Increased Exposure Improves Recruitment: Early Results of a Program Designed to Attract Medical Students Into Surgical Careers

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Background. In recent years, general surgery and surgical subspecialty residency interests have remained somewhat static among medical students, casting some doubt on recruitment of the best students. A summer research program was designed to introduce interested medical students to surgical careers.

Methods. In 2003, the division of cardiac surgery instituted an 8-week structured summer research experience for second-year medical students. Three students were competitively chosen from a pool of 20 to 30 interested applicants every year. They were taught basic operative suturing and knot-tying techniques. Students participated in large animal research projects, witnessed clinical operations, and developed individual clinical projects with an attending cardiac surgeon. The summer experience culminated with oral presentations to the cardiac surgery division, with many students producing manuscripts for publication or presentation at national meetings.

Results. From 2003 to 2012, 30 students participated in the program. Of 23 participants who had applied for residency, 12 (52.2%) matched into general surgery or a surgical subspecialty, including 3 into plastic surgery, 2 into cardiothoracic surgery, 1 into orthopedic surgery, and 1 into neurosurgery. These students produced 64 publications and presented at 51 national and regional meetings.

Conclusions. These results suggest that an 8-week, structured program introducing students to cardiothoracic surgery can successfully attract students into surgical careers. The percentage (52%) of these students entering a surgical career compares favorably with national residency match results (16%) and graduating Johns Hopkins medical students (22%). Increased effort for early exposure to surgery may be a key factor in generating and securing surgical interest among medical students.

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Several publications within the last decade have affirmed that cardiothoracic (CT) surgery has seen a notable decline in resident interest in traditional programs [1–3]. These programs have observed either unfilled matches or matching residents low on the priority list [4]. The declining applicant pool has also resulted in the closing of programs, leading to a reduction of available training positions [1, 4]. The average 8.6 years of traditional CT training involves almost a decade of dedication, generally without specialization training [1, 2]. Moreover, the overall demand for CT surgeons is predicted to significantly increase within the next 7 years, based on the aging baby boomer population with cardiovascular disease as the primary cause of elderly mortality and morbidity [2]. Thus, the CT specialty faces a potentially substantial shortage of surgeons. Declining interest is most apparent in the National Residency Match Program (NRMP). The current 2013 NRMP data for thoracic surgery residencies showed 12 positions and 11 programs unfilled [5].

Cardiothoracic surgery is not the only surgical subspecialty facing surgeon deficits. Surgical residency matches among US senior medical students have remained at 16% for the last 5 years [6]. Fifteen percent of surgical programs were unfilled in the most recent 2013 match [6]. These stagnant numbers from NRMP suggest a lack of increased interest by medical students.

Reasons for this decline in interest include lifestyle, time commitment, call schedules, debt, and residency program length [7]. Lack of early surgical exposure coupled with specialty competition to attract the best students contributes to this static number of resident applicants. It can also result in a lack of education about CT surgery, leading to an unawareness that this specialty may better suit their skills and interests [3, 7]. Without the benefit of early exposure, potentially interested and inherently skilled students may not consider a career in surgery.

During the last 10 years, the divisions of cardiac and general thoracic surgery at The Johns Hopkins Hospital have made a concerted effort to attract medical students into surgery, and in particular, CT surgery [1, 8]. The

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program, initially described in 2006 [8], now has 10 years of data to support the proposed hypothesis that early exposure to surgery will increase interest among medical students, resulting in matriculation into surgical careers. Here, we present these longitudinal results of our internal medical student CT research program.

Material and Methods

In 2003, our early understanding of CT surgeon shortages and the lack of surgical exposure among medical students led us to implement an internal cardiac surgery research summer program. This structured 8-week program has attracted rising second-year students to the cardiac surgery research laboratory, where they are actively engaged in both CT-based clinical and basic science research. Our Cardiac Surgery Research Laboratory personnel instruct students on basic operative techniques including suturing, knot tying, and sterility. In addition, students are engaged in guided hands-on participation in large animal research projects. Under the mentorship of a cardiac surgery research fellow and faculty members, students develop an individual clinical database project, the results of which are presented at grand rounds to the cardiac surgery and general thoracic division members at the end of the 8-week period.

The summer between the first and second year of medical school generally has no scheduled curriculum, which provides students the opportunity to pursue a focused academic experience in a specialty of their choice. An uninterrupted 8-week period allows time to expose the students to the role of an academic surgeon, while creating a potentially publishable clinical database presentation. The Johns Hopkins School of Medicine dean's office provides a stipend for research during this time.

Three students each year were competitively chosen from a pool of approximately 20 to 30 applicants. Decisions were based on grade point average, letters of interest, and a personal interview. The majority of applicant interest stems from positive feedback from former medical students who participated in the program. Summer projects were developed by the students, research fellows, and faculty who addressed a CT-based procedure or problem. The cardiac surgery data center provided the appropriate data, ensuring all patient privacy regulations were observed.

Students and their research fellow meet with their faculty mentor before the program starts to discuss their project and applicable database. As mentioned, the program was configured into an 8-week itinerary. Figure 1 describes that research timeline. The first 2 weeks were dedicated to an orientation to the cardiac surgery research laboratory and applicable literature searches. The next 3 weeks consisted of database creation or manipulations of prior databases or both. The next 2 weeks involved a comprehensive statistical analysis. Presentation preparation and manuscript writing were performed during the last week, ending with project presentations.

Although students formally complete the program after their presentation, many have continued to be involved with the fellows and faculty of CT surgery. Several students published their manuscripts, many of which were presented at regional and national meetings. This initial experience also inspired additional projects for some students during their remaining time in medical school. The cardiac surgery research laboratory maintains a database of all student publications and subsequent residency choices. The developed relationship of the student and cardiac surgery research fellows and faculty often resulted in future career advice and guidance.

To assess our success rate in attracting medical students into a surgical career, we compared our students' surgical residency matches with those of Johns Hopkins medical students who matched into a surgical residency and the NRMP.

Results

From 2003 to 2013, 30 rising second-year medical students completed the cardiac surgery summer research program, including 10 women (33%). From those 30 students, 51 abstracts were presented at regional, national, and international meetings, and 64 manuscripts were published. Not including the most recent summer students, 15 of 27 students (56%) have either presented at a national meeting or authored a journal article. Fifty percent of our students have published their work in CT peer-reviewed journals, and 12 (40%) have presented their work at national CT meetings.

The academic productivity of our summer students demonstrates the interest and dedication of our students, residents, and faculty. Because the summer clinical database projects are often the student's first publication, the CT surgery residents and faculty are committed to promoting student recognition and first-authorship. Excellent experiences in this program often resulted in a continuation of mentorship throughout the student's time in medical school, and that can additionally help foster a career in surgery.

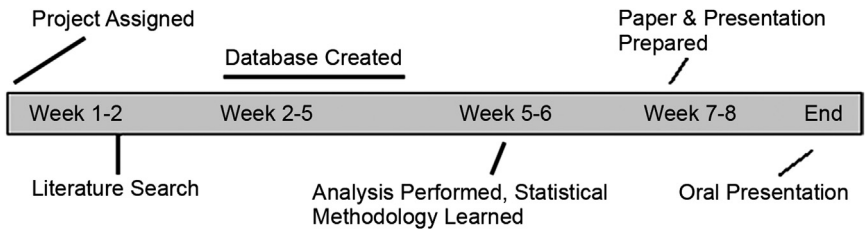

Fig 1. Summer student research timeline. Reprinted from Allen JG, et al, Ann Thorac Surg 2009;87:1816-19 [2], with permission.