

# Thoracic Surgery Practice Surveys

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Professional workforce surveys performed periodically provide a series of snapshots to follow broad demographic and practice trends as well as attitudes of the physician workforce. National concern about the physician workforce has resulted in studies and projections by several professional societies and the Association of American Medical Colleges (AAMC) as well as the federal government. The changing demographics and the disease burden of the United States population have resulted in predicted shortages in many specialties over the next few decades [1–19].

In the early 1970s, long before other specialty societies began to survey their members, The Society of Thoracic Surgeons (STS) and the American Association for Thoracic Surgery (AATS) established a joint ad hoc committee to survey their respective memberships. Chairs of the Manpower Committee (now the Thoracic Surgery Practice and Access Task Force) have included Lyman A. Brewer, III, MD, Paul C. Adkins, MD, Richard J. Cleveland, MD, Floyd D. Loop, MD, Lawrence H. Cohn, MD, Richard J. Shemin, MD, and John S. Ikonomidis, MD, PhD.

Survey snapshots were to be repeated from time to time (every 5 to 10 years) to better understand demographics, practice patterns, caseloads, and other trends in cardiothoracic surgery practice. Surveys of the combined STS and AATS membership began in the early 1970s, with the first results published in 1974, followed by periodic surveys using similar questions and analytical methodology [20–27]. As the survey instrument became more standardized, important trends were documented.

## Survey Evolves With Specialty

In the 1970s, most cardiothoracic surgeons had primarily a general thoracic (GT) and vascular practice. The incorporation of increasing numbers of cardiac surgical procedures into practice significantly changed the specialty and increased the clinical case volume. The cardiac procedures performed expanded from those involving primarily congenital, vascular, and valvular conditions to ever-increasing numbers of myocardial revascularization procedures for coronary artery occlusive disease.

As the specialty changed, the content of the survey instrument was expanded. The additional data accrued provided more detailed insights and identified a number of existing and emerging trends. This information was invaluable and enabled STS and AATS to better represent

the specialty and respond to the increasing demands for information from governmental agencies and third-party payers in the arenas of advocacy and health policy.

Survey questions also sought information on length of training, educational debt, malpractice insurance premiums, career satisfaction, retirement projections, workload, case distribution, the adoption and effect of new technology, and participation in Medicare.

Over the years, survey publication has alternated between the STS and AATS journals, *The Annals of Thoracic Surgery* and the *Journal of Thoracic and Cardiovascular Surgery*, respectively. The most recent survey results were published simultaneously in both journals [27, 28].

## Surveys Track Changes in Scope of Practice

Attempts at using surveys to predict the retirement rate of practicing cardiothoracic surgeons and the number of residency positions required to achieve an optimally sized workforce have been unsuccessful. One reason is that demand for cardiothoracic surgeons, as determined by cardiac and GT diseases requiring surgical treatment, is difficult to measure, principally because of inadequate data and imprecise methodology. The number of procedures performed by thoracic surgeons for lung and pericardial diseases was relatively flat during the 1970s, whereas the number of procedures for cardiac disease, particularly valve surgery and myocardial revascularization, increased substantially [20–27].

The problematic issue of general surgeons performing thoracic procedures remains an area of concern. In the early surveys, the number of GT surgical procedures (lung and esophageal) that were performed by general surgeons was estimated to be 40%, whereas cardiac surgical procedures, such as coronary artery bypass grafting (CABG) and valve procedures, were performed exclusively by board-eligible or board-certified cardiothoracic surgeons. Data gathered by the Dartmouth Health Policy Group [30] and later by the STS/AATS manpower surveys demonstrated that general surgeons continued to perform lung resections, although the volume of procedures was lower.

Trends in the practice of vascular surgery have resulted in a significant reduction in the number of peripheral vascular surgical procedures performed by cardiothoracic surgeons, a change at least partly due to vascular surgery having moved from a subspecialty to a distinct specialty in its own right.

The most recent STS/AATS survey results indicated that endovascular aortic procedures were performed by 36% of adult cardiac (AC) surgeons. Peripheral vascular

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surgical procedures were performed by 33% of surgeons (AC surgeons, 41%; congenital heart [CH] surgeons, 10%; and GT surgeons, 22%). The Southwest (63%) and Mountain (49%) regions were areas where performance of peripheral vascular procedures predominated. At that time, only 8.5% of cardiothoracic surgeons (8.2% of AC surgeons, 0% of CH surgeons, and 7.5% of GT surgeons) were certified in vascular surgery; this figure is similar to 2005 survey findings of 9.0%.

