Fixing the Match: A Survey of Resident Behaviors

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Background: The authors studied residency applicant attitudes toward rank list creation, communication with programs, and the impact of these factors on their performance in the Match.
Methods: An anonymous, 26-question, multiple-choice, online survey was distributed to the program coordinators of every Accreditation Council for Graduate Medical Education–accredited program participating in the National Resident Matching Program for whom e-mail addresses were available. The survey addressed five areas: (1) demographics and interview characteristics, (2) preinterview and interview factors, (3) postinterview contact, (4) importance of various factors in rank list creation, and (5) Match outcome. Survey responses were analyzed with Microsoft Excel.
Results: A total of 1179 responses were received. It was not possible to calculate a response rate, because the number of residents receiving the survey was not known. The majority of respondents (78 percent) reported postinterview contact with a program. A large portion of respondents (42 percent) considered such contact to be important in the creation of their rank lists. Half of all respondents admitted to exaggerating their interest in a program during or after an interview. The majority of respondents (87.5 percent) received no assistance in covering the costs of "second-look" visits to programs.
Conclusions: Applicants may be modifying their rank lists in response to postinterview contact from programs; furthermore, they usually have no assistance in paying for the cost of second looks. To level the playing field for students and programs alike, the authors propose that the National Resident Matching Program modify residency interview rules to (1) disallow any postinterview contact between programs and students, and (2) disallow second looks. (*Plast. Reconstr. Surg.* 132: 711, 2013.)

Every year, medical graduates from U.S. and international schools compete for a limited number of residency positions in the United States. The process is highly competitive—in 2012, 38,000 graduates vied for approximately 27,000 positions.[1] The process is managed by the National Resident Matching Program, which promises to fairly match applicants' preferences for residency positions with program directors' preferences for applicants. The Main Residency Match, as it is officially called by the National Resident Matching Program, or the Match—as it is more colloquially known—has been in place since the 1950s (before this, there was no centralized clearinghouse, and the process was more ad hoc). We have previously analyzed Match strategy, and have shown that the "true preference" strategy is both optimal and immune to false information.[2] We have also suggested that disallowing communication between programs and students before the program deadline for rank list submission may remove incentives for the dissemination of false or misleading information.[2,3] The National Resident Matching Program conducts a survey of all applicants who participate in the Main Residency Match, most recently, in 2011.[4] The survey studies factors that applicants weigh in selecting programs at which to interview and to rank. The survey has an excellent response rate of over 50 percent and is quite comprehensive. However, it fails to ask applicants

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about postinterview contact with programs. Furthermore, it does not correlate applicant results in the Match with the factors they consider important in selecting interviews and creating rank lists. Similarly, there have been several specialty-specific studies that used surveys of residency applicants to determine whether match violations occur.[5–8] However, none of these investigated all three key factors, namely, applicant behaviors (i.e., what factors applicants consider important in the creation of rank lists), the incidence of postinterview contact with programs, and their Match outcome.

Therefore, we designed a survey to study the behaviors and beliefs of applicants, their experience during the application process, and their Match outcome. This article reports our survey findings on applicant attitudes toward rank list creation, preinterview and postinterview contact with programs, and the impact of these factors on their performance in the Match.

METHODS

An anonymous, 26-question, multiple-choice, online survey was designed (Appendix A). It addressed five general areas: (1) demographics and interview/rank list characteristics, (2) preinterview contact and interview factors, (3) postinterview contact, (4) importance of various factors in rank list creation, and (5) Match outcome. The data were collected through the SurveyMonkey (Palo Alto, Calif.) account registered to the University of Texas Southwestern Medical Center Department of Plastic Surgery.

Requests were sent by means of e-mail to program coordinators of all active Accreditation Council for Graduate Medical Education–accredited programs in every specialty participating in the National Resident Matching Program Main Residency Match. This list was obtained from public data published by the Accreditation Council for Graduate Medical Education.[9] Programs for which e-mail addresses were not available from the Accreditation Council for Graduate Medical Education did not receive a survey. Program coordinators were asked to forward the survey to all their current residents.

