

Department of Surgery History Interview
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This interview presents Dr. Randall Bollinger, Chief, Division of General Surgery, Department of Surgery, Duke University Medical Center. The subject of this interview is Dr. Bollinger's work as Chief of the Division of General Surgery. This interview takes place in Dr. Bollinger's office in Room 113A, Bell Building on the Duke University Medical Center Campus. The interviewer is Dr. James Gifford.

Dr. Bollinger, I believe we obtained most of your personal information in an earlier interview, but would you recall for us the years that you have spent as a resident at Duke.

I started here in 1970, actually came to interview with Dr. Sabiston in the fall of 1969. At the end of June we had our orientation and I started at that time on the wards on the Urology Service. After two years of working on the Clinical Service, I went into the Air Force where I was on active duty during the Viet Nam War for two years. Then, when I returned to Duke, it was as a Research Fellow in Surgery, and graduate student in Immunology. I finished working in basic immunology before coming back to the Clinical Residency in 1977. My Chief Residency here was the 1979-1980 year. So, I finished officially on July 1, 1980.

Doctor, what should I understand by the term "general surgery"?

General Surgery refers to originally all of surgery that had not been broken down into sub-specialty areas. General Surgery initially was all of surgery. As certain bodies of knowledge became sufficiently large to warrant specialized study, they left general surgery and became sub-specialties of their own. So that over time, Urology, Plastic Surgery, Orthopedics, Neurosurgery, just as examples, broke away from general surgery and became highly specialized areas. General Surgery is everything that is left. And to the extent that in certain areas of the country, specialists in neurosurgery or orthopedic surgery do not exist. In those areas, the general surgeon who has

had some training in each of those areas functions also as the orthopedist and the neurosurgeon. At an academic center like Duke, general surgery includes those areas of surgery not covered by the well delineated specialties. The areas are primarily GI-surgery, which includes hepatobiliary surgery, colorectal surgery, small bowel surgery, pancreatic surgery, includes transplantation of abdominal organs, including liver, pancreas and kidney. It includes trauma surgery, surgical intensive care, surgical nutritional support, vascular surgery both central and peripheral, endocrine surgery, breast surgery and surgical oncology. Much of the soft tissue of the body such as hernias of various viscera of the abdominal wall would be taken care of by general surgeons. That is a summary of what we do and where we are.

Now at Duke, historically, there has been a partnership or combination of general and thoracic surgery up until very recently. In fact, up until you got appointed. Is this for historical reasons.?

Dr. Sabiston came from Johns Hopkins. Johns Hopkins developed under Halstead the modern surgical residency. Residents at Hopkins were trained in all areas of surgery, and literally, after long training could practice at the level of knowledge at the time in each of the various sub-specialty areas of general surgery. That tradition of providing broad training in surgery that included some exposure to all of the sub-specialties is what was brought to Duke by Deryl Hart, and was continued by Dr. Sabiston. The belief was that we ought to be comfortable taking care of surgical problems above and below the diaphragm, and there shouldn't be some artificial barrier to that. Historically, what happened in Urology or in Orthopedics, has now happened to cardiac surgery, as well. What in 1970 was a specialty primarily of thoracic surgery involving pulmonary surgery, TB surgery, a variety of vascular and cardiac procedures has over the ensuing 25 years, become largely a cardiac surgery sub-specialty, and as a result of that highly specialized nature of the work that is done by most "thoracic surgeons", the relevance of their work to general surgery, and at the same time their desire to be separate and specialized distinct from general surgery, has led to it breaking away in the same way that Urology broke away in the early part of the century. I see it as a natural evolution. We were among the very last centers in the United States to allow thoracic surgery to break away. And, in

fact it was only last year that our last combined general thoracic resident went into thoracic surgery.

Now I notice in the literature describing the general surgery residency the statement is made that the residency prepares people either for a career in academic surgery or a career in private practice. Somehow, as a layman, I am not quite sure I understand how that works. I somehow have the feeling that academic surgery and private practice would be very different, but apparently the preparation is much the same?

