Improving the neurosurgery match

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THE neurosurgery match is a mess: The process is expensive, time consuming, and inefficient. It poorly addresses the needs and concerns of both the applicants and the training programs and, remarkably, seems to be getting worse. The same number of applicants now generate significantly more applications, go to more interviews, and spend more money but match at the same rate. Fundamental changes are needed to make the match more effective.

In 2013, a neurosurgery applicant spent, on average, \$10,300 on the application process. About 70% of the total cost went for interview expenses, and the rest was spent on subinternships and second visits.¹ At that time, applicants accepted about 15 interviews; in 2017, applicants accepted about 18 interviews, and there was, presumably, a proportionate increase in expenditures.¹¹ Even without the increase, neurosurgery applicants pay substantially more than do those applying to other surgical subspecialties. The average interview costs for an applicant in plastic surgery are \$6262, for orthopedics \$5415, and for urology \$4617.^{2,3,4} In large part, these differences reflect the number of interviews attended: an average of 12 in plastic surgery, 11 in orthopedics, and 7 in urology.^{2–4} It is important to remember that the money to apply must be found at a time when students face escalating debt and have no real opportunity to generate income.

Even then, financial considerations may be less important than what the students have given up in their last year of medical school. For many students, most of the senior year is devoted to finding a residency: 2 or 3 months is spent on away rotations, and the fall and early winter are occupied with traveling. During those months, the students, of necessity, choose rotations that allow them to be gone several times. Consequently, fewer can be involved

in more demanding services, including many of those that have traditionally been thought to be important in preparing students to manage the transition to residency. Many medical school schedules have already been adjusted to account for these changes.

The process isn't any better for faculty in neurosurgery training programs. Although there has been no real change in the size of the applicant pool, there has been a tremendous increase in the number of applications. In 2011, an applicant submitted an average of 40 applications; in 2017, the average was 65 (<https://www.aamc.org/download/358800/data/neurologicalsurgery.pdf>). This has resulted in a substantial increase in applications received. In 2012 program directors received 188 applications for 2 spots, in 2014 they received 202, and in 2016 they accepted 241 applications for the same 2 positions.¹⁰ Of note, the number of applications is likely significantly higher in programs thought to be particularly attractive. Reading and categorizing that volume of material takes days, and, even then, it is impossible to spend much time on an individual's dossier. This makes deciding who to interview even more difficult and is almost certainly a primary cause of the increase in the number of interviewees: an average of 35 for 2 spots in 2012, 38 in 2014, and 40 in 2016.^{8–10} For most programs, it takes the better part of 3 or 4 days to conduct the interviews. Part of another day is spent evaluating and ranking the students. And, during all of this time, very little other work is done in the department. The program also accepts the surprisingly high costs of feeding and entertaining the interviewees, as well as several months of salary for a program coordinator to manage the details of the visits.

These problems might be understandable if they were the result of a large increase in the size of the applicant pool or if the match could be shown to be more efficient. But this is not the case. Applications from senior medical students trained in the United States have been stable over the past 20 years if they are adjusted for the number of available positions: in 1999, 138 students applied for 144 positions; in 2001, 134 for 142 positions (Society of Neurological Surgeons Neurosurgery Match Report 2003, unpublished); in 2009, 206 for 191 spots;⁵ in 2013, 218 for 204

spots; in 2017, 218 for 212 positions;⁶ and in 2018, 219 for 225 places.⁷ The match rates for US graduates who ranked neurosurgery as their only specialty choice are also quite consistent during that time: 85% in 1999, 93% in 2001 (Society of Neurological Surgeons Neurosurgery Match Report 2003, unpublished), 82% in 2009, 84% in 2013,⁵ and 90% in both 2017 and 2018 (Fig. 1).⁷ Very little information is available about where on their rank lists applicants match, but what there is does not suggest that they are doing better than they have in the past. In a recent survey of neurosurgery residents, 72% said that they had matched at one of their top 5–ranked programs (R. Lamm et al., unpublished data). This is about the same as the general match rate. In 2017, 74% of US seniors matched at one of their top 3 programs.⁶

If no more people are in the match and it isn't any more efficient, what is driving the changes in the application process? The increase in applications and in interviews is the result of the same number of students applying much more broadly and programs expanding interview spots to deal with the influx of applications. Students apply to 70 programs in part because it is so easy to do but also because they think that every other competitive applicant is doing the same thing. They accept 20 or 30 interviews because everyone else does. And, they rank 20 or more programs because they are afraid that, if they don't and everyone else does, they will not get a spot in a residency program. The situation is untenable, and there is no reason to think that,

left unchecked, it will improve. It seems more likely that things will continue to get worse.

There have been proposals made to change the match, but none have dealt with the basic problems. It has been suggested that interview days should be regionalized: All of the programs in a city or state might agree to offer interviews on different days in a given week.¹ This would certainly be more convenient, but I'm not sure that it would be substantially cheaper, and the change would, if anything, potentially increase the number of accepted interviews. If someone is in the area, it would make sense to interview at all the available programs. Others have proposed an initial regionalized interview with second, targeted interviews at locations that would likely accept an applicant.¹ There would be advantages to this arrangement, but the logistics would be formidable, and, unless the number of secondary interviews offered was strictly limited, I'm not sure you would actually cut down on the students who visited a program.

Structural changes in the match are going to be necessary to deal with the current problems. These 3 changes would improve the process for all involved:

- 1) There would be a limit to the number of programs to which a student could apply. There are currently 109 board-certified training programs in the United States. Applying to 35 of them should allow the student to test programs in a variety of locations, of various sizes, and with different academic philosophies. This is in keep-

FIG. 1. Bar graph showing match statistics.

ing with historical norms. Until 2011, the average student applied to fewer than 40 programs.

- 2) Students may only accept a limited number of interviews. If everyone is limited to some number of visits, perhaps 10, it will make it more likely that the applicants have a true interest in the program. It is important to remember that, before the transition to the new match in 2008, students visited, on average, about 10 programs and matched at the same rate that they do today.
- 3) Similarly, a program would be limited to interviewing 10 applicants per position offered. This would demonstrate a real interest in the students visiting and give the applicants some reassurance that they are serious candidates.

One could certainly argue over the proposed numbers, but some limits on the process would help everyone. The suggested changes would halve the cost borne by the students and significantly decrease the time and cost involved in reviewing applications and in interviewing. They would also assure that those who are interviewed at a program have some interest in being there and that the faculty has a real interest in meeting them.

If these changes were made, applicants would interview at about the same number of places as did applicants 10 years ago, and programs would probably interview about as many students as they did at that time. There is no reason to think that students would be more or less likely to match or to match with a program higher or lower on their rank list. There would be no advantage gained or lost, just a more reasonable experience.

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Disclosures

The author reports no conflict of interest.

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