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*Presidential Address*

## The Association at seventy-five: The challenge of the future

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Seventy-five years ago, this Association was founded. Perhaps we should look back for a moment at the world at that time. Until the First World War scientific medical advances had been made, in large part, by Europeans and, in the field of surgery, by eminent surgeons in clinics throughout the continent. American surgeons frequently visited these clinics to receive additional training and education. But in 1917 Europe was ablaze and was being destroyed on the battlefields. Hundreds of thousands of men were dying in the trenches on the Western Front, in the vast expanses of Poland and Russia, or in the rocky dugouts of the Alps. Millions of people had become refugees, and starvation was common. The war had affected all aspects of life. Only the New World seemed untouched by this, until then, greatest conflagration in the history of man. Although America was soon to enter that war as well, it had the strength of youth, and two oceans protected its lands and cities. It was then that America took up the scientific baton and carried it to many fields

that included our own. With the founding of the Association, many of the great advances in thoracic surgery would be made in North America, most of them by men who were members of this Association, and by many who also served as its presidents. Through the perseverance of Dr. Willy Meyer (Fig. 1, *A*), an assemblage of individuals of diverse backgrounds—each having a major interest in thoracic surgery—united in the need for a formal Association, and ours was founded on June 7, 1917. Some in the group were surgeons, others were internists and otolaryngologists, some were physiologists.

Meyer himself was a German immigrant who had become an eminent surgeon in New York and recognized the need for a specialized society for thoracic surgery after he had given a paper on "Extrathoracic and Intrathoracic Esophagoplasty in Connection With Resections of the Thoracic Portion of the Esophagus for Carcinoma" at the Section on Surgery of the American Medical Association. The minutes state that there was no discussion.

If we highlight some of the achievements of the members of the Association over the ensuing 75 years, it will be evident how vital the Association and its members were to the development of the field of thoracic surgery.

Before 1920, Samuel J. Meltzer (Fig. 1, *B*), a Russian immigrant who studied in Berlin and was an internist and physiologist at the Rockefeller Institute, together with John Auer developed endotracheal insufflation to maintain lung ventilation during a thoracotomy. Nathan W. Green (Fig. 1, *C*), a surgeon at the College of Physicians

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**Fig. 1.** The founders. **A**, Willy Meyer, President, 1918 to 1920. **B**, Samuel J. Meltzer, President, 1917 to 1918. **C**, Nathan W. Green, President, 1924 to 1925. **D**, Franz Torek, President, 1926 to 1927. **E**, Rudolph Matas, President, 1920 to 1921. **F**, Alexis Carrel.

and Surgeons, developed a cuffed endotracheal tube to ventilate the lungs during an open thoracotomy. Meltzer served as the first president of the Association, and Green served as its seventh president. This is not to say that others were not important in this basic area of respiratory physiology and support, so essential in the development of thoracic surgery, but Meltzer, Auer, and Green were clearly leaders in an area vital to our understanding of the physiology of open pneumothorax.

Esophageal surgery had reached a significant landmark when Franz Torek (Fig. 1, *D*), our ninth president, did the first successful esophagectomy for carcinoma with long-term survival.

Rudolph Matas (Fig. 1, *E*), Professor of Surgery at Tulane University, had been a pioneer in the field of vascular surgery and aneurysmorrhaphy. He, too, worked on endotracheal insufflation. He served as third president of the Association. Alexis Carrel (Fig. 1, *F*), in the meantime, while holding an appointment at the Rockefeller Institute, had developed the modern techniques of vascu-

lar anastomosis. For this, he was awarded the Nobel Prize in medicine.

In the 1920s, John Alexander (Fig. 2, *A*), professor of surgery at the University of Michigan, brought to this country the techniques of thoracoplasty for the management of tuberculosis. He very much refined this operation, which remained the standard surgical therapy for tuberculosis until the introduction, many years later, of modern antimicrobial therapy. Perhaps his most lasting contribution was the development in this country of the first thoracic residency in 1928.

Although many contributed to the field of pulmonary resection for both benign and malignant disease, I would like to give special recognition to Howard Lilienthal, our fifth president, and to Edward D. Churchill, our twenty-eighth president. In 1922, Lilienthal (Fig. 2, *B*) reported that he had performed fourteen single lobectomies with six deaths. In the late 1920s and early 1930s, Churchill (Fig. 2, *C*) began to do lobectomies using more modern techniques with individual ligation of the vessels and clo-

sure of the bronchus. He and Belsey went on to develop segmental resection and lingulectomy.

Perhaps one of the most significant contributions to the field of pulmonary surgery was achieved by Evarts A. Graham (Fig. 2, *D*) when, in 1933, he did the first successful total pneumonectomy for cancer of the lung with long-term survival of the patient. Evarts Graham was one of the towering figures of American surgery during the twentieth century, for not only did he make numerous contributions to the field of thoracic surgery, he was a founder of the American Board of Surgery and, of even greater importance perhaps to this Association, he founded *THE JOURNAL OF THORACIC SURGERY*, of which he became the first editor in 1931. This *JOURNAL*, the first in the English language devoted to thoracic surgery, was destined to become the most influential publication in the world concerning the field of thoracic and cardiovascular surgery.

