

# Thoracic Surgical Resident Education: A Costly Endeavor

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**Background.** We sought to define an accurate measure of thoracic surgical education costs.

**Methods.** Program directors from six distinct and differently sized and geographically located thoracic surgical training programs used a common template to provide estimates of resident educational costs. These data were reviewed, clarifying questions or discrepancies when noted and using best estimates when exact data were unavailable. Subsequently, a composite of previously published cost-estimation products was used to capture accurate cost data. Data were then compiled and averaged to provide an accurate picture of all costs associated with thoracic surgical education.

**Results.** Before formal accounting was performed, the estimated average for all programs was approximately \$250,000 per year per resident. However, when formal evaluations by the six programs were performed, the

annual cost of resident education ranged from \$330,000 to \$667,000 per year per resident. The average cost of \$483,000 per year was almost double the initial estimates. Variability was noted by region and size of program. Faculty teaching costs varied from \$208,000 to \$346,000 per year. Simulation costs ranged from \$0 to \$80,000 per year. Resident savings to program ranged from \$0 to \$135,000 per year and averaged \$37,000 per year per resident.

**Conclusions.** Thoracic surgical education costs are considerably higher than initial estimates from program directors and probably represent an unappreciated source of financial burden for cardiothoracic surgical educational programs.

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There have been few reports on the cost of surgical education for residents. In addition, most have been quite limited in scope, with no uniform agreement on what factors should be included in calculating the real “cost” of surgical education [1–3]. For example, one study reported a 35% increase in operative time when residents participated in an operation, yet there was no recognition of this “lost” time to the surgeon [1]. Another study reported on direct costs borne by a department of surgery not paid for by Direct Medical Education and Indirect Medical Education funds, which totaled \$153,000 per year [2]. In another report, instituting a modern curriculum was reported to cost \$235,000 for one department of surgery [3]. There are no similar studies reporting the costs associated with thoracic surgery residents; therefore, the

aim of this study was to better estimate thoracic surgical educational costs.

## Material and Methods

After informal discussion amongst a number of the authors, we realized there had not been a formal effort to capture all of the costs involved in the education of thoracic surgical residents. Because the traditional paradigm of 2 to 3 years of education is evolving to allow for integrated as well as other innovative and more lengthy and time-consuming approaches to education, we determined that a closer look at all costs and benefits associated with thoracic surgical education would be valuable. Initial informal estimates for resident educational costs ranged from \$150,000 to \$250,000 per year, and most of the authors felt that the cost was closer to the higher value. The first author enlisted the support of previous collaborators to adapt a clinical trial cost-estimator tool for the purpose of capturing all costs and benefits of thoracic surgical education [4].

Authors Baisden, Holler, and Calhoon reviewed this tool and sent it to the other authors for their critical review and input. Once this tool was finalized, the authors

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enlisted the support of their respective program directors, administrators, and program coordinators to populate the spreadsheet. These spreadsheets were gathered and collected between mid-2011 and early 2012, and the data were carefully reviewed and scrutinized. In some cases, it was clear that costs could be assigned to overlapping areas. Where there was ambiguity in the data or a question of accurately assignment of costs, further discussion ensued. Once the data were felt to be valid and defensible, the data were compiled into a master data set to calculate averages and ranges. Deidentified data were subsequently sent to each author to ensure that each program was satisfied with its own data as well as the data set as a whole.

## Results

Initial cost estimates were found to be fairly low. Not surprisingly, the highest cost was attributed to faculty time and effort. Of note, all programs spent a significant amount of time and money on Accreditation Council for Graduate Medical Education (ACGME) preparation, resident recruiting, simulation, and teaching conferences. Financial benefits associated with resident work efforts

were real but not nearly as high as the costs associated with their education. An endowment had been created in one program to provide \$100,000 annually to offset costs. The average benefit would have been somewhat lower without this fund.

The study programs enrolled between 1 and 3 residents per year and represented the spectrum of integrated as well as traditional 2-year and 3-year training paradigms. The costs are portrayed in a spreadsheet for clarity (Fig 1). The exact number of residents per year, total number of residents, and program length were omitted for confidentiality reasons.

Resident costs are dominated by the faculty time and effort spent in education, mentoring, and performing ACGME requirements. Significant costs are now incurred in training programs to ensure that quality efforts are continually made and documented. The oversight mandated by the ACGME is costly but has provided a framework that most authors believed provided significant protection for the resident and the program. The paperwork and documentation required to prepare for these visits is expensive and time consuming.

The use of simulation, an improved educational curriculum, and additional conference time have been

COSTS per RESIDENT								
per Year	Recruits per Year	1	2	1	3	2+1	1+1	AVG
	Program Years	3	3	2	2 to 3	2+6	2+6	
	Total Residents	3	6	1	9 to 6	4+2	2+3	
*Recruiting Costs		\$ 33,314.00	\$ 46,742.00	\$ 22,651.00	\$ 9,462.00	\$ 12,000.00	\$ 11,280.00	\$ 22,574.00
Salary and Benefits		\$ 80,012.00	\$ 92,491.00	\$ 69,687.00	\$ 98,133.00	\$ 74,167.00	\$ 66,000.00	\$ 80,082.00
*Incidentals		\$ 14,582.00	\$ 8,223.00	\$ 10,618.00	\$ 39,000.00	\$ 4,833.00	\$ 7,076.00	\$ 14,055.00
*Admin Costs		\$ 62,611.00	\$ 26,435.00	\$ 118,800.00	\$ 68,192.00	\$ 23,083.00	\$ 74,600.00	\$ 62,286.00
Classroom Training		\$ -	\$ 15,504.00	\$ 43,250.00	\$ 18,000.00	\$ 10,000.00	\$ 18,860.00	\$ 17,602.00
Research Lab		\$ -	\$ -	\$ 47,750.00	\$ 15,533.00	\$ 67,000.00	\$ -	\$ 21,714.00
Simulation Lab Training		\$ -	\$ 3,786.00	\$ 13,920.00	\$ 32,532.00	\$ 79,910.00	\$ -	\$ 26,030.00
Faculty Teaching Costs		\$ 307,881.00	\$ 344,181.00	\$ 346,250.00	\$ 221,167.00	\$ 250,000.00	\$ 208,000.00	\$ 279,580.00
COST BENEFITS per RESIDENT		\$ (7,076.00)	\$ (16,214.00)	\$ (5,000.00)	\$ (135,467.00)	\$ -	\$ (56,000.00)	\$ (36,626.00)
TOTAL COST PER RESIDENT		\$ 491,324.00	\$ 521,148.00	\$ 667,926.00	\$ 366,552.00	\$ 520,993.00	\$ 329,816.00	\$ 482,960.00
PER YEAR								
*Recruiting Costs			*Incidentals		*Admin Costs			
advertisement			computer		Residency director			
correspondence			software		Residency secretary			
evaluation			library books		Malpractice insurance			
travel			call room		salaries			
lodging			laundry		travel and lodging associated			
match participation			white coats		ACGME report prep			
faculty evaluation time			loupes		RRC site visit prep and reports			
catering			meals					
interview blue books								
food during interviews								
Surgery ed staff efforts								
Surgery Education FTE % effort								

Fig 1. Resident cost-and-benefit worksheet. (ACGME = Accreditation Council for Graduate Medical Education; AVG = average; FTE = full-time equivalent; RRC = Residency Review Committee.)

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