Relationship of a Second Professional Degree to Research Productivity of General Surgery Residents☆,☆☆

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OBJECTIVE: Many general surgery residents interrupt clinical training for research pursuits or advanced degrees during dedicated research time (DRT). We hypothesize that time required to obtain a second degree during DRT decreases resident publication productivity.

DESIGN, SETTING, AND PARTICIPANTS: All consecutive categorical general surgery residents at the University of Virginia in Charlottesville, VA, graduating in 2007 to 2016 were evaluated. PubMed queries identified journal publications for residents during and after DRT, limited to 1 year postgraduation. DRT varied between 1 and 3 years and was standardized by dividing publication number by DRT plus remaining clinical years and 1 postgraduation year. Median publications were compared between residents by receipt of a second degree.

RESULTS: Thirty-six residents were eligible for analysis. Of these, 8 obtained a Master's in Clinical Research, 3 received Master of Public Health, and 1 completed a Doctorate of Philosophy. Publications ranged from 2 to 76 for degree residents and 1 to 36 for nondegree residents. For the 12 degree residents, median publication number per year was 3.8 (interquartile range: 2.3, 5.2) compared to 2.6 (interquartile range: 1.6, 3.5) in residents not pursuing a postdoctoral degree ($p = 0.04$). There was no significant difference in median number of first and second author publications by degree status.

CONCLUSION: More publications per year were seen among residents earning a second degree, with a statistically significant difference between residents obtaining postdoctoral degrees during DRT compared with their counterparts. Our study demonstrates that residents pursuing a second degree are not hindered in their publication productivity despite the time investment required by the degree program. Additional research is needed to determine whether formal research training through a second degree corresponds to sustained scholarly productivity beyond residency. (J Surg Ed ▮:▮▮▮-▮▮▮. © 2016 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: surgery, resident research, publication productivity, postgraduate degree

ACGME COMPETENCIES: Systems-Based Practice, Medical Knowledge

INTRODUCTION

William S. Halsted established surgical training in the late 19th century, when he personally trained 17 chief residents.[1] Central to this instruction was the importance of research activities. Halsted perfected several surgical techniques through his animal experiments and allowed resident trainees to not only participate but also develop their own hypotheses to be tested.[2] These basic training concepts instilled by Halsted have largely remained unchanged, and research is still recognized as a key component of general surgery residency. The Accreditation Council Graduate Medical Education guidelines recommend, "establishing and maintaining an environment of inquiry and scholarship with an active research component."[3] Approximately 36% of general surgery residents now complete dedicated research time (DRT) from 1 to 3 years, supported by departmental funds and research fellowships.[4-6] DRT extends the training period for these residents from 5 years to 6-8 years.

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Medicare has provided funding for resident salaries since 1965, when graduate medical education became a federal mandate. In 2012, more than 15 billion dollars was used to fund accredited residency spots through various government agencies. The Institute of Medicine called for an overhaul of these federal fund allocations in 2014, owing to a lack of transparency and accountability of this money.[7] Complicating the financial aspect of resident salaries is the tradition to interrupt training with research pursuits, which is unique to surgical trainees. This additional training adds further cost to an already burdened payment system, if the sponsoring organization covers the cost of DRT.

DRT occurs on a spectrum of basic science work to translational research to clinical outcomes and quality. Some residents choose to pursue a second graduate degree during DRT with varying cost and time requirements. Degree options at our institution include Master in Public Health (MPH), Master of Science in Clinical Research (MS-CR), Master of Business Administration (MBA), Juris Doctor, or Doctor of Philosophy (PhD). MPH and MS-CR programs require completion of 42 and 31 credits, respectively, with a practicum. The practicum does not include a published article as a graduation requirement. The Juris Doctor candidates complete 86 credits with a research paper in order to be eligible for graduation. MBA and PhD programs are slightly more variable depending on which track a student pursues, although PhD students are all required to successfully defend a thesis, which should ultimately lead to a published article.

The annual 2012 tuitions vary from $14,300 for an MPH, to $48,000 for an MBA. Tuition for other available degrees falls within this range. Resident salaries during DRT are typically funded from the graduate medical education office and National Institutes of Health (NIH) T32 grants at our institution. Tuition is generally financed by a T32 grant or other research funds and occasionally supplemented by the resident. It is unclear whether the additional time and cost requirement of these degrees are beneficial. We hypothesize that the time required to obtain a second degree during DRT decreases resident publication productivity. Primary endpoints include total number of publications, median publications per year, and a research productivity score reflecting author role and journal impact factor.

METHODS

Study Population

This was a retrospective cohort study of general surgery residents at the University of Virginia. Exemption from our institution's Institutional Review Board was granted as all information was publicly available. All consecutive categorical chief and graduating residents from the University of Virginia General Surgery Program between 2007 and 2016 were evaluated for inclusion. Names were obtained from administrative records kept by the general surgery department. Information on degree completion was obtained from a senior attending (R.G.S.). He was practicing when the first resident obtained a degree during DRT and is heavily involved in resident research training. If R.G.S. was unsure whether the resident completed a degree or DRT, the individual or a classmate was contacted for confirmation. Residents were eligible for inclusion only if they had completed at least 1 year of DRT, which generally occurred between the second and third clinical year. Overall, 2 years of DRT is generally expected of all categorical residents at our institution, although some residents may not complete DRT, based on special circumstances, and at the discretion of the program director. Residents who did not complete general surgery residency, DRT, or residents who obtained an advanced degree before the start of residency were excluded from analysis.

Data Collection

PubMed queries identified eligible publications for each qualifying resident. Publications through 1 year postgraduation were recorded, and articles were only included in the analysis if they occurred during DRT or after DRT. Research was deemed to have occurred during or after DRT based on publication year and DRT years combined with years of residency for each resident. We included articles through 1 year postgraduation to account for delays between submission and publication.

Title, author role, publication type, publication year, journal impact factor, and category of publication were recorded for each article. Author role was defined as first author, second author, senior author, or other. Publication type was defined as peer-reviewed paper, review article, case report, or letter. Journals without impact factors were assigned the lowest impact factor for that year. Impact factors were determined using ISI Web of Knowledge Journal Citation Reports (webofknowledge.com).

Total numbers of publications were recorded and were additionally standardized according to the following formula to account for varying amounts of DRT:

Total Number of Publications / (Years of DRT + Remaining Clinical Years + 1) = Publications per year

Example Calculation:

Total Number of Publications (17) / (Years of DRT (2) + Remaining Clinical Years (3) + 1) = 2.83 publications per year

These standardized numbers are reported as publications per year. Publications per year are also separately reported for first and first or second author role. Research productivity scores (RPS) were assigned to each publication based on methods that have been described elsewhere.[8] In brief, RPS components include author role, journal impact factor for the published year, and article type. Each component