

Profile of the Contemporary Thoracic Surgery Resident

Benson R. Wilcox, MD, Frank T. Stritter, PhD, Richard P. Anderson, MD, William A. Gay, Jr, MD, George C. Kaiser, MD, Mark B. Orringer, MD, W. Gerald Rainer, MD, and Robert L. Replogle, MD

The University of North Carolina School of Medicine, Chapel Hill, North Carolina, and the Ad Hoc Committee on Graduate Education in Thoracic Surgery

Any study of graduate education must take into consideration the recipients of that endeavor—the residents. Seeking demographic data regarding residents presently in training, the Ad Hoc Committee on Graduate Education in Thoracic Surgery [1] could find no authoritative source. Therefore, the Committee initiated an independent study for that purpose. That study served as part of a data base for the Joint Conference on Graduate Education in Thoracic Surgery and is the subject of this report.

A goal of the Committee was to gather sufficient authoritative information to characterize the contemporary thoracic surgery resident in such a way that—after combining information from our own survey (Appendix 1) with that obtained from other sources such as the Association of American Medical Colleges (AAMC), the American Board of Surgery, the American Board of Thoracic Surgery (ABTS), and the Thoracic Surgery Directors Association—a profile could be produced of the person who chooses thoracic surgery. In addition, we sought to be able to describe to some extent the factors leading to that choice and, also, the path these individuals traveled subsequently.

Methods

The Ad Hoc Committee, with the cooperation of the American Board of Thoracic Surgery, identified 140 individuals slated to complete their residency in thoracic surgery in June 1993—hereafter referred to as the Class of 1993. Because of the vagaries of program design and other variables, not all will fit that timetable, but each participant had completed at least one year's experience in an approved program. A survey design employing a questionnaire (see Appendix 1) was developed by the Ad Hoc Committee and mailed to these residents. Follow-up calls and letters to program directors resulted in a relatively high response rate of 80% (112 individuals). These responses were collated and the results made available to the Joint Conference on Graduate Education in Thoracic Surgery.

Next, the operative experience of the Class of 1993 was

obtained from the American Board of Surgery for the years of their general surgical residency. The records were such that a detailed analysis could be carried out for 112 of these individuals (not necessarily the 112 who responded to the questionnaire).

In addition, the AAMC provided medical student data from the most recent (1990) Graduating Student Survey Report. These data were selectively analyzed to allow comparison of students with a stated interest in thoracic surgery as a career to all respondents. This survey is undertaken annually by the AAMC and includes graduates of all medical schools of the United States and Canada.

Then, the operative experience for first-time applicants for the thoracic surgery written examinations in the years 1988 to 1992 was obtained from the ABTS. It should be noted that these are data from *applicants* to the Board, and that each year some of these individuals were not accepted for the credentialing process because of various problems, such as an unacceptable clinical experience.

Finally, the thoracic surgery program directors were questioned regarding the number of years necessary to complete the residency in their institution. Additional data related to the residencies were gathered from the TSDA Registry of Residencies (CB #7065, 108 Burnett-Womack Bldg, Chapel Hill, NC 27599-7065) and the National Resident Matching Program (Suite 201, 2450 N St NW, Washington, DC 20037-1141) for thoracic surgery.

Results

For purposes of this report, the data will be examined to reflect an image of the thoracic surgery resident at three stages of his or her career: (1) medical school, (2) general surgical residency, and (3) thoracic surgical residency.

Medical School

In the medical school graduating class of 1990, there were 11,617 respondents to the AAMC Graduating Student Survey Report, representing 75% of the graduates that year. Seventy-two individuals, less than 1%, indicated that they were pursuing a career in thoracic surgery. Ninety-two percent of the latter group were male, whereas only 65% of the total respondents were male. The racial differences between the groups were not striking; however, approximately 10% of those choosing thoracic surgery were black, whereas only 5% of the total

Presented at the Joint Conference on Graduate Education in Thoracic Surgery, Oak Brook, IL, Sep 25-27, 1992.

Address reprint requests to Dr Wilcox, CB 7065, 108 Burnett-Womack Bldg, University of North Carolina, Chapel Hill, NC 27599-7065.

