

The Influence of Gender and Underrepresented Minority Status on Medical Student Ranking of Residency Programs

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Abstract: Background: Physician diversity is linked to improved quality of care of diverse patient populations. The transition from medical school to residency is an opportunity to improve and increase workforce diversity in all specialties. However, there is limited published literature on the factors contributing to the ranking of residency programs on women and underrepresented minorities (URMs).

Objective: To characterize factors medical students used to rank residency programs and describe any differences based on race/ethnicity or gender.

Methods: A mixed-methods study consisting of a web-based survey and semi-structured interviews with National Resident Matching Program (NRMP) participating graduates over a two-year period. The survey assessed demographics and a 6-point Likert scale rating of various factors used to rank residency programs. Unpaired student t-tests were used to compare means. A subset of students was interviewed and a modified grounded theory approach identified decision-making themes as well as the role of gender and URM status.

Results: Out of a total of 316 invitations sent, 148 completed the survey (46.8% response rate), of which 21% of respondents self-identified as URMs. The majority of respondents graduated in 2014 (53%), and were male (51%). Participants ranked program atmosphere, reputation, location, and proximity to family the highest. URM students ranked patient population ($p < 0.01$), revisit opportunities ($p = 0.04$), gender diversity ($p < 0.01$), and ethnic diversity ($p < 0.01$) significantly higher than non-URM students. Female students ranked patient population ($p < 0.01$) and gender diversity ($p < 0.01$) significantly higher than males. Qualitative findings revealed differences in perceptions by URMs and non-URMs of patient population, revisit opportunities, gender diversity, and ethnic diversity.

Conclusions: While all students prioritized pragmatic factors, women and URM students assess and weigh additional factors related to culture, inclusion, and diversity more than others. By tailoring recruitment strategies to meet the expectations of women and URMs, residency programs can better meet goals in becoming more diverse and inclusive.

Keywords: Residency ■ Diversity ■ Ranking ■ Recruitment

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INTRODUCTION

In 1985, the Heckler Report documented significant health disparities in the United States¹ and amplified a national discourse, underscoring the need for physicians to effectively care for an ethnic and culturally diverse patient population.² The diversity of the physician workforce is also important in addressing disparities. Diversifying the workforce is also important given that minority physicians are more likely to provide care for underserved patient populations, which are more likely to be disproportionately affected by health disparities.^{3–8} The ecosystem of healthcare delivery benefits from the inclusion of more diverse providers through structural changes that enhance diverse provider recruitment and mitigates provider implicit bias, leading to improvements in quality of care and patient satisfaction.^{9–11} Oftentimes, patients are more comfortable with physicians of their own ethnicity as they understand the behaviors and social norms.^{12,13} In turn, concordance can aid in patient adherence and compliance with medical treatment and plans.^{14–17} Furthermore, women and minority healthcare professionals can serve as mentors and sponsors for future individuals interested in pursuing a career in healthcare.^{8,18} While efforts to increase gender and ethnic diversity of the physician workforce have been somewhat successful, these changes have been outpaced by the increasing demographic shifts at the national level.^{5,19} Efforts to improve physician workforce diversity have generally been aimed at the transition between college and medical

school.²⁰ However, the transition between medical school and residency is a leverage point in the pipeline as there remains underrepresentation of both women and minorities in many medical fields and specialties.^{18,21–27} In particular, many URMs choose to pursue residencies in primary care and/or careers practicing medicine outside academic medical centers. This may be attributed to not only interest and pragmatic factors, but also the leaking pipeline of differential opportunities created by medical schools and subsequently residency programs' assessments for URMs applicants compared to others.²⁸ Understanding how these populations differ in their approach to the residency application process is critical to improve recruitment efforts and strategies. While the literature supports evidence that underrepresented populations may possess different considerations than the overall applicant pool,^{29–32} there is insufficient data about how membership in historically underrepresented groups in medicine may shape residency ranking preferences. The objective of this current study is to characterize factors important to medical students when ranking residency programs, noting any differences by underrepresented minority (URM) status and gender.

