

Applicants' Choice of an Ophthalmology Residency Program

Salman J. Yousuf, DO, MS,¹ John Kwagyan, PhD,² Leslie S. Jones, MD¹

Objective: To determine the factors most important to applicants when selecting an ophthalmology residency program.

Design: Cross-sectional survey.

Participants: All 595 applicants who submitted a rank list to the Ophthalmology Residency Matching Program for the 2012 match.

Methods: Participants anonymously completed a 25-item questionnaire after the submission of their rank lists. A multiple-choice format and ordinal scale were used to query applicants on demographics, career plans, and the importance of factors related to program characteristics. One question allowed a free text response to identify factors that caused the applicant to rank a program lower than other programs or not at all (i.e., "red flag").

Main Outcome Measures: Factors important to applicants when creating their rank lists.

Results: The response rate was 37% (218/595). The 3 most important factors affecting rank lists were resident-faculty relationships, clinical and surgical volume, and diversity of training. The fourth most important was the interview experience with faculty; poor interview experience was the most frequently cited "red flag." Age, gender, and marital status did not affect how applicants rated factors. Applicants planning a post-residency fellowship or an academic career placed greater importance on opportunities for resident research and a program's prestige ($P < 0.0001$). Female and ethnic minority applicants placed greater importance on the diversity of faculty and residents by gender or ethnicity ($P < 0.0001$).

Conclusions: Applicants rated educational and interpersonal factors as more important than geographic factors when selecting an ophthalmology residency program. Future career plans and demographic factors influenced the rating of specific factors. The results of this study provide a useful resource to programs preparing for the match.

Financial Disclosure(s): The author(s) have no proprietary or commercial interest in any materials discussed in this article. *Ophthalmology* 2013;120:423-427 © 2013 by the American Academy of Ophthalmology.

Training residents is central to the mission of university-based ophthalmology departments across the United States. As a trainee and member of the alumni, each resident has the potential to make a significant and lasting impact on the department he or she joins. Therefore, vast resources are devoted each year to interview and attract the best possible residency candidates. This includes, but is not limited to, time spent reviewing applications, attending and paying for pre-/post-interview dinners, developing Web sites for potential applicants, and lost revenue from closing clinics and lost operating room time. The present authors reported on the factors important to ophthalmology programs in selecting applicants by performing a multivariate regression analysis of the 2011 resident applicant database.¹ Nallasamy et al² reported on these factors after conducting a detailed survey of ophthalmology program directors, chairpersons, and members of resident selection committees. However, there have been no published data on the factors considered by applicants when selecting their preferred residency programs. The purpose of the present study was to determine the factors that have the greatest influence on applicants when they are creating their rank lists. Applicants' demographic factors and future career plans were analyzed to

evaluate for a correlation between applicant type and importance given to specific program characteristics.

Materials and Methods

This study was approved by the institutional review board. On the basis of review of the literature,³⁻¹³ a 25-item questionnaire was developed to include factors previously identified as important to applicants in selecting preferred residency programs. The literature search was performed on November 1, 2011, using the PubMed (www.pubmed.gov) database and the terms *residency* and *match* with no year or language restrictions. Additional studies were identified by consulting articles cited in the references of the articles retrieved from the PubMed search. The survey queried applicants about demographics, post-residency career plans, and the importance of specific factors in ranking residency programs using an 11-point Likert scale (0 = not important; 10 = most important). One question prompted respondents to rank the following factors in order of importance: (1) program location, (2) future career plans, (3) program characteristics, (4) faculty characteristics, and (5) advice from mentors. The final question allowed a free text response to identify factors that caused the respondent to rank a program lower than other programs or not at all (i.e., "red flag").

The Ophthalmology Residency Matching Program sent an electronic mail invitation to participate in the survey to all 595 applicants who submitted a rank list for the 2012 match. The invitation contained a preamble explaining the purpose of the study and assuring respondents of anonymity. No financial incentive was offered for completion of the survey. Responses were collected over a 6-week period (January 10, 2012, to February 21, 2012), shortly after the due date for rank list submission (January 5, 2012).

