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AAIM Perspectives

AAIM is the largest academically focused specialty organization representing departments of internal medicine at medical schools and teaching hospitals in the United States and Canada. As a consortium of five organizations, AAIM represents department chairs and chiefs; clerkship, residency, and fellowship program directors; division chiefs; and academic and business administrators as well as other faculty and staff in departments of internal medicine and their divisions.

Application Inflation for Internal Medicine Applicants in the Match: Drivers, Consequences, and Potential Solutions

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BACKGROUND

Since at least 2010, seniors from US allopathic medical schools have been applying to an increasing number of residency programs in nearly every specialty with each successive year. Medical school advisors and deans have witnessed this increase in applications when advising fourth-year students; it has become problematic for residency program leaders as they attempt to meet the growing demand for interviews for and applicant placement into their programs.

The increase in applications has been documented by the Electronic Residency Application Service. Between 2010 and 2015, the average number of Electronic Residency Application Service applications for all categories of individual applicants applying to Accreditation Council for Graduate Medical Education-accredited residencies increased from 65 to 79. The average number of applications per international medical graduate increased from 97 to 120, whereas the average number of applications per US allopathic graduate increased from 37 to 47 applications.[1]

Underlying this increase in applications is student perception that competition in the National Resident Matching Program Main Residency Match has become more intense, with each year increasingly competitive. Some advisors and mentors are actively giving this message to their students. Although a few specialties and specific residency programs remain highly competitive and may be becoming more so, available data do not support this perception of a more competitive environment across all specialties and programs for US allopathic medical school senior students. In 2015, the overall number of postgraduate year-1 positions across all specialties per US allopathic senior was 1.51, meaning that for US allopathic applicants there were more than 50% more residency spots available than the group could fill. The ratio is different for different specialties but overall has remained fairly constant since 2005.

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A principal cause of concern among applicants is that the total number of all applicants in the National Resident Matching Program Match is higher than the total number of positions. However, it is not a new phenomenon because it has been the case since the early 1980s. Indeed, since the mid-1990s, the number of all applicants in the Match relative to the number of positions has been as high or higher than it is today. Furthermore, of the 34,905 applicants who submitted preference lists in the 2015 Main Residency Match, 18,025 were US allopathic senior medical students. These students were competing for 30,212 positions. Although a small number of highly competitive specialties do have fewer positions in the Match than the number of allopathic US seniors preferring them (dermatology, internal medicine-emergency medicine, neurologic surgery, orthopedic surgery, otolaryngology, plastic surgery, and thoracic surgery), well more than 90% of US seniors match to their preferred specialty. There also is some concern that although the total number of positions in the Match continues to outnumber the number of US allopathic senior applicants, an increase in preliminary or transitional year positions may be obscuring a scarcity of positions after the first year of training. This concern is not supported by the data. Between 2009 and 2015, the number of preliminary and transitional positions has remained relatively stable at 4092 and 4123, respectively, even as the total number of positions in the Match has increased from 25,185 to 30,212.[2]

PERSPECTIVES VIEWPOINTS

- Since at least 2010, seniors from US allopathic medical schools are applying to an increasing number of residency programs. It has become problematic for residency programs to meet the growing demand for interviews and applicant placement into programs.
- We need to explore factors driving the perception of scarcity of internal medicine positions in the Match and make recommendations to mitigate the generalized increase in applications.
- We should also establish a validated *common currency* of assessment and Match process that ensures "best fit" between student and residency program.

Individual applicants must assess their competitiveness for both their preferred specialty and their desired residency program. Applicant qualifications, including the relative prestige of an applicant's medical school, along with the competitiveness of the desired residency program, have a profound effect on the applicant's ability to obtain a position. Just as competition for residency positions is not the same across specialties, it is not evenly distributed across all programs and depends on the quality—real or perceived—of the applicant and the residency program. We know of no rigorous data to inform an analysis of institutional status as it relates to competition for residency positions, although there is a general consensus that it is an operating factor. However, observation does permit some reasonable conjectures. For students applying to more "prestigious" programs, concerns about the competitiveness for interviews are particularly acute. Students from middle-tier state schools may worry they will not stand out or will be filtered out during the initial screening process at the more competitive programs that receive thousands of applications. The increasing importance of US Medical Licensing Examination Step 1 as a screening tool for interviews also may be exacerbating the perception of a more competitive Match, requiring more students to complete more applications.[3]

