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The Profile of Successful Applicants for Endocrine Surgery Fellowships: Results of a National Survey

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Abstract

Background—The American Association of Endocrine Surgeons (AAES) initiated a fellowship match in 2007. The profile of applicants who successfully match into an endocrine surgery (ES) fellowship has not previously been characterized.

Methods—An IRB-approved, web-based, survey was distributed to recent and current ES fellows.

Results—The survey response rate was 62% (56/90). The overall mean age was 33 years old (SD $\pm$ 3), 54% were female and 37% self-identified as non-white. Only 5% entered their surgical training with the aim of specializing in ES. During residency, respondents were exposed to high volumes of index ES cases. Sixty-two percent had dedicated research time. At the time of fellowship application, the median number of publications was 5 (range, 0–25), and 30% of respondents had additional advanced degrees.

Conclusion—Entering ES fellows have diverse backgrounds, with strong academic credentials. These data help inform the career mentoring of aspiring ES applicants.

Keywords

endocrine surgery; fellowship; successful match; profile/characteristics; mentoring

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Introduction

Endocrine surgery is the discipline that cares for benign and malignant, and functional and nonfunctional, tumors of the thyroid, parathyroids, adrenals, and neuroendocrine pancreas. Endocrine surgery has evolved into a distinct discipline within the field of general surgery over the last several decades.¹ The American Association of Endocrine Surgeons initiated a formal fellowship match process in 2007. Since that time, interest in endocrine surgery has grown and the number of endocrine surgery fellowship positions has increased from 12 to 25 offered in 2013.

Studies in other specialties have evaluated the characteristics of matched applicants. These studies were able to provide valuable information to aspiring applicants in their respective specialties.²⁻⁷ The profile of applicants who successfully match into an endocrine surgery fellowship has not previously been described.⁸⁻¹⁰ By illustrating the demographics, background, training and scholarly activities that characterize successful applicants matched into endocrine surgery, our aim was to provide a reference for interested applicants and career mentors in endocrine surgery.

Methods

An anonymous web-based survey was distributed to recent and current endocrine surgery fellows (2009-2013). This survey was conducted independent of the American Association of Endocrine Surgeons governance. Survey data were collected at the Penn State Hershey Medical Center and managed using REDCap (Research Electronic Data Capture), a secure, web-based application designed to support data capture for research studies.¹¹ Survey questions addressed demographics, background, training and scholarly activities at the time of endocrine surgery fellowship application.

Recent and current endocrine surgery fellows were identified through the American Association of Endocrine Surgeons website, communication with Endocrine Surgery Fellowship program directors and personal contacts. Contact information for the distribution of the survey was obtained in the same manner. Excluding those former endocrine surgery fellows with unobtainable, invalid, or outdated email addresses, 90 individuals were identified for survey questionnaire distribution. After initial distribution, two follow-up electronic communications were sent to those who had not yet completed the survey.

Prior to participation, potential respondents were provided information regarding the purpose of the study, its voluntary and anonymous nature, the intent for the data to be used in a research study, contact information for any inquiries. This study was approved by the Penn State College of Medicine Institutional Review Board.

Results

The survey response rate was 62% (56/90) with approximately equal representation across academic years. Demographics and background information are summarized in Table 1. The mean age was 33 years old (SD $\pm$ 3). Of the 56 respondents, 54% were female and 37% self-identified as non-white. Thirty percent (30%) had additional advanced degrees (beyond a

medical degree) at the time of fellowship application. The most common advanced degrees included Masters of Science or Public Health degrees in 20% of respondents. Two individuals had completed breast fellowships, and four were in private or academic practice prior to endocrine surgery fellowship application. All current and recent endocrine surgery fellows reported matching upon their first attempt, and 96% reported matching into a program in the top five of their rank list.

Training characteristics of respondents are summarized in Table 2. Nearly all (95%) were graduates of U.S. allopathic medical schools and 77% trained at a university-based residency program, while another 14% trained at a university-affiliated program. Most respondents (73%) had formal endocrine surgery faculty at their institution, while only 16% had an endocrine surgery fellowship program. Over three-quarters (77%) of successful applicants obtained a letter of recommendation from an American Association of Endocrine Surgeons member. Only 5% entered their surgical training with the aim of specializing in endocrine surgery. During residency, 86% of respondents performed over 20 thyroid surgeries, and 73% performed over 10 parathyroid surgeries. Additionally, 54% had performed 2-5 adrenal cases, with another 31% performing over 5 adrenal cases. There were 41% of respondents who reported performing 2-5 endocrine pancreas/neuroendocrine tumor operations, with another 23% performing over 5 of these operations.