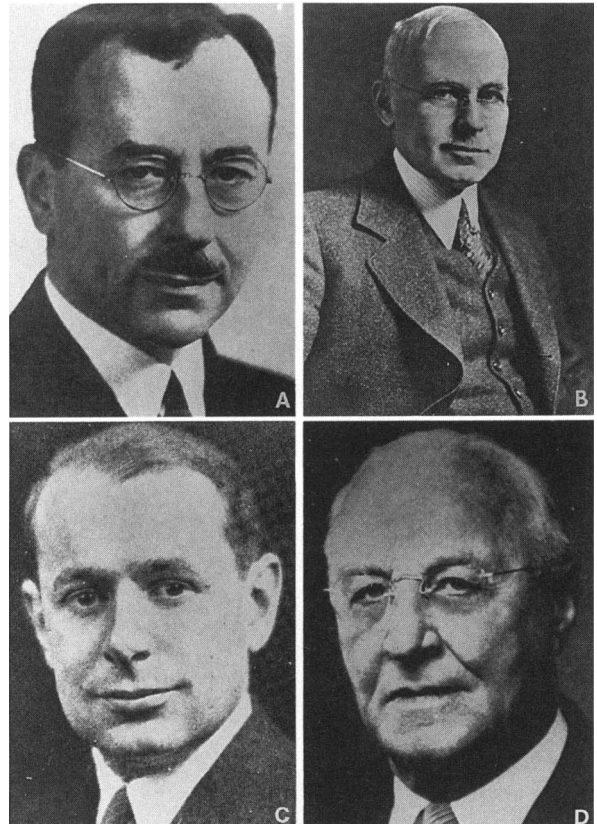
Only sporadic attempts at performing heart operations had been made before the late 1930s and 1940s, but then the field opened rapidly. Within a 15-year period, the entire foundation of modern cardiac surgery was established.

In 1938 Robert E. Gross (Fig. 3, *A*), as a young surgeon in Boston, first successfully ligated a patent ductus arteriosus. He served as the forty-fourth president of the Association and made many other important contributions to the field of thoracic and cardiac surgery in children in addition to being one of the founding fathers of pediatric surgery.

In 1944 Alfred Blalock (Fig. 3, *B*), in association with Helen Taussig, initiated modern surgery for congenital heart disease. After careful studies in the laboratory, the Blalock-Taussig shunt was performed in children with tetralogy of Fallot. Blalock and his disciples became immensely productive in the entire field of cardiac surgery. His experimental approach became the model for cardiac surgical advances and, unlike other surgical disciplines that often evolved empirically in the operating room, cardiac surgery was to grow on the basis of careful experimental studies in the laboratory. Dr. Blalock served as the thirtieth president of the Association.

Operations for mitral stenosis had been previously attempted, but it was not until the late 1940s that they became prescribed procedures. Charles P. Bailey of Philadelphia and Dwight E. Harken (Fig. 3, *C*) of Boston, both members of the Association, successfully performed closed mitral valvuloplasty and thus established this operation as the standard approach to the repair of a common lesion until later, when open valvuloplasty and mitral valve replacement and, more recently, valve repair were introduced.

Thoracic aortic surgery began its modern era when



**Fig. 2.** General thoracic surgery. **A**, John Alexander, President, 1934 to 1935. **B**, Howard Lilienthal, President, 1922 to 1923. **C**, Edward D. Churchill, President, 1948 to 1949. **D**, Evarts A. Graham, President, 1927 to 1928.

Alton Ochsner (Fig. 4, *A*), assisted by Michael E. DeBakey, first successfully excised a saccular aneurysm of the thoracic aorta. Dr. Ochsner served as our twenty-eighth president. Perhaps he and Dr. Graham deserve the greatest credit for recognizing the relationship between smoking and lung cancer.

Thoracic aortic surgery was further developed early in the 1950s, principally by Michael DeBakey (Fig. 4, *B*) and Denton A. Cooley (Fig. 4, *C*) in Houston, and by Henry T. Bahnson (Fig. 4, *D*) at the Johns Hopkins Hospital. Michael DeBakey served as our thirty-eighth president and Denton Cooley is president-elect of our sister society—The Society of Thoracic Surgeons. Henry Bahnson served as our fifty-seventh president. These surgeons attacked saccular aneurysms and dissections of the aorta and, ultimately, diffuse aneurysm with prosthetic graft replacement.

By 1950, Wilfred G. Bigelow (Fig. 5, *A*), our fifty-fifth president, had begun his important work on hypothermia which allowed F. John Lewis, in 1952, to first successfully close an atrial septal defect in a patient.

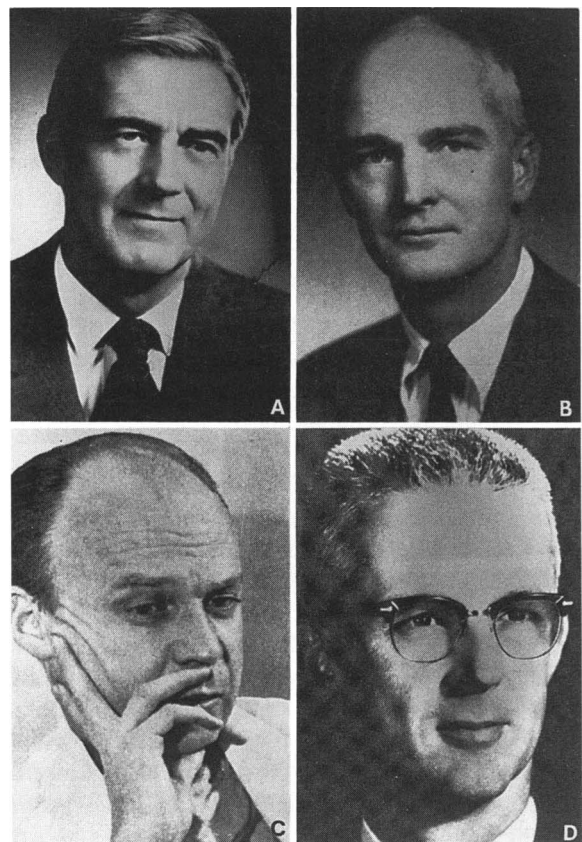


**Fig. 3.** “Closed” cardiac surgery. **A**, Robert E. Gross, President, 1963 to 1964. **B**, Alfred Blalock, President, 1950 to 1951. **C**, Dwight E. Harken.