Survey responses were tabulated and analyzed using spreadsheet software (Excel; Microsoft Corp., Redmond, Wash.). Duplicate submissions from the same computer or Internet Protocol address were prevented by the online survey software. Frequencies and proportions were used to summarize the binary and categorical data. Regression analysis was used to determine the effect of one or more variables on the rank at which respondents matched. A value of $p < 0.05$ was considered significant.

RESULTS

Response Rate

A total of 1179 complete responses were received, along with 240 incomplete responses (i.e., responses where one or more questions were not answered). The method used to disseminate the survey to residents did not lend itself to a precise determination of the response rate. Because we asked program directors or program coordinators to forward the survey to their residents, it was not possible to determine the total number of residents who actually received the survey link.

Demographics and Interview/Rank List Characteristics

The average age of respondents was 27 years. Respondents were split evenly between men (49.5 percent) and women (50.5 percent) (Fig. 1). The majority of respondents were in their first (32.8 percent), second (25.5 percent), or third (23.4 percent) years of residency (Fig. 2). Respondents attended a mean of 10.3 interviews (median, 10) in their "primary" specialty (i.e., the specialty they wished to enter) and 0.8 interviews in one or more secondary specialties (i.e., other specialties applied to as a backup or safety net), for a total of 11.1 (median, 11) programs. They ranked a mean of 9.1 programs (median, 9) in their primary specialty and 0.6 programs in a secondary specialty, for a total of 9.7 (median, 9) programs.

Preinterview Contact and Interview Factors

Sixty-five percent of respondents completed an average of 1.9 "away" rotations at institutions other than their home medical school.

Interview Factors and Postinterview Contact

Of the programs with which the average respondent interviewed, 61 percent of programs asked about an applicant's program preferences and 32 percent contacted the applicant after the interview to express an interest; conversely, 57 percent of respondents initiated contact to express interest. Fifty percent of respondents reported they had exaggerated their interest in a program during or after an interview (Fig. 3). Finally, 28 percent of respondents revisited an average of 1.6 programs after their interview for a "second look" (Fig. 4). The vast majority of these visits (87.5 percent) were fully self-financed by applicants.