Table 3 describes the scholarly activities of respondents. Thirty-five of 56 respondents (62%) described participating in dedicated research time, which most commonly consisted of two years of research. Of those respondents who reported performing any research during training, 53% described some or all of their research as related to the field of endocrine surgery. The median number of peer-reviewed publications at the time of fellowship application was 5 (range, 0-25), while the median number of first author peer-reviewed publications was 2 (range, 0-16). The majority (66%) had attended an American Association of Endocrine Surgeons annual meeting, with approximately one-third of attendees having formally presented research in this forum.

Discussion

Since the establishment of the American Association of Endocrine Surgeons in 1980, endocrine surgery has grown as a discipline. Advances in the understanding of the pathophysiology and genetic basis of surgical endocrine diseases, diagnostic and operative techniques, as well as the increasing incidence and detection of thyroid, parathyroid, adrenal gland and neuroendocrine pancreas pathology, have all contributed to greater interest in and demand for endocrine surgery.¹²⁻¹⁶ Accordingly, the number of approved endocrine surgery fellowship positions has expanded with time.¹

While several studies have addressed practice patterns and satisfaction among early career endocrine surgeons, no previous studies have focused specifically on the profile of successful applicants to endocrine surgery.^{1,17-19} Tsinberg et al. described the operative numbers and case mix of current endocrine surgeons and type of practice (academic vs. private) in survey respondents.¹⁷ A survey by Solorzano et al. encompassing current and recent endocrine surgery fellows, as well as practicing endocrine surgeons, described

fellowship and current practice characteristics, and also captured some elements relating to surgical residency.¹⁹ Notably, the most recent year captured in their study was the group of endocrine surgery fellows who began in 2008.

Our study highlights a previously unsurveyed group, trained or currently training in the era of the formal American Association of Endocrine Surgeons fellowship. In comparison to the group surveyed by Solorzano et al, recent endocrine surgery fellows had greater female representation (54% vs. 39%), while the racial diversity has remained similar.¹⁹

Furthermore, recent respondents were less likely to have trained at a program with an endocrine surgery fellowship (16% vs. 35%). A similar proportion of respondents had dedicated research time during residency in the two surveyed groups. We additionally found that among recent endocrine surgery fellows, nearly one third (30%) of respondents had advanced degrees at the time of fellowship application. Commitment to scholarly activities and professional development during residency was also evident in the number of peer-reviewed publications, as well as attendance at American Association of Endocrine Surgeons annual meetings.

While the overall number of endocrine cases performed by general surgery residents has increased over time, previous studies have demonstrated that endocrine surgery fellows performed greater than average numbers of thyroid, parathyroid, adrenal and endocrine pancreas cases during their surgical residencies.¹⁹⁻²⁴ A recent review of Accreditation Council for Graduate Medical Education general surgery case logs (2009-2012) demonstrates that general surgery residents performed an average of 23.0 thyroid, 9.8 parathyroid, 2.1 adrenal, and 0.4 endocrine pancreas cases.²⁴ While our survey design did not capture the exact mean number of index endocrine operative cases performed during general surgery residency, those entering endocrine surgery fellowships performed a greater volume of index operative cases than the average general surgery resident (Table 2). This difference may be driven by increased exposure to the field secondary to the high volume of endocrine surgery cases at the institutions of the endocrine surgery applicants. Conversely, those residents who are interested in the subspecialty may seek out greater opportunities to be involved in endocrine surgery cases. Nearly three-quarters (73%) of respondents reported the presence of dedicated endocrine surgery faculty in their residency programs and this factor is intricately linked to both endocrine surgery volume and engendering interest in the subspecialty.

This study has several limitations to consider. With a survey response rate of 62%, the respondent group may not be representative of all endocrine surgery fellows in the last 5 years and a participation bias may be present. Additionally, there may be a recall bias involved as respondents were asked to recall information from the time of their endocrine surgery application. This is particularly relevant to the survey question addressing operative case numbers. Finally, because we did not have information on applicants to endocrine surgery who did not match, we were unable to compare characteristics to understand the factors that discriminate between matched and unmatched endocrine surgery fellowship applicants.

We have shown that entering endocrine surgery fellows have diverse backgrounds, with strong academic credentials. A minority of general surgery trainees enter residency with the intent of pursuing endocrine surgery. Exposure to this field via contact with dedicated endocrine surgery faculty, high volume experience with index endocrine surgical procedures, and professional role development through attendance at national meetings characterizes endocrine surgery trainees. These data help inform the career mentoring of aspiring endocrine surgery applicants. Further research is needed to understand factors that discriminate between matched and unmatched endocrine surgery fellowship applicants.

