reminder to this principally educational and economic body that everything we teach will soon be history, whether surgeons participate or not.

Such a powerful influence could constantly provide a focus for the training of surgical investigators. It could lobby for sufficient flexibility on the part of the Boards for an academic track within surgical residencies. An academic track would counteract tendencies to further broaden surgical training and, instead, encourage a deeper understanding of biology in surgery.