Descriptive statistics, including means and standard deviations, and numbers and percentages, were used to summarize the ratings of program characteristics. Ordinal data were further analyzed using the Wilcoxon rank-sum test when comparing 2 independent groups and the Kruskal-Wallis test for 3 or more groups. Statistical significance of 2-tailed tests, with $\alpha = 0.05$, was adjusted for multiple comparisons with a Bonferroni correction. On the basis of the total number of comparisons ($6 \times 17 = 102$) among 6 independent variables (age, sex, race, marital status, and plans for fellowship or academic career) and the 17 factors affecting applicant ranking of programs, statistical significance was defined as $P < 0.0005$. All data analyses were performed using XLSTAT 2012.3 statistical software (Addinsoft SARL, New York, NY).

Results

The response rate was 37% (218/595). Respondent demographics and future career plans are summarized in Table 1. Demographic data for applicants for the ophthalmology residency match were similar to demographic data for all US medical students applying for residency as reported by the Association of American Medical Colleges,¹⁴ except that the percentage of respondents who were African-Americans (<1%) was smaller in the present study. Applicants were more commonly undecided if they would pursue an academic career. Approximately two-thirds of applicants planned to complete a post-residency fellowship, one-third were undecided, and 1% had no plans for completing a post-residency fellowship.

How respondents rated the importance of specific factors when creating their rank order lists is summarized in Table 2. The top 4 factors related to the strength of clinical training or resident-faculty interactions. The highest rated geographic factor ranked sixth in importance, with the other geographic factors rated below average in importance. Overall, low ratings were given to opportunities for resident research and gender and ethnic diversity among program members. However, these factors were rated significantly higher by certain subgroups of applicants (Table 3). Opportunities for resident research were rated higher by applicants planning post-residency fellowships than by those not planning post-residency fellowships (7.3 ± 2.1 vs. 4.7 ± 3.8 ; $P < 0.0001$) and by applicants planning academic careers than by those not planning academic careers (8.1 ± 2.0 vs. 4.9 ± 2.5 ; $P < 0.0001$). Prestige of the program was rated higher by applicants planning post-residency fellowships than by those not planning post-residency fellowships (8.3 ± 1.6 vs. 4.7 ± 3.8 ; $P < 0.0001$) and by applicants planning academic careers than by those not planning academic careers (8.4 ± 1.6 vs. 7.7 ± 1.7 ; $P = 0.0003$). Presence of gender and ethnic diversity among faculty and residents was rated higher by female than by male applicants (5.4 ± 2.8 vs. 3.8 ± 2.7 ; $P < 0.0001$) and was rated higher by ethnic minorities than by Caucasians (6.1 ± 2.6 vs. 3.7 ± 2.6 ; $P < 0.0001$). A trend (7.3 ± 2.3 vs. 6.5 ± 2.0 ; $P = 0.001$) was observed whereby applicants who were ethnic minorities assigned higher ratings to the importance of working with a medically underserved community, but this trend did not meet our strict criteria for statistical significance ($P < 0.0005$).

Table 1. Applicant Demographics and Career Plans (n = 218)

Characteristic	Respondents, % (n)	All US Medical Students, %*
Age, yrs		
24–26	54 (119)	47
27–29	31 (67)	37
30–32	9 (20)	11
>32	5 (11)	5
No response	<1 (1)	
Gender		
Male	54 (118)	50
Female	46 (99)	50
No response	<1 (1)	
Ethnicity [†]		
Caucasian	64 (139)	72
Asian	26 (57)	20
Hispanic	9 (20)	7
African-American	<1 (2)	7
No response	<1 (1)	
Marital status		
Single	64 (140)	Not available
Married	35 (76)	Not available
No response	<1 (2)	
Plan for academic career		
Yes	29 (63)	38
No	15 (32)	46
Undecided	56 (123)	16
No response	0 (0)	
Plan for fellowship		
Yes	63 (136)	60
No	1 (3)	8
Undecided	35 (76)	32
No response	1(3)	

*Based on 2011 Graduation Questionnaire All Schools Summary Report. Association of American Medical Colleges. Available at: <https://www.aamc.org/download/263712/data/gq-2011.pdf>. Accessed May 7, 2012.