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References

1. Shin JJ, Milas M, Mitchell J, et al. The endocrine surgery job market: a survey of fellows, department chairs, and surgery recruiters. *J Surg Educ.* 2013; 70:377–383. [PubMed: 23618449]
2. Lee JT, Teshome M, de Virgilio C, et al. A survey of demographics, motivations, and backgrounds among applicants to the integrated 0 + 5 vascular surgery residency. *J Vasc Surg.* 2010; 51:496–502. discussion 502-503. [PubMed: 20022205]
3. Trindade AJ, Gonzalez S, Tinsley A, et al. Characteristics, goals, and motivations of applicants pursuing a fourth-year advanced endoscopy fellowship. *Gastrointest Endosc.* 2012; 76:939–944. [PubMed: 23078920]
4. Calligaro KD, Dougherty MJ. Choice of vascular surgery as a specialty: what is important? *Semin Vasc Surg.* 2006; 19:180–186. [PubMed: 17178319]
5. Calligaro KD, Dougherty MJ, Sidawy AN, Cronenwett JL. Choice of vascular surgery as a specialty: survey of vascular surgery residents, general surgery chief residents, and medical students at hospitals with vascular surgery training programs. *J Vasc Surg.* 2004; 40:978–984. [PubMed: 15557914]
6. Tchanchaleishvili V, Barrus B, Knight PA, et al. Six-year integrated cardiothoracic surgery residency applicants: characteristics, expectations, and concerns. *J Thorac Cardiovasc Surg.* 2013; 146:753–758. [PubMed: 24041162]
7. Rinard JR, Mahabir RC. Successfully matching into surgical specialties: an analysis of national resident matching program data. *J Grad Med Educ.* 2010; 2:316–321. [PubMed: 21976075]
8. Beres A, Baird R, Puligandla PS. Success in the Pediatric Surgery Match: a survey of the 2010 applicant pool. *J Pediatr Surg.* 2011; 46:957–961. [PubMed: 21616260]
9. Fraser JD, Aguayo P, St Peter S, et al. Analysis of the pediatric surgery match: factors predicting outcome. *Pediatr Surg Int.* 2011; 27:1239–1244. [PubMed: 21523340]
10. Little DC, Yoder SM, Grikscheit TC, et al. Cost considerations and applicant characteristics for the Pediatric Surgery Match. *J Pediatr Surg.* 2005; 40:69–73. discussion 73-74. [PubMed: 15868561]
11. Harris PA, Taylor R, Thielke R, et al. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform.* 2009; 42:377–381. [PubMed: 18929686]
12. Wang TS. Endocrine surgery. *Am J Surg.* 2011; 202:369–371. [PubMed: 21871991]
13. Siegel R, Naishadham D, Jemal A. Cancer statistics, 2013. *CA Cancer J Clin.* 2013; 63:11–30. [PubMed: 23335087]
14. Jemal A, Siegel R, Xu J, Ward E. Cancer statistics, 2010. *CA Cancer J Clin.* 2010; 60:277–300. [PubMed: 20610543]

15. Chen AY, Jemal A, Ward EM. Increasing incidence of differentiated thyroid cancer in the United States, 1988-2005. *Cancer*. 2009; 115:3801–3807. [PubMed: 19598221]
16. Sosa JA, Wang TS, Yeo HL, et al. The maturation of a specialty: Workforce projections for endocrine surgery. *Surgery*. 2007; 142:876–883. [PubMed: 18063071]
17. Tsinberg M, Duh QY, Cisco RM, et al. Practice patterns and job satisfaction in fellowship-trained endocrine surgeons. *Surgery*. 2012; 152:953–956. [PubMed: 23102635]
18. Saunders BD, Wainess RM, Dimick JB, et al. Who performs endocrine operations in the United States? *Surgery*. 2003; 134:924–931. discussion 931. [PubMed: 14668724]
19. Solorzano CC, Sosa JA, Lechner SC, et al. Endocrine surgery: where are we today? A national survey of young endocrine surgeons. *Surgery*. 2010; 147:536–541. [PubMed: 19939426]
20. Le D, Karmali S, Harness JK, Sheppard BC. An update: the operative experience in adrenal, pancreatic, and other less common endocrine diseases of U.S. general surgery residents. *World J Surg*. 2008; 32:232–236. [PubMed: 18066698]
21. Harness JK, Organ CH Jr. Thompson NW. Operative experience of U.S. general surgery residents with diseases of the adrenal glands, endocrine pancreas, and other less common endocrine organs. *World J Surg*. 1996; 20:885–890. discussion 890-891. [PubMed: 8678967]
22. Harness JK, Organ CH Jr. Thompson NW. Operative experience of U.S. general surgery residents in thyroid and parathyroid disease. *Surgery*. 1995; 118:1063–1069. discussion 1069-1070. [PubMed: 7491524]
23. Zarebczan B, McDonald R, Rajamanickam V, et al. Training our future endocrine surgeons: a look at the endocrine surgery operative experience of U.S. surgical residents. *Surgery*. 2010; 148:1075–1080. discussion 1080-1081. [PubMed: 21134536]
24. General Surgery Case Log Statistical Reports. Accreditation Council for Graduate Medical Education (ACGME); Available at: <http://www.acgme.org/acgmeweb/tabid/274/DataCollectionSystems/ResidentCaseLogSystem/CaseLogsStatisticalReports.aspx> [Accessed 11/24/13]

