To Match or Not: Factors Influencing Resident Choice of Graduate Medical Education Program

Alisa Nagler, JD, EdD
Kathryn Andolsek, MD, MPH
Joanne Schlueter, BA
John Weinerth, MD

Abstract

Background Little is known about the factors that influence applicants' decisions to select a graduate medical education training program. Programs may improve their recruitment by better understanding that process.

Methods Following the Match for the years 2008 though 2010, an electronic survey was sent to 664 applicants to 15 Duke University graduate medical education programs. Those individuals were ranked high enough to match to Duke University but chose to match at another institution. We used quantitative and qualitative analyses to explore factors influencing candidates' decisions and to identify program and institutional improvements to better attract top candidates.

Results Response rate was 63% (417/664). The quantitative analysis identified factors that were "very important" to applicants (current resident satisfaction, relationship between faculty and residents, collegiality of current residents, quantity and quality of faculty content/mentoring, faculty teaching expertise, diversity of patients and types of procedures, and location), and those that were "not important" to applicants (child care or education opportunities for children, salary, United States Medical Licensing Examination requirements, part-time training options, favorable environment for minorities or women). There were statistically significant differences among specialties. Qualitative analysis identified 3 themes as most influential in their choice: location, program relationships, and the interview experience.

Conclusion The collection of 3 years of data across specialties identified factors that are important to applicants' choice of a training program. Some factors can be addressed quickly and with little effort, such as the format of the interview day. Others require programs and institutions to revisit their mission, priorities, and training culture to improve relationships between residents and faculty. Programs may wish to be more tactical in selecting the residents and faculty who meet with applicants and be more focused in planning how the interview time is used.

Editor's Notes: The online version of this article contains a table listing factors with statistically significant differences by specialty.

All authors are at Duke University School of Medicine. **Alisa Nagler, JD, EdD,** is Assistant Professor of the Practice of Medical Education, Assistant Dean for Graduate Medical Education, and Educator in the Hospital Office of Graduate Medical Education; **Kathryn Andolsek, MD, MPH,** is the /Associate Director of Graduate Medical Education and Professor in Community and Family Medicine; **Joanne Schlueter, BA,** is Project Specialist in Hospital Office of Graduate Medical Education; and **John Weinerth, MD,** is the Designated Institutional Official, Director of Graduate Medical Education, Professor of Surgery, and Associate Dean of Graduate Medical Education.

Funding: The authors report no external funding source for this study.

Corresponding author: Alisa Nagler, JD, EdD, Office of Graduate Medical Education, Duke University Hospital, Box 3951, Davison Building, Yellow Zone, Room 1086, Durham, NC 27710, 919.681.6601, alisa.nagler@duke.edu

Received May 5, 2011; revision received October 23, 2011 and November 23, 2011; accepted November 1, 2011.

DOI: http://dx.doi.org/10.4300/JGME-D-11-00109.1

Introduction

The National Resident Matching Program, also known as the "Match" is important for residency and fellowship applicants and for graduate medical education (GME) programs and their sponsoring institutions. For applicants, the Match marks the end of a long process of identifying GME programs that meet their professional and personal needs and discovering which programs or institutions have selected them. For institutions and programs, the Match is an important variable in assessing program quality, with *success* typically defined as filling available positions with the "top" candidates.

Although the Match began in 1952,[1] there is limited research about what factors play a role in how applicants choose their training program. The available literature describes what information GME programs use to determine their top picks (date of application, letters of reference, test scores, clinical performance)[2–4]; what

TABLE 1 **Categories of Participating Duke University Hospital Programs**

Specialty Category	Participating Programs
Pediatrics	Pediatrics
	Medicine-Pediatrics
Surgery[a]	General Surgery
	Emergency Medicine
	Otolaryngology
	Neurosurgery
	Urology
Obstetrics-Gynecology	Obstetrics-Gynecology
Family Medicine	Family Medicine
Pathology	Pathology
Other[b]	Anesthesiology
	Ophthalmology
	Radiology
	Radiation Oncology
	Dermatology

[a] All programs in this category are in the Surgery Department.
[b] These specialties are in their own department.

