



EDUCATIONAL ADVANCE

Factors That Influence Medical Student Selection of an Emergency Medicine Residency Program: Implications for Training Programs

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Abstract

Objectives: An understanding of student decision-making when selecting an emergency medicine (EM) training program is essential for program directors as they enter interview season. To build upon preexisting knowledge, a survey was created to identify and prioritize the factors influencing candidate decision-making of U.S. medical graduates.

Methods: This was a cross-sectional, multi-institutional study that anonymously surveyed U.S. allopathic applicants to EM training programs. It took place in the 3-week period between the 2011 National Residency Matching Program (NRMP) rank list submission deadline and the announcement of match results.

Results: Of 1,525 invitations to participate, 870 candidates (57%) completed the survey. Overall, 96% of respondents stated that both geographic location and individual program characteristics were important to decision-making, with approximately equal numbers favoring location when compared to those who favored program characteristics. The most important factors in this regard were preference for a particular geographic location (74.9%, 95% confidence interval [CI] = 72% to 78%) and to be close to spouse, significant other, or family (59.7%, 95% CI = 56% to 63%). Factors pertaining to geographic location tend to be out of the control of the program leadership. The most important program factors include the interview experience (48.9%, 95% CI = 46% to 52%), personal experience with the residents (48.5%, 95% CI = 45% to 52%), and academic reputation (44.9%, 95% CI = 42% to 48%). Unlike location, individual program factors are often either directly or somewhat under the control of the program leadership. Several other factors were ranked as the most important factor a disproportionate number of times, including a rotation in that emergency department (ED), orientation (academic vs. community), and duration of training (3-year vs. 4-year programs). For a subset of applicants, these factors had particular importance in overall decision-making.

Conclusions: The vast majority of applicants to EM residency programs employed a balance of geographic location factors with individual program factors in selecting a residency program. Specific program characteristics represent the greatest opportunity to maximize the success of the immediate interview experience/season, while others provide potential for strategic planning over time. A working knowledge of these results empowers program directors to make informed decisions while providing an appreciation for the limitations in attracting applicants.

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Annually, emergency medicine (EM) residency programs invest a great deal of time, energy, and resources to recruit the best possible candidates to their programs. Program directors and residency selection committees enter this process with limited guidance from the literature regarding how candidates select and rank individual programs.

As the person ultimately charged with the success of the match process, the program director must have a clear grasp of those factors in candidate decision-making that are potentially under his or her control. This allows the program director to focus the interview process on high-priority items that are aligned with program strengths and provides potential ways to improve individual residencies. Several studies have suggested there are a number of critically important factors in decision-making that are out of the control of any given program.¹⁻³ In addition, the number of residency review committee (RRC)-accredited EM residencies has nearly doubled over the past 20 years, from 87 to 155, increasing the number of available positions from 440 to 1,607.⁴⁻⁶ The result is an increasingly complex array of choices for the applicant seeking training in postgraduate EM.

A number of studies provide some insight into applicant decision-making as it pertains to EM residency applicants.^{1-3,7} This includes the importance of geographic location, resident satisfaction, interview day, and program reputation. For a number of reasons, these studies may not generalize to all U.S. allopathic medical students applying to RRC-accredited EM residencies. Several were based on the experiences of single programs, enrolling interviewed applicants only.^{2,3} The relevant remaining studies were performed on a broader population, but were surveyed 6 months to several years after the actual matching process, which introduces recall bias.^{1,2} The current study took place during the 2010-2011 National Residency Matching Program (NRMP) matching process at a point in time where decision-making was complete and still "fresh" in applicants' minds. To minimize bias, special attention was paid to timing. To reflect the opinions of the overall applicant pool to EM, all applicants were included, not just those granted an interview. Although information specific to minority applicants exists for applicants interested in internal medicine, we could find no such study in the EM literature.⁸

The goal of this study was to elucidate and prioritize factors that play a role in decision-making among a cross-section of applicants to U.S. EM training programs. A secondary goal was to evaluate these factors as they pertain to gender and underrepresented minority applicants.

