Rethinking the Match: A Proposal for Modern Match-Making

Chris Ray, MD, Steven E. Bishop, MD, and Alan W. Dow, MD, MSHA

Abstract

Since the 1950s, the National Resident Matching Program, or “the Match,” has governed the placement of medical students into residencies. The Match was created to protect students in an era when residency positions outnumbered applicants and hospitals pressured students early in their academic careers to commit to a residency position. Now, however, applicants outnumber positions, applicants are applying to increasing numbers of programs, and the costs of the Match for applicants and programs are high. Meanwhile, medical education is evolving toward a competency-based approach, a U.S. physician shortage is predicted, and some researchers describe a “July effect”—worse clinical outcomes correlated with the mass entry of new residents.

Against this background, the authors argue for adopting a more modern, free-market approach to residency match-making that might better suit the needs of applicants, programs, and the public. They propose allowing students who have been identified by their medical schools as having achieved graduation-level competency to apply to residency programs at any point during the year. Residency programs would set their own application timetables and extend offers in an ongoing fashion. Students, counseled by their schools, would accept or decline offers as desired. The authors argue this approach would better support competency-based education while allowing applicants and programs more choice regarding how they engage and adapt within the selection process. The approach’s staggered start times for new residents might attenuate the July effect and improve outcomes for patients. Medical students might also enter and thereby complete residency earlier, increasing the physician workforce.

Editor’s Note: An Invited Commentary by L. Arnold, C. Sullivan, and F.A. Okah is available on pages XXX—XXX.

In 1951, the National Resident Matching Program, or “the Match,” was created to address fierce competition among hospitals for highly competitive residency applicants and to protect student interests. At that time students, outnumbered by residency positions and pressured by residency programs, sometimes signed binding commitments prior to their third year of medical school.

The basis of the Match is a mathematical puzzle called the stable marriage problem (SMP). The SMP aims to pair every member of one group (suitors or residency applicants) to a member of a second group (spouses or residency positions) such that the members of any given pairing would not both prefer to be paired otherwise. The Gale–Shapley algorithm (GSA) solves the SMP and led to a Nobel Prize in Economic Sciences.

Yet, today, the Match violates some underlying assumptions of the SMP and GSA. The SMP assumes equal numbers in each group of potential partners, but this is no longer the case in the Match. While for U.S. medical school seniors the ratio of positions to applicants has remained roughly stable over the last several decades, the overall trend is downward for all applicants. In 1976 there were 1.37 positions per U.S. applicant, which is similar to the 2016 ratio of 1.53 positions per U.S. applicant. However, when graduates from foreign medical schools are added in, the ratio of positions per applicant drops from 0.96 in 1976 to 0.79 in 2016. For applicants as a whole, the Match has become more competitive, and the SMP can no longer solve the residency match-making problem.

The GSA also is limited by factors intrinsic to the Match. The algorithm assumes each applicant and each residency program have full knowledge of each other so that accurate preference lists can be created. While advances in technology have enhanced the ability of applicants and programs to evaluate each other, both groups are constrained by an interview season of a few months and must make decisions with imperfect knowledge. Also constraining the effectiveness of the algorithm is application inflation: Motivated by the scarcity of positions, applicants are attempting to improve their chances of matching by increasing the number of programs to which they apply. In recent years, the number of positions ranked by U.S. seniors has increased from 236,229 positions in 2014, to 241,734 positions in 2015, to 251,364 positions in 2016. A recent Alliance for Academic Internal Medicine publication discussing this trend within internal medicine notes that the number of programs applied to per student in that specialty increased.
In addition, the Match is financially inefficient for applicants and programs. Applying to residencies is expensive, with the average applicant spending $5,000 to $10,000 on fees and travel. Applicants typically rank more than 10 programs—each of which they have carefully vetted—but most match to one of their first choice of programs.5 This means a typical applicant spends time and money on at least several interview trips to programs in which they have less interest. The high cost of the process particularly disadvantages applicants with fewer financial resources. Programs, in turn, must expend resources on applicants with lower interest, which may preclude them from interviewing more interested applicants.

**An Alternative Solution**

These ongoing issues with the Match, coupled with a shift toward competency-based medical education,4 a predicted physician shortage in the United States,10 and concerns about the possible “July effect,”11,12 suggest a new approach may be needed. One possibility is to embrace a free-market approach where students and programs would have more autonomy. We propose a process in which students identified by their medical schools as having achieved graduation-level competency would be eligible to apply to residency programs. Students certified as “graduation eligible” by their medical school would interview with residency programs and, counseled by advisors and mentors, accept or decline offers as desired. For their part, residency programs would set their own application timetables and extend offers at any point during the academic year. Once a student and a program agreed on an acceptable start date, the student would transition to beginning work as a resident on that start date.

