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## Review Article

# Results of the Neuroradiology Fellowship Match for July 1, 2002 Candidates

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The selection of fellows in radiology subspecialties has not been a well-organized process and has led to a high degree of dissatisfaction among all parties. The granting of positions in subspecialty training programs proceeds by means of an interview process that is not centrally organized, includes variable periods for timing of interviews, and allows differing periods during which offers can be made by programs and considered by candidates. As a result, candidates face a number of difficulties. First, the interview periods for programs that an individual candidate is considering often do not overlap. This problem leads to short time intervals in which candidates must make decisions, with the concern of rescinded offers ever present. Second, over the past several years, interview periods have begun earlier in a radiology resident's career. As a result, residents need to choose their subspecialty training (and a particular program) after only 2 years of residency. In some cases, the resident's exposure to neuroradiology at this stage may be limited to as little as 1 month in the service, and therefore, fewer residents may seek additional training in this specialty. The commitment of candidates to a position almost 21 months prior to service fails to account for intervening important life events, such as marriage, divorce, employment opportunities for a significant other, childbirth, or unexpected changes in professional goals. In a recent survey, more than 55% of neuroradiology fellowship directors reported the occurrence of ethical dilemmas caused by candidates who renege on their earlier commitments and/or by the solicitation

of candidates by program directors after they have made a prior commitment. Programs may be left with unexpected openings, which are difficult to fill on short notice.

The Association of American Medical Colleges (AAMC) began managing the National Residency Match Programs (NRMP) in 1982, and the selection of radiology residency positions was part of that first combined AAMC-NRMP match year. The use of the NRMP has become standard practice with residency programs. The NRMP currently administer 23 postgraduate year (PGY)-1 programs (20,598 positions), 13 PGY-2 programs (2124 positions), and 15 fellowship programs (personal communication, Peggy Bradley, NRMP, 2001). In general, programs and candidates have a high rate of satisfaction with the match process (1, 2). In an effort to provide organization and equity to the neuroradiology fellowship selection process, the American Society of Neuroradiology (ASNR) solicited the assistance of the NRMP to organize the fellowship selection process for the academic year beginning July 1, 2002. The ASNR believed that a formal match program would favorably regulate crucial selection issues to the advantage of both candidates and programs and that it would alleviate some of the problems cited previously. In so doing, the potential for moving the selection process to a later time in the residents' training subsequently could be accomplished. The ASNR executive team also believed that violations of the match, if handled by an outside authority like the NRMP, were less likely to occur than with an internally administered match system. The results of the match and the attitudes of the participants in the match are described herein.

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## Organization of the Neuroradiology Match

At the annual meeting of the ASNR in April 2000, the Executive Committee of the ASNR and the Fellowship Training Directors Subcommittee of the Education Committee of the ASNR voted in favor of organizing a neuroradiology fellowship match. A match subcommittee was formed to address the issues associated with the institution of this program, and the NRMP was commissioned to help organize the selection process.

The match subcommittee decided that internal candidates from host institutions (individuals who

planned to stay at the same institution as their residency for their fellowship) did not need to participate in the Neuroradiology Fellowship Match. Programs selecting only internal candidates for their fellowship positions were not required to register for the match. Positions in which diagnostic neuroradiology fellowships were combined with interventional neuroradiology programs also were exempted from the match program. The plan designed by the ASNR and NRMP included an interview season that spanned October 15 to December 27, 2000. The final match selection lists had to be submitted by December 27. On January 17, 2001, the match results were distributed for those candidates starting fellowships on July 1, 2002.

As a result of an active campaign that included e-mail messages, personal communications, and interventions by the executive committee of the ASNR and the chairmen of various radiology programs, directors of 90 of 91 fellowship programs listed in the ASNR Fellowship Directory agreed to participate in the neuroradiology fellowship match. After the match, an e-mail survey of all of the program directors and applicants who registered for the match was circulated over a 6-wk period. Three separate mailings were sent to these individuals before the results of the survey were tabulated.

### Results of the Match

Although 90 program directors agreed to participate in the neuroradiology fellowship match, only 81 enrolled with the NRMP, and of these, only 74 submitted rank-order match lists. The reasons these 16 programs did not participate in the match included the following: 1) only internal candidates were selected, 2) no candidates applied for the positions, 3) no candidates of sufficient quality applied for the positions for selection, 4) fellowship positions were rescinded, 5) only combined body and neuroradiology-MR imaging or diagnostic neuroradiology-interventional neuroradiology positions were offered, and 6) they failed to submit a match list on time. The 74 programs that participated in the NRMP match offered 156 fellowship positions.