METHODS

Study Design and Population

This was a cross-sectional survey of U.S. allopathic medical students applying to EM training programs through the 2011 NRMP. All participating investigators gained institutional review board (IRB) approval from their respective institutions before initiating the study. Due to the anonymous nature of this survey, each affiliated IRB

approved the study as exempt from informed consent, although Regions Hospital did require an "opt out" option in advance of the survey invitation. No compensation was offered to candidates for participation.

Potential participants consisted of fourth-year medical students applying for a first-year position with one or more of seven geographically diverse EM training programs: Beth Israel Deaconess Medical Center (Massachusetts), Emory University (Georgia), Georgetown University/Washington Hospital Center (Washington, DC), Harbor-UCLA (California), Alameda County Medical Center-Highland (California), Regions Hospital (Minnesota), and the University of Michigan (Michigan). Five of the programs have a 3-year format and two are 4-year programs. Candidate information was provided by each program from its applicant list generated from the Electronic Residency Application Service (Washington, DC). This information included sex, medical school region, and an e-mail address to initiate contact. Candidates were identified by e-mail address only. Each program's list was cross-referenced with every other program to eliminate duplication. As the primary site, all invitations to participate in this study were sent from Georgetown University.

Survey Content and Administration

The survey was developed through author discussion, a review of relevant publications,⁸ and focus groups with incoming interns from three of the participating sites during the summer of 2010. This process was carried out to assure content validity. The survey, consisting of eight questions, was purposely kept brief in an attempt to maximize the response rate. To assess relative importance of each factor, candidates were asked to select the three most important factors in order of importance pertaining to geographic location and program characteristics. A pilot of 20 interns from two of the participating programs provided response process validity.

An e-mail invitation was sent to each potential participant the day after the deadline for submission of rank-order lists to the NRMP. The survey was open to candidates from February 24, 2011, to March 13, 2011. A cover letter included information on IRB approval, the purpose of the study, and a statement that this survey was independent of the participating program's selection process. Group e-mails were sent to participants via a blind "carbon copy" to prevent participants from being able to identify one another. The survey (Data Supplement S1, available as supporting information in the online version of this paper) was completed electronically through Survey Monkey (Palo Alto, CA) with reminders to those who had not completed the survey on March 2 and 9, 2011. Completed surveys were included for data analysis if they were received before the initial release of match results.

An informal survey was completed by each of the participating authors asking them to define each of the selection factors presented in the survey as within the control of the program leadership, somewhat within the control of the program leadership, or outside the control of the program leadership. A simple majority determined how each was defined for the purposes of this study.

Data Analysis

Respondents and nonrespondents were compared for gender and region of medical school attendance to identify possible response bias. “Regions” were defined as northeastern, southern, midwestern, and western as outlined by the U.S. Census Bureau.⁹ Data were downloaded from Survey Monkey into Microsoft Excel (Microsoft Excel for Macintosh, v 14.1.2, Redmond, WA) to calculate descriptive statistics. Data were further analyzed using Graphpad Prism (Prism 5.0d for Macintosh, v 5.0, La Jolla, CA). Subgroup comparisons of nominal outcomes were analyzed either with chi-square or Fisher’s exact test. Alpha was set at 0.05 for all comparisons, with no adjustment for the multiple testing.

RESULTS

Of 1,525 invitations to participate in this study, 870 were completed, for a response rate of 57%. Eight candidates from Regions Hospital “opted out” of receiving the survey and were counted as nonresponders. Table 1 provides demographic information regarding the total pool (gender/region), and those who completed the survey. There were no significant differences in terms of gender ($p = 0.3$) or geographic location ($p = 0.1$). Among those completing the survey, 31.2% of the men, 49.2% of the women, and 38% overall identified themselves as being in a committed relationship. Participants had the opportunity to identify themselves as underrepresented minorities. This group made up 9.7% of the study population, of whom 42.9% were in a committed relationship.