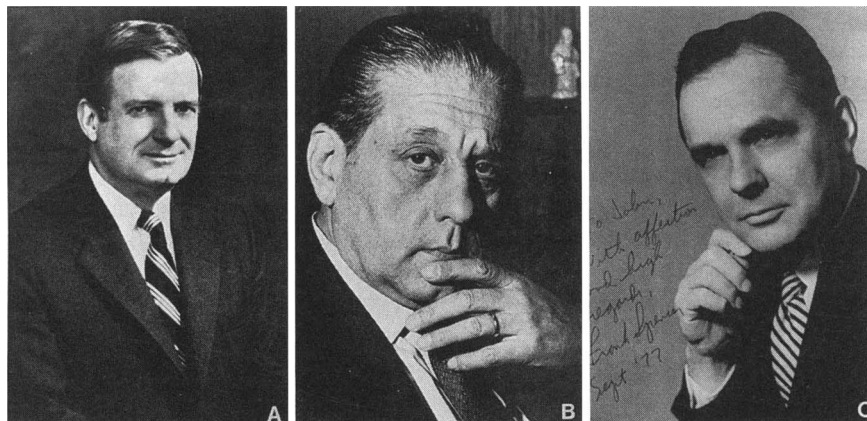
**Fig. 4.** Aortic surgery. **A**, Alton Ochsner, President, 1947 to 1948. **B**, Michael E. DeBakey, President, 1958 to 1959. **C**, Denton A. Cooley. **D**, Henry T. Bahnson, President, 1976 to 1977.

The greatest breakthrough in cardiac surgery, however, occurred in 1953, when John H. Gibbon, Jr. (Fig. 5, *B*), of Philadelphia, after years of intense experimental work, developed a pump-oxygenator that allowed him to successfully close an atrial septal defect in a woman. One year later, C. Walton Lillehei (Fig. 5, *C*) in Minneapolis and John W. Kirklin (Fig. 5, *D*) at the Mayo Clinic inde-



**Fig. 5.** “Open” cardiac surgery. **A**, Wilfred G. Bigelow, President, 1974 to 1975. **B**, John H. Gibbon, Jr., President, 1960 to 1961. **C**, C. Walton Lillehei. **D**, John W. Kirklin, President, 1978 to 1979.

pendently developed intracardiac repair of a variety of congenital heart lesions and thus opened the entire field of modern open heart surgery. Today, as a result of these pioneering efforts, only rarely is a congenital lesion not amenable to intracardiac repair. John Kirklin, of course,



**Fig. 6.** Coronary bypass surgery. **A**, David C. Sabiston, President, 1984 to 1985. **B**, René G. Favaloro. **C**, Frank C. Spencer, President, 1982 to 1983.

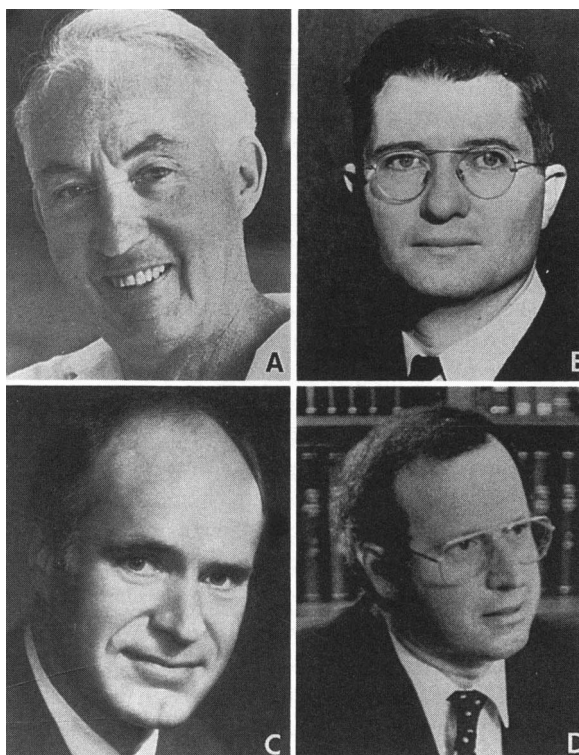
was our fifty-ninth president and currently serves as editor of *THE JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY*.

It was in the 1960s that coronary artery disease was first addressed and endarterectomy was used with some success. But David C. Sabiston (Fig. 6, *A*), during his time in Baltimore, deserves the credit for doing the first saphenous vein bypass graft from the aorta to the right coronary artery. Independently, Garrett and DeBakey did a similar procedure with survival of the patient. Unaware of these efforts, René G. Favaloro (Fig. 6, *B*), at the Cleveland Clinic, developed reversed saphenous vein bypass grafting, particularly to the right coronary artery, and reported extensive clinical experience by the late 1960s.

In the meantime, experimental work on the use of the internal mammary artery to bypass a lesion of the left anterior descending coronary artery had been developed by Green and Tice at New York University, and extensive clinical experience with the use of microvascular techniques was reported by Frank C. Spencer (Fig. 6, *C*), our sixty-third president.

Attempts at transplanting the heart had been made as early as the 1900s by Alexis Carrel at the Rockefeller Institute, but it was not until the 1960s that Richard R. Lower and Norman E. Shumway (Fig. 7, *A*), our sixty-seventh president, laid the modern foundation for heart transplantation, which they ultimately so beautifully carried out in a large series of patients in the early 1970s.

Lung transplantation was initially attempted in man in 1963 by James D. Hardy (Fig. 7, *B*) of Mississippi after he had done extensive experimental work in the laboratory, but it was not until 1981 that Bruce A. Reitz (Fig. 7, *C*) and his associates at Stanford performed successful en bloc transplantation of the heart and lungs in patients with end-stage disease. In 1987 Joel D. Cooper (Fig. 7, *D*)



**Fig. 7.** Heart and lung transplantation. **A**, Norman E. Shumway, President, 1986 to 1987. **B**, James D. Hardy. **C**, Bruce A. Reitz. **D**, Joel D. Cooper.

and his associates in Toronto established single-lung and double-lung transplantation as an effective therapeutic modality in the management of end-stage lung disease.