[†]Each respondent was allowed to select >1 ethnicity.

Responses to the ranking of 5 factors (program location, future career plans, program characteristics, faculty characteristics, advice from mentors) were excluded from analysis. Respondents frequently ranked multiple factors with the same rating (e.g., they ranked all factors first in importance) or only completed a partial rank list, precluding meaningful interpretation of these data.

Factors that caused applicants to rank a program lower than other programs or not at all (i.e., “red flags”) are summarized in Table 4. The following red flags accounted for two-thirds of all responses (in decreasing frequency): poor interview experience, perception of low resident morale, and program or institutional instability.

Discussion

To our knowledge, this study is the first to present US national data on factors important to applicants in choosing an ophthalmology residency program. Applicants' demographics in the present study appear similar to those of their counterparts applying to residency programs in other specialties as reported by the Association of American Medical Colleges (Table 1),¹⁴ other than the lower percentage of

Table 2. Ranking of Factors in Determining Applicants' Rank Order List (0 = Not Important; 10 = Most Important)

Factors as Perceived by Candidates	Mean Score ± SD
Resident–faculty relationship (i.e., perceived as positive or negative)	8.7±1.5
Clinical and surgical volume (i.e., busy clinic, perform large number of procedures)	8.5±1.3
Diversity of training (i.e., breadth of pathology, patient diversity)	8.5±1.5
Interview experience with faculty (i.e., perceived as positive or negative)	8.3±1.5
House staff quality of life (i.e., favorable on-call schedule, balance between work and personal life)	8.1±1.8
Desirable geography and climate of training location	7.9±1.9
Prestige of program (i.e., highly ranked nationally)	7.8±1.8
Presence of a resident-run clinic (i.e., residents have their own patients)	7.5±2.0
Clinic appearance and features (i.e., new and well-equipped lanes, latest technology)	7.4±1.7
Overall average response	7.2±2.4
Exposure to residents during interview day	7.0±2.3
Proximity of training location to family support	7.0±2.5
Caring for underserved population	6.8±2.1
Size of residency program (i.e., number of faculty and residents)	6.8±2.2
Opportunities for resident research (i.e., residents frequently publish)	6.7±2.3
Cost of living associated with training location	5.7±2.7
Cultural and ethnic diversity of training location	5.6±2.7
Diversity of house staff and faculty (i.e., by gender or ethnicity)	4.6±2.8

SD = standard deviation.

African-American respondents in the present study. It cannot be known whether this difference represents a study bias or accurately reflects the population of applicants, because information on the ethnic backgrounds of nonrespondents

Table 3. Effects of Applicant Characteristics on Rating of Factors Important in Selecting an Ophthalmology Residency Program

Correlating Factors	P Value*
Planning on academic career and opportunity for resident research	<0.0001
Planning on academic career and prestige of program	0.0003
Planning on fellowship and opportunity for resident research	<0.0001
Planning on fellowship and prestige of program	<0.0001
Female gender and diversity of faculty/residents by race or gender	<0.0001
Female gender and desirability of geography/climate of training site	0.0002
Ethnic minority and diversity of faculty/residents by race or gender	<0.0001
Ethnic minority and cultural/ethnic diversity of location of training site	<0.0001

*Wilcoxon rank-sum test to compare 2 independent variables and Kruskal–Wallis test to compare ≥3 unpaired groups. Statistical significance was defined as $P < 0.0005$, based on a Bonferroni correction for multiple comparisons.