The relative importance of geographic location versus program characteristics is summarized in Figure 1. A balance of geographic location and program qualities was the rule, with less than 5% of the applicants basing their decision solely on one or the other. Candidate priorities regarding location factors are listed in Table 2, and those pertaining to program characteristics in Table 3. The numbered priorities (e.g., 1, 2, etc.) are based on the number of times each item was selected as one of the top three choices. Also provided is a measure of how often a factor was selected as the most important factor relative to the number of times it was selected as one of the top three choices (first/first +

second + third). Those with the highest ratio or percentage had a propensity for being ranked as the most important choice. For example, “interview experience” was the most common program characteristic selected as one of the top three choices (48.9%). In 39% of this group it was chosen as the most important factor. Conversely, a “rotation in that emergency department” (ED) was selected as one of the three most important factors less often (30.9%), yet applicants who made this choice more commonly selected it as the most important factor (59.7%).

Overall, only one factor was found to be significantly different between men and women. Men selected program orientation (academic vs. community) more often than women did (33.4%, 95% confidence interval [CI] = 30% to 38% vs. 27%, 95% CI = 23% to 32%; $p < 0.05$ despite overlap of CIs). Compared to the general population, minority applicants were less likely to make decisions based on program characteristics ($p < 0.001$; 3.1%, 95% CI = 0.01% to 18% vs. 53.4%, 95% CI = 49% to 58%). In other words, minority applicants favored geographic location more often. There were no statistical differences in any factor when comparing applicants based on the regional location of their medical schools. When evaluating the opinions of candidates based on the primary residence over their lifetime, those from urban backgrounds were significantly more concerned about compensation (19.1%, 95% CI = 13% to 27% vs. 10.1%, 95% CI = 8% to 13%; $p = 0.005$), program diversity (33.8%, 95% CI = 26% to 42% vs. 12.1%, 95% CI = 10% to 15%; $p = 0.001$), and geography as it related to a spouse or significant other (79.4%, 95% CI = 72% to 85% vs. 65.5%, 95% CI = 61% to 68%; $p = 0.004$) compared to applicants from suburban and rural settings.

DISCUSSION

Residency program leadership has limited information available to direct their interviewing efforts. Many programs carry out an annual postmatch survey of their competitive candidates from the past year. Such instruments can provide useful information, allowing some assessment of what a program does well and how they might improve. However, they do not provide systematic evaluation of those factors essential in decision-making. Furthermore, the information gained from any single program’s survey does not necessarily generalize to other programs. Several studies in the EM literature shed further light on this subject, but may be limited by the scope or timing of their surveys.^{1-3,7} Through its multi-institutional design, including seven geographically and academically diverse EM training programs, this study strives to build on prior works, representing the attitudes of all U.S. allopathic students applying to EM residencies. The total number of applicants invited to participate ($n = 1,526$) represents 98% of the U.S. allopathic applicants to EM this academic year ($n = 1,566$).⁶ With a response rate of 57%, the results of this study appear to represent the priorities of the larger population.

An important aspect of any study on candidate opinions is the actual timing of the survey. For the “rising”

Table 1
Demographics Regarding Gender and Current Geographic Location of those Invited to Participate and those Completing the Survey

Characteristic	Invited	Participated
Gender		
Men	969 (63.5)	543 (62.5)
Women	556 (36.5)	327 (37.5)
Location		
Northeast	362 (23.7)	213 (24.5)
South	499 (32.7)	265 (30.5)
Midwest	472 (31.0)	271 (31.1)
West	192 (12.6)	121 (13.9)
Values are given as n (%).		

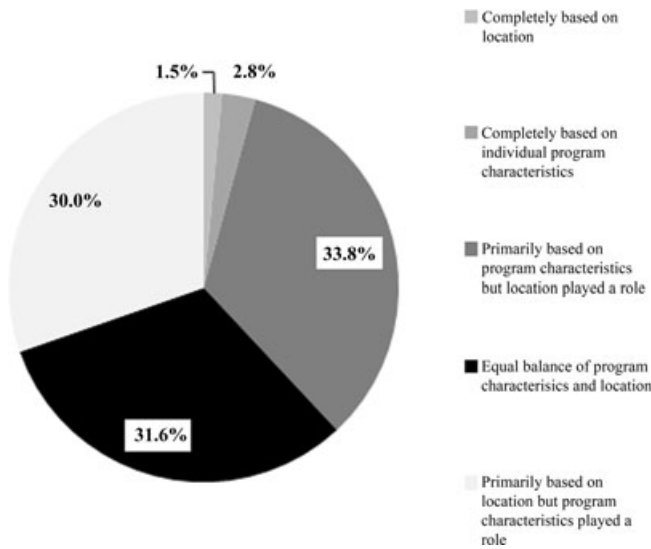


Figure 1. Relative importance of location versus program characteristics in applicant decision-making.