I do not wish to imply that this list is a complete one, nor that surgeons from other countries have not also made great contributions to cardiothoracic surgery. I merely

wish to emphasize the point that, in its 75 years, the history of this Association is the history of cardiothoracic surgery and that many of its members became world leaders in this new field, which had progressed from the excision of tumors and lesions early on to the successful repair of complex cardiac lesions and, ultimately, to the successful transplantation of both the heart and the lungs. In my own mind, this represents one of the most glorious chapters in the history of medicine.

However, for an association to remain viable and to fulfill its purpose, its members must not look only on the glorious past. They, particularly the younger generation, must look to the future and at the challenges that face us. Yet some of us have been concerned as to whether American cardiothoracic surgery is still attracting the best and brightest graduates of our medical schools and, indeed, what the field of thoracic and cardiac surgery is to be in the future. What should be the education of a future cardiothoracic surgeon? What should be the direction of future research? How shall this be funded? How do we as cardiothoracic surgeons relate to our fellowman in an ever more complex and shrinking world? To these ends, a conference was proposed to bring focus to these difficult questions.

On September 20, 1991, the Association invited the leadership of our sister societies—the Society of Thoracic Surgeons, The Western Thoracic Surgical Association, and the Southern Thoracic Surgical Association—to attend the conference. Also invited to contribute were the leadership of the American Board of Thoracic Surgery, the leadership of the Thoracic Surgery Program Directors, that of the Advisory Council for Cardiothoracic Surgery of the American College of Surgeons, that of the Residency Review Committee for Thoracic Surgery, and the Executive Secretary of the American Board of Surgery, as well as select thoracic surgeons from the United States and Canada who were actively making contributions to the field either in research or in clinical developments, who had recently completed cardiothoracic residency training programs, or who were even current residents in such programs. Approximately 50 individuals attended the conference.

The group was divided into five separate workshops, each with one of the following assignments: (1) Resident Education, (2) The Scope of Cardiothoracic Surgery, (3) Future Directions of Research, (4) Funding for Cardiothoracic Surgical Research, and (5) The Cardiothoracic Surgeon and Social Responsibility. I would like to summarize for you these reports, for I believe they are of great significance to the future of our specialty. Some changes, indeed, have already borne fruit.

Although some concern had been expressed as to how appropriate the current education of cardiothoracic sur-

geons in the United States was, many of us thought that the system was fundamentally sound, particularly in view of the high quality of the residents in the programs, the competitiveness of thoracic residency programs in terms of the quality and quantity of applicants and, ultimately, the performance of recent graduates. Nevertheless, resident education was placed on the agenda because of some disturbing findings. As the conference progressed, it became even more evident that we do have a serious problem. Residents are now required to remain in training for a minimum of 7 years, but already 20% of the programs have increased this to 8 years. Research time is additional. Thus graduates of our programs are entering the practice of their specialty in their mid-30s or older, with loss of some of their most productive years. The residents are spending an overwhelming amount of their time in the operating room with little chance of participating in perioperative care, particularly in the preoperative evaluation of patients. Exposure to physiology as it applies to the cardiovascular system, the respiratory system, or to the esophagus is less than optimal. At the same time, residents frequently are doing 200% more than the minimum operative requirements of the American Board of Thoracic Surgery, and this figure is continuing to rise each year. A single operation, coronary bypass, is seriously unbalancing many programs, which often have a dearth of diversity in case material. Residents are working 120 or more hours per week, many of which are spent on such tasks as “hotel management” and other chores that have little to do with education. The length of the residency and the hurdles to overcome have made this basically exciting field less attractive to many exceedingly talented individuals, particularly in view of the increasing competitiveness of such fields as orthopedics.

Enhancing these adverse factors are others, such as an ever-increasing amount of information that the resident must master. Yet the thoracic residency has not significantly changed in duration for the past 45 years while, in that same period of time, the entire field of cardiac surgery has been developed and expanded. Specialization in the field of cardiothoracic surgery is ever increasing as the fields of general thoracic surgery, adult cardiac surgery, congenital heart disease surgery, and transplantation become distinct areas of endeavor. Other external factors include the unpredictable number of patients who will require coronary artery bypass in the future, and the increasing regulation affecting the practice of medicine, particularly the practice of cardiothoracic surgery. There will be an ever-heightened competition for patients as more and more professionals, other than cardiothoracic surgeons, who perform minimally invasive procedures enter the field. All of these factors will affect our specialty and, therefore, the future of our residency program.

The following recommendations for the future education of cardiothoracic surgeons are, in large part, those posed by the group at the workshop and, indeed, by many at the plenary session. Some are my own. By no means do I mean to imply that they are official as to this Association, or for that matter, to the American Board of Thoracic Surgery.

The recommendations include the following (Table I):

1. *Maintain the integrity of cardiothoracic surgery.* Although some have postulated that general thoracic surgery would revert to general surgery, it was a general belief that thoracic and cardiac surgery should be integrated and that the resident should have basic education in both general thoracic surgery and cardiac surgery.

2. *Improve the education environment.* We must reduce the service load on our residents by using more ancillary personnel. We must stress the educational nature of the residency. Our residents must become more involved in the perioperative management of patients. This is particularly true in the diagnostic aspects. Residents should learn to do cardiac catheterization, pulmonary function studies, and esophageal manometry to better understand the basic physiology involved in the diseases we treat. The continued emphasis by the American Board of Thoracic Surgery and the Residency Review Committee on the numbers of operations performed by residents should be tempered by a review of all aspects of a resident's experience. Perhaps more important than numbers, our residents must learn the basic principles of thoracic surgery rather than just specific techniques. After all, most of us today perform operations that none of us saw, much less did, when we were residents. The things that allow an individual to adapt to new advances are a flexible mind, an understanding of surgical principles, and a desire to maintain scientific currency.