MATERIALS AND METHODS

Data sources

Quantitative: survey. A 42-item web-based survey (Qualtrics) was initially informed by an extensive literature review. This study was approved by the Institutional Review Board at the University of Pennsylvania. The survey was initially sent to faculty with experience in graduate and undergraduate medical education and pilot tested with medical students for an assessment of clarity and face validity. The survey was sent via email to all medical students who graduated from the Perelman School of Medicine at the University of Pennsylvania in 2013 and 2014 and participated in the National Resident Matching Program (NRMP), Ophthalmology or Urology matches ($n = 316$). Requests for participation in this online survey were distributed from July to August 2014, with two email reminders. Using a 6-point Likert scale (1 – did not consider, 2 – not at all influential, 3 – slightly influential, 4 – somewhat influential, 5 – very influential, and 6 – extremely influential), the survey asked respondents to evaluate the relative importance of factors considered when generating their rank list. Specifically, the survey assessed: 1) fixed program characteristics; 2) perceptions of programs; 3) personal experiences with programs; and 4) sources of advice. In addition, the survey asked demographic questions such as age, gender, self-identified race/ethnicity, marital status, degree pursued (e.g. MD vs. MD-PhD), specialty, and couples match status.

Qualitative: semi-structured interviews. Following the survey, all participants were invited to participate in a semi-structured interview. From the pool of willing survey participants, a random selection of a subset of individuals was completed using a pseudorandom number generator to populate stratification cells for URM–non-URM and male–female participants to promote adequate representation across groups. A semi-structured interview guide was created with the following objectives: 1) identify factors most important to participants when constructing their rank list; 2) elucidate participants' understanding of prioritized survey items; 3) characterize participants' thoughts on the influence of URM and gender status on decisions about rank lists. The Mixed Methods Research Lab at the University of Pennsylvania (MMRL: www.med.upenn.edu/mmrl/) trained two study team members (AA and TD) who conducted the interviews using the interview guide. Interviews were audio recorded and transcribed for analysis. Transcripts were anonymized and entered into an NVivo 10 (QSR International) database to support analyses and facilitate comparisons across stakeholder groups.

Data analysis

Quantitative: survey. The descriptive statistics were generated based on demographic responses. Using the Association of American Medical Colleges (AAMC) definition as guidance, individuals were characterized as URMs if they selected Black, Cuban, Puerto Rican, American Indian or Alaskan Native, or Mexican, Mexican American, Chicano/Chicana as their identifying race/ethnicity.³³ The distribution of participant responses was assessed, treating 6-point Likert scaled questions as continuous variables. Using two-tailed student t-tests we identified significant differences in response by URM status and gender with an *a priori* alpha of 0.05.

Qualitative: semi-structured interviews. To analyze the narrative data, a modified grounded theory approach was used which involved iterative development of themes as data was collected and analyzed,³⁴ by applying *a priori* codes for factors related to diversity and URMs. A coding schema was used and discrepancies were resolved using consensus methods during regular study team meetings. The data was contrasted across the sample based on URM status and gender. Themes were compared across transcripts to ensure that they were both representative and inclusive of all cases.

RESULTS & DISCUSSION

Quantitative: survey

Among 316 survey invitations, 148 were completed resulting in a 47% response rate (Table 1). Fifty-one

Table 1. Participant characteristics.

Mean age (SD)	29 (2)
Race/Ethnicity – n (%)	
Non-Hispanic White	96 (65)
Asian	18 (12)
Hispanic	18 (12)
Non-Hispanic Black	13 (9)
Missing/Did not answer	3 (2)
URM Status – n (%)	
Non-URM	117 (79)
URM	31 (21)
Gender – n (%)	
Male	75 (51)
Female	73 (49)
Underrepresented Minority – n (%)	
No	117 (79)
Yes	31 (21)
Specialty – n (%)	
Internal Medicine	33 (22)
Emergency Medicine	18 (12)
Pediatrics	17 (11)
Ophthalmology	11 (7)
Obstetrics and Gynecology	7 (5)
Orthopedic Surgery	7 (5)
Psychiatry	7 (5)
Anesthesiology	6 (4)
Dermatology	6 (4)
General Surgery	6 (4)
Radiology	6 (4)
Family Medicine	4 (3)
Otorhinolaryngology	4 (3)
Plastic Surgery	3 (2)
Internal Medicine/Pediatrics	2 (1)
Neurology	2 (1)
Pathology	2 (1)
Urology	2 (1)
Missing/Did not answer	2 (1)
Pediatric Neurology	1 (1)
Internal Medicine/Dermatology	1 (1)
Radiation Oncology	1 (1)
Marital Status – n (%)	
Single	62 (42)

