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Original

Factors correlated with residents' decisions to enter academic dermatology

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Abstract

The demand for dermatologic services and training at academic medical centers has outpaced the growth in the field's academic workforce. Recruitment of graduating residents has been proposed as a solution to the shortage of academic dermatologists. The purpose of this study was to further our current understanding of the factors that support the recruitment and retention of academicians. A survey questionnaire was mailed to graduates of the dermatology residency program at the University of North Carolina, and data were gathered retrospectively from participants' residency application materials. The factors from residency applications that predicted initial practice setting and the driving factors behind the choice of initial practice in academia were analyzed using generalized linear models. Of the department's 39 graduates between 2005 and 2014, 37 (95%) completed our survey. Sixteen graduates (43%) remained in academia upon completion of residency, whereas fourteen graduates (38%) are currently in academic practices. Those who had obtained a PhD before starting residency were more likely than their peers to initially accept academic positions (RR 2.73, 95% CL 1.64, 4.71, $p = 0.05$). However, other applicant characteristics available from residency application materials poorly predicted graduates' likelihood of remaining in academia at the time of graduation. In free-text survey responses, graduates who joined academic practices upon completion of residency were significantly more likely to cite teaching opportunities (PR 3.01, 95% CL 1.60-5.78, $p = 0.05$) and practice environment (PR 2.97, 95% CL 1.51-6.37, $p = 0.05$) as factors that had strongly influenced their initial career decisions. Because it is difficult to predict which residency applicants will ultimately pursue careers in academia, promoting the desirable aspects of the academic practice setting during residency training may be a better strategy for addressing the academic workforce shortage than the selection of residency applicants who possess specific characteristics.

Keywords: academic dermatology; resident recruitment; resident retention; residency training

Introduction

In the United States, the field of dermatology has faced a shortage of academicians for some time, owing to challenges with both recruitment and retention [1-3]. Surrogate measures of the demand for dermatologists, such as the waiting time for new patient appointments, suggest that there is an undersupply of providers in academic settings [2]. The heads of most (87%) academic dermatology departments desire to recruit more physicians to their practices and are more likely than their counterparts in nonacademic practices to report active recruitment [2, 3]. Furthermore, a large majority (97%) of academic department chairs feel that there is a shortage of academicians, with 71% of those citing decreased resident interest as the primary reason [3].

In an attempt to meet the growing need for academicians, many residency programs aim to recruit applicants who they believe will contribute to their fields through various academic pursuits. In dermatology, however, there appears to be a much greater interest in academia at the time of residency application than there is at the time of the initial job search [4]. There seems to be an even lower interest in academia later in dermatologists' lifetimes [5]. For these reasons, program leaders have attempted to gain a better understanding of the factors that encourage residents to join academic practices and the factors that cause them to lose interest in academic careers [3, 5, 6, 7]. However, previous studies have provided limited insight into the factors that are most helpful to program leaders when deciding among many qualified residency candidates and the ways in which they can promote resident interest in academia.

Methods

Our objectives in this study were to ascertain (1) which applicant characteristics predict initial practice setting, (2) which factors influenced graduates' career decisions at the time of residency graduation, and (3) which factors prompted graduates to change practice settings later in their careers. To that end, a brief survey questionnaire was mailed to graduates of the Department of Dermatology at the University of North Carolina who completed their residency training between 2005 and 2014. All participants provided informed consent to participate in the study by completing and returning the questionnaire. This study was approved by the institutional review board of the University of North Carolina at Chapel Hill (UNC).

Respondents were asked to select their initial and current practice settings (academic or nonacademic) and to list the factors that drove their initial career decisions and any change in practice setting that occurred later, if applicable. We defined an academic position as a research-based or clinician-educator-based position in all activities. Nonacademic positions were defined as those in private practice, private practice with part-time teaching, or industry. The factors listed in each participant's free-text responses were reviewed by two of the authors and placed into various categories, e.g., location, environment. For those graduates who provided consent, data were also obtained from Electronic Residency Application Service (ERAS) materials, including information on demographics; work, research, and volunteer experiences during medical school; number of publications; and United States Medical Licensing Examination (USMLE) Step scores. In addition, ERAS personal statements were assessed for participants' expressed interest in academic dermatology at the time of residency application.