What was known
Programs may benefit from knowing how the interview and other factors may influence applicants' decisions to select a given residency or fellowship program.

What is new
Information important to applicants in making program selections includes satisfaction and collegiality of residents currently in the program, the relationship between faculty and residents, the quantity and quality of faculty teaching and mentoring, the diversity of clinical experience and geographic location.

Limitations
Single-site study limits generalizability. A significant percentage of nonrespondents raises concerns about respondent bias.

Bottom line
Many factors important in residency program selection relate to the culture of the program and institution, particularly the relationships among the residents and between the residents and faculty.

motivates medical school graduates to choose a particular specialty (lifestyle issues, exposure to specialty, advice of deans, prestige)[5–7]; recommendations for applicants on how to get into one's program of choice[8]; and how applicants choose a particular institution for GME training in a particular specialty.[9–13]

Understanding program attributes important to applicants may provide institutions and programs opportunities to improve their recruitment processes and their overall perceived quality. Our objectives were (1) to determine factors that were important to Duke University GME applicants in deciding which programs to rank, and (2) to identify program and institutional improvements to better attract top candidates.

Methods

Survey Development and Administration

The principal investigators developed an electronic survey, including closed and open-ended questions, using SurveyMonkey (Palo Alto, CA). Although the survey tool was not validated, Duke University program director feedback was elicited and included. The study was declared exempt by the Duke University School of Medicine Institutional Review Board. We obtained e-mail addresses from the Electronic Residency Application Service for identified individuals and e-mailed the survey to them as close as possible to Match day. Each year, aggregate results were shared with all programs, and participating programs received their results.

Study Participants

We surveyed individuals who were ranked high enough to match at Duke University Hospital GME programs following the Match in each year from 2007 to 2010 but who did not match at Duke University (N = 946). To clarify inclusion criteria, we provided participating programs with the following guidance: "A program ranks 40 applicants for 10 slots. To fill the 10 slots, applicants 1–5, 9–12, and 15 'match.' Given this example, applicants 6–8 and 13–14 would be surveyed."

Qualitative and Quantitative Analysis

Because of incompatibilities in the way the questions were formatted, the quantitative data from the 2007 survey could not be included in the quantitative analysis, although the data showed similar trends. Combined over the 2008, 2009, and 2010 surveys, 15 programs participated (of the 19 Duke University programs that participated in the Match). Nonparticipating programs either matched with their top candidates (there was no one to survey) or conducted their own surveys. The principal investigators reviewed these programs' findings to see if there were marked differences.

For quantitative analysis, the 15 programs were grouped by specialty: pediatrics, surgery, obstetrics and gynecology, family medicine, pathology, and other (TABLE 1). The analysis was structured to describe the relative importance of a set of factors for applicants in determining how to rank residency programs. Programs were considered as nominal classes and were evaluated by using the Cochran-Mantel-Haenszel test statistic with an omnibus 5-degree of freedom test.

TABLE 2 **Responder Rating of Factor Importance (2008, 2009, and 2010 Combined)**