The internal medicine community has felt the impact of residency application inflation. Between 2010 and 2015, the average number of Electronic Residency Application Service applications for all categories of individual applicants applying to Accreditation Council for Graduate Medical Education-accredited categoric internal medicine residencies increased from 42 to 51. The average number of applications per international medical graduate increased from 56 to 70. For US allopathic senior students, the average increased from 20 to 27 (**Table**).[4] At an internal medicine residency program level, it translated into an increased average of 2262 to 2853 applications per program, with the average number of US allopathic senior students increasing from 324 to 671 and the average number of international medical graduates increasing from 1938 to 2366.[5] This application inflation occurred despite the reality that ranking a minimum of 11 internal medicine

Table Number of Applications per Individual Applicant Applying in Internal Medicine, by Applicant Type, 2011-2015

Internal Medicine Applicant Type	2011	2012	2013	2014	2015
All US allopathic graduates	20.3	22.0	23.2	25.5	26.6
US allopathic graduates — public school	20.3	22.5	23.0	25.9	27.2
US allopathic graduates — private school	20.8	22.0	23.8	25.7	26.3
US osteopathic graduates	18.7	20.4	22.3	23.9	25.8
International medical graduates*	55.6	61.4	65.5	67.9	69.8

*Includes graduates of Canadian medical schools and graduates of fifth-pathway programs. These students' match rates are not shown because there are typically less than 100 students per each of these types per applicant year.

programs by US allopathic senior students yielded an approximately 100% probability of matching in 2014. The ratio of categoric internal medicine postgraduate year-1 positions per US allopathic senior student preferring internal medicine was 2.0.[6] Indeed, in 2015, 49.9% of all internal medicine categoric positions in the Match were filled by independent applicants, that is, non-US allopathic seniors. Only family medicine, pathology, and primary pediatrics programs had larger percentages of independent applicants matching into those programs than did internal medicine.[2]

DRIVING FACTORS

The purpose of this article is to explore the factors that may be driving the perception of scarcity of internal medicine categoric positions in the Match and to make recommendations for changes aimed at mitigating the generalized increase in applications per US allopathic applicant. An understanding of the factors operating for students, specialty-specific advisors at medical schools, and residency programs will allow us to better define the challenges and to propose effective solutions.

Students

The awareness of the increasing number of US medical school graduates has contributed to a scarcity mentality as students fear that residency positions have not kept pace with expanding medical school enrollments.[7] This fear may be exacerbated by ready access to online forums and social media, allowing anxious students to monitor whether residency programs have sent out interview invitations to their peers. Successful applicants typically post the programs from which they have received an invitation shortly after they book an interview spot. Such instant availability of information about invitations to other applicants may intensify the perception of scarcity. An additional driver for students may be that as they learn that peers are planning to submit more applications, they feel obliged to increase the number of applications they submit.[8]

The influence of peer student plans may cross specialties. For example, internal medicine applicants may feel pressured to apply to more programs in reaction to their peers who are applying to more competitive fields in which submitting a large number of applications historically has been the norm. Although the average ratio of available residency spots to US allopathic senior student applicants is 1.51, it is not constant across specialties. The traditionally more competitive specialties do have a ratio of less than 1.0, which drives an accurate perception of limited capacity for students interested in matching in these specialties.[2] This reality is not new and may be contaminating the internal medicine applicant pool and fueling a false perception of scarcity.

Advisors

Advisors (eg, clerkship directors, deans, faculty advisors) likely are influenced by the student factors and may be reacting to their alarm. Students often seek advice from multiple faculty members, some of whom may be unaware that there is no historical shortage of resident positions in internal medicine. In response to students' alarm, advisors not familiar with internal medicine-specific National Resident Matching Program Match data may advise students to increase numbers of applications to ensure that their students will match. This advice may diverge from that received from internal medicine-specific advisors, such as clerkship directors in internal medicine. In a 2013 national survey of internal medicine clerkship directors in allopathic medical schools, 88% reported that they advised senior students. Clerkship directors who advised senior students recommended applying to a median of 10 programs for students in the highest academic quartile and 15 programs for students in the lowest quartile.[9] During that same year, US allopathic senior students applied to an average of 23 internal medicine residency programs.[10]

Broader considerations of institutional performance at home medical schools also may be driving application inflation in a manner that reveals different priorities in the medical school advising process. Although some advisors may encourage students to increase applications to internal medicine programs because of their own unfamiliarity with Match data, advisors in the dean's office may be motivated to maximize their institution's success. The National Resident Matching Program Match rate is an outcome measure considered by medical school applicants, and dean's office performance assessment is linked to this outcome.