Data obtained from the survey and residency application files were analyzed using generalized linear models with an exact estimator to limit finite sample bias in the setting of small sample size. All p values were two-sided and a significance threshold of 0.05 was chosen *a priori*. Statistical analyses were performed using SAS software (SAS version 9.4, SAS Institute Inc., Cary, NC). Word clouds were also produced using the Word Cloud Generator to illustrate, based on font size, the proportion of free-text survey responses falling in each category for the driving factors behind initial career decisions [8].

Results

Of the 39 graduates of our dermatology residency program between 2005 and 2014, 37 responded to our survey and provided consent for the collection of data from their residency application files for a response rate of 94.8%. Of those who responded, 43.2% (N = 16) accepted an academic position immediately following residency graduation. Table 1 displays participant characteristics obtained from ERAS and their correlations with an initial decision to remain in an academic practice. The only factor from residency application materials that predicted entry into academic dermatology immediately following residency was the attainment of a PhD degree prior to the start of training. No other applicant characteristics examined in this study were significantly associated with a decision to accept an academic position upon graduation from residency.

Table 1. Risk Ratio for Initially Entering Academia for Selected ERAS Characteristics of UNC Dermatology Residency Graduates (N = 37).

Characteristic	Median / Percent (N)	Mean (SD)	Range	Missing (#)	Risk Ratio (95% CL)
Age at start of residency ¹	28	29.4 (4.3)	24 – 49	0	1.02 (0.97, 1.07)
Female sex	54.0% (20)			0	0.86 (0.40, 1.81)
Caucasian race ²	80.6% (29)			1	0.92 (0.35, 2.31)
Graduate school ³	24.3% (9)			0	1.63 (0.81, 3.38)
MD/PhD	13.5% (5)			0	2.73 (1.64, 4.71) ⁷
USMLE Step 1 Score ⁴	245	242.2 (14.9)	206 – 264	1	0.92 (0.76, 1.15)
USMLE Step 2 Score ⁴	245.5	244.5 (20.9)	184 – 278	3	0.96 (0.96, 1.10)
Academic career goal ⁵	40.5% (15)			0	0.74 (0.33, 1.64)
Research career goal ⁵	29.7% (11)			0	0.67 (0.25, 1.74)
Foreign language	48.7% (18)			0	1.07 (0.51, 2.40)
Medical honors (#) ⁶	3	2.9 (2.3)	0 – 8	0	0.98 (0.86, 1.16)
Volunteer experiences (#) ⁶	4	4.1 (2.4)	0 – 9	0	0.92 (0.79, 1.08)
Research experiences (#) ⁶	3	3.5 (2.8)	0 – 17	0	1.03 (0.93, 1.09)
Publications (#) ⁶	1	4.0 (10.2)	0 – 61	0	1.01 (0.99, 1.02)
Presentations (#) ⁶	1	1.7 (2.7)	0 – 12	0	1.01 (0.99, 1.02)
Leadership roles (#) ⁶	2	2.7 (2.7)	0 – 10	0	0.97 (0.84, 1.11)
Major in humanities	18.9% (7)			0	0.93 (0.35, 2.71)

ERAS, Electronic Residency Application Service; UNC, University of North Carolina at Chapel Hill; SD, standard deviation; USMLE, United States Medical Licensing Examination.

¹Per increased year.

²Versus all other races/ethnicities.

³Other than medical school.

⁴Per 10-point increase.

⁵Endorsed in ERAS personal statement.

⁶Per additional.

⁷Significant at alpha = 0.05.