Table 1. Demographic Data on Members of the Medical School Graduating Class of 1990^a

Variable	Thoracic Surgery (n = 72)	All Graduates (n = 11,617)
Age (y)	27.6	28.1
Race		
Black	10%	5%
White	78%	80%
Sex		
Male	92%	65%
Female	8%	35%
Never married	69%	53%
Loans	75%	78%
Scholarships	50%	51%
Mean debt	\$39,148	\$36,423

^a Data from Association of American Medical Colleges graduating student survey report of 1990.

group identified themselves as black. Almost 70% from the thoracic group and only 53% of all respondents reported never having been married. There was little difference between the average age of the two groups (27.6 years for thoracic surgery versus 28.1 years for all). Also, there were no marked differences in the financial status when the two groups were compared, with about equal numbers on scholarship and a comparable debt (Table 1).

Research played a larger role in the course of those choosing thoracic surgery. Forty-four percent of the thoracic group included research in their graduate education plans, compared with only 19% of the others. Thirty-two percent of the thoracic group thought they would be significantly involved in research in their careers, and 50% indicated a first career choice of a full-time academic position involving clinical practice, teaching, and research. These figures were 14% and 29%, respectively, for the total group of respondents. When asked what other areas of practice they seriously considered—if they considered other areas of practice—the thoracic group indicated internal medicine, 31% (versus 20% of others); pediatrics, 14% (versus 10% of others); orthopedic surgery, 0% (versus 5% of others); and general surgery, 3% (versus 13% of others). When asked when they had made their choice of a type of practice, 43% of the thoracic group (versus 13% of others) had made this decision before entering medical school.

Data pertaining to medical school activity were also obtained from the questionnaire sent to the thoracic surgery residents in training—the Class of 1993. The 112 respondents were products of 69 different medical schools. These included one osteopathic graduate and nine graduates of off-shore institutions varying from Oxford University in one instance to St. Georges in Grenada in three instances. One school produced four of the residents, four produced three of the residents, and the remainder produced one or two. Twenty-one percent of that group had decided on thoracic surgery before medical school, an additional 34% before the end of

Table 2. Timing of Choice of Thoracic Surgery^a

Timing	Percentage
Before medical school	21%
Basic science years	3%
Clinical years	31%
Medical school subtotal	55%
General surgery years 1-2	23%
General surgery years 3-4	20%
Chief residency in general surgery	2%
Residency subtotal	45%

^a Data from Ad Hoc Committee survey of thoracic surgery residents.

medical school, and the rest during their general surgery residency (23% first two years, 22% in the later years) (Table 2). Approximately 80% stated that they were in the upper one-third of their class; 38% were members of Alpha Omega Alpha, and 43% belonged to an undergraduate honor society. Twenty-three percent had six months or more of dedicated research time as a medical student, and 70% had at least a two-week rotation on thoracic surgery as a medical student (Table 3).

According to the AAMC survey of medical students, approximately 80% of those interested in thoracic surgery applied to 11 or more residency programs—presumably in general surgery—whereas 19% applied to 26 or more programs. Comparable figures for the remaining respondents were 53% applied to 11 or more and 12% to 26 or more. A majority (57%) of the students with an interest in thoracic surgery indicated that one or more of the programs to which they applied suggested their chance of being selected would be enhanced if they would take an elective in that institution. This was the case for only 38% of the other respondents.

General Surgical Residency

According to the responses of the Class of 1993, 78% did their general surgery in a university medical center, 12% in a community hospital, 4% in a large private clinic, 4% in a military program, and 4% in some other place. Sixty percent of the general surgical programs were associated with an approved thoracic surgery program, and approx-

Table 3. Medical School Data^a

Variable	Percentage
Class Rank	
Upper third	79%
Middle third	15%
Lower third	1%
Unknown/unranked	5%
Member of Alpha Omega Alpha	38%
Member of undergraduate honor society	43%
≥6 month research as student	23%
≥2-week thoracic rotation as student	70%

^a Data from Ad Hoc Committee survey of thoracic surgery residents.

Table 4. General Surgery Residency: Summary of Operative Experience, 1986 to 1991 (n = 112)^a

Type	Mean		Standard Deviation		Minimum		Maximum	
	Total	CR/TA	Total	CR/TA	Total	CR/TA	Total	CR/TA
Head	27	8	15	6	6	0	79	31
Breast	89	20	45	14	25	1	268	80
Alimentary	248	88	73	28	143	31	465	154
Abdomen	246	79	75	26	127	30	509	168
Vascular	222	86	75	39	73	9	469	221
Endocrine	22	9	13	7	3	0	90	37
Thoracic	81	14	54	12	7	0	233	52
Pediatric	59	6	32	9	6	0	175	42
Genito-urinary	29	4	23	5	2	0	134	25
Plastic	26	4	20	4	1	0	104	23
Trauma	108	39	63	32	8	2	310	140
Total major	1,226	360	344	114	736	0	2,852	651
Total minor	236	50	161	37	49	0	998	221
Patient care management/nonoperative care	174	22	211	23	1	0	1,212	157

^a Total number of operations as chief resident (CR) plus teaching assistant (TA) year.

imately one-half of the individuals in such programs remained in the same institution for their thoracic residency. Fifty-three percent of the Class of 1993 had at least 3 months of dedicated research time as part of their general surgical experience.