Ninety-two candidates registered for the neuroradiology match, but only 71 submitted match lists. Eight did not fill out a rank-order list, and 13 withdrew from the match. Fellowship candidates withdrew from the match for the following reasons: 1) they took an internal position, 2) they waited until after the match to select a program, 3) they entered a nonneuroradiology program, 4) they entered a combined neuroradiology-body MR imaging or diagnostic neuroradiology-interventional neuroradiology program, and 5) they withdrew for unknown reasons. Seventy (99%) of 71 candidates who submitted rank-order lists were matched with a fellowship program. Fifty-six (79%) of 71 were matched with their first choice, and eight (11%) candidates matched with their second choice. Therefore, 90%

of the candidates were matched with their first or second choice. One candidate was not matched with a program.

The small number of candidates in the match (71 candidates) for the 156 positions offered affected the number of programs that filled their match positions. Seventy (45%) of 156 positions were filled. Thirty-four programs filled some positions through the match, and 40 programs filled none. Only 16 (22%) of 74 programs filled all of their positions. Forty-seven (84%) of 56 programs with two or fewer fellowship positions, five (62%) of eight programs with three available positions, and six (60%) of 10 programs with four or more positions did not fill all of their available positions.

### Results of the Post-Match Survey

Sixty-four fellowship program directors responded to the post-match survey (Table 1). Of these, 54 participated in the match. The 54 that responded accounted for 60 of the 70 fellows who were to begin July 1, 2002. On the basis of these survey results, 30 internal candidates were selected outside the match, and 10 candidates sought fellowship positions after the match (between January 17 and March 1, 2001). Therefore, 111 candidates (71 match candidates, 30 internal candidates, and 10 post-match candidates) sought positions beginning July 1, 2002, among the 186 positions offered (156 positions in the match and 30 positions for internal candidates outside the match).

The 111 potential candidates for July 1, 2002, positions reflect a decrease in the number, compared with the number of persons currently in the fellowship programs who responded to the survey. On the basis of the post-match survey results of the 64 fellowship directors (Table 1), 143 fellowship positions were filled in 1999–2000, and 131 were filled in 2000–2001. Therefore, the projected number for 2002–2003 (ie, 111 positions) reflects a decrease of almost 25% in enrollment over 3–4 y. Since additional candidates are anticipated to accept fellowship positions outside of the match process, the current total used (111 trainees) likely is an underestimation of the number of trainees who actually will begin neuroradiology fellowships on July 1, 2002.

The results of the post-match survey of the program directors are shown in Table 1. A few salient points should be emphasized. Fifty-four of 55 respondents believed that the match was administered fairly, with one person abstaining. Most program directors believed that the interview time was sufficient for the match (87%) and that the timing of the match was appropriate (75%). Nonetheless, more than 25% believed that the interview season was too early.

In general, the program directors' satisfaction with the match results was tempered by the paucity of candidates. Thus, a number of the program directors who did not fill their positions registered

TABLE 1: Survey of program directors

Question	Answer		
	Yes	No	Neutral
"Did you participate in the neuroradiology match this year?"	54 (84)	10 (16)	0 (0)
"Did you interview more fellow candidates this year than last year?"	20 (32)	42 (68)	0 (0)
"Did you take more internal candidates this year because of the uncertainty inherent in the results of a match?"	1 (2)	39 (98)	0 (0)
"Have you been approached since Match Day by fellowship candidates who are looking for positions?"	18 (30)	41 (70)	0 (0)
"Did you feel that the Match process was administered fairly?"	54 (98)	0 (0)	1 (2)
"Were you satisfied with the results of the Match?"	28 (49)	26 (46)	3 (5)
"Did the match schedule provide adequate time for scheduling and completing your interviews?"	46 (87)	7 (13)	0 (0)
"Are you aware of any violations of the match?"	1 (2)	56 (98)	0 (0)
"Do you think it would be beneficial to extend a match process to all radiology fellowship programs?"	36 (64)	11 (20)	9 (16)
	Better	Worse	Same
	23 (36)	21 (33)	20 (31)
	Too Early	Too Late	Appropriate
	15 (25)	0 (0)	44 (75)
	Benefit	Hurt	Neutral
	12 (20)	17 (28)	31 (52)
	Favorable	Unfavorable	Neutral
	16 (44)	4 (11)	16 (44)