Characteristic, N = 417	Very Important, No. (%)	Not Important, No. (%)	Somewhat Important, No. (%)
Current resident satisfaction, n = 415	377 (91)	1 (0)	37 (9)
Relationship between faculty and residents, n = 415	372 (90)	0 (0)	43 (10)
Collegiality of current residents, n = 413	367 (89)	3 (1)	43 (10)
Quantity and quality of faculty contact/mentoring, n = 412	311 (75)	4 (1)	97 (24)
Faculty teaching expertise, n = 407	297 (73)	8 (2)	102 (25)
Diversity of patients/types of procedures in specialty, n = 415	276 (67)	14 (3)	123 (30)
Location in the country, n = 413	252 (61)	28 (7)	133 (32)
Employment/education opportunities for significant other, n = 412	187 (45)	163 (40)	62 (15)
Curriculum and training schedule, n = 410	171 (42)	59 (14)	180 (44)
Success of graduates getting prestigious fellowships, n = 413	171 (41)	70 (17)	172 (42)
Multidisciplinary interactions, n = 414	160 (39)	43 (10)	211 (51)
Research opportunities, n = 413	154 (37)	77 (19)	182 (44)
Prestige of institution,[a] n = 412	150 (36)	38 (9)	224 (54)
Urban versus rural environment, n = 413	137 (33)	58 (14)	218 (53)
Adherence to duty hours,[a] n = 413	120 (29)	68 (16)	225 (54)
Experience with initial application process, n = 409	113 (28)	112 (27)	184 (45)
Success of residents on board exams, n = 412	104 (25)	112 (27)	196 (48)
Opportunity for international rotations/electives, n = 413	104 (25)	145 (35)	164 (40)
Technology, n = 411	103 (25)	67 (16)	241 (59)
Amount of "scut work," n = 413	78 (19)	72 (17)	263 (64)
Favorable environment for minorities, n = 410	77 (19)	188 (46)	145 (35)
Size of program, n = 411	75 (18)	123 (30)	213 (52)
Favorable environment for women, n = 410	63 (15)	220 (54)	127 (31)
GME trainee benefits (call rooms, meals on call, etc.),[a] n = 413	39 (9)	137 (33)	237 (57)
Child care or education opportunities for my children, n = 409	34 (8)	323 (79)	52 (13)
Employment benefits, n = 413	28 (7)	177 (43)	208 (50)
Option of part-time, flex-time training, n = 410	28 (7)	284 (69)	98 (24)
USMLE requirements, n = 411	11 (3)	287 (70)	113 (27)
Salary, n = 415	8 (2)	297 (72)	110 (27)
Onsite child care,[a] n = 412	8 (2)	362 (89)	42 (10)

Abbreviations: GME, graduate medical education; USMLE, United States Medical Licensing Examination.

[a] Because of rounding, these percentages do not equal 100%.

Grounded theory methods were used to analyze the qualitative data collected from the open-ended question, "What was one thing Duke could have done differently to influence you to have picked Duke as #1?"[14] Data were extracted from the open-ended question using open coding to identify recurring themes. The constant comparative method was used to group concepts within themes and to clarify and rename each theme until the data were fully described and categorized. Two authors independently coded all comments. Coding discrepancies were discussed,

and themes were revised to better represent the data. Open-ended comments were not compared across programs, and instead, these data are treated as a single set.

Results

The overall response rate for the survey (2008 through 2010) was 63% (417/664). The data were not collected in a way that allowed assessment of bias in respondents and nonrespondents.

Quantitative Data: "Important" and "Not Important" Factors

Participants in the 2008, 2009, and 2010 surveys were asked to select whether factors were "not important," "somewhat important," or "very important" in their decision to select an institution for GME training (TABLE 2).

For many of the factors, there were statistically significant differences by specialty, which included salary, part-time option, favorable environment for minorities, diversity of patients/procedures, curriculum and training schedule, collegiality of current residents, multidisciplinary interactions, prestige of institution, success of graduates getting prestigious fellowships, success of residents on board exams, opportunity for international rotations, research opportunities, size of program, and experience with initial application process (TABLE provided as online supplemental material).

Qualitative Coded Categories

Three themes were identified in the analysis of the open-ended question, "What is one thing Duke could have done differently to influence you to have chosen Duke as #1?" Analysis by specialty did not occur, although informal review of qualitative data did not show distinct differences by specialty. Themes found in the analysis included (1) location, (2) interview experience, and (3) relationships within program.

Location The most commonly coded theme was the location of the residency program. Respondents reported that they wanted to live near a larger city, closer to family, or in a more central location. "I loved the program and people were great. My family is from the northeast and I went to medical school in California. Durham is just not near any of my friends, family, or areas of interest."

Interview Experience Experience with the interview process was the second most commonly coded theme. These included the format of the interview day(s) including follow-up (or lack thereof) with whom applicants met (and did not meet) and the applicants' perception of the learning/work environment. Comments were negative and positive in this area. "My interview experience was great. I loved the informal dinner with residents the night before and it says a lot that the Chair met with every one of us!" "The interview process was so impersonal. It was rushed, I never met with the program director and the residents seemed disinterested in meeting with me"; "I had a thank you note waiting for me when I got home—the program seemed to really care."

