Not the Last Word

Not the Last Word: Want to Match in an Orthopaedic Surgery Residency? Send a Rose to the Program Director

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Back in the day, before the advent of the Electronic Residency Application Service (ERAS), there were no charges for submitting a residency application, but the process was hardly free. Each program required completion of its own, unique form and a high price was paid in time and effort. In 1989, I applied to eight programs and not nine simply because I did not want to glower at the typewriter any longer, answering another set of just-slightly-different questions, making sure my responses fit into the allotted space on the page.

These days, the marginal cost of sending out an application is just one mouse click and 29 bucks. And because it has gotten easier to send out ever-increasing numbers of applications, ever-increasing numbers of applications have been sent. In orthopaedics, 88,169 applications were filed in 2015 by only 1058 applicants [7]—on average, more than 83 per person.

Applicants may be happy to be unshackled from the typewriter (assuming they even know what a typewriter is), but overall, ERAS has left many of them worse off. The fraction of the medical school class

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applying to orthopaedic surgery has remained stable at ~ 4% for the past 30 years [7], and the slight increase in the number of residency positions across the country has been offset by a commensurate increase in the size of the graduating class nationally. That is, the odds of matching are unchanged, but now everyone who wants to keep even is forced to spend more than USD 1000. And while it is generally ludicrous to apply to 83 programs, in a world where everybody else is doing so, such numbers are not only smart but necessary. Indeed, another front in the residency arms race [2] has been opened.

Programs may appreciate getting applications in electronic form, but they too can be harmed by the new arrangement. Under ERAS, programs are inundated with applications—about 540 per program, on average [7]—and because applications are so easily submitted, programs have no means of inferring the applicants' particular interest. (Suffering at the typewriter is a mark of sincerity). Programs face two options: Reading a great deal of casually submitted applications or relying on arbitrary screening criteria that

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might filter out otherwise worthy and well-suited students.

There is a solution to this problem, and it comes to us from the world of online dating. There, one "applies" for a date by sending a message. These messages are free, and thus can be sent in great number. Desirable partners are inundated with messages and, lacking the means of inferring the senders' particular interest, thus face two options: Wading through a lot of casually submitted requests for dates, or relying on arbitrary screening criteria that might filter out otherwise worthy and well-suited potential partners.

The solution to the online dating problem is sending a rose. If users of the dating service are given a limited quantity of (electronic) "roses" that can be attached to a message, these users can, by expending a scarce resource, signal specific interest. And it works. In their study on signaling in an online dating market, Lee and Niederle note: "By sending a rose a person can substantially increase the chance of [a date proposal] being accepted … [and] roses increase the total number of dates" [6].

A similar approach has been applied in the more practical realm of job hunting by graduate students in economics [3]. Each year, more than 1000 newly minted PhDs hope to fill more than 1000 academic and industry positions. As John Cawley PhD, Professor in the Department of Policy Analysis and Management and Department of Economics at Cornell University, commented in his paper on the academic market for new PhD economists: "Employers receive applications from far more candidates than they can interview… and a lack of information about the interest of otherwise-similar applicants can lead to suboptimal interviewing schedules" [3]. To address this problem, the American Economic Association (AEA) allows applicants to append up to two "signals of interest" when responding to advertisements on its job network [1]. These signals are credible because the AEA is credible. Employers can confidently rely on the AEA to strictly enforce a limit of two signals.

Within orthopaedics, an organization similar in stature to the AEA could create such a system for residency applicants. The mechanism is simple: Students would register with this organization and designate, say, 15 programs as "core"—in a sense, sending a rose their way. Immediately after the application-filing deadline, the organization would contact the programs and share with them the names of the applicants who designated them.

Residency programs would, of course, not be obliged to pay attention to the list, but they would be wise to do so. All things equal, offering interviews to students who have expressed specific interest will improve the program's yield (both in terms of the fraction accepting an interview and the fraction ranking the program). A signaling system may also specifically benefit middle-tier programs, by enabling them to recruit better candidates. Without a signal, it's easy to imagine that some superstar student might be rejected by a middle-tier program under a mistaken assumption: "She would never come here, so let's not waste an interview slot on her."

To be sure, applicants can send signals now, even without a rose-sending system in place. But there is a problem of trust. There is no way for a recipient to be sure that the applicant did not send out 83 emails, each swearing love and fidelity, to accompany each of his 83 applications. The distinction is that under the proposed system there is a reputable organization to lend its credibility to the process.

Come to think of it, the organization need not "lend" its credibility, but could rent it. I think a charge of USD 200 per student could pass muster, considering that the service might liberate the applicant from submitting 60 or more marginal applications at USD 29 apiece. Even after paying the programmers to write software to

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implement the system—and paying the lawyers even more to bless it—a charge of USD 200 per student will leave an ample reward for the sponsor. (Or at least in the short run: I imagine that ERAS, eager to recoup the revenue lost on those applications not sent, would start selling a signal service itself soon enough).

A signal service is not a perfect solution, but it can leave applicants better off, and leave programs better off—and, with the right fee structure in place, leave the sponsoring organization better off.

Why isn't somebody doing this?

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Now that applying to many residency programs is easy, programs receive so many applications that they have trouble deciding whom to interview, particularly because receiving an application is no longer as strong a signal of interest as it was when applying was harder. The same could be said for how residents applied to colleges when they were younger, and how they will apply to fellowships when they are older. The internet and common application tools make sending applications easier, and evaluating them harder. This is the common problem of "congestion." For example, it's harder to use email when we get too many emails.