Survey results track and reinforce findings that cardiologists, especially those in the subspecialty of cardiac electrophysiology, have largely replaced cardiothoracic surgeons for the placement of cardiac pacemakers. The development of less invasive technology, such as percutaneous coronary intervention and endovascular grafting for thoracic aortic disease, has reduced the number of procedures performed by AC surgeons. This reduction in volume has occurred despite increased numbers of appropriately insured elderly patients who require interventions for cardiac and vascular disease.

### Cardiothoracic Surgery Sees Shifts in Supply and Demand

Now the specialty faces the effect of another “disruptive” new technology, transcatheter aortic valve replacement, which is reducing the volume of open aortic replacements. Transcatheter approaches to mitral valve disease are rapidly evolving and will soon be more widely available. Future surveys will need to follow these trends.

The supply side of the workforce can be accurately determined by the number of filled residency positions and by the number of practicing American Board of Thoracic Surgery (ABTS) diplomates; however, recent surveys have found that the number of positions available to competent cardiothoracic surgeons—the demand side—is unpredictable.

Estimates on the attrition rate from the cardiothoracic surgery workforce as a result of retirement or other reasons, such as family leave, disability, or assuming nonoperating positions (eg, full time research, administration), have not been as predictable as assumed in some studies. Survey results from 1999 found that most cardiothoracic surgeons wanted to retire between the ages of 61 and 65 years. Findings in the 2009 survey, however, showed a significant deferral of retirement to an older age, driven mainly by unfavorable economic conditions. Surgeons are remaining in practice longer because of a downturn in the financial markets and the overall economy, both of which affected the value of retirement and pension funds. Early retirement today is more unusual and driven principally by disability or by practice environments that are no longer financially viable. Although the number of surgeons who have assumed “nonoperating” positions, such as health executives or administrators, has increased, this has had little impact on the total number of clinically active cardiothoracic surgeons.

A “perfect storm” was created by the deferral of early retirement and reduced case volume, a situation then

compounded by reduced reimbursement—all of which led to a tight market for available positions. This “perfect storm” had a profound effect on residents who had completed their training. The attractiveness of cardiothoracic surgery as a specialty has been negatively affected, and consequently, the number of applicants to cardiothoracic surgery training programs has declined considerably.

### Practice Settings Also Change

According to survey results, practice settings have varied among the cardiothoracic surgery subspecialties. The typical CH surgeon is most likely to practice only CH surgery as part of an academic group in a major metropolitan center. The typical GT surgeon is located in or around a major city, working in a multispecialty or academic group practice. AC surgeons have the widest geographic distribution and the most diverse practices. Even though their focus is on cardiac surgery, approximately 80% of these surgeons perform GT procedures, 33% perform vascular procedures, and a few perform CH procedures. Only 8.5% are board-certified in vascular surgery, and 6% are certified in critical care. Most work in single-specialty private group practices or in large multispecialty groups, in both private and academic settings.

The solo practice, so common in the early surveys, has virtually disappeared. Hospital or health maintenance organization full-time employment models are now the most prevalent forms of practice. Health care reform and the reorganization into Accountable Care Organizations make these models attractive from the economic standpoint [29].

Results from the 1999 and 2009 surveys documented the effect of the changing economic conditions and practice patterns, which partly contributed to the significant reduction in applications to cardiothoracic surgery residency programs. Another factor contributing to the decline in applications is the relative unattractiveness of the specialty of cardiothoracic surgery to women. Women currently compose 3% of the cardiothoracic surgery workforce; however, women represent more than 50% of the current medical school enrollment and fill more than 25% of the residency training positions in general surgery.

### Specialty Sees Declining Surgical Volume

The 2009 survey results showed that operative volume declined over the previous 12 months for 30% of surgeons. The greatest decrease was 34% for AC surgeons, followed by 20% for GT surgeons, and 13% for CH surgeons. AC surgeons experienced the greatest reductions in reimbursement as well as case volume, reporting an average of 155 AC cases per year. Those AC surgeons doing GT procedures reported performing 92 pulmonary and 22 esophageal procedures on average each year. GT surgeons reported an average of 174 pulmonary and 40 esophageal cases per year. The CH surgeons reported 191 pediatric and 28 adult congenital cases per year. There

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