Sufficient information regarding their operative experience was available on 112 members of the Class of 1993. Although detailed analysis was carried out on these data, only that information deemed relevant to the thoracic surgical experience is reported. Table 4 relates to the operative experience in various clinical areas in two periods. The first set of numbers reports all operations over the course of the residency in which the resident was involved either as an assistant or responsible surgeon. The second set of numbers indicates those cases in which the resident was more or less responsible for the operation either as chief resident or teaching assistant. The total

number of major and minor cases does not equal the sum of those listed in these tables because not all clinical areas in which the resident had experience have been included.

Operations involving the alimentary tract, the abdomen, and vascular diseases constitute a large part of the residents' experience at both the junior and senior levels. These are followed by experience in trauma, breast, and thoracic operations. Thoracic surgical cases account for only about 5.5% of the average total experience (number of thoracic cases divided by the sum of major and minor cases) and 3.8% of the average chief and teaching assistant experience.

Table 5 details the thoracic operative experience for the same two time periods—the total experience and that of the chief/teaching assistant time. The numbers are small in both periods, although a rather wide variation is noted for some of the procedures.

Table 5. General Surgery Residency: Summary of Operative Experience, 1986 to 1991—Thoracic Operations Only (n = 112)

Type	Mean		Standard Deviation		Minimum		Maximum	
	Total	CR/TA	Total	CR/TA	Total	CR/TA	Total	CR/TA
Thoracotomy	6	2	5	2	0	0	28	14
Pneumonectomy	3	1	3	1	0	0	25	8
Lobectomy	11	3	10	4	0	0	61	19
Wedge resection	7	2	6	2	0	0	28	9
Outlet decompression	1	0	2	1	0	0	23	3
Drainage of empyema	3	1	3	2	0	0	12	8
Pericardiectomy	2	0	2	1	0	0	10	7
Pacemaker	5	1	11	2	0	0	106	11
Cardiac procedures	32	1	37	2	0	0	176	21
Esophagus	12	4	7	3	0	0	46	17
Other major	9	2	13	3	0	0	84	17

CR/TA = number of cases as chief resident or teaching assistant.

Table 6. Factors Influencing Choice of Thoracic Surgery
Appearing Ten or More Times^a

Factor	No. of Times
1. Role models in this specialty	71
2. Intellectual content of specialty	66
3. Rotations during residency	48
4. Electives/clerkships in medical school	32
5. Type of patient problems encountered	23
6. Prestige within medical profession	21
7. Challenging diagnostic problems	20
8. Encouragement from faculty	11
9. High technology of this specialty	11
10. Possession of skills/talent for this specialty	10
11. Good income relative to other specialties	5
12. Other	6

^a Data from Ad Hoc Committee survey of thoracic surgery residents.

Despite this relatively limited experience in thoracic surgery, 45% of the members of the Class of 1993 made their decision to enter our specialty during the general surgical residency (see Table 2). Also, when those individuals were asked to choose three items from a list of factors influencing their choice, the third most frequently noted factor was their experience on various rotations during their general surgical residency (Table 6). Also, the leading influence—role models in the specialty—is very likely to have been a product of the general surgical residency years for a large number of these individuals.

Thoracic Surgery Residency

Demographic data from the resident survey are listed in Table 7. The average age of the 112 respondents was 34 years (range, 30 to 43 years). One hundred five were men, and seven were women. Five identified themselves as of Asian/Pacific origin, 5 as African American, 2 as Hispanic, and 100 as white. Sixty-nine percent of the group gradu-

Table 7. Demographic Data on Thoracic Surgery Residents
Responding to Survey^a

Variable	No.	%
Sex		
Male	105	94
Female	7	6
Race		
Asian Pacific	5	4.5
African-American	5	4.5
Hispanic	2	2
White	100	90
Year Graduated from Medical School:		
Before 1985	44	39
1985	34	30
1986	32	29
1987	2	2

^a Data from Ad Hoc Committee survey of thoracic surgery residents.

ated from medical school before 1986; thus, if all of this 69% complete their residency in 1993, they will have spent more than the basic 7 years required by the Board. The average time from medical school graduation to completion of the residency process is 8.6 years for the entire group.