We therefore examined the prevalence of self-reported factors that drove graduates' initial career decisions; these are displayed in Table 2. When all participants were considered together, irrespective of initial practice setting, location and environment were the two most frequently cited factors. However, those who cited location as a priority were significantly more likely to have joined a nonacademic practice following residency. On the other hand, those who cited practice environment as an important factor were significantly more likely to have accepted an academic position. The opportunity to teach was also cited significantly more often by those who entered academic medicine than by those who originally joined nonacademic practices.

Table 2. Prevalence Ratio (PR) for Joining Academic Practice after Residency Graduation for Motivating Factors

Motivating Factor	Prevalence Ratio (PR) and 95% Confidence Limits (CL) versus Non-Academic	Academic N (%)	Non-academic N (%)
Location	0.39 (0.16, 0.92) ¹	4 (25.0)	13 (61.9)
Autonomy	0.04 (0.00, 1.09)	0 (0)	5 (23.8)
Family	0.07 (0.00, 1.21)	0 (0)	4 (19.1)
Lifestyle	0.50 (0.08, 2.00)	1 (6.3)	3 (14.3)
Compensation	0.08 (0.00, 1.46)	0 (0)	3 (14.3)
Teaching	3.01 (1.60, 5.78) ¹	8 (50)	1 (4.8)
Environment	2.97 (1.51, 6.37) ¹	9 (56.3)	2 (9.5)
Ancillary staff	0.85 (0.24, 2.17)	2 (12.5)	3 (14.3)
Patient population	0.80 (0.29, 2.08)	3 (18.8)	5 (23.8)
Colleagues	1.31 (0.39, 4.46)	4 (25.0)	4 (19.1)
Mentorship	23.75 (0.79, 95.01)	3 (18.8)	0 (0)
Research	23.75 (0.79, 95.01)	3 (18.8)	0 (0)
Subspecialty interest	1.71 (0.78, 3.68)	3 (18.8)	1 (4.8)
Job security	1.00 (0.22, 2.93)	1 (6.3)	1 (4.8)

UNC, University of North Carolina at Chapel Hill.

¹Significant at alpha = 0.05.

Location and autonomy were the factors listed most often by those who initially joined nonacademic practices, but the frequency with which these factors were cited did not differ significantly between the two groups. Autonomy, family considerations, and compensation were factors that were listed by one or more respondents who joined nonacademic practices but were never listed by those who entered academic medicine. Likewise, mentorship and research opportunities were listed by several respondents who entered academic medicine but were never listed by those who joined nonacademic practices. The relative frequencies with which these decision-driving factors appeared in participants' free-text responses are illustrated as word clouds for those who initially joined academic practices (Figure 1) and nonacademic practices (Figure 2).

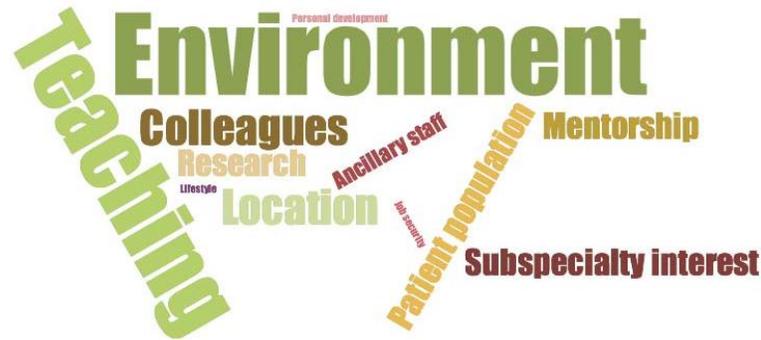


Figure 1. Word cloud illustrating frequencies of driving factors listed by those who entered academic dermatology. The size of the word corresponds to the relative frequency with which it appeared in participants' responses



Figure 2. Word cloud illustrating frequencies of driving factors listed by those who entered nonacademic dermatology. The size of the word corresponds to the relative frequency with which it appeared in participants' responses.