For all these reasons, students may be receiving inaccurate and confusing messages from advisors and from their peers. Taken together, these forces—peer behavior and advice and advisor input—combine to exaggerate the necessary number of applications, which creates and feeds an unstable (and unsustainable) positive feedback loop.

Programs

Residency program directors are struggling to manage the increased number of residency applications; as a result, many programs send out invitations in waves. Student knowledge of peer invitations may amplify anxiety among students who have not yet heard from the same programs, resulting in increased inquiries of individual programs and perhaps applications to additional programs. As residency programs respond to application inflation, they may struggle to identify discriminating factors that will allow them to keep recruiting burdens manageable. The consequence may be an unintended and regrettable reliance on US Medical Licensing Examination scores and reputation of home medical school

as screening tools to grant interviews. Indeed, even before the recent increase in applications per applicant, in a 2006 survey of 2528 program directors from 21 specialties, US Medical Licensing Examination Step 1 score was ranked second most important in residency selection criteria and was second only to grades in required clerkships.[11] Medical students certainly are aware of this phenomenon; the natural response would be to apply to more programs if a student believed he or she was vulnerable in either of these metrics.

In addition, program directors are naturally invested in ensuring a successful Match; they may hesitate to inform applicants of final interview rejection decisions until they have filled all their interview slots. This delay injects more uncertainty into the Match process and is likely to heighten applicants' perception of scarcity.

IMPACT

Just as the drivers of application inflation are operating for students, advisors, and residency program directors, they also experience the impact of this issue. Application inflation imposes significant burdens—educational, psychologic, financial, and logistic—on US seniors. Internal medicine residency program directors have their own anxieties and programmatic concerns. They have responded to application inflation by offering more interview dates. They fear that as applicants apply to more programs, any given applicant may be less likely to rank their residency program highly enough to match into their program; students will have more choices than applicants in years past. Some data support this fear: The average number of ranked applicants necessary to fill an internal medicine residency program position has increased from 5.9 in 2011 to 6.5 in 2015.[2] The increase in interviews increases the financial resource and faculty time necessary for an already costly process, which may affect smaller programs disproportionately. A 2009 national survey of internal medicine program directors reported a median recruitment costs $148,000. Sixty-four percent of the cost is derived from program director and associate program director support; an additional 20% is dedicated to administrative support. The National Resident Matching Program "all-in" policy instituted in 2014 has likely increased this cost as program directors cannot rely on filling some of their positions before the Match. This change drives program directors to interview more candidates.[12]

Despite offering more interview dates, the dramatic increase in applications has resulted in rapid filling of interview slots during the initial phase of the application process, causing alarm among students who did not secure these interview slots. Later in the application process, as students begin to secure more invitations and choice among programs, they begin to cancel previously secured interview slots. Residency programs have responded by overbooking interview slots to compensate for this phenomenon. Overall, the interview season becomes more unpredictable and disjointed for students and program directors.

Both the undergraduate and graduate sides of this phenomenon are concerned that the costs of application inflation are not adding value to the transition from medical school to residency. Rather, inflation is diminishing the educational experience of students and siphoning off educational resources that could be put to better use.[13] In addition to the added time and financial burden created by attending more interviews, student focus on awaiting invitations and planning travel can detract from experience on clinical rotations. Faculty in senior year clerkships report students checking their handheld devices as they watch for interview invitations during hospital rounds. As students perceive that the competition for interview spots has become more intense, they believe an invitation must be accepted within a short window (Clerkship Directors in Internal Medicine Council, March 21, 2016, personal communication). This consequence of application inflation is perverse and unintended.

Despite the augmentation of resources invested in the Match process, evidence suggests that the increased number of applications per individual applicant across the country has a neutralizing effect. Each applicant's increase may cancel out the increase of the next student, thus not improving the likelihood of matching for any applicant. Despite a steady increase in Electronic Residency Application Service applications since at least 2010, there has been no change in the percentage of applicants matched into residency programs.[8] The problem itself has already produced an unstable positive feedback effect in which perception of scarcity is fueling increased applications. This increase leads to a smaller yield of interviews per application, reinforcing the original perception and increasing the undesired behavior.