As noted earlier (see Table 3), 38% were members of Alpha Omega Alpha, 79% were in the upper third of their medical school class, and 23% had 6 months or more of research experience as a medical student. Cross-tabulations ($n = 109$) show that 5 of the 7 women residents were members of Alpha Omega Alpha. Also, those who were members of Alpha Omega Alpha tended to have pursued general surgery residency programs in university medical centers and were more likely to have had research experiences during their general surgery residency. Whereas 53% of the Class of 1993 had at least 3 months of concentrated research experience during their general surgery residency, only 30% of the group had or will have such an experience during their thoracic residency.

When the respondents were asked to list positive and negative factors regarding their residency experience, a number of important responses were noted (Appendix 2). The top five favorable factors—in terms of times mentioned—were (1) *Aspects of clinical experience* (64 times), eg, excellent variety/diversity of cases; (2) *Faculty* (43 times), eg, excellent role models; (3) *Intrinsic rewards* (40 times), eg, satisfaction of being in a discipline with future research possibilities and cutting-edge work; (4) *Operative experience* (26 times), eg, active participation in complex procedures; and (5) *Institutional characteristics* (9 times), eg, excellent teaching and working environment. Negative factors included (1) *Insufficient time away from patient care responsibilities* (46 times), eg, insufficient time for reading, studying, and writing papers; (2) *Aspects of clinical experience* (33 times), eg, overemphasis on a particular area, including cardiac or transplantation; (3) *Extraordinary rigor of clinical schedule* (31 times), eg, long, unhumane working hours; (4) *Faculty and teaching* (14 times), eg, poor teaching skills by attendings in the operating room; and (5) *Structure of residency* (12 times), eg, lack of programmatic commitment to didactic teaching.

Although we do not yet have a record of the operative exposure for the Class of 1993, there are considerable historical data available from the ABTS that are of value in anticipating what they might expect to do. Figure 1 shows the average number of operations in selected areas done by 701 candidates applying for certification for the first time in the years 1988 through 1992. The number of major operations averaged 395, 386, 383, 402, and 401, respectively, for these years. The average for all 5 years was 396, with a range of 117 to 891. Figure 2 is a graphic representation of these numbers for selected clinical areas, showing the mean and one standard deviation for the 5-year period. Figure 3 illustrates, in broad terms, the type of operations being done. Two-thirds of the operations are cardiac and one-third are general thoracic.

The length of time spent in the thoracic residency can be inferred from two sources. First, as noted above (see Table 7), approximately 70% will finish their residency

Operations

Fig
the
car
198
5-ymu
an
po
ab
the
the
rei
4 y
all
Th
ab
2 y
po
Co
Th
es
be
Ap

Operations

Fig
the
by
year
SD

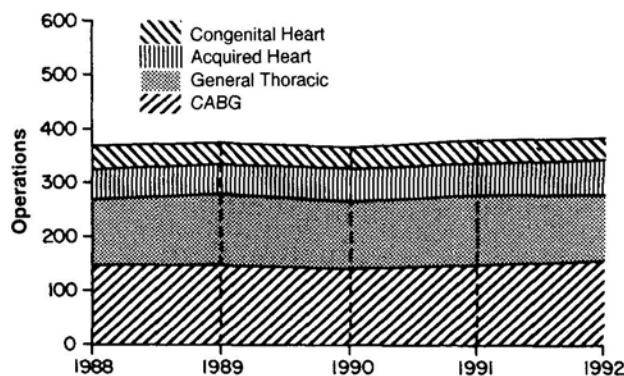


Fig 1. American Board of Thoracic Surgery operative data showing the average number of operations in selected areas performed by 701 candidates applying for certification for the first time in the years 1988 through 1992. Note the lack of variation in each area over the 5-year period. (CABG = coronary artery bypass grafting.)

more than 7 years after graduating from medical school, and the entire group averaged 8.6 years. Second, by polling the 93 directors of approved programs, we were able to determine the length of time needed to complete their particular course of study. We discovered that 72 of the 93 programs (77%) are approved for 2 years and the remaining 21 (23%) for longer than 2 years (range, 2.5 to 4 years) (Table 8). Only 55 of the 72 "2-year programs" allowed their residents to complete the task in 2 years. Thus, only 55 of the 93 programs (89/148 positions), or about 60%, are organized so that they can be completed in 2 years. The remaining 38 programs, offering 59 of 148 positions, require longer than 2 years.