In congested markets, in which not every interesting applicant can be interviewed, signals are important. An application itself is a signal about an applicant's accomplishments. Like a peacock's tail, it shows how desirable a candidate is (that is, why the program should be interested in the applicant). When a program receives too many applications, it becomes more costly to read them all, but each one continues to convey the applicant's accomplishments.

What is lost when applications are easy to send is how interested the applicant is in the program. And, in a congested market, it helps to signal not only how interesting you are, but also how interested, because programs that can't interview every attractive applicant need to devote much of their interviewing to applicants who might ultimately be interested.

In Economics, the AEA's signaling system allows each candidate to send no more than two signals of particular interest in being interviewed, for free [4]. Why only two? Because while one signal can unambiguously improve the process of selecting candidates for interviews [5], too many signals could harm the process. Suppose we allowed 50 signals, then the absence of a signal would start to be a signal itself ("this candidate must not be interested in us at all if he didn't even send us one of his 50 signals …"). Signals get much of their value by being scarce. So when you can send only two, a program which receives one knows that you targeted them as one of only two recipients.

To which programs should a candidate signal? We advise candidates not to send either of their signals to the top programs in their field. Those programs can simply interview the candidates they like best, since they have good reason to believe that every application signals genuine interest. Signals will do the most good if sent to programs that should be interested in the candidate, but to whom it might not be obvious that he or she is interested in them.

The residency match removes congestion from the process of making offers and accepting or rejecting them, since each participant can submit a long rank order list that is processed centrally [8]. But interviewing remains congested, because interviews take time. It is worthwhile considering how changes in the market design [9] could smooth the process. Organizing a signaling system—and then monitoring how it works—seems like a promising step.

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I read with interest Dr. Bernstein's comments about how to improve the efficiency of the residency match process for both applicants and program directors. Now, before I comment on specific electronic or social media-based solutions, I must disclose that my last date was handled on a rotary dial phone with a wire cord that attached to the wall. I have never been accused of knowing anything about internet dating, social media, botany, or the AEA. I have had the privilege of having served in the process for many years and in leadership positions. My comments here are my own and do not reflect the position of any organization to which I have been or am currently affiliated.

The answer is not to "add on" to the process by involving yet another organization charging a fee in an effort to somehow fine tune the efforts of the ERAS. The application process, as inefficient as it may be, is fair to the applicant. That takes precedence. Any modifications that require the applicant to designate special interest compromise the integrity of the process and should not be encouraged.

The applicants' actions already indicate their preferences. Besides the application, the successful applicant must choose to do an elective at two to four programs outside of his or her medical school. Applicants express further interest by requesting additional letters of recommendation or soliciting contact with program leaders at desirable programs.

Adding expressions of "particular interest" will result in applicants feeling compelled to express affection for a program that may help their cause with a few programs, but inevitably harm their relationships with others. This will not affect the best of the best programs and applicants; they will be sought out by everyone. For the majority, it will further compromise the integrity and fairness of the process.

Program directors need to assume leadership around the effective counseling and communication offered to our applicants. Colleges and universities have employed processes that can, with good success, direct their graduates to professional schools. There are far more medical schools and prospective medical students than orthopaedic programs, but it would be rare for an applicant to apply to more than 30 schools. Chances of success do not increase with an increased number of applications. We need to do a better job of communicating this to our students.

As a group, we should be able to better direct applicants to the programs to which they are likely to match. A registry of information available to programs and applicants would help. All programs have preferences. Programs could communicate these preferences honestly and publicly. Characteristics of those individuals who have matched and ranked could be blinded and made publicly available. A registry of valid information would enable us to be better counselors to our students. Save the flowers for loved ones. Let us focus instead on arming our programs and applicants with information to improve their decision making.

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Orthopaedic surgery is a dynamic and fascinating field. It is no wonder that medical students are attracted to our specialty in large numbers. I read Dr. Bernstein's essay with interest, but I do not see the issue as he does. We in orthopaedics suffer from an "embarrassment of riches." We annually attract the top medical students, and that is not a bad thing. Having a large, highly qualified pool of applicants to choose from ensures that our trainees possess more than the basic qualities needed to succeed in the field of musculoskeletal medicine. It also

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ensures that all programs, regardless of size, type, or location will have their complement of outstanding students to begin training in orthopaedic surgery.

That fact that an electronic application process makes it easier to apply to more programs is not a problem for applicants nor for programs. Program directors and committees must fully evaluate these applicants and not limit the number of applications they review. Top-tier undergraduate colleges and universities have seen a similar increase in the number of applicants they are reviewing. It should be up to each program to design and implement a suitable system for resident selection that is fair and focuses on diversity and inclusion.

I do not see the several thousand dollars spent on the application process as an impediment when compared to the mountain of educational debt accrued through college and medical school. I also do not see the benefit of Dr. Bernstein's "Rose Proposal" system. Programs will want to interview candidates of their choosing based upon their own specific criteria, not based on students' expression of interest in their programs. In my experience, students who "would never come" to a program usually reject the interview offer when the time comes. Ultimately, the student's desire to send a "rose" or another such signal to a program does not make him or her a better candidate.

Dr. Bernstein does not mention whether the job-application process through the AEA is similar to ours, but I assume it is not. I have not heard of Wall Street firms utilizing a "matching" program to hire college graduates out of the top business schools, though perhaps they should. In the end, it is the medical school advisors who need to do a better job of steering candidates towards or away from this competitive field, and the program director and committees to scrutinize each application carefully and completely for suitability.

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