My view on that is that excellence in surgery is what we teach. If one finishes here, they will be sufficiently competent in surgery, and have both clinical and research experience to become a teacher of surgery. Others may not choose to become a teacher of surgery, but rather a practitioner of surgery. But they will be among the very best practitioners of surgery in the United States because they will be better trained than the majority of surgeons who finish residency and will be more accomplished in specialty areas, and hence be able to practice at a higher plane than the average person who goes into practice. Excellence in surgery, whether practiced at a medical center of a teaching university, or practiced in a private practice situation, is what we are after.

The student in any surgical specialty who begins residency, begins by doing general surgery. Is that correct? The first year or two are pretty much devoted to a general surgery background?

We are seeing an evolution there also. Dr. Gifford, and just as the specialties broke away in years past, the managed health care environment is putting pressure on the residency right now. The proposals before Congress would have residents supported only to the first level of their certification, and only for a maximum of five years. What means is that is that the broad general surgery training that used to be essential for orthopedic surgeons, ENT surgeons and urologists, is being ever more restricted. Your statement has been historically been generally true, but right now we are seeing a trend of starting specialty training after one year of general exposure, so that for

some time neurosurgeons leave after an internship and go into neurosurgery specialty training. Effective right now, this year, orthopedic surgery is moving half of its residents out into orthopedic specialty training after one year and within the next year or so, all of the residents will move out of general training into orthopedic specialty training after one year. And that trend is likely to be repeated in the other specialties including plastic surgery and thoracic surgery that currently now require full general surgery training prior to going into their specialty area. This is a prediction, but I predict that as soon as, and if this law passes, that we will see orthopedics for thoracic surgery and plastic surgery to discontinue initial boards in general surgery. Since they will have no way of supporting their residents, they will very likely end up moving their residents into three years of thoracic training after two years of general surgery rather than after a full five-year of general surgery training program.

In doing a little bit of research in preparation for our conversation, I happened to dig out Andy Wechsler's operating experience back when he was a resident which I compared to the operative experience of someone named Duane Davis, much more recently. It looked to me like the number of procedures in which the students today are involved is considerably larger than the number of procedures in which Andy Wechsler was involved twenty years ago. But I wondered if that were true, I may be comparing apples and apples here, and I just wondered if you could tell me if it is true that a student training in general surgery back when you were a resident would have had fewer operative experiences than one training now, and if so why is that true?

Well, I think that the goal of our training program has been to preserve a large surgical experience for everyone of our residents. The problem of this sort of comparison is that Dr. Wechsler was a resident from 1968 to 1974. This was a considerably shorter period of time than Duane Davis who was a resident from 1984 to 1983. So we are talking about a nine year program versus a six or seven year program . So if one pro-rated the cases done per year, the 937 for Andy Wechsler in a shorter period of time, would not look so small compared to Duane Davis who was a resident three years long. In

addition to that, the total cardiothoracic surgery experience of Duane Davis is 160 cases more. And that, I think typifies or reflects the change in thoracic surgery that has occurred in twenty years between the two of them. Open heart surgery has become a large part of surgical practice at Duke Hospital, whereas when Andy Wechsler trained, it was a small part of surgical practice.

That is the kind of thing I would like to get to, what things have happened over that period, why did the number of years increase?

The number of years increased because the Thoracic Board required additional training that was specific to cardiac surgery. Again, it is the same specialty consideration we talked about before. It is impossible to get thoracic boards now without being trained in open-heart surgery. The training in open-heart surgery required additional cases and additional time. That is an example of how the evolution of a specialty has impacted on the residency. Now, we are going to be compelled to reduce the total time of residency. Now you see where I was coming from in the earlier conversation. What is going to suffer? It is not going to be the number of open-heart cases that a young thoracic surgeon does. It is going to be the number of general cases they do ahead of time in general preparation for surgery training that is going to diminish.

Are there any other developments over the period of time between your residency and today the impact on those figures that I ought to know about? Specific things that either were either included or excluded.