fourth-year medical student, the process of selecting a training program begins in late spring or summer. Over a period of months applicants become increasingly sophisticated about the choices and their own personal priorities with respect to selecting a program. Much of this development takes place by interviewing and communicating with other applicants, residents, and faculty. The interview season culminates in the development and submission of a rank list at the end of February by each candidate. It is the process of completing this ultimate decision for final submission that “crystallizes” priorities into their relative importance. Surveys performed prior to candidate rank list submission run the risk of incomplete decision-making or “maturation.” They also risk bias based on respondents believing their responses might influence their ultimate match results. Surveys that are performed after release of the match results are at risk for bias based on these results. This survey was planned to take place within the 3-week period between the 2011 NRMP rank list submission deadline and the subsequent announcement of the match results.

Figure 1 demonstrates that for 96% of the applicants there is a balance between geographic location and individual program characteristics that plays into decision-making regarding a training program. Some favor geographic location, while a nearly equivalent number stratify program characteristics more highly. Overall, the relative importance of these two major factors is nearly equally weighted. The importance of location is a recurrent theme in prior studies.¹⁻³ In the current study, the factors most often listed as one of the top three geographic reasons for selecting a program in order of importance were preference for a particular region; to be close to spouse, significant other, or family; and community supportive of my life style (Table 2). A somewhat different perspective is provided by the percentage of times any given factor was selected as the most important factor, as opposed to the number of times it was selected as one of the top three choices (first/first + second + third). The factor related to geography that was most important in this regard was, “to be close to spouse, significant other, or family” (64.4%). The fact that 38% of respondents reported that they were in a committed relationship likely contributes to just how important this issue is for select applicants. Overall, location factors are largely out of the control of program leadership.

When asked to select the top three program characteristics in order of importance, the factors most often listed in order of frequency of response were interview experience, personal experience with the residents, and reputation of the program. A number of program factors were disproportionately selected as the number one choice (relative to the number of times it was selected as one of the top three choices), including rotation in the ED (57.6%), length of program (3 years vs. 4 years; 45.4%), and orientation (academic vs. community; 43.1%). Although this latter group of factors was not as popular overall, they appear to be very important to a select group of applicants. In 1995, Diebold et al.¹ reported that 62% of their study population preferred a 3-year program, compared to 6% preferring the four year format. Factors under the control of the program leadership include the interview day, interaction with residents/faculty, and the opportunity to perform a rotation in the ED. These represent some of the

Table 2
The Priorities of Applicants Regarding Location Factors

Priority	Factors	Percentage (95% CI)*	First/First + Second + Third	Program Leadership Control
1	Preference for a particular geographic location	74.9 (72–78)	44.00	No
2	To be close to spouse, significant other, or family	59.7 (56–63)	64.60	No
3	Community supportive of my life style	52.4 (49–56)	26.40	No
4	Desired location to live/work after completing training	38.2 (35–41)	10.10	No
5	Cost of living	34.9 (32–38)	12.30	No
6	Preference for a particular sized community	31.0 (28–34)	21.90	No
7	Community supportive of my values	19.8 (17–23)	14.30	No

These are ranked in order of importance based on the total number of applicants providing each as one of their top three choices (*), the percentage of times when selected as one of the top three priorities a factor was chose as the most important factor (priority), and whether the program leadership has the ability to control these individuals factors.

Table 3
The Priorities of Applicants Regarding Program Characteristics.