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Mean age (SD)	29 (2)
Married	58 (39)
Living with partner	26 (18)
Divorced	1 (1)
Engaged	1 (1)
Participated in Couples Match – n (%)	
No	136 (92)
Yes	12 (8)
Year of Graduation – n (%)	
2013	77 (52)
2014	71 (48)
Graduated with dual degree – n (%)	
No	104 (70)
Yes	43 (29)
Missing/Did not answer	1 (1)

percent ($n = 75$) of respondents identified as male and the majority of respondents identified as non-URM ($n = 117$, 79%). The survey items with the highest mean scores were: program atmosphere (5.4, SD 0.7), program reputation (5.3, SD 0.7), geographic location (5.3, SD 0.9), and family factors (5.0, SD 1.3) (Table 2). URM respondents ranked program's patient population ($p < 0.01$), gender diversity of faculty/housestaff ($p = 0.01$), ethnic diversity of faculty/housestaff ($p < 0.01$), and program revisit opportunities ($p = 0.04$) significantly higher than non-URMs (Figure 1). Female respondents ranked program's patient populations ($p < 0.01$), and gender diversity of faculty/housestaff ($p < 0.01$) significantly higher than males (Figure 2).

Qualitative: semi-structured interviews

Semi-structured interviews were conducted with 27 individuals and a thematic saturation was achieved. A baseline analysis examined the factors used to weigh residency options. There were significant variations between respondents in factors guiding residency program decisions. Responses illuminated the ways individuals viewed specific program features and other relevant considerations.

Qualitative-quantitative intersection

The qualitative data related to the highest scored survey items (program atmosphere, program reputation, geographic location, and family factors). The analysis suggests that individuals interpreted and experienced these

Table 2. Likert scale rankings.

Item	Mean	SD	n ^a
Program atmosphere	5.4	0.7	147
Program reputation	5.3	0.7	146
Geographic location	5.3	0.9	147
Family factors	5.0	1.3	147
Interview experience	4.7	0.9	144
Program curriculum	4.7	0.9	146
Career development opportunities	4.7	1.0	147
Post-residency opportunities	4.6	1.1	146
Personal experience with house staff	4.5	1.4	144
Experience with program director	4.4	1.1	144
Mentorship opportunities	4.3	1.2	147
Experience with program faculty	4.2	1.5	144
Opinions of faculty/mentors at Penn	4.2	1.1	140
Opinions of family, friends, or significant others	4.1	1.2	140
Program's patient population	3.9	1.3	147
Program responsibilities	3.7	1.1	147
Opinions of other Penn students	3.2	1.1	140
Safety at program location	3.1	1.3	147
Opinions of residents at Penn	3.1	1.3	140
Gender diversity of faculty/house staff	3.0	1.4	144
Opinions of students/residents/faculty not at Penn	3.0	1.4	139
Ethnic diversity of faculty/house staff	2.9	1.3	144
Program Compensation/benefits	2.8	1.1	147
Program revisit opportunities	2.1	1.2	147

Abbreviations: SD = standard deviation.

^aThis represents the number of non-missing responses for a given survey item.

factors uniquely. In the survey, the concept of *program atmosphere* was provided using the descriptor “e.g. sense of community among housestaff, faculty, etc.” Program atmosphere described inclusivity among peers meaning how applicants felt they might “fit in” with current residents and faculty, how residents are treated, and the nature of their interactions during training. Programs described

more positively elicited a “sense of belonging” to the applicant. Applicants envisioned “getting along” with or being “friends” with residents they interacted with. Often, the atmosphere was credited as creating “camaraderie” or a “family” where residents felt supported and welcomed. Participants consistently described a collaborative and hierarchy-free environment where professional growth was nurtured for example, “...are the people there happy, are the people there warm, are they collegial, are they willing to collaborate, are they big thinkers.”