Andy Wechsler did very little transplantation during his residency. In fact, I don't even see him listing transplantation as one of the procedures included. On the other hand, transplantation, laparoscopy, endoscopy and thoroscopy are all major components of modern practice that played a minor role in Andy Wechsler's grant. There was no laparoscopy when Andy Wechsler trained. Duane Davis performed 37 of those procedures. A resident who finishes in 1996, will probably perform 100 of those. The procedures that were done in the early days were quite different than the procedures that are

being done now. In fact, operations that I do day in and day out now were not taught in residency, because they were not done in residency. We did not transplant the pancreas, we only occasionally transplanted the kidney. We did not have Gortex grafts to put into people's arms for dialysis access. There was no laparoscopy as I mentioned. There was no ileoanal pull-through procedure. These are all procedures that have evolved since I was a Duke resident. What we need to prepare our residents for is the future. We teach them using present technology but they have to be prepared to acquire new skills in the future, new knowledge.

Prepare them to do that by.....

By teaching them an approach to surgery based on principles. Based on physiologic and anatomic principles that are unchanging. Our concept of them may change, but there is some very basic knowledge that allows a person to safely proceed with surgery. We teach them a certain caution and an awareness of potential problems that might arise and they learn over time ways of getting out of trouble if they do get into it. They have research time, two years or more where there delving into new knowledge right the border of what is known. And they learn during that time, if not before to read the literature, to inquire

Your expectation then would be that the student of general surgery will continue to add these procedures as they become available that are new and on the cutting edge but not with the pressure of managed care, there is going to be a danger on the back side that the regular things that are basic will be short-changed to a degree.

I fear that. I certainly do. It is those basic things that one learns during the early years of residency, and by short-changing people on the basic things and go immediately to the current high specialty interests, the foundation is less firm than it would be if more time had been spent in preparation.

Will you walk me through a residency structure year by year and tell me what happens at each level?

I would be pleased to. I am going to base it on a general surgery resident who has not differentiated into one of the specialties knowing full well that some of them may choose to break off at a certain point, and perhaps I should indicate to you what those break points are most commonly. A person who says they are interested in surgery who wants to come to the Duke Residency Program will already have accomplished quite a bit. He will be a member of AOA in the upper 20% of his class, may have done some research already before he comes. So we are starting out with a pretty select group of young people. Those people go through a two-year program of internship and junior residency during which they are exposed to not only general surgery but all the surgical sub-specialties, to learn basically what goes on in urology, orthopedics or neurosurgery and etc.. They spend time in the emergency room learning trauma, and time in the Intensive Care Units, learning how to take care of very sick patients. The emphasis is upon learning the physiology of pre and perioperative surgery diseases by taking care of a large number of patients who have those problems. Then to the operating room and gain some of the basic manual skills required to do more complex procedures. Complex procedures that come in the senior and chief years of the residency are an accumulation of a number of very small steps. It is in these years that the resident learns the basic small steps, building blocks if you will, that they will use to create the house of their own surgery. To the junior residency, when a resident has been exposed to much of the science and principles of surgery, there is a natural breakpoint. Those people who are going into subspecialties have historically left at that point to go into the subspecialty. They have the basic building blocks, now they will put them together in a little different way to do ENT than if they were going to do urology, and that works very well. It has worked very well. We talked about the pressures that may change that. Those who are going into general surgery at a place like Duke who trains teachers of surgery, those basic surgical skills are taken to a laboratory where the resident spends two and sometimes more years delving into at a more basic level, the science that underlies surgery, and contributes something to that, adds new knowledge to it. The beauty of the break after the second year is that during the first two years, residents have a chance to see what is going on in the laboratories around here, and so they can choose wisely where they want to go for their

research years. On the other hand, on the clinical service, they have an understanding of the problems that patients do face, and so can take a real world problem to the laboratory to study it. So, I see one contributing to the other. After they have done their research time, they come back into the senior residency years, and this is the building process of putting those basic skills together into larger and larger operations, takes place. It is a situation where great responsibility is given to the resident as they are able to take on more and more, until finally, in the Chief Residency year, they act as a leader of the group of residents, teach young residents basic skills and the biggest operations on general surgery. From aortic aneurysms to transplantation of the kidney, to removal of parathyroid disease, all sorts of surgical oncology. They do the biggest operations in general surgery during their chief residency. So, by the time they are graduating and they are leaving and going into practice here, they are prepared intellectually, that is how they work their way through a residency.