Comment

The question "Are we attracting the 'best and the brightest'?" is regularly raised—as it should be. As well as can be determined, the answer at present is a definite "Yes." Approximately 80% of the residents surveyed were in the

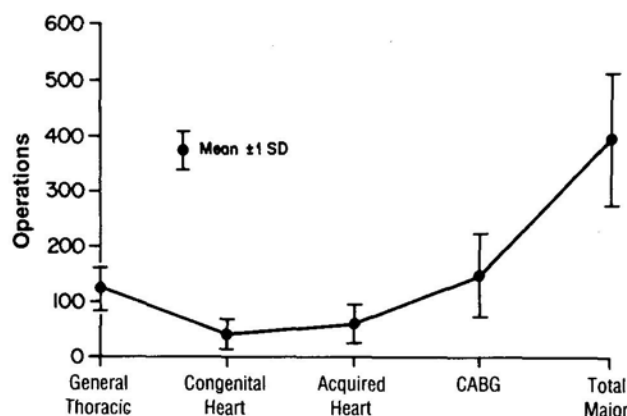


Fig 2. American Board of Thoracic Surgery operative data showing the average number of operations in selected clinical areas performed by 701 candidates applying for certification for the first time in the years 1988 through 1992. (CABG = coronary artery bypass grafting; SD = standard deviation.)

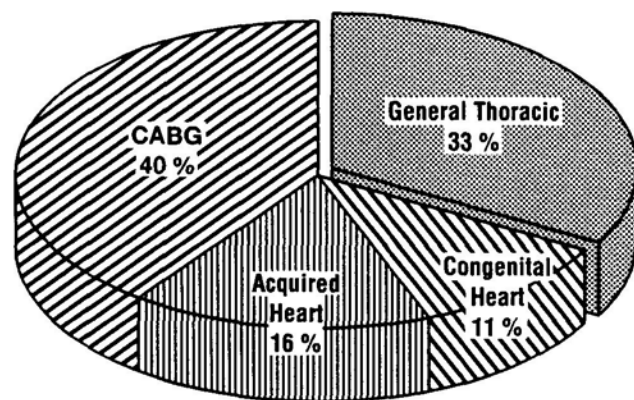


Fig 3. American Board of Thoracic Surgery operative data showing the types of thoracic operations being performed by residents in the years 1988 through 1992. (CABG = coronary artery bypass grafting.)

upper third of their medical school class, 38% are members of Alpha Omega Alpha, and 43% belonged to an undergraduate honorary society. They are a research-oriented group—at least before their thoracic residency—and they have an academic orientation both in their choice of general surgical residencies (78%) and future career (50%). "Intellectual content of the specialty" was an important factor leading to the choice of thoracic surgery as an area of special interest. These are, then, highly motivated, very bright individuals—just the type of people we have indicated we want in our field [2]. Clearly, the job of thoracic educators is to make sure these talents are reinforced and developed to their full potential.

A completely unexpected finding is the interest in nonsurgical specialties exhibited by the medical students who chose thoracic surgery as a career. It could have been anticipated that these individuals were interested in surgery and simply picked thoracic surgery as the most appealing aspect of surgical practice. However, only 3% indicated their alternate choice was general surgery (ver-

Table 8. Length of Time Required to Complete 93 Approved Thoracic Surgery Training Programs^a

No. of Programs	Years Approved	Years to Complete	% of Total
55 programs	2	2	59
1 program	2.5	2.5	1
2 programs	2.5	3	2
14 programs	2	3	15
18 programs	3	3	19
1 program	2	2-4	1
1 program	2	1 resident 2 years, 1 resident 3 years	1
1 program	2	3-4	1

^a Data from survey of program directors. 77% of 93 programs are approved for 2 years; 23% of 93 programs are approved for >2 years. 55 of 93 programs (59%) allow completion in 2 years; 38 of 93 programs (41%) require longer than 2 years to complete. 89/148 positions (60%) can be completed in 2 years; 59/148 positions (40%) require longer than 2 years to complete.

sus 13% of all respondents), and 45% said that if they had not picked thoracic surgery, then internal medicine or pediatrics would have been their choice. It would appear from these numbers that thoracic surgery is attracting a number of residents who might not otherwise have chosen a surgical field.

