

# The Economics of Academic Advancement Within Surgery

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**BACKGROUND:** The success of an academic surgeon's career is often viewed as directly related to academic appointment; therefore, the sequence of promotion is a demanding, rigorous process. This paper seeks to define the financial implication of academic advancement across different surgical subspecialties.

**STUDY DESIGN:** Data was collected from the Association of American Medical College's 2015 report of average annual salaries. Assumptions included 30 years of practice, 5 years as assistant professor, and 10 years as associate professor before advancement. The base formula used was: (average annual salary)  $\times$  (years of practice [30 years – fellowship/research years]) + (\$50,000  $\times$  years of fellowship/research) = total adjusted lifetime salary income.

**RESULTS:** There was a significant increase in lifetime salary income with advancement from assistant to associate professor in all subspecialties when compared to an increase from associate to full professor. The greatest increase in income from assistant to associate professor was seen in transplant and cardiothoracic surgery (35% and 27%, respectively). Trauma surgery and surgical oncology had the smallest increases of 8% and 9%, respectively. With advancement to full professor, the increase in lifetime salary income was significantly less across all subspecialties, ranging from 1% in plastic surgery to 8% in pediatric surgery.

**CONCLUSION:** When analyzing the economics of career advancement in academic surgery, there is a substantial financial benefit in lifetime income to becoming an associate professor in all fields; whereas, advancement to full professor is associated with a drastically reduced economic benefit. (J Surg Ed ■■■■-■■■. © 2017 Association of Program

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**KEY WORDS:** economics, career advancement, surgery, finance, lifetime salary income

**COMPETENCIES:** Practice Based Learning and Improvement

## INTRODUCTION

The success of an academic surgical career is marked by research productivity, clinical service, educational efforts, and advancement within the hierarchical framework. The progression as one climbs the academic ladder is often arduous and becomes gradually more challenging as candidates must meet increasingly advanced criteria in order to qualify for further promotion. Requirements for promotion usually include career longevity, high output research productivity, scholarly achievement with widespread implications, and citation impact.<sup>1,2</sup> One must often demonstrate a leadership commitment not only to internal service but also to national associations and editorial boards in the broader professional community. Additionally, deliberations for promotions involve peer review to assess the distinction of an individual, which inevitably results in a process that can be influenced by subjectivity and politics.<sup>3</sup> The high attrition rate within academia has been partly attributed to this difficulty of ascension, with about 30% of faculty leaving for reasons involving professional advancement.<sup>4</sup> Given the difficulty of academic advancement, it is reasonable to question whether there is an economic benefit worthy of this uphill battle. Additionally, with significant opportunity costs present in certain surgical fields secondary to the delay to practice associated with research and fellowship years, it would be helpful to ascertain and assess other factors involved in the economic climate of surgery.<sup>5</sup> Currently, there is no data available showing the financial implications of promotion. This study seeks to examine whether there is a significant economic benefit paralleling the degree of exertion and productivity one must achieve to advance academically.

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## METHODS

This study is a retrospective cross-sectional analysis in which the principle outcome was to evaluate differences in lifetime salary income between academic appointments of surgeons in general surgery and the following 7 different subspecialties: cardiothoracic/thoracic, pediatric, plastic, vascular, trauma/critical care, transplant, and surgical oncology. Data was obtained from the Association of American Medical College's (AAMC) 2015 report of average national annual salaries for each of the following appointment: assistant professor, associate professor, and full professor.<sup>6</sup>

Several assumptions were made to derive a formula for total adjusted income. Duration of total practice was set at 30 years even though there is certainly individual variability in length. Expected years of fellowship training and time spent performing research during residency training was included as per current trends of each subspecialty (Appendix A). It was assumed that full professorship meant completing 2 years of research regardless of subspecialty. The position of assistant professor was set for a duration of 5 years and associate professor for 10 years before advancement. Time to promotion was chosen through a combination of subjective clinical experience and Warner et al.'s<sup>7</sup> work that showed promotion to associate professor took on average  $5.3 \pm 3.2$  years and  $8.7 \pm 5.3$  years from associate to full professor. Finally, our calculations rested on the assumption that one could not progress in seniority before first proceeding through earlier appointments. The equations used can be represented as