Note.—Data in parentheses are percentages.

dissatisfaction with the results of the match, but they did not implicitly blame the match for the results. Nearly equal percentages of program directors believed that the match was beneficial (12 [20%] of 60) or harmful (17 [28%] of 60), with the majority believing that the match had little affect on their ability to obtain quality fellows (31 [52%] of 60). The feedback about the match from the fellowship candidates to the program directors was either favorable (16 [44%] of 36) or neutral (16 [44%] of 36), with few candidates voicing dissatisfaction with the process.

Only 33 of the 71 candidates who registered for the match returned survey results, and they did not answer all of the questions. The results of the questions asked of the candidates are shown in Table 2. A few points should be highlighted. The vast majority of the participants believed that the match was administered fairly (25 [86%] of 29) and that the 10-wk interval for interviewing was sufficient (23 [79%] of 29). A substantial percentage (14 [48%] of 29) believed that the interview process and match should occur later in their careers. No candidates reported being offered a position outside the match or before the match. The fellowship candidates knew of no violations of the match. Twenty-six (90%) of 29 candidates were satisfied with the results of the match, with the remaining neutral to its effects. Thirteen (50%) of 26 believed that the match was beneficial to them, while 10 (38%)

were neutral regarding the effect of the match. Only three (12%) believed that the match harmed their fellowship selection.

Thirty-six (64%) of 56 fellowship program directors and 12 (41%) of 29 fellowship candidates believed that the match system should be extended to other fellowship programs. Eleven (20%) fellowship directors, and nine (31%) candidates were opposed to extending the match beyond neuroradiology.

In their comments, fellowship candidates stressed the added expense of interviewing at multiple programs and the benefits of using a universal fellowship application form. The comments from the program directors included concerns regarding the advantages and disadvantages of the system or larger or smaller programs.

### Implications

The relatively low number of candidates applying for neuroradiology positions likely reflects the current market conditions. Radiology residents are being offered lucrative private practice positions that do not require fellowships, because of a national shortage of radiologists. Some positions even provide informal on-the-job training in subspecialty techniques. These factors have created a market in which more than two positions in the neuroradiology fellowship match program (156 positions) were

TABLE 2: Survey of candidates

Question	Answer		
	Yes	No	Neutral
"Did you participate in the neuroradiology match this year?"	87 (96)	4 (4)	0 (0)
"Did you drop out of the Match?"	3 (10)	26 (90)	0 (0)
"Did you feel that the Match process was administered fairly?"	25 (86)	2 (7)	2 (7)
"Were you satisfied with the results of the Match?"	26 (90)	0 (0)	3 (10)
"Did the match schedule provide adequate time for scheduling and completing your interviews?"	23 (79)	6 (21)	0 (0)
"Are you aware of any violations of the match? Were you asked to make a commitment before match day?"	0 (0)	26 (100)	0 (0)
"Do you think it would be beneficial to extend a match process to all radiology fellowship programs?"	12 (41)	9 (31)	8 (28)
"Did you consider looking for a position after the Match to avoid the Match?"	1 (4)	27 (96)	0 (0)
	Too Early	Too Late	Appropriate
"Did you feel that the timing of the interview season (October 15–December 27) was too early, too late, or appropriate?"	14 (48)	1 (3)	14 (48)
	Benefit	Hurt	Neutral
"Overall did you feel that the match process benefited you, hurt you, or was neutral to you as far as the results?"	13 (50)	3 (12)	10 (38)

Note.—Data in parentheses are percentages.

available for each candidate (71 candidates). A high rate of unfilled positions (55%) resulted and dampened the enthusiasm of program directors and their satisfaction with the results of the match. This trend is also reflected in the survey results of the past 2–3 y, in which a 22% decline ([143 minus 111] divided by 143) in neuroradiology fellowship enrollment over 3 y was reported.

The concept that the match was weighted toward the candidates was exemplified by the high rate (>90%) with which the candidates were matched with their first- or second-choice programs. This result clearly was influenced by the abundance of offered positions compared with the number of candidates seeking positions. These results might be different in another market in which candidates outnumber positions. Satisfaction with the match was much higher among the candidates (90%) than the program directors (49%), likely because of these demographic data.