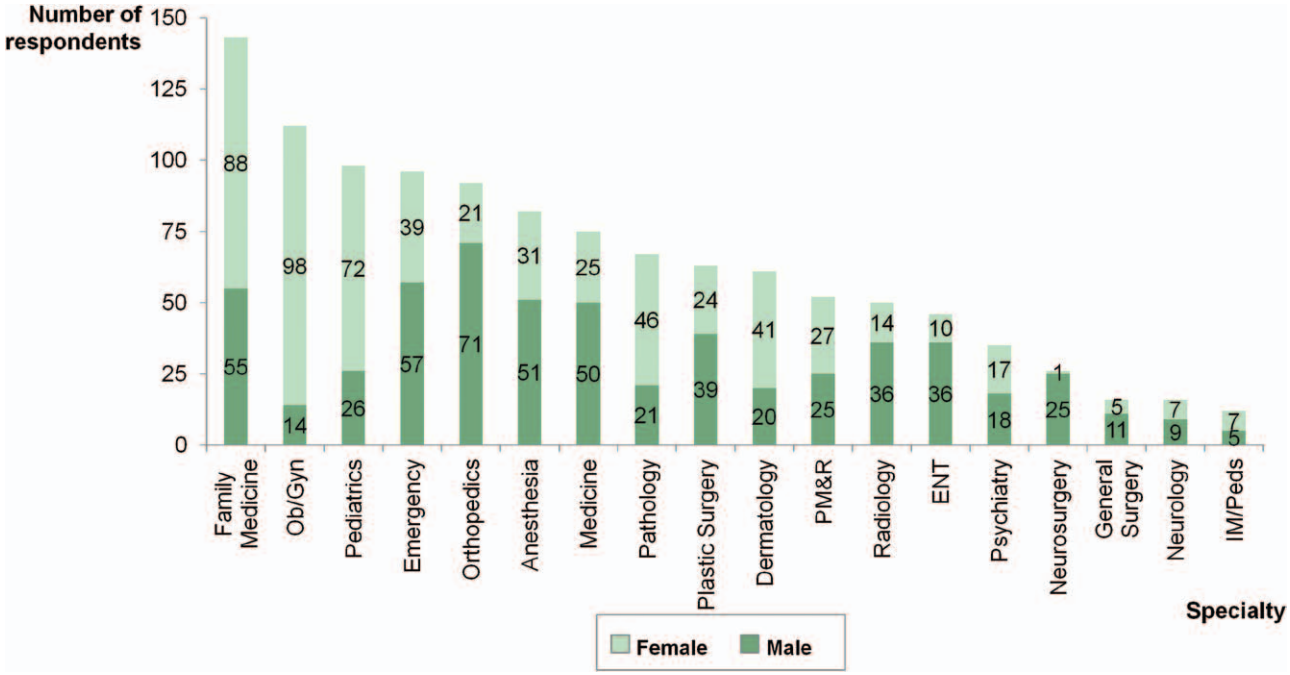

Fig. 1. Number of respondents by specialty and sex. *Ob/Gyn*, obstetrics and gynecology; *PM&R*, physical medicine and rehabilitation; *ENT*, ear, nose, and throat; *IM/Peds*, internal medicine and pediatrics.

Importance of Various Factors in Rank List Creation

Respondents were asked to rate the absolute importance of various factors in creating their rank list (i.e., not important at all, only slightly important, somewhat important, very important, or most important). Three factors were designed to reflect the program's likelihood of accepting the applicant, that is, factors that should not influence respondent rank lists.[2] Because the strategically correct response to these factors was a negative one, we cohorted responses of "somewhat important" or greater into the general category "important." A large percentage of respondents felt that these three factors were important (Fig. 5):

1. How well you felt you had done on your interview (65 percent).
2. Number of residents taken by that program each year (63 percent).
3. Communication regarding whether the program was going to rank you highly (42 percent).

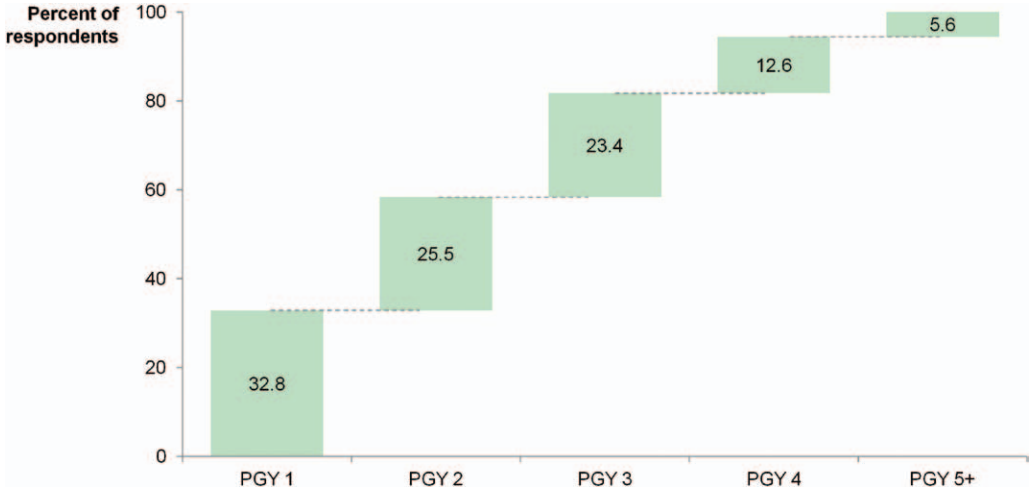

Fig. 2. Distribution of respondents by postgraduate year (*PGY*). The majority of respondents were in their first 3 years of training.