In economics, "bubble phenomenon" occurs when an asset price increases above the fundamental value of the asset, leading to speculation. Analysis of aggregate match data in this article demonstrates that the value of residency positions has not changed significantly from a demand and supply standpoint, but the perception of their value has. At the fellowship level, there is at least one report of a program responding to the surge in applications with a potentially maladaptive solution: a supplemental application with a fee (AAIM/APDIM internal communication). A small study in otolaryngology showed a 25% decrease in the number of applicants to a program that required a secondary essay.[14] Certainly, it is in neither the interest of applicants or training programs to increase the costs and complexity of the Match.

PROPOSED SOLUTIONS

Application inflation has complex drivers with substantial psychologic underpinnings. Solutions will

require a multilevel approach. We separate our proposed solutions into short-term recommendations and long-term recommendations.

Recommended Short-Term Solutions

First, within the academic internal medicine community, we must develop and disseminate best practices for residency programs, student advisors, and applicants. We suggest the following recommendations for the major stakeholders of this process.

Notification Windows. Develop a window during which programs agree to notify applicants of their status with an invitation for interview, a rejection, or a notification of being waitlisted for possible interview. It will be challenging to determine an appropriate time window for programs to review thousands of applications, but without such a window, students will continue to operate without knowledge of their likelihood of securing a sufficient number of interviews. Mitigating this source of uncertainty could reduce the deluge of student inquiries about their status, and the reflexive application to additional programs could translate into less administrative work at the program level.

Standard Approach and Language. Develop a standard approach and language with regard to a time window for applicants to respond to an invitation before it is offered to another applicant. As a component of this effort, programs must not offer more interview spots than they have the capacity to accommodate. With a known window of at least a few days and a knowledge that an invitation accepted within that window of time does indeed guarantee an interview spot, students should not be as compelled to interrupt their educational and clinical obligations to check for invitations.

Discourage Supplemental Application. Roundly discourage the emerging use of supplemental applications, with or without a fee. Supplemental applications increase the stress, expense, and logistic challenges for an already demanding and complex match process, especially for students with a large debt load from medical school. Although conceptually appealing to programs, they could conceivably worsen the administrative load of the Match, while also alienating applicants.

Provide Match Data. Make readily available the most updated internal medicine residency Match data for all medical school advisors. Program directors and clerkship directors must collaborate with the dean's office at their local institution(s) to bridge the undergraduate medical education and graduate medical education divide that has occurred in this area. Program directors and clerkship directors should provide current internal medicine residency Match data to students, faculty advisors, and student affairs deans. The National Resident Matching Program data we have presented can counterbalance the building anxiety and inaccurate perception of scarcity. With data refuting rumors of fewer spots per applicant than in years past, program and clerkship directors can guide recommendations provided to students from all their trusted sources. This data dissemination also will facilitate agreement among all of these advisors so that students receive a consistent message, also potentially alleviating some of their anxiety around the Match.

Appropriate Etiquette. For student applicants, appropriate etiquette, reinforced by their school and specialty advisors, should be exercised when interacting with residency programs. Namely, if an applicant decides to cancel an interview, he or she must notify that residency program immediately so that the opened interview slot can be offered to another applicant. This courtesy will optimize the number of available interview slots for residency programs and the applicant pool alike.

In addition, we need more data and greater transparency of data. We have only a limited anecdotal window into student motivations and behavior as they apply. Likewise, we have not systematically collected clerkship and program director perspectives. We also lack data on the perspectives of recent medical school graduates who are now residents in our training programs. Important questions for these major stakeholders remain unanswered:

- Are programs more satisfied with matched applicants than they have been in the past?
- How do schools align messages from various student advisors, clerkship directors, program directors, and deans?
- What advice would current residents have deemed useful to have when reflecting back on their own application experience?
- To what extent do programs really rely on US Medical Licensing Examination scores and perceived prestige of medical school to make interviewing decisions?
- What additional factors do programs individually and as a group rely on?

Crucially, we need to know how many interviews actually occur per student and per program. This bedrock information will enable educators at medical schools and residency programs to analyze trends and better advise students during the Match. From the 2015 National Resident Matching Program Applicant Survey, respondents reported receiving a median of 15 interview offers and attending a median of 12

interviews; however, the accuracy of these data may be questioned because of a response rate of not quite 50%. From 2009 to 2015, there is a suggestion of a trend toward more interviews (~2 per year), although it may be an artifact of the "all-in" Match policy.[15] Decision making based on a perception—not a reality—of residency position scarcity currently prevails. Ideally, we will collect more granular data that more factually define "competitiveness" and "prestige" of students and programs, although we recognize that these are potentially controversial issues. In addition to defining the epidemiology of application inflation, surveys also could query communities for potential solutions, including recommendations for student advising and program director communication to applicants. In this way, we could seek broad input into guidelines for recommended behaviors.

