

# Factors Influencing Scholarly Impact: Does Urology Fellowship Training Affect Research Output?

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**PURPOSE:** Residents seek postresidency fellowship training to increase competency with novel surgical techniques and augment their fund of knowledge. Research productivity is a vital component of advancement in academic urology. Our objectives were to use the *h-index* (an objective and readily available bibliometric that has been repeatedly shown to correlate with scholarly impact, funding procurement, and academic promotion in urology as well as other specialties) to determine whether any relationship exists between fellowship training and scholarly impact among academic urologists. Additional examination was performed to determine whether any differences in scholarly influence are present among practitioners in the major urologic subspecialties.

**MATERIALS AND METHODS:** Overall, 851 faculty members from 101 academic urology departments were organized by academic rank and fellowship completed. Research productivity was calculated using the *h-index*, calculated from the Scopus database.

**RESULTS:** There was no statistical difference in *h-index* found between fellowship-trained and nonfellowship-trained academic urologists. The highest *h-indices* were seen among urologic oncologists ( $18.1 \pm 0.95$ ) and nonfellowship-trained urologists ( $14.62 \pm 0.80$ ). Nearly 70% of department chairs included in this analysis were urologic oncologists or general urologists.

**CONCLUSIONS:** No difference in *h-index* existed between fellowship-trained and nonfellowship-trained urologists,

although practitioners in the subspecialty cohorts with the highest research productivity (nonfellowship-trained and urologic oncologists) comprised 70% of department chairpersons. This relationship suggests that a strong research profile is highly valued during selection for academic promotion. Differences existed on further comparison by subspecialty. Fellowship training may represent another potential opportunity to introduce structured research experiences for trainees. (J Surg 71:345-352. © 2014 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

**KEY WORDS:** academic promotion, scholarly productivity, fellowship training, urology, research productivity, research output

**COMPETENCIES:** Medical Knowledge, Professionalism, Practice-Based Learning and Improvement

## INTRODUCTION

The advent of novel surgical techniques and rapidly accumulating clinical knowledge has changed the climate of surgical specialties. In urology, laparoscopic and robotic techniques are rapidly becoming the standard of care in all subspecialties. In both academic and private practice settings, the use of these minimally invasive techniques has increased over time.<sup>1,2</sup> Consequently, it is not surprising that these technologies are increasingly incorporated into residency training. Nonetheless, recent surveys have suggested that most urology residents do not feel they have adequate technical and clinical training to begin their careers.<sup>3,4</sup> One

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analysis of urology physicians found that nearly half of participants in the study (49%) anticipated pursuing a fellowship when they applied for urology residency and an even greater number (69%) actually applied for a fellowship.<sup>5</sup> Among residents surveyed, the most important factors considered by individuals pursuing fellowships included the intellectual appeal of additional training, the presence of mentors with specialized training, and a desire for an additional point of view for surgical training.<sup>5</sup>

In addition to honing technical skills, fellowships potentially offer trainees further structured opportunities for conducting research, contributing to both their edification and the productivity of their department, scholastically and clinically.<sup>2</sup> Research productivity has been linked to better clinical care and increased opportunities for academic promotion, and may also be a factor in the tendency toward pursuing a fellowship.<sup>6-12</sup> Clinical and basic research is a time-consuming endeavor often limited during residency training.<sup>13</sup> According to the Fellowship and Residency Electronic Interactive Database,<sup>14</sup> 66 of the 124 nonmilitary residency programs in urology have a required research rotation, varying in length from a few weeks up to a year. Recently, the duration of many urology training programs has decreased to 5 years. This has the potential to decrease the opportunity to produce meaningful research during residency training, though the data related to this subject have been mixed.<sup>5,6</sup>

It has been reported that those who author or coauthor a manuscript during residency are 6-times more likely to pursue a fellowship.<sup>5</sup> When in fellowship, trainees often have more dedicated time to increase their clinical competency as well as their scholarly activities. It is suggested that participating in a fellowship exposes an individual to research, which may ultimately increase the propensity to enter academic medicine.<sup>5</sup>

In academia, advancement is directly linked to various attributes of the clinician. Patient care, teaching ability, grant support, scholarly activities, and national recognition are important factors in the evaluation of a faculty member.<sup>7,15-18</sup> Nonetheless, a study examining the views of faculty being considered for promotion reported that clinical research and written scholarship were the 2 criteria perceived to be most important in the promotion process.<sup>19</sup> Scholarly activity in the form of research publications is a relatively objective measure as compared with other criterion, which may explain its outsized importance in the advancement process. In addition to advancing the career of the clinician, academic productivity can augment the recognition and status of the home institution, further justifying its relationship with advancement.<sup>20</sup>

Quantifying research contribution is a complicated task that should ideally consider all of attributes of an individual's authorships. Factors such as total publications, total citations, and overall effect of the work are often used as measures of productivity.<sup>21</sup> The value of each of these factors individually is limited, however Hirsch<sup>22</sup> developed

the *h-index*, an objective measure to quantify research and characterize the scientific output of an individual. Taking into account these various attributes related to a person's research output, the *h-index* measures the relevance of an individual's published work.

Hirsch proposed<sup>22</sup> that the *h-index* is best used when comparing individuals within a field. Studies undertaken in multiple fields, including urology, have illustrated a strong association between the *h-index* and other factors such as academic advancement, grant funding procurement, and other measures of scholarly impact.<sup>15,16,18,23-46</sup> This bibliometric serves as an excellent tool with which to compare researchers within the field of urology. Our objectives were to examine whether scholarly impact, as measured by the *h-index*, is affected by fellowship training status. Additionally, we aimed to further characterize whether there are differences in research productivity among academic practitioners in the various subspecialties to better understand whether there may be differences in research emphasis among these fields.

## MATERIALS AND METHODS

The American Medical Association's Fellowship and Residency Electronic Interactive Database (FREIDA) was used to retrieve a listing of urology residency programs. Of the 124 academic urology departments on this list, faculty members from 101 programs were included in this analysis after application of exclusion criteria. Exclusion criteria included the following: nonurology-trained faculty, nonacademic faculty, nonphysician faculty, part-time clinical faculty, and faculty for whom academic rank or fellowship training status or both were not available on their respective departmental websites. Twenty-three websites had incomplete information about fellowship training or academic rank or both; therefore, all faculty members from these academic departments were also excluded.

Fellowship training information was used to organize faculty by the following major urologic subspecialties: endourology/minimally invasive urology, female urology/urodynamics, male infertility/andrology, pediatric urology, urologic oncology, other clinical fellowship, and multiple clinical fellowships.

The *h-index* of each faculty member was calculated using the Scopus database ([www.scopus.com](http://www.scopus.com)). As searching for commonly occurring names may result in multiple author profiles in Scopus, current and past departmental affiliations as well as journal source history were used to ensure the Scopus entries used for *h-index* calculations were for the appropriate author. The Scopus database is a widely used resource previously used to calculate the *h-index* in multiple other analyses.<sup>15,16,18,23-26,29,32,47</sup> It is one of a number of resources, including Publish or Perish and ISI Web of Knowledge. A previous analysis reported that *h-index* calculations from Scopus have a high degree of correlation

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