Organizing the match was the first step in the process of moving the selection process to later in the residency. The advantages of moving the selection process for fellowship positions are multiple. Resident factors, such as an evolving socioeconomic status (eg, marital status, spousal occupational requirements, needs of children), can be better assessed closer to the start of a new position. Also, many residents simply have not decided whether they wish to subspecialize or in what field they will subspecialize early in the third year of residency, which is the current time for fellowship interviews. Some residents are unwilling or unable to commit to fellowships that far in advance, particularly if they have spent only a month or two in the relevant rotation at that point. Private practice jobs generally do not require residents to commit that far in advance, although this may be changing. When offers are made to candidates who already have accepted

positions a year in advance, the environment in which residents, program directors, private practitioners, and recruiters interact becomes uncomfortable. By moving the process later in the residency and closer to the onset of the fellowship, the decisions of both the residents and the programs could more closely reflect the job market, leading to greater satisfaction for all participants. Moving some of the neuroradiology fellowship-type training into the residency years (ie, "resifellows") may be another potential solution.

From the fellowship training director's standpoint, moving the selection process to a later time would enable better assessment of the department's ability to finance fellowships, more proximate assessment of resident and fellow staffing needs, and clearer assessment of faculty staffing needs to support those positions. The Accreditation Council for Graduate Medical Education typically requires a training ratio of two faculty members per fellow, and with the current shortage of academic neuroradiologists, this requirement may influence the number of fellows that can enter a fellowship program. From the chairperson's position, a later acceptance date allows better assessment of the job market for positions in the fellowship as well as in the faculty.

Nonetheless, fellowship training directors generally perceive that programs that unilaterally delay the selection process without joint agreement by members of the subspecialty or across the subspecialties are at a disadvantage with those residents who wish to commit early. The competitive advantage for individual candidates and programs with early acceptance is simply too strong to overcome the general good produced by delaying the process. The use of a single match for all radiology fellowships would ensure the uniformity of the timing of



interviews and candidate selection across programs and across radiologic subspecialties.

The disadvantages of fellowship match programs are reflected in the added expense and time required to interview more individuals and for candidates to interview at more programs. From the training directors' standpoint, because the sense of how the candidates view the program may be diminished, it behooves the program directors to schedule more interviews with more candidates to guarantee filling their positions. Devoting the extra time to interviewing more people can be burdensome, especially in strong programs that normally attract the best candidates early in the selection process. By the same token, the candidates may have to interview for more programs, because they will not be receiving job offers early in the process, as the case has been. Although interviewing with many programs is arguably advantageous for candidates, the financial burden on the candidates, coupled with the uncertainty of where they will be matched, explains why some candidates had negative reactions to the fellowship match. This also may have contributed to the reduced number of participants; however, the post-match survey results did not identify a large post-match candidate pool (only 10 candidates were identified).

A fellowship match in neuroradiology was attempted several years ago. It failed at that time because of the perception that widespread cheating existed (ie, individuals were offered positions outside the match). This perception led to reluctance on the part of many program directors who were active in that match to participate this time. Why did so few violations occur in the current match? A strong stance by the Executive Committee of the ASNR and frequent group announcements and re-

mindings helped ensure its success. Group e-mailings and a few judicious phone calls likely led to uniform compliance with match guidelines among program directors. There was general hope that all parties would conform to the regulations for a positive first-year experience.

Can we judge the neuroradiology match a success? While nearly all program directors believed that the process was fair, the discrepancy between success rates in small (16%) and large (40%) programs in this job market complicates the answer to this question. It also begs the question as to whether larger programs are better suited to train neuroradiology fellows, given the attendant increase in resources (both human and infrastructural) likely at their disposal. These issues were not addressed in this study, but they are vexing. Many programs filled no positions at all. Is this process a natural Darwinian selection? Applicants viewed the process as generally beneficial or neutral and were overwhelmingly satisfied (90%) with the results. Therefore, from the candidates' standpoint, the neuroradiology fellowship match can be viewed as a success. Having a universal match program with a universal application for all radiology subspecialties could lead to a selection process that is fairer, more appropriately timed, and better organized than what is currently in place throughout radiology. Whether having such a universal match process is acceptable to all radiology subspecialties remains to be seen.

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