Summary

The authors used a survey to characterize the profile of applicants who successfully match into an endocrine surgery fellowship in order to inform the career mentoring of aspiring endocrine surgery applicants. Entering endocrine surgery fellows had diverse backgrounds and strong academic credentials. Exposure to this field via contact with dedicated endocrine surgery faculty, high volume experience with index endocrine surgical procedures, and professional role development through attendance at national meetings characterizes endocrine surgery trainees.

Table 1**Demographics and Background**

Variable	(n = 56)
Age (years), mean	33 ($\pm$ 3)
Sex	
Male	26 (46%)
Female	30 (54%)
Race	
White	35 (63%)
Black	7 (13%)
Asian	10 (18%)
Hispanic	1 (2%)
Other	3 (5%)
Phi Beta Kappa *	12 (23%)
Medical degree	
Allopathic	53 (95%)
Osteopathic	0 (0%)
International	3 (5%)
Alpha Omega Alpha *	14 (26%)
ABSITE 75% in 4th clinical year *	19 (36%)
Advanced degrees	17 (30%)
PhD	1 (2%)
Masters in Education	2 (4%)
Masters in Public Health	4 (7%)
Masters in Science	7 (13%)
Other degree	3 (5%)
Additional clinical fellowship training	2 (4%)
In practice (private or academic) after residency and prior to endocrine surgery fellowship	4 (7%)
Endocrine surgery fellowship year	
2009	12 (21%)
2010	12 (21%)
2011	10 (18%)
2012	10 (18%)
2013	12 (21%)
Letter of recommendation from AAES member	43 (77%)
Entered residency with aim of endocrine surgery as a specialty focus	3 (5%)
Matched into endocrine surgery fellowship at home institution	4 (7%)
Successful endocrine fellowship match at 1st attempt	56 (100%)
Matched within top 5 of rank list	54 (96%)

ABSITE = American Board of Surgery In-Service Training Examination

AAES = American Association of Endocrine Surgeons

* n = 53, 3 respondents without PBK, AOA, or ABSITE at their institutions

Table 2

Training Characteristics

Variable	(n = 56)
Residency program type	
University	43 (77%)
University-affiliated	8 (14%)
Community-based	3 (5%)
Other	2 (4%)
Presence of endocrine surgery fellowship at residency program	9 (16%)
Presence of formal endocrine surgery faculty at residency program	41 (73%)
Thyroid cases	
0-20	8 (14%)
21-40	21 (38%)
>40	27 (48%)
Parathyroid cases	
0-10	15 (27%)
11-20	19 (34%)
>20	22 (39%)
Adrenal cases	
0-1	9 (16%)
2-5	30 (54%)
6-10	11 (20%)
>10	6 (11%)
Endocrine pancreas/GI neuroendocrine tumor cases	
0-1	20 (36%)
2-5	23 (41%)
6-10	4 (7%)
>10	9 (16%)

GI = Gastrointestinal

Table 3

Scholarly Activities

Variable	(n=56)
Dedicated research time	
None	21 (38%)
1 year	8 (14%)
2 years	22 (39%)
3 years	4 (7%)
Other	1 (2%)
Endocrine surgery related research *	
Yes	19 (36%)
No	25 (47%)
Some	9 (17%)
Number of publications, any author, median (range)	5 (0-25)
Number of publications, first author, median (range)	2 (0-16)
Number of AAES conferences attended (any)	37 (66%)
1	27 (48%)
2	10 (18%)
Number of AAES oral/poster presentations (any)	19 (34%)
1	14 (25%)
2	5 (9%)

AAES = American Association of Endocrine Surgeons

*
n = 53, 3 respondents answered N/A