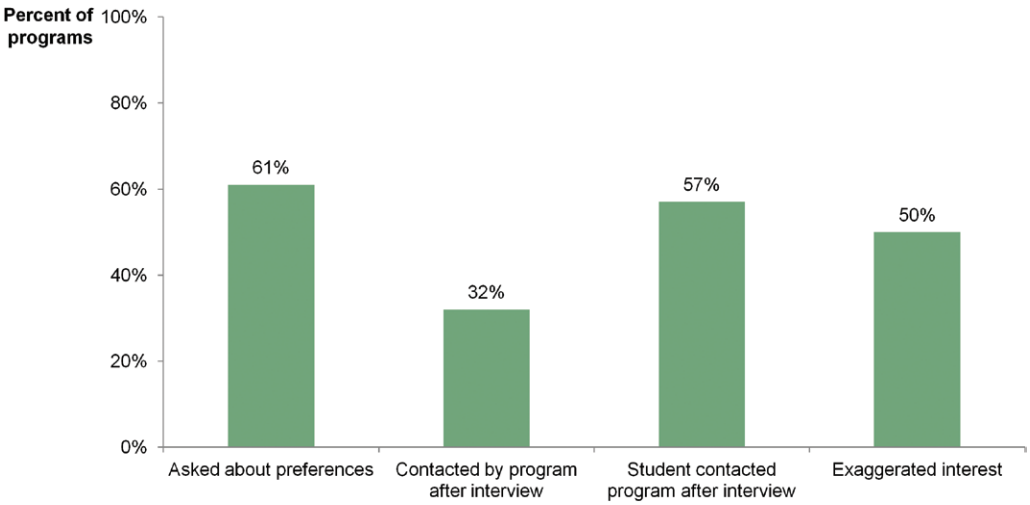

Fig. 3. Frequency of postinterview contact and National Resident Matching Program rule violations. Asking applicants about their rank list preferences during an interview (a National Resident Matching Program rule violation) was surprisingly common.

Match Outcomes

A majority of respondents matched at one of the following (Fig. 6):

1. The residency program of their own medical school (21 percent).
2. A program where they completed an away rotation (24 percent).
3. A program where they went for a second look (11 percent).

The vast majority (78 percent) of respondents had some form of postinterview contact with the program they matched to—46 percent were contacted by the program, 71 percent contacted the program, and 38 percent had two-way contact. Rates of postinterview contact were not significantly different when we compared residents who matched at a program where they attended medical school, completed an away rotation, or went for a second look, to residents who matched at a program that did not fall into these three categories. The majority of respondents matched to their top choice (57 percent). Figure 7 shows the distribution of ranks at which respondents matched.

Correlation between Preinterview/Postinterview Behaviors and Match Outcome

We found that the rank at which a student matched was correlated with several factors. As the number of interviews attended by a student

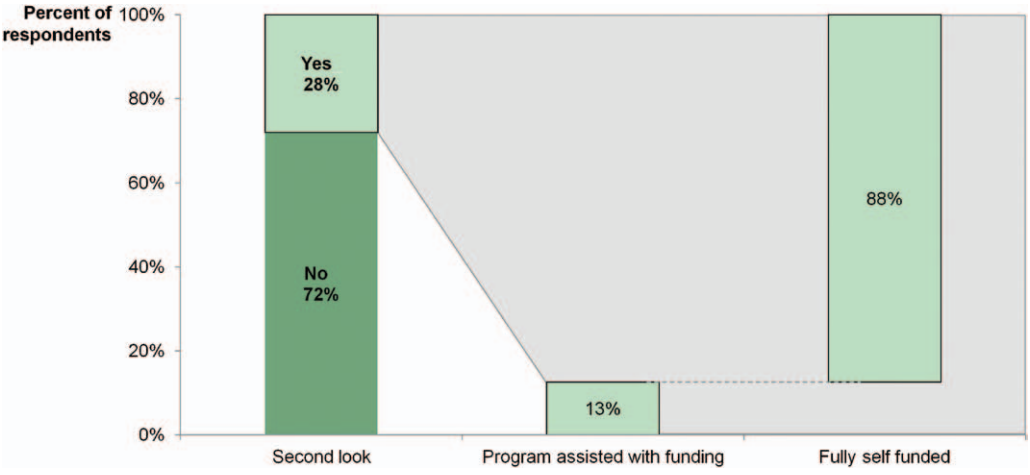

Fig. 4. Frequency of second looks and source of funding. Most second-look visits were fully self-funded by applicants.