3. *Establish a core curriculum.* We need to establish a curriculum that is common to all residency programs in cardiothoracic surgery. A core curriculum will allow later specialization in specific fields and emphasize the strength and excellence of a given residency program. This core curriculum should also highlight basic knowledge of physiology and pathology as it pertains to the specialty of cardiothoracic surgery.

4. *Specialization.* It is evident that there will be more specialization in the field of cardiothoracic surgery, for few practitioners can encompass the entire field. This specialization has resulted in many residents finishing their cardiothoracic training and then taking an additional 6 months to a year in a given area, such as congenital heart disease, lung transplantation, or heart transplantation. Undoubtedly, this specialization will continue. Some programs do have greater strengths in certain areas,

**Table I.** *Workshop: resident education; chair: John A. Waldhausen*

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1. Integrity of cardiothoracic surgery
2. Educational environment
3. Curriculum
4. Specialization
5. American Board of Surgery certification?
6. General surgery—thoracic surgery

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and by allowing greater flexibility in training programs, each one should emphasize that component of its program. Thus a resident interested in the field of transplantation could attempt to receive his residency training in Pittsburgh or St. Louis, while another, more interested in a general thoracic education, might do so in Michigan. We must make every attempt to ensure that our residency programs enhance their strengths, minimize their weaknesses, and have individual character rather than each becoming a uniform but overall mediocre 2- or 3-year experience.

5. *American Board of Surgery certification.* This hurdle in our cardiothoracic education was much debated, and 63% of the participants at Snowbird voted against continued mandatory American Board of Surgery certification.

But before we throw out American Board of Surgery certification, we must ask how would we control the quality of the general surgical education of residents entering the field of cardiothoracic surgery. If no standards are set for those residents or for the general surgery program directors, how can we be sure that the residents are getting a good experience? Indeed, already, some of them are not; those destined to enter a residency in thoracic surgery get placed on services primarily for "resident coverage" rather than for educational purposes.

Furthermore, abandoning the American Board of Surgery certification would further remove our specialty from general surgery, and future departmental chairmen would rarely, if ever, be drawn from our ranks. Perhaps we should distinguish between mandatory American Board of Surgery certification and eligibility for certification. Some believe that all of our residents should be able to take the American Board of Surgery examination, but that this should be optional. I am convinced, however, that at least those who are headed for an academic career should continue to be certified.

6. *General and thoracic resident training relationships.* Much time was spent at Snowbird discussing how we can fit general surgical and cardiothoracic surgical education into a more cohesive and logical experience. Currently, we require 5 years of general surgery, and only 2 of thoracic surgery. It was uniformly agreed that the

latter is too short and the former too long. There should be a minimum of 3 years devoted to education in cardiothoracic surgery. Yet, we do not want to continuously increase the total length of training, for ultimately our graduates will be ready for retirement benefits at the completion of their education. Although many different tracks were discussed, there appears to be a consensus that a 4-year education in general surgery and a 3-year education in cardiothoracic surgery will constitute a reasonable compromise that would significantly enhance education in cardiothoracic surgery without significantly diminishing that in general surgery. It is essential that we, as thoracic surgeons, develop a curriculum for the general surgical part of our residents' program in conjunction with the program directors in general surgery and the American Board of Surgery. We must have a say as to what these 4 years are. They should truly be a foundation for education in cardiothoracic surgery and not merely a "tempering furnace," as Randolph Griep so eloquently phrased it, in which an "experience in the monastery" would be of equal value. It is evident that the American Board of Surgery is also eager that a dialogue be established between their Board and ours. They, too, wish to modify the general surgical residency and reserve the complex index cases for those staying in general surgery. The 4 years in general surgery could be taken in sequence, with the final year being on the senior level but not including the so-called "chief" year. In most general surgical programs, the last 2 years have become rather similar, with the resident functioning in a "chief" capacity in both. Thus curtailing the program by a year would not deprive our residents of that unique "chief" responsibility. If this were then followed by a cardiothoracic residency, the American Board of Surgery examinations would be taken after a year in that residency.

A similar track would be 2 years of general surgery, followed by a year totally devoted to cardiothoracic surgery with rotations in the catheterization laboratory, on the pulmonary service, and on the cardiothoracic service as a junior resident, followed by 2 years of senior residency in general surgery, including the "chief" year, followed by 2 additional years in cardiothoracic surgery. Again, general surgery board certification would be taken during these final 2 years.

What is clear in these proposals is that we must develop a close cooperation between the program directors of general and thoracic surgery. I am not recommending a return to the old single residency with double certification. I am recommending that we look at both components of the residency education—the general surgical component and the thoracic surgical component—and come up with what is truly beneficial to our residents,

rather than leaving the two programs unrelated, like two random events.

Although the final results of the deliberations at Snowbird in regard to cardiothoracic education are as yet unknown, it is of interest that a dialogue is now taking place between the American Board of Surgery and the American Board of Thoracic Surgery and that, this fall, there will be the Joint Conference on Resident Education in Thoracic Surgery of which the Association will be a sponsor. I am convinced that, in time, change will occur for the betterment of our future residents.

