National Orthopedic Residency Attrition: Who Is At Risk?

Jennifer M. Bauer, MD, and Ginger E. Holt, MD

Vanderbilt University Medical Center, Nashville, Tennessee

BACKGROUND: National U.S. orthopedic resident attrition rates have been historically low, but no literature exists as to the characteristics of those who leave nor the circumstance of the departure. We aimed to determine factors that may place a resident at higher risk for attrition. Additionally, we planned to determine whether the 2003-work hour restriction affected attrition rate.

MATERIALS AND METHODS: All orthopedic surgery residency program directors in the United States were surveyed on demographic data for their current resident class, the number of residents who left the program, as well as demographic description for each of the residents who left their program from 1998 to 2013. Exclusion criteria included military programs and those younger than 3 years. All data were deidentified and compared to the Accreditation Council for Graduate Medical Education Data Resource book to protect against sample error in respondents.

RESULTS: Of 146 programs included, the overall response rate was 54% of residency directors, representing 51% of orthopedic residents. The respondent demographic make-up of 13.7% female, and average program size of 22.3 residents, compared similarly to the Accreditation Council for Graduate Medical Education national average of 13% female and 23-resident program size. Compared to all respondents, residents who left their program were more likely to be female (27%, $p = 0.0018$), single (51%, $p = 0.0028$), and without children (80%, $p = 0.0018$). There was no statistical difference based on minority status or 2003-instituted work hour restriction. Of those who left, 45% transferred to another specialty, 34% were dismissed, 14% voluntarily withdrew or cited personal reasons, and 6% transferred to another orthopedic program. The most common specialties to transfer into were radiology (30%), emergency medicine (25%), and anesthesia (18%).

CONCLUSIONS: Orthopedic residents who are female, single, or without children are statistically more likely to undergo attrition. Consideration could be given to targeted mentoring of these resident groups. (J Surg Ed 73:852-857. © 2016 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: resident attrition, resident education, orthopedic residency

COMPETENCIES: Professionalism, Interpersonal and Communication Skills

INTRODUCTION

Losing residents from U.S. orthopedic surgery residencies is not common, with an average annual loss in the last 7 years of 0.96% of residents, as reported by the Accreditation Council for Graduate Medical Education (ACGME).[1-7] Of those who do not complete residency each year, 16% do so for reasons of dismissal or lack of success, whereas 84% are due to transfer and withdrawal that can be considered voluntary attrition. Although these numbers are low because the average residency class size is 4.5 residents and much time and diligence is spent by programs to pick and train a residency class, the loss of one resident can weigh heavily on a class and a program.

Although there is currently little information on who leaves an orthopedic program, other specialties have been investigated. Abundant literature exists examining the annual rates and reasons for general surgery attrition, cited as high as 20% by some,[8,9] with at least one study noting an increase in the rate despite 80-hour work restrictions.[10] Other specialties' annual loss of residents includes 14% per year in neurosurgery, with a statistically significant increased rate for women[11-12]; 4.2% in obstetrics and gynecology, with a higher rate in men[13]; 1.1% in ophthalmology that was equal between both the sexes[14]; and 1.2% in otolaryngology.[15] This data from peer reviewed literature does not always match that reported by the ACGME.

There are no recent studies that examine the rate and characteristics of orthopedic resident attrition. The purpose

Correspondence: Inquiries to Jennifer M. Bauer, MD, Vanderbilt University Medical Center, 1215 21st Ave S, Medical Center East, South Tower, Suite 4200, Nashville, TN 37232-8774. fax: +615 875 1915; e-mail: jennifer.m.bauer@gmail.com

  1931-7204/$30.00 http://dx.doi.org/10.1016/j.jsurg.2016.03.010

TABLE 1. Survey Questions

Basic Questions for All Programs	Questions for Each Resident Who Left
How many residents are currently in your program?	Residency class size for resident's year at departure?
How many current residents are female?	Resident's sex?
How many current residents identify as non-Caucasian?	What race/ethnicity did the resident identify as?
How many current residents are single? (or unknown)	Was the resident married/have a partner/comparable significant other?
How many current residents have children? (or unknown)	Did the resident have children?
How many current residents left your program between July 1998 and 2003?	At what point in the resident's training did he/she leave?
How many current residents left your program between July 2003 and 2013?	To your understanding, why did he/she leave? Dismissal Left medicine completely Transfer to different specialty—if so which Health/Hardship Unknown Other—please explain further

of our study was to determine if statistically significant characteristics are shared among orthopedic surgery residents who leave their programs, the reason residents leave, and if the rate of attrition has been affected by the 2003 80-hour work restriction.

MATERIALS AND METHODS

We compiled a comprehensive list of U.S. orthopedic surgery residency programs from the American Medical Association's online data system. Using this, individual program websites, and Council of Orthopaedic Residency Directors directories, we gathered e-mail addresses for each resident program director. There are 157 individual orthopedic programs currently active. Programs were excluded from the data collection if they were noncivilian programs, because of the complexity of commitment to military programs. Those started within the last 3 years were also excluded. We included a total of 146 programs.

An electronic survey was created on Research Electronic Data Capture (REDCap) with 7 basic questions and a set of further detailed questions for each resident who left (Table 1). Residency directors were asked about the basic demographics of their current residency class; the number of residents who left in the previous 5 years of 2003-work hour restrictions and in the 10 years after; and specifics about those who left, including demographics, reasons for leaving, and what the resident pursued after leaving. There was an option for additional questions or comments at the end. To collect participants, the REDCap survey that collects deidentified data was sent twice to nonrespondents, followed by 4 separate rounds of individualized emails with both the REDCap link and an option to fill a spreadsheet with the same questions, with that data then deidentified on receipt. To ensure the data we captured did not represent significant sampling error, the demographics of our sample were compared against published ACGME data averaged from the last 7 years.[1-7] Data was analyzed using 2-tailed Fisher exact test for categorical variables, or Student *t*-test for continuous variable means with 95% confidence intervals included. Responses that were left blank or answered as "unknown" were factored out of the calculations for averages and percentages.

TABLE 2. Demographics, U.S. Orthopaedic Surgery Residents

	Total Survey Respondents Class of 2013 to 2014	ACGME Class of 2013 to 2014	Significance
Total residents	1763	3566	
Average program size	22.3	23	$p = 0.5$ 95% CI: −2.65 to 1.29
Percent female	13.7	13	$p = 0.5$
Percent Ethnic or racial minority	20.3	35.3	$p < 0.001$
Percent without significant other	40.0	—	
Percent without children	30.8	—	