From a historical point of view, prior to the late fifties, early sixties, they were not associated with surgical departments for the most part these many laboratories we have today. How then, did the surgeons of prior eras gain the basic physiological understanding that you talked about as being necessary for a firm foundation?

One of the common ways was to apprentice themselves to a skilled surgeon. The old apprentice technique. If you had someone that was successful and quite good at the practice of surgery, and you followed that person around for enough years, you would eventually have rub off on you enough knowledge about how to do things correctly that you might independently do things correctly. So apprenticeship was one of approach that was used before we had this type of residency. The formal residency program developed by Halstead allows one to concentrate apprenticeship into a short period of time, shorter than a lifetime, into six or eight years, instead of into ten or fifteen years. The level of understanding that existed in general surgery, prior to establishment of these surgery laboratories, was a minute fraction of what is known today. And, I don't doubt that what we know today is minute fraction of what is to be known. But the point is that those principles were not very well known. And if the truth be stated, some of the practices then, it turns

out, were just wrong. Because the practices were not subjected to scientific analysis, they were not given that tough scrutiny that a laboratory project requires. It is a different point of view. I wasn't around in 1950's hospitals to see exactly how they practiced surgery. You could probably speak to that better than I.

Well, I was looking at the image that you drew of the research years being on the one hand a building upon the first steps, and on the other hand, they become a way of going back to the first steps once you are out in clinical practice. And, I am thinking about how to tie that up to Dr. Hart/s era when the laboratories just did not exist, in part, for want of money, but in part also because surgery was thought much more to be a matter of engineering than a matter of laboratory work, and that balance has obviously changed.

We have an unusual surgery department, too, and you understand I am sure, that most surgery departments would not be into gene therapy, and xenotransplantation in the way our department is. So, we are sort of special in that respect.

Hopefully, that is going to make the book worth writing. One of the things that has always been associated with residency programs, is long work hours. Can you tell me what is required of a resident in terms of the commitment of time, and why that commitment of time is beneficial with the values are that are gained from it?

It is a high commitment of time. Throughout my residency, we were on 36 hours, off 12, and I had finished a 40-year week in the first three days. But during that time, we were totally immersed in surgery inside and outside of the operating room, the care of our patients, and gained an appreciation for how patients change over time. You really have to be around patients over periods of time to observe the changes that occur. If you are off somewhere else at home or at the library, you don't see what you need to see and learn what you need to learn. That is one of the answers to "why". Another answer is that when you are here at night and most people aren't, there are more responsibilities that fall to the house staff. You don't have multiple attending

surgeons walking up and down the halls. You have a more skeleton crew. If it is to get done, you as a house officer have to do it. So, that the experience in the middle of the night is better than the experience in the middle of the day from the point of view of challenge, but to learn. One learns by working hard at it, plugging away, you eventually do come to an understanding. So, I think that hard work, and learning hard work, and dedication to the patients, and not signing off on them by punching a clock, is an approach to medical care that is good for patients. You or I would want to be treated if we were in the hospital, wouldn't we want to have a doctor who was dedicated.

If he wasn't exhausted and making mistakes.

Yes that's true, and that has been the counter-balancing argument that at the end of the 36th hour there is no way that we could have been as effective as we were in the first hour. I believe that is true.

Do they still work 36-12?