Relationships Within the Program Many respondents reported on the perceived relationships between residents and/or between residents and faculty. "I could sense tension with the interns during my interview"; "The faculty are clearly interested in the residents' well being and treat them like colleagues. They expressed enthusiasm for teaching and mentoring"; "It's a malignant work environment—from the top down"; "Residents seem to love what they are doing and their relationships with each other and their faculty. This would be a good place to train."

Discussion

Important Factors

Factors that are "important" and "not important" in applicants' decision regarding where to train can be useful information for programs and institutions as they consider resources and options to better recruit the right candidates. These candidates may be different by program, for example, those graduating from top-ranked medical schools or those with a specific career plan.

Salary and other benefits were less important than expected, given the attention institutions focus on these issues. Perhaps, that is because the differences are minimal across institutions and thus not as important at the trainee level. Factors such as "scut work," duty hours, United States Medical Licensing Examination requirements, and the option of part or flex-time were also not rated as very important.

Many of the factors that were "very important" are not tangible but, instead, speak to the culture of an institution. Applicants appear to care most about collegiality, potential relationships with other residents and faculty. The work environment was very important as noted by the ratings for curriculum schedules and numbers and types of procedures.

Differences by Specialty

The results suggest some differences by specialty. Salary appeared to be more important to those in community and family medicine than it did in other specialty groups. Family Medicine is one of the lower paid specialties,[15–17] and that may contribute to salary being noted as *somewhat important* to those respondents. Diversity of patients and types of procedures were more important for specialties such as surgery and obstetrics-gynecology. As those are both procedure/surgical fields, it is logical that this was important to residents entering those programs. Curricu-

lum and training schedule appeared most important to applicants of family medicine programs. That may be a result of the diversity across family medicine programs nationwide, and applicants using that diversity to help determine a good fit for their personal and professional interests. Community and family medicine respondents identified multidisciplinary interactions as important, more so than other specialties. Given the role of a family medicine physician and the need to interact with other disciplines, those entering that specialty may see that as important early on. The prestige of the institution or fellowships following residency was more important for applicants to some specialties than it was for others. For those specialties in which it was important, programs and institutions could dedicate more energy highlighting their prestigious qualities (eg, *US World and News Report* ranking, "quality" of current residents, world-renowned attending physicians).

Common Themes

Identified themes were (1) location, (2) interview experience, and (3) relationships within the program. Location was the most common theme. Participants' who shared positive responses noted that there was nothing Duke University could have done differently, and that they had chosen to train elsewhere for reasons beyond the institution's control, such as its East Coast Durham, North Carolina, location.

Feedback regarding the interview process was most useful in identifying tangible opportunities for program and institutional improvements. Comments suggest that the brief time applicants spend on site is significant to their ranking of the program. Quality time with the program director, faculty, and even the chair is critical. Respondents noted that meals, tours, and follow-up correspondence were appreciated, and the lack thereof was a place for improvement. Having the opportunity to informally interact with current residents was another common finding. The extensive comments regarding relationships within the program or culture suggest that applicants formed opinions about those aspects of the program in their short visit, which played a major role in their ranking decisions. Changing the culture of interactions and relationships between faculty and residents is no easy task and may not be a goal of the program. It is, however, important to know that applicants care about those relationships and the working environment and may use the findings from their observations during interviews to decide how high to rank an institution.

Our study's qualitative and quantitative findings suggest that relationships and work culture are very important as is the location of the training program. Some factors require little effort or time to change, such as the format of the interview day itself; others, if valid, may take years and significant culture change, such as perceived relationships between residents and faculty.

A number of Duke University programs and the institution have made improvements because of this information. First, the institution is exploring the integration of technology to enhance recruiting and interviewing. Qualitative feedback suggested time spent with program directors, residents, and chairs was sometimes inadequate. Technology may enhance interactions with web-based interviews and chat rooms. Existing opportunities have been identified to market Durham, North Carolina, and surrounding communities. In addition, the institution has begun collecting information regarding programs' process for recruiting and interviewing with the goal of sharing best practices. Results of institutional findings are being analyzed for presentation in a future manuscript. Program changes included collaboration with Duke's institution-sponsored global health program to provide an international rotation/elective, and one program changed its interview process to ensure the department chair met with every candidate.