In 1992, there were 183 applicants who participated in the thoracic surgery match (National Resident Matching Program, personal communication, April 1992). Extrapolating from the AAMC data (75% response rate), we can estimate that approximately 90 to 100 individuals made the decision for a thoracic surgical career before graduating from medical school. We do not know how many of those students ultimately end up in thoracic surgery; however, it is reasonable to assume that close to one-half of the resident applicant pool is made up of individuals who chose the specialty early in their medical careers. This means that to attract good applicants, thoracic surgeons must be visible early in the professional educational experience. As just one example of what can be done, at many institutions, orthopedic surgeons are in charge of the musculoskeletal anatomy courses, and otolaryngologists teach head and neck anatomy. Who better than the thoracic surgeon can teach cardiopulmonary anatomy and physiology? The importance of role models to the budding thoracic surgeon has been emphasized again and again, so the earlier this exposure to our specialty and its practitioners, the more effective will be our effort to attract good students to our field.

Although it seems self-evident that both time and money would be important considerations for the young thoracic surgeon, we could find no evidence that either one played the dominant role often attributed to them by critics of the present educational process. For example, it has been suggested that the lure of a lucrative practice has drawn a poorer quality of resident to thoracic surgery. Certainly the information cited above suggests that we have continued to attract highly intelligent and well-motivated students.

Although we have no information regarding the level of debt at the end of their residency, there was surprisingly little comment about financial hardship. Graduating medical students in 1990 had an average debt of \$36,423, and those interested in thoracic surgery were not very different (\$39,148) (see Table 1). It is possible that because 70% of the students interested in thoracic surgery had never been married, compared with 53% of the entire group, they may have had fewer financial concerns. In addition, about half of the students going into thoracic surgery anticipated a career in a full-time academic position, which is not universally recognized as the rapid road to riches.

Also, when the residents of the Class of 1993 were asked to choose from a list of factors influencing their decision in favor of thoracic surgery, income was listed a distant last as a motivating source (see Table 6). Intellectual content and other professional qualities far exceeded financial considerations. When asked to list what they liked about their thoracic surgery residency, the number one item related to the excellent variety and diversity of

their clinical cases. The number two item was their faculty, echoing the choice of role models as being the leading factor attracting them to thoracic surgery (see Table 6). Also, the most frequently noted negative aspect of their residency experience was the lack of time for intellectual development.

With an average age at graduation of 27.6 years and an average of 8.6 years of residency, the starting thoracic surgeon is in his or her middle thirties. Rather surprisingly, there were few complaints about the number of years required for certification into the specialty. Perhaps it is recognized that this is not an unreasonable age to begin taking on the serious responsibilities of a thoracic surgery practice.

Thus, it would appear that neither time nor financial considerations are problems of major proportions. If one studies the negative factors of the residency experience cited by the Class of 1993, it is clear that the issues are qualitative in nature rather than quantitative. The survey respondents ask for more time for reflecting on the clinical experience. They want a more thoughtful, well-balanced curriculum that does not overemphasize a particular part of thoracic surgery. They indict the inhumane demands of the clinical load imposed in some programs, and they want their teachers to be better trained to teach. Finally, they ask that the residency be more thoughtfully structured as an educational experience.

Educators in surgery must respond to this rather reasonable list of requests. A top priority must be to use our resources more efficiently. For example, members of the Class of 1993 performed an average of 360 major operations as a chief resident or teaching assistant in general surgery. Fewer than 4% (14) of these were thoracic procedures, whereas more than 50% (187) were abdominal, alimentary tract, or breast operations (see Table 4). Because approximately 60% of these residents did their general surgery in programs that also had an approved thoracic residency, there would appear to be an opportunity for better use of these years and operative cases. As long as they are under the direction of a bona fide thoracic surgical faculty, why not alter the path of those committed to thoracic surgery to include a greater exposure to the specialty earlier? If the ABTS and the Residency Review Committee would credit this experience, then perhaps more "quality time" might be available during the years of thoracic residency. Also, importantly, a significant amount of clinical material would be made more readily available to the general surgeon in training.