**The scope of cardiothoracic surgery.** Although the scope of our specialty has been well defined by both the Association and the Society of Thoracic Surgeons, as well as by the American Board of Thoracic Surgery, we must face the fact that our specialty, in many regards, has been shrinking. It was thoracic surgeons who clinically introduced cardiac catheterization for the diagnosis of congenital heart disease. It was thoracic surgeons who opened the field of pediatric thoracic surgery. It was thoracic surgeons who established the entire field of critical care so necessary to the postoperative management of their patients, and it was thoracic surgeons who developed support systems for patients in cardiogenic shock. In many of these areas we have completely retreated and are no longer visible, whereas in others we are only barely evident. The workshop on the Scope of Cardiothoracic Surgery, led by George Magovern, looked into the reasons for this retreat. I believe that their conclusions are apt. Coronary bypass became the dominant operation of our specialty during the 1970s and 1980s and was done by many surgeons to the exclusion of almost all other procedures. Little or no time was spent outside the operating room participating in the diagnosis and cogent aspects of our specialty. This vacuum was filled by other specialists, often with inadequate surgical judgment. We neglected general thoracic surgery, and our residents received little and inadequate experience in that field. We failed to implement new technologies because of the absence of research efforts. We retreated from the laboratory. Our influence eroded because of our absence from the halls of decision-making. We lost our influence on how institutionally based resources that were begun by our own specialty were allocated, such as perfusion technology, endoscopy, pulmonary function laboratories, intensive care units, and trauma triage. There was an ever-increasing intrusion into our field by specialists who used minimally invasive technology. Some of these innovations could equally well have been carried forth by thoracic surgeons. Of interest is that recently thoracoscopic surgery courses were being given throughout the country by faculty who were not thoracic surgeons but who were pri-



**Table II.** *Workshop: scope of cardiothoracic surgery; chair: George J. Magovern*

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1. Participate in or do preoperative diagnostic workup—echocardiography, laser, angiography, sonography
2. Avoid relegation to “operative supertechnician”
3. Maintain presence in intensive care unit
4. Capture new minimally invasive technology—video-assisted thoracoscopy
5. Emphasize foregut problems, including diagnosis and management

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marily involved in laparoscopy. In France a whole book on this new technology has been published by a pulmonologist. This access to the chest cavity and its organs is a viable alternative to open thoracotomy but, aside from the instrumentation, it requires the same surgical judgment and knowledge of the operative management of thoracic organs. In response to the challenges of this new technology, your Association, together with the Society of Thoracic Surgeons, sponsored courses throughout North America on video-assisted thoracoscopic surgery.

We must respond to these challenges by reasserting ourselves as those best qualified to deal with surgical diseases of the chest (Table II). We must reassert ourselves in the intensive care unit, for critical care was in large part developed by us and is essential to the surgical management of diseases of the chest. We must understand the echocardiogram, respirators, and other complex equipment in these units. Cardiopulmonary perfusion, whether it is in the operating room, in the cardiac catheterization laboratory, in the neonatal intensive care unit, or in the adult intensive care unit, should be under the supervision of cardiothoracic surgeons. Cardiogenic shock is, fundamentally, a surgical disease and should be treated in a cooperative, synergistic manner by cardiothoracic surgeons and cardiologists.

In brief, cardiothoracic surgeons must reassert themselves in the hospitals, outside the operating rooms, as innovators and leaders in the entire field of cardiothoracic care. We must imbue our residents with the concept that they are physiologists, physicians, and surgeons wrapped into one. This will require an alteration in the residency program, a balancing of the program, and a reallocation of time spent on the floors and in the operating rooms. It must be done if our specialty is to return to the eminent and innovative discipline that characterized its first 75 years.

The Research Workshop was led by Andrew Wechsler. A survey questionnaire on attitudes toward research in cardiothoracic surgery was sent to the members of the Association. Four hundred sixty-seven members responded. There was remarkable support for research in the

**Table III.** *Workshop: research; chair: Andrew S. Wechsler*

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1. Horizontal integration with basic sciences
2. Multiinstitutional studies by surgeons
3. Internal marketing
4. Attract “best and brightest” a. add more women b. change residency training: decrease general surgery increase cardiothoracic surgery
5. Divisional as well as individual effort—the Division becomes the “triple threat”
6. Cardiothoracic surgical biology clubs

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specialty of cardiothoracic surgery and a strong belief that investigative efforts should not be limited to purely clinical or pragmatic endeavors but should include fundamental work in the laboratory.

However, although the number of manuscripts submitted for publication remains high, there was a general belief within the workshop that the quality had declined. In this age of molecular biology, cardiothoracic surgery is faring less well when it applies for National Institutes of Health research support. Few grant applications from surgeons are received, much less funded, by the American Heart Association. What is the cause of this malaise? The workshop concluded that research in cardiothoracic surgery is different from that in other disciplines and is often looked down upon as descriptive and less fundamental. Some of this, of course, is natural since often the questions being asked are, indeed, quite clinical and practical. Nevertheless, the workshop believed that some of the emerging research fields should play an important role in cardiothoracic research. These include molecular biology and myocardial physiology and endothelial cell function. There are opportunities for studies of biomaterials, transplantation of allografts and xenografts, assisted circulation including myoplasty, ventricular assist devices, and artificial hearts, thoracoscopic surgery, electrophysiology, myocardial preservation, and the development of controlled clinical trials.

If research in cardiothoracic surgery is also regarded as insufficiently fundamental, how do we respond to this deficiency? Many of us lack expertise in the basic and complex research tools, such as molecular biology. In addition to our lack of that understanding, frequently we are unable to develop a cohesive group to initiate large controlled clinical trials, and thus we have a tendency to report retrospective studies rather than prospective ones. In part, the solution to our dilemma lies in greater horizontal integration of cardiothoracic surgeons with other members of the medical school faculty. Clinicians often

**Table IV.** *Workshop: research funding; chair: William A. Gay, Jr.*


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1. Improve National Institutes of Health grant applications by collaboration with basic sciences
2. Encourage applications to American Heart Association; American Cancer Society
3. Establish Research and Education Foundation for Cardiothoracic Surgery
4. Solicit funds from former patients, industry and cardiothoracic surgeons

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have first-rate ideas but lack sufficient understanding of the tools needed to achieve these ideas. Basic scientists often lack an appreciation of the clinical problems but have superb training in the application of highly complex investigative techniques.