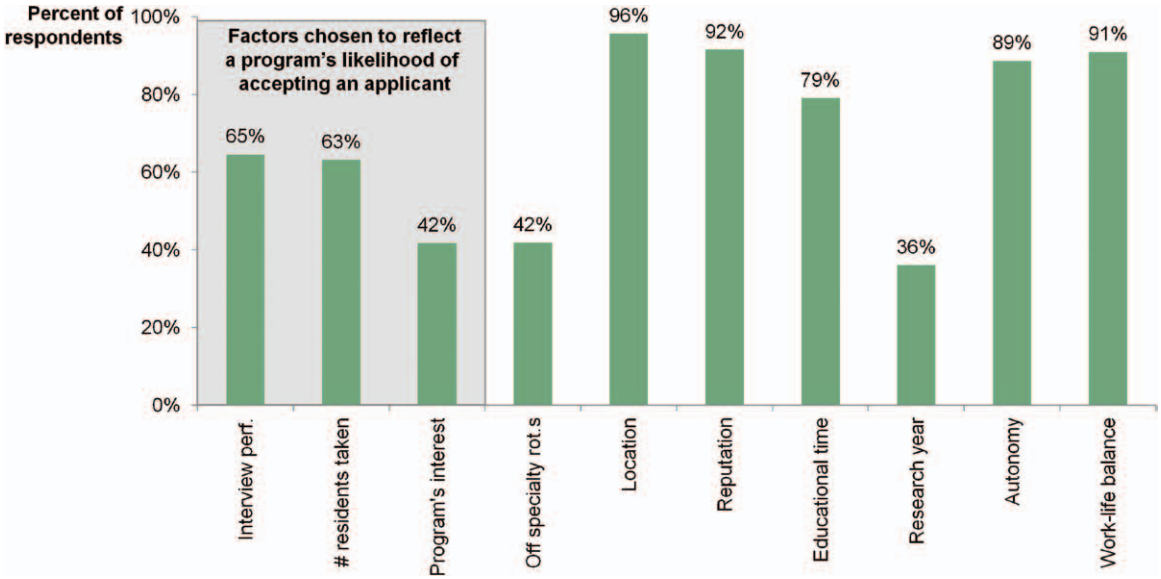

Fig. 5. Importance of various factors in creation of the rank list. Three factors chosen by us to represent a program's likelihood of accepting an applicant were felt to be "important" by over half of respondents.

increased, the rank at which the student matched worsened ($p = 0.004$). The same was true of the number of programs on the student's final rank list ($p < 0.001$).

Conversely, the rank at which a student matched improved as the percentage of programs that had postinterview contact with the student increased ($p = 0.045$). Rank similarly improved when there was postinterview contact from the matched program ($p < 0.001$), postinterview contact with the program ($p = 0.008$), and completion of an away rotation at the program ($p < 0.001$). A multiple regression model examining correlation between the rank at which a student matched and (1) number of programs ranked, (2) percentage of interviewing programs that had postinterview contact with the student, (3) having completed an away rotation at the matched program, and (4) having contacted the matched program was also found to have significance ($p < 0.001$).

DISCUSSION

The Match is highly competitive from the point of view of applicants and programs. The pressure to find a good residency position (for an

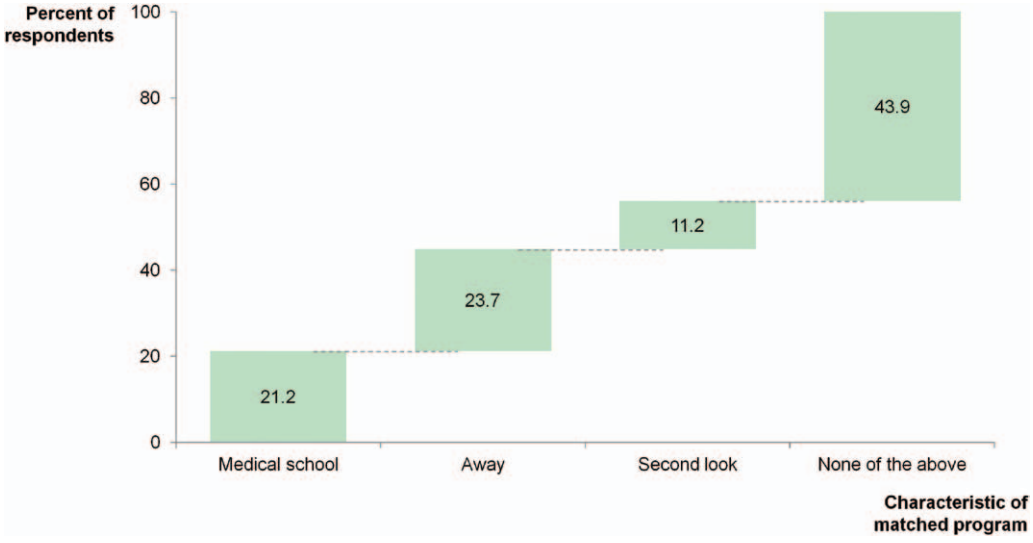

Fig. 6. Distribution of characteristics of the matched program. Applicants tended to match at programs with which they had had close contact.