At the time of our survey, 37.8% (N = 14) of our graduates described their current practice as academic. One graduate moved from a nonacademic practice to an academic practice and cited family and location as the reasons behind both his initial and current career decisions. Three others transitioned from academic practices to nonacademic practices. Two of these cited the availability of positions after a move as the driving factor for choosing nonacademic practices later in their careers, with one graduate explicitly stating that there was no academic center at his or her new location. Autonomy, compensation, lifestyle, and absence of pressure to publish/obtain grants were also cited as reasons for switching to a nonacademic practice setting.

Conclusions

This study examines the residency application materials that predict a career in academic dermatology and the factors that influence dermatologists' decisions to enter academia both at the time of residency graduation and later in their careers. Our data corroborates evidence from a previous study, which demonstrated that it is difficult to determine whether an applicant will later pursue a career in academic medicine based on the majority of the information available to program directors in residency application materials [9]. It also confirms findings from previous studies that suggested, however, that those with a combined MD/PhD degree are more likely to pursue careers in academic dermatology [9, 10].

Furthermore, the finding that residency candidates' self-reported interest in academia is a poor predictor of ultimate career choice supports the results from a previous study conducted in a US dermatology residency program [4]. It remains unclear whether applicants' career goals differ from residents' goals because of a true loss of interest in academic dermatology that occurs during residency or because some applicants falsely state their interests in academic medicine with the hope of being ranked more highly by residency programs [4, 5]. Further research is needed to determine which factors in the resident selection process serve as reliable predictors of ultimate career choice.

When all the graduates' responses were analyzed in aggregate, location was found to be the most frequently cited driving factor for initial career decision; this is consistent with other studies of dermatology residency graduates, implying that non-modifiable factors may carry the most weight in residents' decisions [1, 6]. On the other hand, our study indicates that practice environment was a significant driver behind academic dermatologists' career decisions and suggests that residency programs should work to enhance the desirable aspects of that environment so that residents will lend more weight to this factor.

Based on our graduates' free-text responses, the features of the academic environment that they valued most were the dynamic atmosphere and the opportunities to collaborate with physicians in other fields. These are in addition to those aspects of that environment that are likely encompassed by other response categories included in our study, such as the care for socioeconomically and culturally diverse patient populations with complex dermatologic conditions that is provided at academic centers and the opportunities for research, teaching, mentorship. Program leaders, faculty, and resident mentors should therefore emphasize these features during training so that residents retain an interest in academia.

Data for this study were obtained from recent graduates from a single residency program. The proportion of our graduates who joined academic practices after graduating from residency and who remain in academic positions is substantially higher than the proportions of residency graduates and US dermatologists in academia, suggesting that selection bias is a potential limitation of our study [1, 3]. Therefore, our results may not be generalizable to the larger population of dermatologists, to future residency graduates, or to all applicants to dermatology or other medical specialties. Our study was also not powered to detect effects of a small magnitude or for a rare effect. In order to better study the residency selection process so that program directors are able to achieve desired outcomes, future studies should review data from residents at multiple institutions in order to detect smaller differences and make findings more generalizable.

Nonetheless, a major strength of this study is the high response rate. Response to our survey was nearly complete, limiting the possibility of nonresponse bias. The study's setting in a dermatology residency program with a strong research and teaching tradition also afforded our residents a breadth of opportunities to pursue academic careers.

The shortage of academic dermatologists in the United States has the potential to negatively impact patient care, research, and resident education. Our study shows that it is difficult to predict which candidates for residency positions will practice dermatology in an academic setting and that it is difficult to know which strategies will be most effective for recruiting and retaining residency graduates in academic positions. In addition, residency graduates may lend more weight to non-modifiable factors such as location when making career decisions.

Nevertheless, perceptions of the academic environment also appear to play a significant role in residents' career decisions. Further research is necessary to more precisely characterize the various aspects of the academic environment that attract residents. However, based on our graduates' responses, we surmise that they value the dynamic environment that exists at academic centers and the opportunities to collaborate with physicians in other fields. Program leaders, faculty, and resident mentors should therefore work to identify and bring greater focus to the desirable aspects of a career in academia.

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