Another area in which education efficiency could be improved relates to the distribution of clinical material during the thoracic residency. The most notable example is in the number of coronary artery operations performed during the residency (see Fig 2). As thoracic surgical educators, we must ask ourselves whether, in having our residents perform an average of almost 150 coronary operations, we are meeting our responsibility as educators. Are we giving our residents 150 examples of clinical problems or an example of one clinical problem 150 times? The optimal number for any particular procedure neces-

sa
ca
fo
iti
th
is
th
se
th
ar

de
di
in
nu
Th
w
de
th
sy
in
pr—
W
C
—

R

1.

2.

A
E
Q

sarily varies among individual residents. Therefore, because it is desirable to plan an individualized curriculum for each resident, the guidelines published by the accrediting bodies must be carefully constructed to encourage this degree of flexibility. A complicating factor, of course, is that our residencies do not operate in a vacuum where there are no "service responsibilities." Nevertheless, a serious analysis of our educational effort will surely show that qualitative improvement can be achieved in many areas.

In summary, the contemporary thoracic surgery residents are exceptionally talented, well-motivated individuals. By and large, they pick the specialty early in their medical careers and are willing to spend a number of years to achieve certification in the specialty. There is relatively little unhappiness on their part with either the specialty as they perceive it or the residency in general. However, there is wide recognition that the residency experience would benefit from a systematic analysis leading to qualitative changes more in line with reasonable educational expectations and practices.

We extend our sincere thanks for assistance in this project to Carol Tresolini, Walter Purcell, Peter Rybolt, and Jan Shaw.

References

1. Wilcox BR. Graduate education in thoracic surgery. *Ann Thorac Surg* 1991;52:177.
2. Wilcox BR, Stritter FT, Anderson RP, et al. A systematic survey of opinion regarding the thoracic surgery residency. *Ann Thorac Surg* 1993;55:000-00.

Appendix 1. Ad Hoc Committee on Graduate Education In Thoracic Surgery Resident Questionnaire

1. Name: _____
2. Social Security Number: _____-_____-_____
3. What is your year of birth? _____
4. What is your gender?
☐ Male
☐ Female
5. How would you describe yourself?
☐ Black/Afro-American
☐ American Indian
☐ Hispanic
☐ Asian/Pacific Islander
☐ White
6. Which type of general surgery residency did you attend?
☐ University Medical Center
☐ Large Private Clinic (eg, Cleveland Clinic)
☐ Community Hospital
☐ Military Program
☐ Other (please specify) _____
7. Which medical school did you attend?

8. Which year did you graduate from medical school?

9. What was your class rank in medical school?
☐ Top third
☐ Middle third
☐ Bottom third
☐ Unknown or not ranked
10. Are you a member of Alpha Omega Alpha?
☐ Yes
☐ No
11. Are you a member of an undergraduate academic honorary society (eg, Phi Beta Kappa)?
☐ Yes, which one _____
☐ No
12. Did you have six months or more of dedicated research experience as a medical student?
☐ Yes
☐ No
13. Did you have a thoracic surgery rotation of at least two weeks as a medical student?
☐ Yes
☐ No
14. Did you have three months or more of dedicated research experience as a general surgery resident?
☐ Yes
☐ No
15. Have you had or do you plan to have three months or more of dedicated research experience as a thoracic surgery resident?
☐ Yes
☐ No
16. When did you decide on thoracic surgery as a specialty?
☐ Prior to medical school
☐ Basic science years in medical school
☐ Clinical years in medical school
☐ First or second year of general surgery residency
☐ Third or fourth year of general surgery residency
☐ Chief residency year of general surgery
17. What factor(s) was most important in influencing your choice of thoracic surgery? (check no more than 3)
☐ Electives/clerkships in medical school
☐ Rotations during residency
☐ Role model(s) in this specialty
☐ Predictable working hours
☐ Good income (relative to other specialties)
☐ Prestige within the medical profession
☐ Intellectual content of the specialty
☐ Challenging diagnostic problems
☐ Minimum of uncertainties in diagnosis and treatment
☐ Encouragement from faculty
☐ Encouragement from other students/residents
☐ Encouragement from practicing physicians
☐ Number of opportunities in this specialty
☐ Type of patient problems encountered
☐ I possess special skills/talent unique to this specialty
☐ High technology of this specialty
☐ Level of personal/educational debt
☐ Opportunity for research
☐ Other, specify: _____
18. What have been the positive factors of your thoracic residency education to date?
19. What have been the negative factors of your thoracic residency education to date?

Appendix 2. Positive and Negative Factors of Residency Education

Note: Numbers in brackets indicate the number of times the factor was mentioned by respondents.