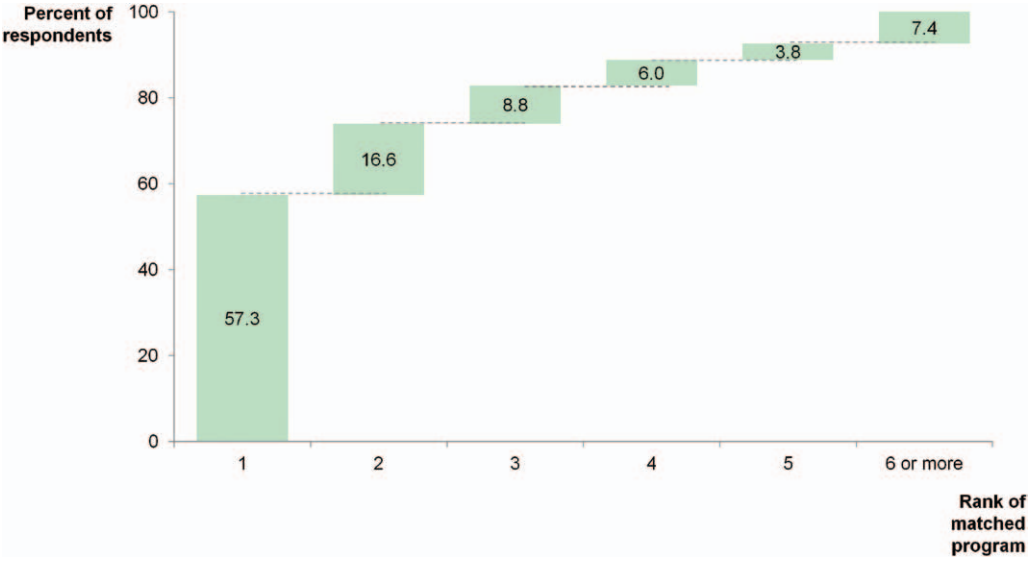

Fig. 7. Distribution of rank at which respondents matched. A large majority of respondents (83 percent) matched at one of their top three choices.

applicant) or a good cohort of residents (for a program) cannot be overstated. As we have previously discussed, the Match causes a degree of angst by introducing an element of uncertainty not present in the traditional (nonclearinghouse) hiring paradigm. Participants value information about each other's preferences because it may provide certainty, but they also distrust it, because we all tell people what we think they want to hear.[10] It is clear that some number of applicants are influenced by such phone calls and would raise the rank of calling programs.[11]

As this survey shows, a sizable percentage of programs (32 percent) call applicants in the postinterview period, and a large proportion of applicants consider this information important (42 percent) in their determination of a program's rank. Furthermore, two other factors that were chosen to represent program preference or likelihood of matching rather than applicant preference (i.e., how well you felt you had done on your interview, and number of residents taken by that program each year) were felt to be important by a majority of applicants (65 percent and 63 percent, respectively). Applicants tended to match at a higher rank when they were contacted by more programs ($p < 0.05$), and applicants who matched with a program with which they had postinterview contact tended to match at a higher rank. Similarly, applicants who matched at their own medical school tended to match at a higher rank. It is clear from these data that applicants overvalue program preference, in the form of self-assessment of interview performance, likelihood of matching at a program, or the incidence of program-initiated postinterview contact. Because matching at a higher rank tended to correlate with contact with that program, one interpretation is that this overvaluation of program preference may be causing applicants to raise the rank of programs that express their interest in the postinterview period. This interpretation of the data fits well with the results of a recent survey of senior medical students at seven U.S. medical schools, which found that 23 percent of respondents changed their rank lists based on communications with programs.[12]

Finally, a key finding of this survey relates to the phenomenon of second looks or postinterview visits to programs. Residency interviews are an expensive undertaking because of travel and lodging costs, and it can cost medical students thousands of dollars to go through the process.[13] Our survey results show that the vast majority (87.5 percent) of students who went on a second look paid for the entire visit out of pocket.