The *program reputation* factor generally suggested a desire to be in a “prestigious” program, believed to position graduates for desirable and highly sought out post-residency opportunities. Respondents sometimes considered rankings (e.g. US News and World Report or Doximity) when weighing residency options. A less formal interpretation of reputation included word-of-mouth descriptions of the program’s work-life balance or treatment of residents, concepts that were also explored as components of program atmosphere. For example, a respondent explained how a program might have a strong clinical training program that graduates extremely competent doctors but is known for its “toxic” atmosphere.

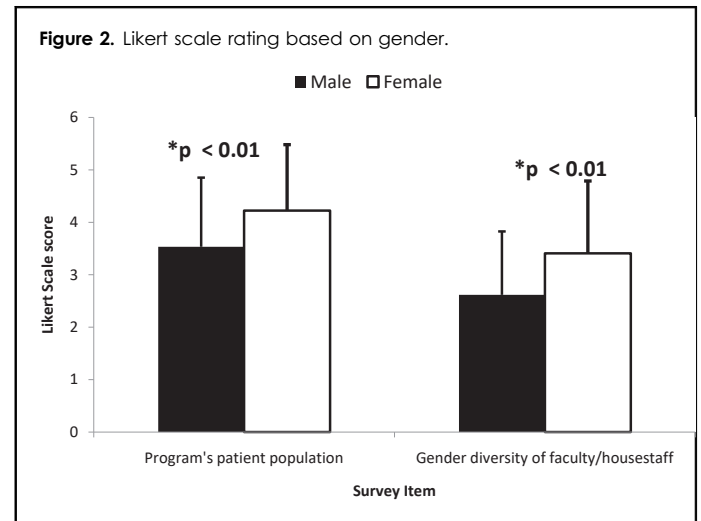
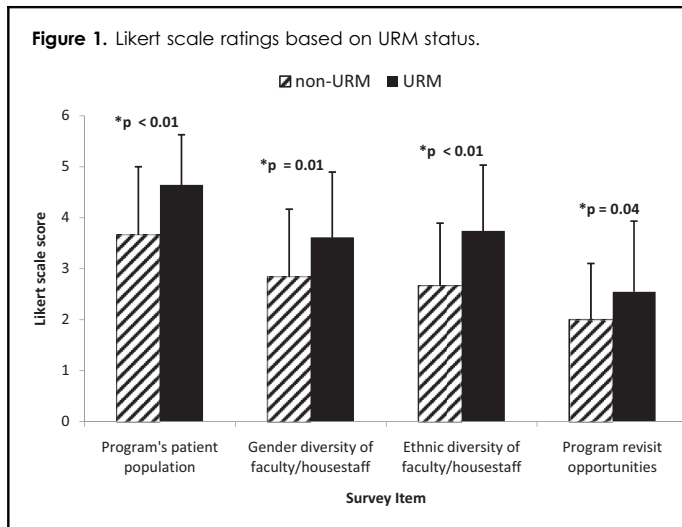
Geographic location and *family factors* were typically intertwined concepts often cited as primary drivers in residency selection. Many participants described their geographic preference as a direct reflection of their interest in staying close to parents or other family, finding a location that was agreeable to a partner and aligned with the partner’s personal/professional needs, and/or ensuring connections to friends. Respondents also considered preference for regions, climates, economic factors, and cultural components. One respondent discussed the central role of geography in residency choice as, “geography ended up being the most important thing above all...so I think geography was very, very important. In my case, especially so, but in most people’s cases.”

Influence of URM status

The analysis of the qualitative data revealed evidence of differences in perceptions by URMs and non-URMs related to program’s patient population, revisit opportunities, gender diversity and ethnic diversity of faculty/housestaff.

