The Costliness of US Residency Applications: Moving Toward Preference Signaling and Caps

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The first day that residency programs can view applications within the Electronic Residency Application Service (ERAS) and send interview offers is both exciting and stressful. One of the authors (J.A.C.) recently went through this process, and after months of research and discussions with advisors and colleagues, J.A.C. applied to 31 US emergency medicine programs. J.A.C.'s examination scores, membership in the Gold Humanism Honor Society, and recommendation letters predicted an excellent chance to match into an emergency medicine program.[1] One month out from that first day, with only 3 interview offers, J.A.C. had a 38% chance to match. All 3 of these programs truly interested J.A.C., but matching is a numbers game. Historically, 66% of residency interview offers are sent by this point.[2] Increasing to 11-15 interviews would change J.A.C.'s chance to nearly 100%.[1] The only recommendations from advisors were to apply to programs that didn't truly interest J.A.C. There are 2 issues with this process: more applications equate to higher costs, and applying to programs that aren't a good fit isn't ideal for either party. We propose that the US residency application system would be improved by application caps and preference signaling.

Capping residency applications has been discussed for years as a way to reduce escalating application numbers. It would alleviate costs and potentially improve equity in the process. In 1992, before the implementation of ERAS, medical students applied to a median of 12 programs. In 2007, the average US senior medical graduate applied to just over 30 programs. In 2021 that number rose to nearly 73 programs.[3] Using the average number of applications, if a student applies to only one specialty, the cost is $1,677 versus $611 in 2007.[4] Considering the cost of applying to more programs, not every medical student can afford to apply to more than 70 programs. Those with the funds and knowledge to apply broadly are indirectly, and likely unknowingly, hurting those without these resources. Capping would further decrease the financial burden on applicants by lowering the number of programs applied to and could decrease racial and socioeconomic disparities in residency matching that are inherent, given the outsized cost of applying to 73 programs.

Limiting applications would require more thorough research by the applicant and would allow programs to assess candidates more effectively. Although tools such as Association of American Medical Colleges (AAMC) Residency Explorer exist, it is unlikely that when applying to more than 100 programs, applicants have done sufficient research about individual programs. Considering the increasing number of candidates each program receives, it is also possible that an applicant will be instantly screened out based on metrics that program directors use to limit the pool considered. In the 2022 National Resident Matching Program (NRMP) Program Director Survey, 45% of applications were "rejected based on a standardized screening process."[5] If a student knew that there was no chance of matching at a specific program, at an average of 73 programs applied to, this could amount to $718 savings per student. At a record 48 700 students[6] applying for residency in 2022, this amounts to nearly $35 million going from students' pockets to the AAMC with little or no benefit to the applicants (73 programs × $21.87 per application = $1,597 per applicant × 0.45 = $718 × 48 700 = 34 998 325. Due to the tiered structure of application costs, these numbers are based on averages and one specialty application.)

As of yet, there are no data on the efficacy of capping, although there is strong support from program directors, clerkship directors, and student affairs deans for application capping.[7] Conversely, only 29.6%[7] of medical students favor this approach, likely due to concerns that capping the number of applications can limit students' choices. There is a discrete, individual advantage to applying to more programs. A classic game theory problem, the prisoner's dilemma, applies here.[8] Each individual applicant has a higher chance to match if they apply to more programs. In the prisoner's dilemma, this is reflected in a worse outcome for all participants. In the NRMP, this is reflected historically by an inverse relationship between number of applications and first choice Match rates.[9] While poor Match outcomes

may be the perception, overall Match rates for MD senior medical graduates have largely remained unchanged since 2007. These factors, along with vastly diminishing returns[10] resulting from increasing the number of applications, should help convince students that it is in their best interest to support caps. We acknowledge that there may not be a perfect number for caps at this time. Therefore, we recommend that the AAMC, in conjunction with specialty societies, create specialty-specific caps by analyzing data collected by the NRMP.

While caps begin to address the issue of applying to programs that are a poor fit for candidates, the benefits could be magnified by preference signaling. Using signaling, applicants can indicate their interest in a specific number of programs upon application. This has proven successful within the NRMP for otolaryngology[11] and outside of medicine among economics graduate students.[12] In this Match cycle, there are 15 specialties moving toward signaling within ERAS,[13] as well as urology[14] and plastic surgery.[15] While signaling does not eliminate the inherent financial inequities that arise from the increased price of each additional program application, it requires more thorough research into programs and would allow applicants who signal their preference for a specific program to have a higher chance of receiving an interview.[16] It may further ease the burden on residency programs of sifting through hundreds of applications, theoretically enabling them to focus on applicants who have indicated specific interest. In otolaryngology, this method trended toward a higher rate of interviews to signaled programs and was strongly favored by most applicants and program directors.[11]

If executed correctly, signaling may eventually have a role in minimizing disparities by highlighting specific applicants who express clear interest in programs. This could allow some residency programs to use a more holistic approach in applicant review, focusing on applicants who have signaled preference, and placing less emphasis on boards scores, which have been shown to be lower among students from lower socioeconomic households and underrepresented minorities due to inherent inequities in society.[17-19] This system could enable "less competitive" programs to more easily find applicants who are truly interested. Yet, "more competitive" programs may still struggle with a plethora of signals. Therefore, we suggest signaling in conjunction with caps to address the inequities in the system.

The current US residency application process allows for marked disparities, excess expense, and wasted applicant and program time. Specialties and medical schools must take a stand to improve the process of residency applications and protect their trainees. Regardless of specialty, after 20 years of intense schooling and massive educational expenses, medical students should have the chance to try to match into their specialty of choice, without unnecessary economic strain. By implementing preference signaling and application caps, we can begin to move the needle on systemic change to create a more equitable system of residency applications.

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