We have previously advocated the need for a change in National Resident Matching Program rules that will ban second looks and limit postinterview contact.[2] Approximately 4 years ago, the American Council of Academic Plastic Surgeons decided to disallow any postinterview contact between programs and students (other than through the program coordinator), and to ban second looks. During the final preparation of this article, the American Council of Academic Plastic Surgeons went one step further by banning communication between applicants and a program, including its residents, unless contact is initiated

by the applicants themselves. Based on the results of this survey, it is clear that medical students consider postinterview contact to be important, and their rank lists are affected by such contact. Furthermore, second looks generally represent an additional out-of-pocket cost for medical students. The National Resident Matching Program did recently issue a new code of conduct that prohibits program directors from requiring second looks or implying that second looks are used in determining applicant placement on rank lists.[14] The new code further emphasizes that postinterview communication should not be solicited or required, and that program directors should not engage in "postinterview communication that is disingenuous for the purpose of influencing applicants' ranking preferences." However, we feel that this code does not go far enough. It is difficult to enforce a code that prohibits what programs may imply, or that asks program directors to not be disingenuous—determining whether or not a violation has occurred becomes a question of subjective perception. It is far more effective to simply ban second looks and postinterview communication. As such, in our opinion, it would be prudent for the National Resident Matching Program to institute residency interview rules that mirror the steps taken by the American Council of Academic Plastic Surgeons, to level the playing field for programs and students alike.

There is a concern that restricting postinterview contact may disadvantage primary care specialties, which tend to have both a greater number of unfilled residency positions and a higher rate of postinterview contact.[12] However, low fill rates in a specialty are generally related to a low number of applicants—in other words, primary care specialties with low fill rates tend to have very high match rates, with most applicants matching into the specialty. Prohibiting postinterview contact would not prevent programs from reaching out to *potential* applicants to foster an interest in their specialty before the interview and Match process, thereby increasing the number of applicants and the numbers of primary care physicians. The goal of restricting such contact is simply to level the playing field for applicants who have already decided to participate in the Match.

There are several problems with our data and results. We received responses from 1179 residents across all specialties, representing only a fraction of all National Resident Matching Program participants, so it is possible that the survey suffers from sampling error. The distribution of respondents by specialty is clearly *not* representative of all residents (e.g., <2 percent of our respondents were general surgery residents). The National Resident Matching Program does not collect or report demographic data such as age or sex, but it does report the number of interviews attended, number of programs ranked, and the match outcome.[1,4] Our results are identical to National Resident Matching Program data on the median number of interviews attended (10) and the median number of programs ranked (nine).[4] Furthermore, we found that 57.3 percent of respondents matched at their first choice, 16.6 percent matched at their second choice, and 8.8 percent matched at their third choice—closely mirroring the results of the 2012 National Resident Matching Program Residency Match (54.2 percent at first choice, 17.2 percent at second choice, and 10.2 percent at third choice).[1] As such, we believe that at an aggregate level our survey population is a representative sample of the set of all residency applicants. However, because the specialty distribution was not representative, no subgroup analysis was possible.

The survey was subject to significant recall bias, as many of the respondents were years away from the interview period on which they were reporting. There are clearly confounding factors that our survey was unable to determine. Specifically, it seems likely to us that the best applicants, who are most likely to match at a high rank, would also be the recipients of the most postinterview contact. We were unable to control for this factor, because we chose not to ask applicants questions about their potential desirability as residents (e.g., United States Medical Licensing Examination scores, medical school grade point averages, number of publications). We felt that such questions could decrease our response rate, and that self-reporting of such data would be open to further bias, potentially clouding the results further.

To correct for these confounding factors and remove sources of bias, further studies would be necessary. A modified National Resident Matching Program applicant survey could be administered and correlated with actual (as opposed to self-reported) Match results to improve the response rate, decrease sources of bias, and provide more definitive insight into applicant behavior in rank list creation.