Patient population

About half of all respondents referenced patient population. It was broadly conceptualized and included references to demographics, socioeconomic, and breadth of medical conditions with which patients present. In general, applicants’ interest in working with patients from specific groupings was aimed towards fortifying the quality of their



training by practicing emerging clinical skills with a diverse group of patients. This diversity involved patients who present with both common and atypical needs, and who presumably come from different sociodemographic and regional backgrounds. Exploring two responses provided by URM respondents regarding “minority” populations demonstrates how being a member of an underrepresented minority group was viewed as an opportunity to connect to patients in a unique way. They both described the importance of clinicians having a connection or coming from a similar background as the populations they serve. For example, one respondent expressed interest in working with a population that was similar to her own (Latina). Another felt that being a minority provided better opportunities to relate to and impact the quality of care provided to minorities by asking the right questions. In contrast, non-URM students tended to reference diversity of patients’ pathologies, illness, and injuries as an asset for improving the quality of their training.

Revisit opportunities

Respondents had varied views on the utility and purpose of revisit opportunities. Respondents who did not revisit did not seem to appreciate the purpose, or they felt the revisit opportunity benefited the program, not the applicant. Of the students who did revisit, a majority used the opportunity to reinforce what they already knew. One respondent stated the revisit opportunity helped finalize her top three programs, while others felt the revisit solidified the ranking of programs. Revisit opportunities offered insight to the working life of the residents that might not have been seen during the initial visit, “when you shadow residents, you see the day-to-day experience they have, and you can imagine yourself in their shoes and if you would like it or not”.

The qualitative interviews revealed that some URM students felt revisit opportunities benefited the program rather than the applicant. One applicant was happy to not be offered any revisit opportunities because she felt they were mandatory to attend, if offered. For URM respondents who did revisit, the idea that a revisit only clarified or solidified the applicants’ view of a program was evident in a majority of the responses. One applicant discussed the impact minority-specific revisit opportunities had on his decision-making process. He felt this type of recruitment helped make the value of minority residents clear, “because they realize that it’s very hard to recruit minority applicants in [city] for either obvious or not obvious reasons.”

Gender diversity

As gender diversity did not emerge in early interviews, the last round of respondents were asked to comment on the topic. Four respondents, including two women and two men, offered thoughts on gender and its potential impact on residency choices. One female applicant noted, “it was definitely important. It was something that I wanted. I think just kind of luck, it ended up that my intern class has a pretty good balance of men to women... And I would say that that’s definitely something that I think is a big plus of this program and a really big attribute. Because I think it takes all styles of people and I really enjoy working with everybody.” The other female respondent did not feel that gender was a factor. Two men also provided responses. One stated that gender diversity was not a factor in his application process. The other was asked his interpretation of what women may face when considering residency options. This respondent felt that Emergency Medicine would offer a more flexible work-life balance that might benefit women, especially those interested in raising a family.

Ethnic diversity

To comprehensively explore ethnic diversity, we grouped all references to “diversity” and URM-related constructs to examine broad or fine distinctions. Eight of nine responses related to these two constructs were prompted by interviewer questions, with the ninth interviewee noting that there had been a discussion about minority recruitment before the interview started. Diversity was defined as reflections involving race/ethnicity but excluded other characteristics (e.g. ‘socioeconomic’ or general mentions of ‘diversity’) that were not clearly inclusive of racial or ethnic diversity. URM constructs were typically associated with questions relevant to URM students (e.g. recruitment opportunities for minority students). Notably, a subset of URM students discussed their unique perspective as minority students and its implications for their residency experience. For example, two URM applicants saw their background as an opportunity to connect with and/or respond more sensitively to patients who share the same experiences, a unique opportunity only available to a person who identifies as an URM. Another described the importance of cultural commonalities, “I also noticed that some programs — for example one program in [location-1], literally all the residents and attending’s I met were like from the Southern United States — white, Southern people, and — which I didn’t really have that much in common with them. But in [location-2, location-3, location-4—] I had more in common with the key people in terms of their — I guess, cultural background.” Another respondent described a program’s lack of focus on minority recruitment which he perceived as a lack of value for his experiences. In addition, he stressed that a lack of diversity in the residents and staff was also not positive for the patients. Three students actively sought out programs with minority recruitment strategies, while another stated that “if there were programs that had more underrepresented minorities in it, I probably would have used that for making the decision.”