Table 4. Factors that Caused Applicants to Rank a Program Lower than Other Programs or Not at All (i.e., “Red Flags”)

“Red Flag”	No. of Responses (n = 161)
Poor interview experience (e.g., disorganized interview day, unfriendly interviewers, missing faculty/residents)	47
Low resident morale/poor quality of life	35
Program/institution instability (e.g., concern over accreditation or hospital affiliations, frequent faculty turnover)	26
Poor resident–faculty relationship	16
Too many or distant secondary training sites	11
Low surgical volume	10
Other	16

was not available and previous data on ethnic profiles of ophthalmology applicants are lacking. In either case, attracting physicians of underrepresented backgrounds is important because they reduce cultural barriers that limit access to care for many minority patients¹⁵ and are more likely to provide care to medically underserved communities.¹⁶ Although US national data on the marital status of residency applicants are not available, other studies have also found that approximately two-thirds of applicants were single and one-third were married.^{4,13}

With the understanding that applicants may change their minds about the future during the course of residency, applicants were queried about post-residency career plans to determine whether their current plans influenced the importance they assigned to specific factors. Approximately half of the applicants were undecided about pursuing an academic career. Of those who were decided, twice as many planned to pursue academia than not. Only approximately 1% of applicants responded that they were not planning on pursuing fellowship training. Gedde et al¹⁷ conducted a survey of graduating ophthalmology residents in 2003 in which it was found that 32% of residents were not planning on pursuing fellowship training. Future study will be needed to assess whether incoming residents will pursue fellowship training in greater proportion than previously reported.

In contrast to surveys on this topic in other specialties, which have frequently cited geography as the top factor in selecting a preference for a residency program,^{9–12} ophthalmology residency applicants seemed to place greater emphasis on other factors. This is likely related to ophthalmology applicants facing greater competition for fewer programs in comparison with applicants in other specialties—a situation that makes some level of compromise in terms of geography more acceptable for the sake of securing the right position. Similar to other studies, perceptions about faculty–resident relationships were highly ranked. This likely relates to the close working relationships of trainees with faculty, along with most ophthalmology departments having fewer faculty members to work with than departments in other fields (e.g., internal medicine). The importance of high clinical and surgical volume is not surprising and is consistent with the general surgery literature on this topic.⁶

Age, gender, and marital status did not affect how applicants rated factors. Applicants planning a post-residency fellowship or an academic career placed greater importance on opportunities for resident research and the program's prestige ($P < 0.0001$), likely because of the perception that these program characteristics would assist them in achieving their future career plans. Female and ethnic minority applicants placed greater importance on the gender and ethnic diversity of faculty and house staff ($P < 0.0001$), which is an important consideration for programs that want to attract highly qualified applicants of minority backgrounds.

There are many factors that can influence an applicant's selection of a residency program. A survey design can only evaluate for so many factors before its length negatively affects the response rate. Therefore, the literature was reviewed to ensure the inclusion of factors commonly cited as important and the exclusion of factors reported to be of marginal importance (e.g., benefits package). Likewise, future studies may replace factors rated as low in importance in the present study with unexplored areas of potential interest, such as opportunities for international rotations, appropriate balance between resident supervision and autonomy, and perceived likelihood of matching to a specific program. Our response rate (37%) was suboptimal, although similar to that of studies in other specialties.³⁻¹³ Data regarding nonrespondents were not available and could not be inferred. A representative sample is not guaranteed by a high response rate; however, a lower response rate may introduce biases by eliciting responses from those with more free time, more accustomed to completing surveys, or with higher or lower levels of satisfaction with the match process. Likert scales lack uniformity in the literature (commonly ranging from 3-point to 11-point) and are subject to central tendency bias (respondents tend not to use the full spectrum of the scale). However, because virtually all studies on this topic have used Likert scales, we did the same to allow for a more meaningful comparison with the literature. To minimize recall bias, questionnaires were administered shortly after the submission of rank lists. Match day was included within the study period, and it is unknown whether knowledge of the match results affected how applicants responded. Decisions made earlier in the application process (e.g., deciding where to apply) may introduce a filtering effect that may not be captured by our analysis of factors influencing the final stage of decision making, creating a rank list. Our survey improved on the existing literature by not being institution-specific, by querying applicants before they entered residency, and by being the first to study the decision-making process of ophthalmology residency applicants specifically.

In conclusion, data from this study provide a better understanding of the decision-making process used by applicants when selecting their preferred residency program. Programs may use the data to ensure that they present those features of their programs that are of greatest interest to applicants and to make improvements (e.g., a positive interview experience) to attract the best possible candidates.

Acknowledgment. The authors thank Damien Joseph, Central Application Services manager of the San Francisco Matching Program, for a critical role in data retrieval.