**Advantages for applicants and programs**

Our proposed approach has several advantages for applicants and programs. Making the application calendar more flexible would allow both students and programs the opportunity to approach the hiring process in a fashion that better suits their individual preferences. Both parties would also benefit from receiving ongoing feedback about their approach. Programs having trouble scheduling interviews or hiring applicants could make midcourse adjustments, such as offering higher salaries or pursuing less competitive applicants. They might also be encouraged to adopt resident-friendly innovations such as alternative structures for duty hours, wellness programs, or dedicated retirement funding. Meanwhile, strong applicants could quickly accept a position of their choice while applicants having limited success could modify their approach and/or apply to less competitive programs or specialties. With a shifting market for positions, applicants would be able to react to changing conditions.

This approach would also better account for special situations. Applicants with interest in multiple specialties could explore more than one option while getting feedback on their relative competitiveness in each field. Further, the complex calculus of couples matching would become a more straightforward conversation between two programs and two individuals.

Additionally, overall costs to applicants and to programs would likely decline. Both groups currently expend resources evaluating options that do not have a high likelihood of coming to fruition. Under our proposed system, applicants with an offer in hand—especially individuals with less financial resources—might forgo interviews at locations they consider less desirable. Programs would benefit because they would only interview and expend resources on the most interested applicants. With more resources available per interviewee and more time to interview applicants, programs would be able to implement more intensive screening processes, such as simulation-based exercises or multiple mini-interviews, to help them better identify the applicants who are the best fit. Both programs and applicants would benefit by knowing their investment in an interview had a higher probability of leading to the right match.

**Benefits to society**

Our proposed approach might also provide broader benefits to society. The United States faces a projected physician workforce shortfall of between 61,700 and 94,700 by 2025.10 Allowing students to transition into—and thereby graduate from—residency sooner could help address this shortage. As this new process for residency applications matures, less competitive specialties (e.g., primary care or psychiatry, at present) might have shorter wait times to start residency, which could encourage applicants to opt for those fields instead of pursuing more competitive specialties with longer waits to start residency. This process would be an excellent and adaptable target for incentives that address broader policy aims such as increasing the primary care workforce. A free-market approach would also support a competency-based approach to UME by allowing students to begin applications based on achieved competency rather than waiting for the fall of their fourth year. It might spur a competency-based approach to completing residency, speeding the transition from GME to practice and allowing physicians to apply their abilities to benefit society faster.

Further, staggering residents’ start dates might abrogate the “July effect”—the reported, but controversial, worsening of clinical outcomes coinciding with new residents entering the workforce en masse in July.11,12 Integrating first-year residents gradually would support retention of organizational learning by having more continuity between the newest residents and more experienced residents and might lead to better patient outcomes. In addition, rather than having to pick several newly minted physicians to start residency in highly complex assignments such as the intensive care unit, program directors could reserve those assignments for more experienced interns who have already displayed basic competency in several rotations in general inpatient settings. Such incremental increases in responsibility for residents fit well with competency-based models.9

**Looking Ahead**

Transforming the residency application process as we propose would no doubt have a radical effect on the landscape of medical education. The logistical hurdles related to this paradigm shift are neither minor nor insurmountable. A reasonable first step would be to pilot this approach within the UME-to-GME transition at a single institution.
Expanding to this broader, free-market system would likely produce unforeseen consequences, both positive and negative. To ensure equity and success, certain systems—real-time transparency about the number and quality of available applicants and positions, for example—would be essential. In addition, medical schools would need to provide applicants with high-quality advising to help them navigate the process optimally. However, in our view, continuing a system that increasingly disadvantages applicants, limits educational innovation, increases costs, and potentially increases the risk of harmful medical errors in July is untenable. Students and society deserve a thoughtful consideration of the heart and soul of why medical schools and residency programs exist—to provide an adequate number of competent, compassionate physicians for the nation. As a step toward this ultimate goal, we need a more modern approach to residency match-making.

**Funding/Support:** None reported.

**Other disclosures:** None reported.

**Ethical approval:** Reported as not applicable.

**References**

1. Roth AE. The origins, history, and design of the resident match. JAMA. 2003;289:909–912.