They are off two nights after being on one, so they work every third night instead of every other night. So the residency now is but a shadow of the residency that Andy Wechsler and I went through. But I don't lament its passing to the extent that we find ways of infiltrating this knowledge and the work ethic into residency. The level of intensity on the ward is much greater than it was in the seventies.. The hospital is becoming an Intensive Care Unit. The patients who used to be on the wards are going home so that the level of illness, the acuity of the patient illness is much greater now than it was even ten years ago. For social reasons, in the sixties and seventies, there were patients who could more conveniently be cared in the hospital than at home. That has ceased to exist. When you are in the hospital, you are really sick. And that means that you have to do a lot to take care of patients. Our interns are running like mad. They take care of more sick patients than we took care of when we were on 50% longer than the are.

Let me switch gears a bit. You are the Chief of something called a Division. That is an administrative category that has carried over from the Dr. Hart era, pre-1960 era to the present day, and I gather

has mostly to do with patient management. A division is an administrative category into which classes of patients are fit according to their problem. Is that right?

Divisions can be defined at many different levels. You are absolutely correct that the level of patient with a kidney problem, they are going to go either the medical nephrologist or to the surgical urologist. On the other hand, when a patient shows up in the emergency room who has been traumatized and may have hurt their chest and kidney and have broken their leg and contused their spleen and liver, then you need someone who is general from the clinical point of view, because you don't know what division to put the patient into. So, you can't think of these divisions as being, at least in terms of the general surgery division, as being only a clinical allocation. We also have to have some way of grouping our faculty, and providing residency training in these general principles that we have discussed up to now. Divisions function in each of these groups. So, it is not just in a division of clinical care.

Let us deal with research for a moment. I have talked with you once before about research as it was involved in a specialized laboratory which I gather functions independent of a division. What research activities does a division undertake.

We are in an evolution there. At one point, there wasn't any research laboratory separate from a division. Research laboratories were a part of a division, part of an evolution that is still in progress. I can say examples of when things have changed. Dr. Beard started this virology laboratory that used to be where we are sitting, right here in the Bell Building. That was one of the very first laboratories in the surgery department was devoted to a more basic science. That was of the Department of Surgery. It was of this division was called General and Thoracic Surgery. Most of the laboratories that existed through the 1980's were laboratories that were of this division of general and thoracic surgery. It was not a separate laboratory group. When Dani Bolegnesi became a Professor of Experimental Surgery, he was the only scientist in our department who had a tenured position. It was very infrequent to have a scientist be in the surgery department and have tenure. But

was the beginning of a new era in research. It became difficult for clinical scientists who had laboratories next to their clinical operation to allow them to independently obtain peer review for grant support for their science. So that the old surgeon's lab model that we had used for many years, became increasingly unattainable in order to promote the scientific research we needed to underpin our surgery department. So, what we have seen over the last ten years, is a shift away from surgeons' specific laboratories which are increasingly difficult to find externally, towards laboratories that are in a research division of the department where there are full time MD,PhD researchers devoted just to the underlying science. who work on projects that relate to surgery, in the Department of Surgery. To the extent we still have some divisional members, faculty members who have their own research laboratory, but do not have external support by the divisions who have been supporting those people. As our internal sources of support dry up, we will see fewer and fewer divisional laboratories, and more and more of these larger extramurally funded primary research laboratories. Does that mean that the divisions will have no role. Absolutely not. Because the faculty members interested in research will be doing their research in collaboration with the laboratories that we have established that are effective and can be supported. The young surgical scientist we are trying to train will be going to those laboratories to do their research years. So, we will still as a division be providing our residents the support to go into these research laboratories. We ourselves will go into these research laboratories, but they will not be physically located next to our individual faculty offices in the Department of Surgery in many instances.

And they will be administratively separate because they will be in a Research Division.

That Research Division is yet a new construct in the evolution of our Department. We did not have a separate research division until Bob Anderson came. We had people interested in research, like Dani who I mentioned, and Otto Hagen, but they were never pulled out of the general and thoracic group. They were just a part of our division. Now they are separate. There is a research division. Dani Bolegnesi is the Vice-Chairman for research. Labs like Eli Gilboa and Jeff Platt's, Dani Bolegnesi's are laboratories that

are in that group. So that is continued evolution we are seeing. I suspect it won't stop.