Positive Factors

1. Aspects of clinical experience [64]

Excellent variety/diversity of cases
Large volume, abundant exposure to a complex array of clinical problems
Interesting cases and problems
Broad training and experience
Opportunity for complex patient care from work-up through postoperative care
Opportunity for extensive work in specific areas of interest: postoperative care and convalescence of coronary and lung carcinoma patients, intensive care work, endoscopic techniques, pediatric surgery, cardiac surgery, transplantation
High degree of responsibility for clinical management and decision-making, opportunity for independent patient management
Concentrated rotations dedicated to particular fields of thoracic surgery
One-on-one rounds

2. Faculty [43]

Excellent role models in general and with regard to strong work ethic and technical, intellectual, and problem-solving excellence
Opportunity to work with an excellent doctor or group of doctors or chairman
Diverse faculty, modeling diverse techniques
Supportive, interested faculty
Opportunity to attend regular lectures by outstanding doctors
Good working relationships
Good attending teaching in the operating room
Accessibility of staff for difficult cases

3. Intrinsic rewards [40]

Satisfaction of being in a discipline with future research possibilities, cutting-edge work
Enjoyment of learning something new every day, seeing technical and clinical skills improve
Enjoyment of the discipline of thoracic surgery
Intellectual, physical, technical challenges inherent in thoracic surgery
Opportunity to help critically ill patients
Social status
Satisfaction of a field that incorporates the most correlation between physiology, pathology, and clinical surgery
Gaining confidence in the treatment of complex problems

4. Operative experience [26]

Active participation in complex procedures
Extensive amount of active, intensive operative experience
Opportunity for experience in areas of particular interest: transplantation, cardiovascular disease, congenital heart disease
Immediate participation in surgical procedures
Challenging operative experience
"Outstanding" or "great" operative experience

5. Institutional characteristics [9]

Excellent teaching and working environment

Opportunity to work at an institution with a rich history of pioneering, cutting-edge work
Well-qualified ancillary personnel
Excellent staff interaction
Camaraderie among residents

Negative Factors

1. Insufficient time away from patient care responsibilities [46]

Insufficient time for reading, studying, writing papers
Insufficient time for research, lack of dedicated time for research
Difficulty taking contract-guaranteed vacation or other time off
Too much time away from family
Insufficient time for preparing for or attending meetings and conferences
No time to live life

2. Aspects of clinical experience [33]

Overemphasis on a particular area, including cardiac surgery, transplantation, pediatric cardiac surgery, primary care, postoperative management
Underemphasis on a particular area, including general thoracic surgery, esophageal work, preoperative and postoperative care of cardiac transplant patients, trauma
Barely adequate number of thoracic cases, low case load
Poor quality of experience in a particular area, eg, congenital heart disease
Insufficient or limited operative experience
Too much time spent watching techniques, not enough doing
Insufficient independent responsibility
Heavy service or menial orientation rather than educational, sometimes due to understaffing
General surgeons or new staff "stealing" thoracic cases
Antagonistic cardiologists unwilling to appraise their results or interventions honestly
Too much turnover time between cases
Lack of understanding by pulmonary colleagues in the treatment of lung cancer

3. Extraordinary rigor of clinical schedule [31]

Long, inhumane working hours
Too much time on call
Exhaustion, sometimes 3 or 4 days without sleep
Overwhelming case loads
High stress, pressure

4. Faculty and teaching [14]

Poor teaching skills by attendings in the operating room
Insufficient interest in thoracic surgery by faculty in fellowship training
Absence of organized or didactic teaching by faculty
Lack of in-depth teaching
Lack of attending input outside of the operating room
Public humiliation of residents as teaching method
Faculty indifference to education

5. Structure of residency [12]

Lack of programmatic commitment to didactic teaching
Politics
Little positive reinforcement
Location
Overly long training program
Having to focus on general surgery boards while trying to learn thoracic surgery

T
Ja
Ce

E
m
s
i
r
a
n
d
e
f
a
c
h
f
r
o
m
c
h
e
c
t
o
p
e
r
i
o
d
i
c
e
v
a
s
a
r
c
e
a
t

o
t
c
h
t
r
a
a
T
o
f
a
t
h
p
e
g
e
r
b
e
b
e
m
c
i
t
h
t
e
x
i
n
a
r

e
p
s
a
t
o

—
Pr
Su

Ac
Si

©