Priority	Factors	Percentage (95% CI)*	First/First + Second + Third	Program Leadership Control
1	Interview experience	48.9 (46–52)	39.00	Yes
2	Personal experience with residents	48.5 (45–52)	38.70	Yes
3	Reputation of program	44.9 (42–48)	32.20	Somewhat
4	Length of program	36.2 (33–40)	45.40	Somewhat
5	Personal experience with faculty	33.3 (30–37)	27.30	Yes
6	Orientation (academic vs. community)	30.9 (28–34)	43.10	Somewhat
7	Rotation in that ED	30.2 (27–34)	57.60	Yes
8	Available opportunities in subspecialties	29.3 (26–32)	25.20	Yes
9	Amount of faculty supervision/mentoring	14.7 (13–17)	28.10	Somewhat
10	Diversity within program	14.5 (12–17)	28.00	Somewhat
11	Number of training sites	11.3 (9–14)	13.30	Somewhat
12	Second visit/shadowing/stopping by	11.0 (9–13)	12.50	Yes
13	Compensation/benefits	10.9 (9–13)	12.60	Somewhat
14	Size of program	9.5 (8–12)	21.90	Somewhat
15	Interaction with electronic media	7.0 (6–9)	8.20	Yes

These are ranked in order of importance based on the total number of applicants selecting each as one of their top three choices (*), the percentage of times when selected as one of the top three priorities a factor was chosen as the most important factor (priority), and whether the program leadership has the ability to control these individual factors.

most important factors to candidates, and are most amenable to immediate change. Others, such as program length (3 years vs. 4 years), reputation, academic/community orientation, and educational opportunities, are less obviously under the program director's control. Change involving any of these factors may be more difficult or even impossible. As a result, these factors represent an opportunity for longer-term strategic planning based on priorities and resources available to the program.

Consistent with prior studies, a number of program factors were ranked as relatively less important, including the number of training sites offered and program size.^{1,2} In addition, factors such as salary/benefits and the cost of living in a given community appear to be relatively low priority issues when students select a training program. That residency training is about education and not financial gain is a recurrent theme in studies involving applicants to EM programs, as well as other specialties.^{1,7,8,10,11} Although salary and benefits consistently rank as a relatively unimportant factor, decision-making in training program selection is a multi-factorial process. Consequently, lesser priority factors should not be disregarded.

Regarding gender, men appeared more likely than women to believe that the academic versus community orientation was an important consideration in residency choice ($p < 0.05$). This finding may relate to previous reports that women are underrepresented in academic EM.^{12,13} Perhaps decision-making resulting in this disparity develops in medical school, if not before. Applicants who identify themselves as underrepresented minorities were significantly more interested in geographic location factors over program characteristics ($p < 0.01$). A prior study in internal medicine applicants found diversity to be an important program factor to minority applicants; however, the current study did not.⁷ Perhaps our minority applicants view geographic location as a more important indicator of

diversity than factors within individual programs? Further exploration of why this important group favors geographic location is warranted. Perhaps the most interesting aspect of subgroup analysis regarding gender and underrepresented minority analysis is the lack of significant differences in most instances from the overall population.

LIMITATIONS

Beside those that are inherent in all surveys, such as the self-reporting of data, there are several additional limitations to this study. The study population consisted of "all" U.S. allopathic students applying to EM in the year of 2011. There was no attempt to differentiate those applicants who were determined to be most competitive. Several e-mailed comments to the authors from those invited to complete the survey conveyed a lack of willingness to participate because they were not invited to interview at one or more of the eight participating programs. Consequently, our findings have a potential bias toward the opinions of those applicants who were offered an interview. In addition, several issues could use clarification. For a candidate, what constitutes the reputation of a program? Is it the institution, faculty or program director, the program itself, or some combination? Furthermore, although the length of the program is important to many applicants, the only information about the relative importance of a 3- versus 4-year format is 16 years old.¹ Last, what aspects of location are most important to underrepresented minorities? Future studies should address these questions and more.

CONCLUSIONS

The vast majority of applicants to EM residency programs value both location factors and program characteristics when selecting a program. Although individual

programs have very little control over their geographic location, they do have considerable say over program characteristics. Some of these are amenable to immediate change to maximize interview success, including issues related to resident happiness and a positive interview experience. Other factors represent an opportunity for strategic planning. A firm grasp of the relative importance of these issues should help program leadership understand the potential opportunities, as well as the limitations, in resident recruitment.

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Supporting Information

The following supporting information is available in the online version of this paper:

Data Supplement S1. Factors that influence medical students decision-making when selecting an emergency medicine residency.

The document is in PDF format.

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