The results demonstrate that despite several universally important factors for residency applicants (e.g. program atmosphere, reputation, geographic location), important differences exist among women and URMs. These findings mirror the two latest iterations (2013, 2015) of a survey by the NRMP, which found that geographic location, quality, reputation of program, and perceived goodness of fit were most important to applicants.^{35,36} However, the influence of gender or URM status was not explored, as this survey did not collect demographic data.³⁵

A myriad number of factors are thought to influence medical students’ decisions regarding ranking residency programs; some that are program-specific and others that

are applicant-specific. Program-specific factors can be divided into those that are modifiable and those that are non-modifiable by the program. Non-modifiable factors relate to geographic location as well as proximity of programs to applicants’ spouses, significant others, family, and friends.^{37–44} Modifiable factors include the interview experience and current residents. Applicants consistently rate resident satisfaction or morale as significant factors in program evaluation,^{29,31,37–39,43–45} as well as personal experience with residents^{31,42} which may regulate their subjective feelings about a program.^{39,40} The interview experience and program reputation also play significant roles in applicants’ evaluation of residency programs.^{29,31,42–44} In addition, the perception of how much programs care about their trainees is important to applicants. Finally, perception of how well applicants think they would “fit in” rounds out the modifiable factors in program selection by medical students.^{37,38} Applicant-specific factors such as gender and URM status can influence residency program rankings.³⁰ URM applicants place more emphasis on factors such as patient and resident diversity,^{29,30} which is consistent with our qualitative results. Female applicants have been known to rank the importance of gender diversity of faculty and residents higher than their male counterparts.^{29,30,45,46} Furthermore, a few studies suggest that female applicants may value geographic location more than male applicants^{29,45,47} however, this was not evident in our data.

Our results indicate that applicants are seeking residency programs with an inclusive culture. There is growing evidence that culture contributes to faculty vitality and retention in addition to the work-life balance among female junior faculty.^{48–50} URM respondents in our study stressed the importance of cultural fit (i.e. “belonging” and camaraderie) as key factors in their decision-making. Comments related to “feeling valued as a URM applicant” are critically important to consider as programs interface with candidates. When there is a clear and intentional demonstration of alignment between leadership and staff related to inclusion and diversity, there is evidence of greater satisfaction and performance.⁵¹

Strengths and limitations

The study has several strengths. First, the use of a mixed methods design allowed the collection of both quantitative data and qualitative analysis of interview content for themes important for program ranking. In addition, there was a strong response rate across two medical school classes, and across both gender and URMs. Finally, students who applied in Urology and Ophthalmology, populations who are typically excluded from the NRMP survey as they do not participate in the NRMP match, were

included.³⁵ The study may also have several limitations. First, although the findings of this study mirror those of the most recent NRMP survey, the results are limited to graduates of a single medical school and may not be generalizable to other institutions. In that regard, this line of investigation may be considered a pilot, since the shared educational experiences of this group of students created a baseline for understanding how their interactions with residency programs may differ. The sample size for the qualitative data could be considered a second limitation, however our data resulted in thematic saturation. This narrative analysis was aimed to capture meaningful data from medical students in regard to factors that affect their decision-making, of which, to date, has not been widely studied. Third, participants who responded to surveys and participated in interviews may reflect a selected proportion of the students surveyed and thus may have created biased results. Finally, participants were asked to retrospectively recall the residency application process, which introduced the possibility of recall bias.

IMPLICATIONS

The study describes several factors that medical students universally prioritize when applying for residency and highlights that workforce ethnic and gender diversity as well as patient population served as factors important to women and URM applicants. Qualitative interviews further suggest the importance of “fit” among all applicants and the potential value of recruitment strategies focused on minority applicants. Information gained from this study will help residency programs improve their institutional ethnic and gender diversity, as well as help shape their recruitment strategies and outreach for women and URM candidates.

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