We must develop collaborative efforts with these basic scientists (Table III). Our residents must be allowed to spend time in basic science laboratories to further enhance integration with these colleagues. Well-organized, multiinstitutional groups should be established to perform well-prepared clinical trials for new surgical therapeutic modalities. Surgeons should respond promptly to these new modalities rather than let such studies be done by those outside our specialty.

We must, as cardiothoracic surgeons, do internal marketing within our academic institutions and make it clear that we are interested not only in the operating rooms but in the laboratories and in the investigative aspects of our profession.

Research time for our residents must be established. When the clinical component of the residency is already too long, this becomes most difficult and adds further to the unattractiveness of our residency programs. It was evident to the members of the workshop that serious consideration must be given to modifying the general surgical residency training period and increasing time for cardiothoracic surgical training.

If we wish to attract the best and brightest into academic cardiothoracic surgery, we must not only alter our residency programs but we must make them more attractive to women, who clearly have the potential of adding a whole new pool of bright individuals to the current one. Finally, we must make it attractive for medical students to enter cardiothoracic surgical laboratories and to become fascinated by the many prospects in our field. This requires that we actively participate in the undergraduate curriculum of our students. We must be seen in the classrooms and on the floors and actively participate in medical student education, much the same as those we all saw and admired when we were students.

We must recognize that the triple threat—the excellent

clinician, the educator, and the NIH-funded investigator all in one—is increasingly becoming a rarity as medicine becomes more complex. A cardiothoracic division with members proficient in different aspects of its mission is needed to establish broad representation. Divisional accomplishments should be recognized rather than only the individual ones. The division should become the “triple threat” rather than the individual.

The cardiothoracic community as a whole must place greater emphasis on research, and to that end the workshop proposed the establishment of cardiothoracic surgical biology clubs as forums for the presentation of work in progress not only by members of the Association but by young investigators who have not yet achieved membership. Thus a general thoracic surgical biology club under the leadership of Alec Patterson has been initiated. Another one, under Andrew Wechsler, has also come into being and is devoted to the field of research in cardiac surgery.

Some concern was expressed in regard to the high salary expectations of our faculty, and this, in turn, serves as a deterrent to those who might be interested in the more contemplative and academic aspect of our specialty. There is no question in my own mind that the increased pressure by both the hospital and the department or division on the academic cardiothoracic surgeon to do more operations has had serious negative effects on our academic endeavors. Yet I am fully convinced that the academic cardiothoracic community overwhelmingly recognizes the importance of research and will bring forth innovative ideas as well as the determination to continue in the footsteps of our academic forefathers.

The workshop on research funding was headed by William Gay. He addressed the possible sources of research funding. Traditionally, the National Institutes of Health has been the main external source of funding for our research. Unfortunately, funding from the National Institutes of Health has become exceedingly competitive and is often directed more toward molecular biology, making it difficult to fund traditional research in cardiothoracic surgery. Nevertheless, two Surgical Study Sections at the National Institutes of Health have surgeons as members, and we must continue to make applications. The voluntary agencies, such as the American Heart Association and the American Cancer Society, also dispense funds for research and have surgeons on their granting committees. An insufficient number of applications from surgeons is being received by these agencies, so we must become more aggressive and competitive in seeking funds from them.

Although our patients are fundamentally a significant potential source of funding for our research, as is industry, we need to establish a far more organized approach.

The following recommendations were made (Table IV):

1. Cardiothoracic surgeons must become more competitive in the National Institutes of Health arena by establishing with basic scientists and others collaborative efforts to enhance the level of sophistication of the applications.

2. More applications must be made to the American Heart Association and the American Cancer Society. Well-thought-out grant applications by surgeons will be given a hearing since we have surgeons in these organizations, but we will receive funds only if we make proposals.

3. The workshop proposed that a research and education foundation be formed. This foundation would be freestanding but would be sponsored by the Association as well as by the Society of Thoracic Surgeons and the two regional thoracic surgical associations. This foundation would become a depository for funds from industry and former patients and others, as well as from cardiothoracic surgeons, who directly benefit from the research done in our universities. It would dispense funds for research based on peer-reviewed grant applications. To that end, your Association has joined hands with the Society of Thoracic Surgeons and The Western Thoracic Surgical Association in forming the Thoracic Surgery Foundation for Research and Education. This foundation is now in existence, and our Association has made a donation of \$100,000 to it. A governing board is being established, as is a scientific review board to peer-review grant applications. I, for one, am extremely pleased about the progress that has been made by the Foundation under the leadership of Harold Liddle.

The fifth workshop, led by Frank C. Spencer, addressed issues of social responsibility in cardiothoracic surgery. Five issues were discussed. The problems of human immunodeficiency virus (HIV) infection were thoroughly discussed (Table V, A). It was believed that there was no scientific indication for testing health care workers at this time in view of the total lack of data. More complex was the issue of the HIV-positive house officer. All agreed that he should be counseled to take up a different career. There was no consensus as to what should be done if he refused. What is clear is that residents should have disability insurance coverage, should they become HIV positive. Finally, and perhaps most important, the committee emphatically stated that the surgeon has an ethical responsibility to take care of an HIV-positive patient. Although he may wish to transfer that responsibility to another physician, he cannot abandon the patient.