*Assistant professor:*  $TAR = (AaYS) [30 - (F + R)] + [50,000 (F + R)]$

*Associate professor:*  $TAR = AaYS*5 + \{(AbYS) [25 - (F + R)] + [50,000 (F + R)]\}$

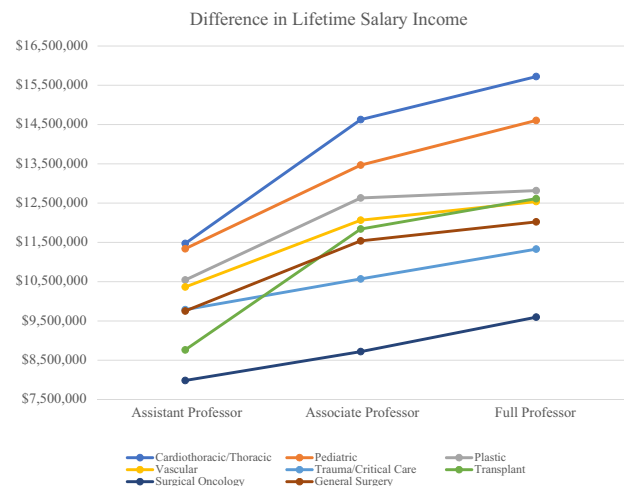
*Full professor:*  $TAR = [AaYS*5 + AbYS*10] + \{(AcYS) [15 - (F + R)] + [50,000 (F + R)]\}$

where TAR is total adjusted revenue, AaYS is assistant professor average yearly salary, AbYS is associate professor average yearly salary, AcYS is full professor average yearly salary,  $F$  is years of fellowship training, and  $R$  is years of research during residency. Calculations were made for each of the 7 subspecialties examined and general surgery. An independent paired samples  $t$ -test was conducted to compare the average percent increase of an associate professor's lifetime income to that of a full professor.

The primary study objective was to compare the lifetime salary incomes of each academic appointment within a surgical subspecialty and to determine the economic impact of advancement. All calculated results were recorded in US dollars (Figs. 1 and 2).

## RESULTS

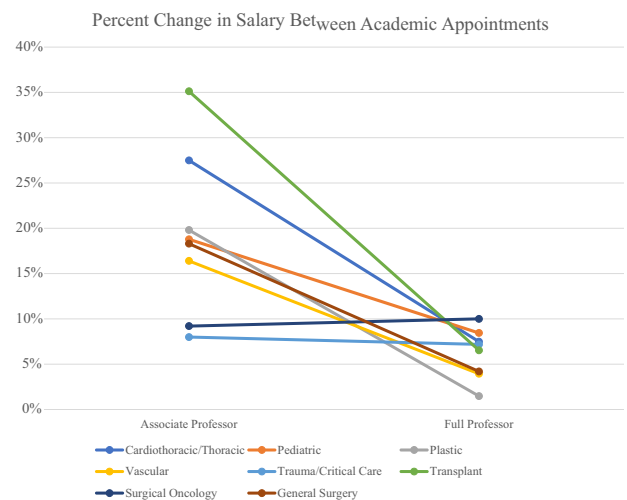
A total of 7 surgical subspecialties and general surgery were included (Table 1). The annual average salary of an assistant



**FIGURE 1.** The difference in lifetime salary income between academic appointments.

professor ranged from \$299,400 (surgical oncology) to \$448,900 (cardiothoracic/thoracic). The yearly salary of an associate professor ranged from \$351,100 (surgical oncology) to \$606,600 (cardiothoracic/thoracic) and a full professor's income ranged from \$399,000 (surgical oncology) to \$716,100 (cardiothoracic/thoracic).

If one chose to remain an assistant professor for the duration of their career, lifetime salary income ranged from \$7,984,400 in surgical oncology to \$11,472,500 in cardiothoracic/thoracic surgery (Table 2). With advancement to associate professor, one's lifetime revenue ranged from \$8,719,000 in surgical oncology to \$14,626,500 in cardiothoracic/thoracic. Finally, with advancement to full professor, lifetime salary income ranged from \$9,198,000 in surgical oncology to \$15,721,500 in cardiothoracic/thoracic surgery.



**FIGURE 2.** Percent change in lifetime salary income between academic appointments.

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