The US Residency Match at 70: What Was, What Is, and What Could Be

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What Was

In the beginning there was chaos, and then there was order. Eighty years ago, the number of internship positions greatly exceeded the number of graduating medical students in the United States. Hospitals therefore competed intensely to fill their spots. No rules governed when applicants should apply, how and when hospitals should offer positions, or how long an applicant should be allowed to entertain an offer.[1] Students felt pressure to accept early offers lest no better ones materialize later.

To remedy this, in 1945 the Association of American Medical Colleges (AAMC) proposed a "Cooperative Plan" to standardize intern selection by placing an embargo on the release of academic information until an agreed-upon date in the fourth year.[1] This policy eliminated early recruiting but replaced it with frenzied recruitment that began the moment student academic credentials were released. Students had only a short window—sometimes less than 12 to 24 hours—to respond to offers, forcing them to make career-altering decisions with incomplete information.[1]

By 1950, it was clear that the Cooperative Plan was at best a partial solution, leading the dean of the University of Chicago to propose an innovative alternative. Instead of being required to accept or decline individual offers, students would submit their preferences to a central clearinghouse. Hospitals would do the same, and this clearinghouse—which eventually came to be called the National Intern Matching Program—would match applicants and hospitals.[2]

Created with the goal to be "as fair as possible to both students and hospitals," the inaugural Match would, for the first time, allow applicants to fully consider programs and express their preferences freely.[2] In response to student protests that the proposed matching algorithm penalized students for ranking programs honestly, last minute adjustments to the algorithm were made; punched cards were submitted; and in March of 1952, a computer matched 5564 senior medical students to one of approximately 10 500 intern positions.[1,3]

In the 70 years since, the National Intern Matching Program has grown into the National Resident Matching Program (NRMP) and now provides matching services for not only internships but also categorical residency positions. Although some programs (such as those in urology, ophthalmology, and military hospitals) use separate matching services, the NRMP Match fills the vast majority of residency positions in the United States.

What Is

Much has changed since the first Match. The matching algorithm has evolved to discourage strategic ranking decisions by applicants, allow simultaneous matching to both intern and advanced positions, and permit couples matching.[4] Notably, the matching algorithm used in 1952 was proposed by medical students and approximated the deferred acceptance algorithm identified nearly a decade later by mathematicians as the ideal solution to a 2-sided matching problem.[5] The 2012 Nobel Memorial Prize in Economic Sciences cited the NRMP's algorithm in honoring the recipients' contributions to the theory and practical applications of matching markers.[6]

Changes in the residency application process have been even more dramatic, with the previous surplus of positions standing in stark contrast to circumstances today. Since 1992, the number of applicants submitting a rank order list has exceeded the number of available positions, with 42 549 active applicants (19 902 US MD seniors, 7303 US DO seniors, 12 912 international medical graduates, and 2414 previous US MD and DO graduates) vying for 36 277 postgraduate year 1 (PGY-1) positions in 2022.[7]

In recent years, the NRMP Match has become responsible for assigning an increasing share of PGY-1 positions. In 2008, 71% of all PGY-1 positions had been filled in the previous year's Match. By 2020, the NRMP Match assigned 85% of active residents, with most of the remaining positions assigned by other

matching services. This increase coincides with the implementation of the NRMP's "All In" policy, which requires any program participating in the Match to attempt to fill all of the program's positions through the Match or another national matching plan.[8]

Yet, other aspects of the Match have remained constant. Outcomes for graduating US MDs remain good, with 98% of such applicants successfully matching in 1952, and with match rates of approximately 93% for the past 25 years. The NRMP succeeded in eliminating the problems the organization was founded to solve; its subsequent success speaks to the value of the service the organization provides to new physicians and residency programs.

But while early offers are long gone, the residency selection process now faces a new set of challenges related to the increasing number of applications submitted by contemporary applicants. In 2020 the average US medical school graduate submitted 70 residency applications.[9] The average for some specialties is even higher. For instance, in 2022, the average osteopathic medical school applicant in obstetrics and gynecology submitted 85 applications, while US MD applicants in orthopedic surgery submitted 96 applications, and international medical graduates submitted 100 applications each to internal medicine programs.[10] This overapplication increases costs for applicants and programs, leads to reliance on convenient screening metrics in applicant evaluation, and does not ultimately improve Match rates.[9]

Several efforts have recently been made to improve transparency and ease congestion in residency selection. Some specialties have trialed preference signaling, allowing applicants to designate a number of programs in which they have strong interest.[11] Meanwhile, obstetrics and gynecology program directors have recommended a common deadline for interview invitation, at least 2 days to reply to an interview offer, and a deadline to notify applicants of their status.[12] While it is notable that these innovations have come from medical specialty and residency program director organizations, the NRMP has continued its longstanding effort to allow applicants and programs to fully consider their options through the guidance of its Code of Conduct: forbidding questions about ranking preferences, diminishing financial burdens by making second visits voluntary, and limiting post-interview communication.[13]

What Could Be

After 7 successful decades of Match Days, the NRMP may need only to maintain its current standard of accurate service to ensure the longevity of the organization for decades more. Yet such a view requires a narrow reading of the organization's mission "to match healthcare professionals to graduate medical education…through a process that is fair, equitable, efficient, transparent, and reliable."[13] While these adjectives may accurately describe the NRMP's algorithm to process rank order lists, the residency selection process at large is increasingly viewed as expensive, inequitable, and having adverse effects on medical education.[14] Should the NRMP play a bigger role in addressing these problems?

Today's NRMP has attained, by virtue of its market share and the nearly indispensable service it provides, a powerful position from which to influence and improve other aspects of residency selection. Further, the NRMP Match Participation Agreements (MPAs) give it the means to do so. Building on its current Code of Conduct and MPAs, the NRMP could further improve the process. Adding the following specific tools would be a meaningful first step:

Timelines for Interview Offers and Acceptances

A consistent and transparent timeline for application review could simplify the application process and reduce stress for applicants. The NRMP could delineate a clear timeframe for programs to extend interview invitations, a deadline when applicants must accept or decline, and a date when a final decision is made for all applicants. A consistent and transparent timeline for application review could reduce stress for applicants, and knowing all the interview offers that will be extended might help applicants more efficiently decide which offer to accept.

Interview Offers

Some residency programs invite more applicants to interview than they have interviews available, meaning that applicants who do not schedule their interview immediately—often within minutes—may lose their opportunity to interview.[15] The NRMP should require that programs participating in the Match offer no more interviews than they have available at any given time.

Congestion Reduction

Although the application process exists external to the Match, the NRMP should nonetheless encourage efforts to reduce application numbers by allowing more efficient means for programs to identify well-suited and interested applicants (and vice versa), such as preference signaling. The NRMP could insist that participating programs report their selection criteria in a standardized manner to prevent applicants from

applying to programs where their application will not be seriously considered.

Data Standardization

Together, the NRMP, AAMC, and the Accreditation Council for Graduate Medical Education house much important data regarding efficiency and equity in the residency application process—but maintaining individual data silos prevents comprehensive analysis. The NRMP's plan to collect and report applicant demographics is a good first step.[16] Improved data sharing and standardization of geographic and demographic terms among these organizations would be a useful second step to help applicants more judiciously rank programs to which they are well suited and have a good chance of receiving an interview and matching.

The formation of the Match is a testament to the power of innovation to improve the residency selection process. But if the NRMP is to enjoy as much success in its next 70 years as it did in its first, it should draw on both its current position of power and the pioneering spirit that led to its creation.

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