Over the whole course of Duke's history, we went from having no laboratories in the clinical departments, primarily for want of money, and also to support the basic science departments in the medical school, so having individual scientists laboratories within the divisions to having research laboratories that could be supported and could be efficient on a large scale, to now research being a separate division. That is quite a story. I didn't realize there were all those steps in it. That is the first time it has made sense to me since I started.

Dr. Sabiston's buddy at Harvard has just had a book written about him, Francis Moore. It says something about surgery being applied to biological aspects of engineering, and basically I had been looking at a two-step evolution where I was getting too caught up with no laboratories in Dr. Hart's time, and lots of laboratories in Dr. Sabiston's time. And it is not that simple.

It is more complex than that.

I have been trying to find a middle term. And the middle term is where the money switches over when the database grows, and the money goes into the growth of other database which takes it out of those individual labs and Duke really never went through a full-fledged period when they had lots of individual scientists surgeons' labs right beside their offices. That was never a dominant model.

When I started on the faculty in 1980, most of the young faculty members had a laboratory. That is a big difference from what you described during Dr. Hart's tenure. Now in 1995, most of the young faculty members are associated with a laboratory, rather than having one.

Now, in 1980 when you were going through, they had a laboratory because?

Because that is where they did their academic research work. It was different from everybody else's' academic research work, and each of us had our own little projects.

And that becomes difficult to support?

Not only does it become more difficult to support financially, but if you look beyond that superficial reason to why is it difficult to support financially. It is because the quality of the research that is done in those laboratories can't keep up with what is done in a large research laboratory with many people devoted full time to doing research. You have got a part time surgical scientist competing for grant support against a group of full-time researchers who are pushing the cutting edge of the science. These people are applied researchers. These people are basic, and are now in a department where application is interesting and important so they start doing applied research too. Once you have got those two different forces doing applied research, this one over here is going to get the support. And it isn't because of dollars so much as it is because of the quality of the science. And the dollars have followed it. The two are not going to exist for long in the same institution. This one will have higher quality science that gets more support, this one will have lower quality science and won't get its grants renewed, unless these people associate with this and do collaborative things. So, you have Lyerly working with Gilboa. You have Iglehart working with Futrell. You have people working together, scientist and clinician in order to advance.

From the point of view of patients, how have the patients changed in general surgery over the time since your residency. You outlined for me at the beginning of this interview what specific things a general surgeon would do, but have there been any noticeable shifts, you tell me that people are getting sicker because of the pressure of managed care. Are there any specific things in terms of what patients come with or what patients no longer come with that are important?

People don't have tuberculosis now the way they used to have tuberculosis in many organs of the body, but especially the lung. So

infectious disease has changed. People come now for gall bladder surgery at a much earlier stage on the average than they came twenty years ago because of laparoscopic cholecystectomy, same day surgery, for minimally symptomatic gallbladder disease with minimal impact, low cost, low discomfort, rapid return to work. And that is a whole technology that did not exist before. I mentioned to you the increased acuity of our in-patients, due to managed care. But, at the same time, you have to understand that a large part of our surgery has become ambulatory. It has become out-patient surgery. So, we are busier as a department of surgery and a division of general surgery than we have ever been before in terms of the number of cases we do. And the length of stay in the hospital has plummeted. We have empty beds in the hospital because we are not admitting our patients to the hospital any longer to do many types of surgery.

For the complete story of the division, we would need to pay attention to some statistics on how long people stayed in the hospital in the sixties as opposed to now, and why that has changed.

Absolutely. My special area of interest, transplantation, was something that was only starting in the sixties. I mean, Del Stickel did the first kidney transplant here in 1965. Just beginning. The total number for one year of transplants done including kidney, liver, pancreas and lung was about 160. So we went from doing one the first year to doing 160. 160 is not a large number of cases compared to what Duke Hospital does, but it represents a fundamental change in what we are doing. At one time we took out disease. Now, we are talking about an era where we replace old organs. It is a different world out there.

Well, I think I have got enough to chew on for awhile. I thank you very much for your time this morning, and I will be back in touch.

I will look forward to reading the results of your work.