References

1. Yousuf SJ, Jones LS. Ophthalmology Residency Match outcomes for 2011. *Ophthalmology* 2012;119:642-6.
2. Nallasamy S, Uhler T, Nallasamy N, et al. Ophthalmology resident selection: current trends in selection criteria and improving the process. *Ophthalmology* 2010;117:1041-7.
3. Nuthalapaty FS, Jackson JR, Owen J. The influence of quality-of-life, academic, and workplace factors on residency program selection. *Acad Med* 2004;79:417-25.
4. Aagaard EM, Julian K, Dedier J, et al. Factors affecting medical students' selection of an internal medicine residency program. *J Natl Med Assoc* 2005;97:1264-70.
5. Pretorius ES, Hrung J. Factors that affect National Resident Matching Program rankings of medical students applying for radiology residency. *Acad Radiol* 2002;9:75-81.
6. Crace PP, Nounou J, Engel AM, Welling RE. Attracting medical students to surgical residency programs. *Am Surg* 2006;72:485-90.
7. Davydow D, Bienvenu OJ, Lipsey J, Swartz K. Factors influencing the choice of a psychiatric residency program: a survey of applicants to the Johns Hopkins residency program in psychiatry. *Acad Psychiatry* 2008;32:143-6.
8. Laskin DM, Lesny RJ, Best AM. The residents' viewpoint of the matching process, factors influencing their program selection, and satisfaction with the results. *J Oral Maxillofac Surg* 2003;61:228-33.
9. Sledge WH, Leaf PJ, Sacks MH. Applicants' choice of a residency training program. *Am J Psychiatry* 1987;144:501-3.
10. Diebold SE, David CT, Ferraro CM. Factors influencing applicants' match rank order [letter]. *Acad Emerg Med* 1995;2:328-30.
11. Mayeaux EJ Jr, Arnold J. Why first-year family practice residents choose their residency programs. *Fam Med* 1993;25:253-6.
12. Flynn TC, Gerrity MS, Berkowitz LR. What do applicants look for when selecting internal medicine residency programs? A comparison of rating scale and open-ended responses. *J Gen Intern Med* 1993;8:249-54.
13. Wang T, Wong B, Huang A, et al. Factors affecting residency rank-listing: a Maxdiff survey of graduating Canadian medical students. *BMC Med Educ* [serial online] 2011;11:61. Available at: <http://www.biomedcentral.com/1472-6920/11/61>. Accessed July 22, 2012.
14. Association of American Medical Colleges. Medical School Graduation Questionnaire. 2011 All Schools Summary Report. October 2011:1. Available at: <https://www.aamc.org/download/263712/data/gq-2011.pdf>. Accessed May 7, 2012.
15. Council of Graduate Medical Education. Seventeenth Report. Minorities in Medicine: An Ethnic and Cultural Challenge for Physician Training. An Update. April 2005. Available at: <http://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/Reports/seventeenthtrpt.pdf>. Accessed May 7, 2012.
16. Brotherton SE, Simon FA, Tomany SC. US graduate medical education, 1999-2000. *JAMA* 2000;284:1121-6.
17. Gedde SJ, Budenz DL, Haft P, et al. Factors influencing career choices among graduating ophthalmology residents. *Ophthalmology* 2005;112:1247-54.

Footnotes and Financial Disclosures

Originally received: June 9, 2012.

Final revision: July 10, 2012.

Accepted: July 30, 2012.

Available online: October 18, 2012. Manuscript no. 2012-855.

¹ Department of Ophthalmology, Howard University College of Medicine, Washington, District of Columbia.

² Center for Clinical & Translational Science, Howard University College of Medicine, Washington, District of Columbia.

Financial Disclosure(s):

The author(s) have no proprietary or commercial interest in any materials discussed in this article.

Presented at: the Association for Research in Vision and Ophthalmology Annual Meeting, May 6–10, 2012, Fort Lauderdale, Florida.

Correspondence:

Leslie S. Jones, MD, Department of Ophthalmology, Howard University, Washington, DC 20060. E-mail: L_s_jones@howard.edu.