Is Medical Student Interest in Cardiothoracic Surgery Maintained After Receiving Scholarship Awards?

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Background. **Medical student exposure to cardiothoracic surgery has been facilitated by many scholarship opportunities. This study reviews the long-term interest of students at our institution who have received such support.**

Methods. **After the first or second year of medical school, participants were selected to receive scholarships for clinical or research activities in cardiothoracic surgery ranging from 4 to 8 weeks in duration. These were funded by the American Association for Thoracic Surgery, Society of Thoracic Surgeons, Southern Thoracic Surgical Association, or a private family donor. Over time, each student's scholarship type, current interest in cardiothoracic surgery, and current education or career status was prospectively monitored in an institutional database.**

Results. **Since 1999, 45 students received scholarships. Eight (18%) were funded by the American Association for Thoracic Surgery, two (4%) by The Society of Thoracic Surgeons one (2%) by the Southern Thoracic Surgical Association, and 34 (76%) by private donors. The median follow-up of graduated students is 7 years. Of the 20 (44%) with an active current interest in cardiothoracic surgery, 2 are faculty, 1 is a fellow, 1 is in an integrated 6-year program, 11 are in general surgery residency and are planning to apply to cardiothoracic surgery fellowship, and the remaining 5 are in medical school and planning a cardiothoracic surgery career. Of all former medical students who received cardiothoracic surgery research scholarships and who have now made a career choice, 17.4% chose cardiothoracic surgery.**

Conclusions. **More than one-third of medical students who received scholarships in cardiothoracic surgery maintained their interest over time, and more than half maintained interest in a surgical field. Although long-term data are scarce, it remains critical to foster mentoring relationships with students over time to guide their career choices.**

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Recent data over the past few decades has documented declining numbers of cardiothoracic (CT) surgeons being trained in the United States (U.S.) each year. This is thought to result from not only a declining physician-to-patient ratio in the U.S. as the number of medical school seats has been held relatively constant while the population continues to grow but also from a decreasing proportion of potential applicants seeking to be trained in CT surgery [1, 2]. A decline by more than 50% in applicants to training positions in CT surgery was reported between 1997 and 2012 [3]. These statistics are worrisome in light of the fact that one-third to one-half of our nation's current CT surgeons will retire within the next decade while the population older than age 65 is expected to double, placing a tremendous demand on the declining CT surgery workforce and pressure to train more CT surgeons [4, 5].

Early attempts to alleviate this projected shortage have included increasing employment of foreign medical graduates to take unfilled seats; however despite this, many training positions in CT surgery continued to go unfilled. More recent strategies have included the creation of "I-6" integrated 6-year training programs, increasing the use of simulation training among surgical residents and medical students to bolster interest and skill building [6, 7], development of mentored scholarly experiences [8], and the distribution of scholarships to fund medical student participation in clinical and research experiences in CT surgery.

Some of the most prominent scholarships awarded to medical students in the field of CT surgery are those offered by the American Association of Thoracic Surgery, The Society of Thoracic Surgeons, and the Southern Thoracic Surgical Association. Others are given on a more local level within communities and specific medical schools. These scholarships invest thousands of dollars per medical student to pursue rigorous clinical or research experiences, or both, in CT surgery in the form of stipends, funding of research, and travel expenses to attend and present at national conferences.

Many of these scholarships have been offered for decades, with numerous recipients each year. Although it

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Table 1. Study Population

Variable	Students
First-year students, No. (%)	5 (11)
Second-year students, No. (%)	36 (80)
Third-year students, No. (%)	4 (9)
Female, No. (%)	22 (49)
Follow-up, y	7
Scholarship type, No. (%)	
AATS	8 (18)
STS	2 (4)
STSA	1 (2)
Private award	34 (76)

AATS = American Association of Thoracic Surgery; STSA = Southern Thoracic Surgical Association; STS = The Society of Thoracic Surgeons.

has been documented that in the short-term several scholarship recipients are able to successfully produce scholarly work, including publications and presentations, how many of these students will go on to become cardiothoracic surgeons in the long-term remains unknown. To help answer this question, we conducted a prospective study looking at career outcomes of students who received such scholarships at our institution during the past 15 years.

Material and Methods

Since 1999, approximately 1 to 5 students at our institution apply to highly competitive national scholarships such as those offered by the American Association of Thoracic Surgery and The Society of Thoracic Surgeons, which were awarded to up to 1 student each year. Private awards funded by donor families were given to up to 4 additional students each year, many of whom had also applied to the national scholarships but did not receive them. The intended purpose of these scholarships was to enhance student exposure to CT surgery, both clinically and academically, to help encourage more students to join the field. Similar to the national awards, our private awards included a $1,000 stipend to help cover living expenses during the time of the program. Research materials and travel expenses were covered separately by the Division of Thoracic Surgery.

Students who received the national or private awards spent 4 to 8 weeks engaged in clinical, research, or combined experiences based on the student's interests and stage in medical school. The awards were not contingent upon academic productivity; however, all students were strongly encouraged to present their work within the institution at medical school research events and to submit abstracts and manuscripts to national research conferences, if possible.

Table 2. Study Population

Participant	Entire Study Sample No.	Those Responding to Survey No. (%)
Faculty	17	10 (59)
Fellow	5	4 (80)
Resident/I-6 program	16	15 (94)
Medical student	7	7 (100)
Total	45	36 (80)

Table 3. Short-Term Academic Productivity

Variable	Total No.	Presentations No.	Manuscripts No.	Awards No.
Outcomes	25	10	13	2
Students	45	9	11	2
Outcomes per student	0.6	1.1	1.2	1.0

In many of the application seasons, enough national and local awards were available to offer all interested students a scholarship opportunity; however, occasionally we had to selectively choose recipients among a larger group of applicants. Selections were made based on a personal statement and research proposal that demonstrated an academic interest in the field of CT surgery. We were able to obtain private funding for our local scholarships from a donor family that was interested in funding cardiothoracic surgery education and training.

Medical students who applied for and received one of the above-mentioned awards were prospectively monitored in an institutional database. At the time of enrollment, we recorded the class level, type of scholarship received, and long-term contact information of each student. Over time, we maintained data on student productivity in publications, poster presentations, and abstracts, as well as career choice in terms of residency matriculation. This information was revised and updated several times annually or as needed by faculty in the Department of Thoracic Surgery, who were closely involved in conducting research with the students, and as well at the time of the annual residency match.

Between March 2014 and September 2014, we retrospectively surveyed awardees in compliance with our institutional review board. All current and former award recipients were emailed an anonymous online survey enquiring about current career status, level of interest in pursuing CT surgery, if applicable (this question was not applicable to current faculty, fellows, and residents in other fields), at what point during or before medical school the participant decided which field to pursue residency training in, important factors that led the participant to apply for the scholarship in CT surgery, and advice on what could have been done to enhance the participant's interest in CT surgery while he or she was in medical school.

Results

The study included 45 students, of which 22 (49%) were women, including 5 (11%) first-year medical students, 36 (80%) second-year students, and 4 (9%) third-year

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