CONCLUSIONS

This survey provides data as an addition to the baseline obtained by the National Resident Matching Program through their applicant survey,

specifically, by asking applicants about preinterview and postinterview contact with programs, and correlating this information with self-reported match outcomes. Four conclusions are clear from the data presented in this article: (1) postinterview contact between applicants and programs is the norm, not the exception; (2) applicants consider such contact to be an important factor in the creation of their rank lists; (3) the majority of residents admitted to exaggerating their interest in a program; and (4) the majority of students receive no assistance in covering the costs of second-look visits to programs. We present data that support other researchers' findings that applicants modify their rank lists in response to contact from programs.[12] We believe that these findings indicate a need to level the playing field for students and programs alike. We propose that the National Resident Matching Program mirror the recent steps taken by the American Council of Academic Plastic Surgeons, and modify residency interview rules to (1) disallow any postinterview contact between programs and students, and (2) disallow second looks.

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APPENDIX A

1. What is your gender?
2. How old were you when you were applying for residency?
3. Which year of residency are you in?
4. Did you enter into a surgical subspecialty residency directly out of medical school (i.e., one of the following: ear, nose, and throat; neurosurgery; orthopedic surgery; plastic surgery; and urology)?

Questions for Surgical Subspecialty Residents

5. What is your surgical subspecialty?
6. How many programs did you interview at in your surgical subspecialty (not including any preliminary or transitional years, or fellowships)?
7. How many programs outside your subspecialty did you interview at, for example, general surgery as a "backup" (not including any preliminary or transitional years, or fellowships)?
8. How many programs from your primary surgical subspecialty did you include on your final rank list?
9. How many programs outside your primary surgical subspecialty did you include on your final rank list?

Questions for Nonsurgery Residents

10. What is your specialty?
11. How many programs did you interview at in your primary specialty (not including any preliminary or transitional years, or fellowships)?
12. How many programs did you interview at outside your primary specialty (not including any preliminary or transitional years, or fellowships)?
13. How many programs from your primary specialty did you include on your final rank list?
14. How many programs outside your primary specialty did you include on your final rank list?

Questions for All Residents

15. How many "away" rotations (or visiting student elective rotations) did you complete in your primary specialty?
16. How many programs asked you about your preferences during the interview process? This includes questions such as: "Do you have family in this city?" and "Do you have any personal connection to this city?" This also includes any questions about the position of any program on your list, the relative position of one program versus another, and so on.
17. How many programs contacted you by phone, e-mail, letter, or any other means after your interview? This does not include any contact from the program coordinator or residents.
18. How many programs did you contact by phone, e-mail, letter, or any other means after your interview? This does include any contact with the program coordinator or residents.
19. Did you ever exaggerate your interest in a program either during an interview or through communication after the interview?
20. How many second looks did you do? This includes any visit to a program after the initial formal interview, not counting the program at your own medical school.
21. If you went on any second looks, how many were paid for by the program? This includes any payment for transportation or

accommodation. Please enter 0 if you did not go on any second looks.

22. Of the following, which, if any, were true of the program you matched at? Options include the following: program was associated with your medical school; completed an away rotation at this program; attended a second look at this program; program contacted you after interview; and you contacted program after interview.
23. What was the rank, on *your* rank list, of the program you matched at?
24. How important would you say the following were in determining your rank list, where 5 = most important, 1 = not important at all? Options include the following: amount of time spent on rotations outside your specialty (e.g., general surgery rotations for plastic surgery residents; city size, location, and personal connections to the city or state); communication regarding whether the program was going to rank you highly; how well you felt you had done on your interview; number of residents taken by that program each year; prestige or reputation of the program; protected educational time; research year requirement; resident autonomy; and work-life balance/call schedule.
25. Please rank the following factors in order of their importance in determining your rank list, where 1 = most important, and 10 = least important. Options include the following: amount of time spent on rotations outside your specialty (e.g., general surgery rotations for plastic surgery residents; city size, location, and personal connections to the city or state); communication regarding whether the program was going to rank you highly; how well you felt you had done on your interview; number of residents taken by that program each year; prestige or reputation of the program; protected educational time; research year requirement; resident autonomy; and work-life balance/call schedule.

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