Study Limitations

Our study was a single-site intervention, which limits generalizability. Respondents may have highlighted factors that they liked most and least about Duke University specifically and were less objective, thorough, or honest in addressing other factors that may influence their selection of a program. Similarly, there was no inclusion of what a successful match looks like to programs. The survey was sent from a central institution office of GME and not the individual program. Whether that affects respondents' likelihood to complete the survey is unknown. Also, there were a significant percentage of nonrespondents. Lastly, we did not analyze the data by year, so we could not identify trends or improvements across time.

Conclusions

Our study identified factors important to applicants' ranking of residency and fellowship programs. Although it may be difficult to address the variety of factors that applicants deem important across specialties, knowing what is important to them (and to individual programs) may provide an opportunity to improve recruitment as well as the educational program, and to recruit the "right" residents.

References

1 [NRMP] National Residency Matching Program (NRMP). NRMP home page. http://www.nrmp.org/. Accessed March 1, 2010.

2 Fuhman GM, Dada S, Ehleben C. Application submission date reflects applicant quality. *J Surg Educ.* 2008;65(6):397–400.

3 Brothers TE, Wetherholt S. Importance of the faculty interview during the resident application process. *J Surg Educ*. 2007;64(6):378–785.
4 Green M, Jones P, Thomas JX Jr. Selection criteria for residency: results of a national program directors survey. *Acad Med*. 2009;84(3):362–367.
5 Pugno PA, McGaha AL, Schmittling GT, DeVilbiss AD, Ostergaad DJ. Results of the 2009 National Resident Matching Program: family medicine. *Fam Med*. 2009;41(8):567–577.
6 Chung KC, Lau FH, Kotsis SV, Kim HM. Factors influencing residents' decisions to pursue a career in hand surgery: a national survey. *J Hand Surg Am*. 2004;29(4):738–747.
7 Freed GL, Dunham KM, Jones MD, McGuinness GA, Althouse L. General pediatrics resident perspectives on training decisions and career choice. *Pediatrics*. 2009;123(suppl 1):S26–30.
8 Ziegelstein RC, Mojoko E, Moghalu O. Rocking the match II: more lessons on applying and getting into residency. *J Natl Med Assoc*. 2009;101(9):959–966.
9 Lantry JM, Nyland JA, Perkins DR, Roberts CS. A formal reception improves orthopaedic surgery residency program applicant perceptions of the interview experience. *J Ky Med Assoc*. 2008;106(4):177–181.
10 Deiorio NM, Yarris LM, Gaines SA. Emergency medicine residency applicant views on the interview day process. *Acad Emerg Med*. 2009;16(suppl 2):s67–70.
11 Yarris MS, Delorio NM, Lowe RA. Factors applicants value when selecting an emergency medicine residency. *West J Emerg Med*. 2009;10(3):159–162.
12 Rogers CR, Karol A, Rio AM, Larson DL, Edwards MB, Hansen JE, et al. Integrated plastic surgery residency applicant survey: characteristics of successful applicant and feedback about the interview process. *Plast Reconstr Surg*. 2009;123(5):1607–1617.
13 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(2):143–146.
14 Kennedy JT, Lingard LA. Making sense of grounded theory in medical education. *Med Educ*. 2006;40(2):101–108.
15 [AAMC] Association of American Medical Colleges. Careers in medicine website. http://www.aamc.org/students/cim/specialties.htm. Accessed February 25, 2010.
16 [MGMA-ACMPE] Medical Group Management Association–American College of Medical Practice Executives. *Physician Compensation and Production Survey: 2009*. Englewood, CO: MGMA-ACMPE; 2009.
17 [AAFP] American Academy of Family Physicians. *Practice Profile Survey*. Leawood, KS: AAFP; 2009.