Resident working conditions were discussed (Table V, B). It is essential that we remember that the primary goal of the residency is education. As time has passed, the

**Table V.** *Workshop: social responsibility and the cardiothoracic surgeon; chair: Frank C. Spencer*

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- A. HIV problems
    - 1. No mandatory testing of health care workers
    - 2. The HIV-positive resident?
    - 3. Disability insurance for HIV for all residents
    - 4. Surgeon has responsibility to care for HIV-positive patient; he cannot abandon patient.
  - B. Resident working conditions
    - 1. Education—not service
    - 2. The system needs change—do not try to maintain status quo
    - 3. Residency Review Committee in "Essentials" should require adequate ancillary personnel funded in hospital budget
    - 4. Adequate conditions for eating and sleeping—appropriate work hours
    - 5. No moonlighting
  - C. Physician-patient relationship
    - 1. Surgeon must remain in charge of the patient, including in the intensive care unit; may delegate portions of care.
    - 2. The aged patient: Brain function should determine whether to operate or not—living wills
    - 3. Public disclosure of surgeons' mortality figures is detrimental to patient access
  - D. Physician and social issues
    - 1. Indigent patient—surgeon has responsibility to care for all, rich or poor
    - 2. We need to participate in health care system to help solve problems of access and cost
    - 3. Joint committee of The American Association for Thoracic Surgery and the Society of Thoracic Surgeons to continue to address problems regarding social responsibility
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work load on residents has gradually but dramatically increased, primarily because of regulations and paperwork. In a study in New York, nearly 80% of the actual work time for first- and second-year residents had nothing to do with patient care. Thus it is essential that we, as surgeons, not continue to try to maintain the status quo. The only solution to this problem is to insist that adequate ancillary staff be made available to help support the clinical program. It was the recommendation of the committee that this be incorporated in the Accreditation Council for Graduate Medical Education and Residency Review Committee Essentials of a Thoracic Residency. This would place pressure on the hospitals to provide the necessary funding in their budgets. It was thought that adequate sleeping and eating facilities should be available to house staff and that reasonable hours should be maintained. It was recommended that moonlighting be prohibited in view of the fact that it was contrary to the educational objectives of a residency and further contributed to the excessive work load of residents.

In the area of physician-patient relationships (Table V, C), the surgeon must remain in charge of his patient if he is to maintain a good and close relationship with him or her. He may delegate portions of care to various consult-

ants, but it is essential that the patient recognize him or her as the responsible physician. The abdication of this responsibility has resulted in an image, particularly of the cardiac surgeon, of an overpaid "supertechician." A common comment by patients is that they were operated on by a "supersurgeon," but they doubt if the surgeon remembers their names.

The problem of the aged patient was addressed. Who should and who should not be operated on? It was the consensus that the functioning of the patient's brain was perhaps most important in the final decision. Many 86-year-olds are alert and enjoy life. An aortic valve replacement in them is far more indicated than in someone who is chronologically younger but who is merely vegetating. The use of a living will should be encouraged as well as the use of a hospital committee to help support both the family and the surgeon in making the complex decision as to whether or not to terminate artificial means of support.

The issue of publicizing an individual surgeon's surgical mortality figures was discussed and condemned in that it would be highly adverse to the accessibility of high-risk patients to appropriate surgical care. A surgeon's mortality and morbidity figures should remain data to be handled on the hospital level and, if need be, by outside consultants, a concept which I believe the Ethics Committee of the Society of Thoracic Surgeons has so ably been doing.

Finally, the committee addressed the issue of the indigent (Table VD). Our current image as cardiothoracic surgeons is poor. It has been said that we lost some of our admiration and respect from the public when we gave up free care. We should again step forward and participate in this care. In addition, we should actively participate in the debate over our health care system and try to help solve the problems of access and cost. We as physicians have a responsibility to see to it that the 35 million Americans who lack insurance ultimately do have health care. In that light, it was recommended by the workshop that the Councils of The American Association for Thoracic Surgery and the Society of Thoracic Surgeons develop a joint committee, the Committee on Social Responsibility, to work with the American College of Surgeons, the two regional societies, and others to address some of these issues as they affect the cardiothoracic surgeon. To that end, our two societies have formed such a committee, which is chaired by Harvey Bender. It will meet three or four times a year and make an annual report to this Association and to the Society of Thoracic Surgeons.

Much ground was covered at the Snowbird Conference. As I reviewed it again for presentation to you today, it became evident to me that there is a theme throughout the conference, in all five workshops. We have, in part, lost our way. We are no longer fully participating, from beginning to end, in the care of our patients. We have allowed ourselves to become operating room technicians and, indeed, are forcing our residents into a similar mold. This has resulted in a less intellectually challenging residency, with cardiothoracic surgeons becoming intellectually narrower and the field of cardiothoracic surgery retreating from the bold frontiers that were established during the past 75 years. It has resulted in a loss of influence of cardiothoracic surgeons in the hospital, in the educational programs of our medical students and residents, and on the executive committees of our institutions. The brilliant research over the past 75 years is fading, often replaced by make-do kinds of investigation. We are no longer competing at the National Institutes of Health or other funding societies for support for our research. We have too often abdicated our responsibilities to our patients and to our fellowmen, who often view us as overpaid, arrogant supertechicians. To some extent, our own success has been our downfall.

However, we can find our way back. We must change our resident educational programs to make them more attractive, educationally sound, and intellectually challenging. We must enter the clinical arena on a much broader scale, becoming involved in the diagnosis and management of our patients, as well as in their postoperative care and long-term follow-up. We must ally ourselves with basic scientists to develop meaningful, highly sophisticated research programs that are worthy of National Institutes of Health funding. Our own research foundation also will further some of these aims. Finally, we must look at our fellowman and not shrink from our responsibility to him or her as physicians and leaders. We must participate in trying to address the health care issues of our time in a positive sense for our patients and perhaps in a less self-serving manner.

In closing, I want to thank the many who have made this past year a challenging one for me. I would particularly like to single out the Council of this Association, the participants of the Snowbird Conference, the leadership of The Society of Thoracic Surgeons with whom we should develop a much closer relationship, for together we can do much, and Bill Maloney—that "protector of presidents."