Ultimately, better data would permit individualized advising for students entering the Match. These data would be useful not only to the internal medicine community but also to the Association of American Medical Colleges and to other specialties, all of whom are confronting the same issue and striving to craft an optimal transition from medical school to residency. The Association of American Medical Colleges is currently conducting a program director survey that will focus on the practices used by programs to manage and carry out the selection process, from screening applicants for interview invitations to creating the rank order list. The results of this survey should inform recommendations to streamline and optimize the residency selection process for students and residency programs.

Long-Term Solutions

In the longer term, our community may need to recommend a limit on applications, as suggested by Weissbart et al.[8] We recommend that the Alliance for Academic Internal Medicine collaborate with constituent groups to explore the possibility of a specialty-specific recommendation to limit the total number of programs to which applicants would apply at the opening of the Match cycle. This group should include, but not be limited to, the Association of American Medical Colleges, National Resident Matching Program, American Medical Association, and specialty-specific professional organizations. We recognize that there is great heterogeneity among students and internal medicine residency programs and that one size might not fit all. It may be possible to develop variable recommended limits depending on standardized student performance measures.

We do not propose a recommended limit on number of applications without promising our students objective, factual program information they can use to accurately assess their own competitiveness for a given residency program. Standard notification language to be included on residency program websites would spell out certain specifics of what individual programs seek in applicants and what qualifications have led to interviews and placement in their programs. These data would describe characteristics of candidates interviewed and eventually matched by the program in previous years (including average US Medical Licensing Examination scores). Such information could guide students and advisors alike in selecting the most appropriate programs with a more limited number of applications. Program directors may wonder if this information will result in a decrease in total number of applications, given that applicants are free to apply independent of their likelihood of receiving an invitation to interview. When coupled with a recommended application limit, this transparency potentially could decrease the number of less competitive applicants applying to any specific program.

The demand for transparent standards at the program level inevitably leads to a discussion about the transparency and validity of student assessment available to program directors when they make their recruiting decisions. A recent review of Medical School Performance Evaluations from 117 of the 131 Liaison Committee on Medical Education-accredited US medical schools demonstrated that approximately one half provided incomplete information about clerkship grade distribution, making comparisons across schools impractical.[16] The current paucity of comparative, benchmarked assessments very well may lead to an overreliance on US Medical Licensing Examination Step 1 score as a discriminator for interviewing and selection in the Match. As our undergraduate medical education community begins to transform student assessment, we must provide program directors robust, competency-based assessments with transparent reports of student performance that are comparable within and across schools. We should reduce prominence of the US Medical Licensing Examination Step 1 score as a discriminating factor, a purpose for which the test was not intended.[3] The Association of American Medical Colleges' 13 proposed core entrustable professional activities for entering residency offer a promising framework for such a common currency of assessment that will allow for the nuanced judgments to optimize applicant and program fit.

We recognize the controversial nature of a proposal for recommended application limits and the disclosure of what might be considered proprietary program information. We also recognize that the current application inflation is unsustainable and leading to costly and educationally unproductive activity at both the student and residency program levels. Misuse of licensing metrics occurs routinely, and maladaptive barriers to application are emerging. Our recommendations are intended to initiate a constructive conversation to improve the Match by making it more rational (ie, data driven) and transparent (ie, fair).

CONCLUSIONS

Over the past several years, the internal medicine community has seen a steady increase in the number of applications each student submits for the Match. This increase appears to be driven by an unsubstantiated perception that the Match has become more competitive and that there are an insufficient number of spots for qualified applicants. This steady increase creates cost to the applicants and the residency programs without changing any individual applicant's likelihood of a successful Match. Our community must work to prevent an ongoing escalation in these applications and to reverse the current unsustainable situation.

Ultimately, all stakeholders, students, residency programs, and the general public want medical education across the continuum to result in excellent skill sets for all physicians. In internal medicine, it is best accomplished through collaborative work in organizations such as the Alliance for Academic Internal Medicine to ensure high-quality training and competency-based assessment. Collaborative work between stakeholders could establish a validated common currency of assessment and a Match process that ensures "best fit" between student and residency program, not based on perceived criteria of "competiveness" of the applicant or program but based on factors such as learning styles and learning environment that will allow for excellence in ongoing competency development. The current state of the Match process is detracting from these greater goals, and addressing the current crisis will allow us to move closer to achieving these goals.

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