

# Recent Trends and Future Directions for the Integrated Plastic Surgery Match

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**Summary:** The integrated plastic surgery residency match has risen to be the most competitive specialty in the 2022 match. This reality has prompted medical students to reach a high level of personal achievements, including pursuing research fellowships to boost research productivity. The competitive nature of this specialty has highlighted several barriers for applicants, such as those from groups underrepresented in surgery, of lower socioeconomic backgrounds, or without a home program. In recent years, there have been several changes to the match that stand to attenuate disparities among applicants, such as the transition to virtual interviews and the shift of the United States Medical Licensing Examination Step 1 score to pass-fail. The introduction of the Plastic Surgery Common Application and standardized letters of recommendation has altered the application process for the plastic surgery match. Given these recent trends, evaluating the current landscape and looking toward future directions for the integrated plastic surgery match becomes necessary. Understanding these changes will not only benefit medical students by giving them a transparent look into the match process but also provide a framework for other specialties to follow to increase accessibility to their specific specialty. (*Plast Reconstr Surg Glob Open* 2023; 11:e5053; doi: 10.1097/GOX.0000000000005053; Published online 19 June 2023.)

## INTRODUCTION

An increasing number of qualified applicants participate in the residency match every year. In 2021, the number of applicants reached 42,508, an all-time high.<sup>1</sup> Unfortunately, the number of residency positions has not grown proportionally, leading to decreased match rates across specialties. Competitive specialties, such as plastic surgery, have fewer positions available in the match than medical doctor (MD) seniors—residency applicants who are in their last year of medical school at a U.S. MD granting institution—who prefer each specialty (Fig. 1).<sup>2-5</sup>

Integrated plastic surgery residency was the most competitive specialty in the 2022 match, with an applicant match rate of around 55%. The match rate for MD seniors has dropped by 23%, from 85.7% in 2018 to 62.7% in 2022. This is the most significant decrease in match

rate reported by National Resident Matching Program data (Fig. 2). Additionally, applicant achievement, particularly research productivity, has grown tremendously. To improve their chances in the match, many applicants utilize financially burdensome options, such as research fellowships, multiple away rotations, and submitting applications to numerous residency programs nationwide, making integrated plastic surgery one of the costliest medical specialties.<sup>6-8</sup>

Overall, the volume of applicants applying, coupled with the increasing applicant academic success, without a proportional increase in positions available, makes the integrated plastic surgery match process both costly and risky (Fig. 3). Recent changes, such as the transition to virtual interviews after the COVID-19 pandemic, the Plastic Surgery Common Application (PSCA) introduction, and the looming shift to a pass-fail (P/F) United States Medical Licensing Examination (USMLE) Step 1 score, have altered the overall selection process for applicants and residency program selection committees. This review will examine the integrated plastic surgery match's current landscape and future directions.

## TRANSITION TO PASS/FAIL USMLE STEP 1 SCORES

Historically, USMLE scores have been utilized as a quick metric to differentiate applicants in the match.<sup>9,10</sup>

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Many programs require a “cutoff score” for a holistic application review.<sup>11,12</sup> Step 1 scores have been positively associated with the total number of interview invites and match rates for the integrated plastic surgery applicant.<sup>13,14</sup> Matched applicants’ Step 1 scores have trended upward for the past few years, supporting the increased academic achievement of the applicant pool (Fig. 4).<sup>1</sup> Overall, current literature overwhelmingly endorses the importance of Step 1 scores for success in the match.

In 2020, the National Board of Medical Examiners and the Federation of State Medical Boards revealed that the Step 1 examination results would no longer have a visible score. Test takers would receive a P/F mark beginning in 2022.<sup>15</sup> The transition was made because the three-digit scoring system was suggested to augment disparities for disadvantaged and underrepresented groups.<sup>16</sup> Furthermore, they argued that a P/F scoring system would improve the overall wellness of all medical students.<sup>16,17</sup>

While the effects of this modification are to be determined, some have proposed other metrics, replacing Step 1 as the primary objective metric for resident selection.<sup>18–20</sup> Many students may utilize their Step 2CK as a preselection system of measurement for their future specialty options as they did for Step 1 in the past.<sup>21</sup>

Even with a scored Step 1 examination, research productivity has been increasingly emphasized in the integrated plastic surgery match. In the past 10 years, the number of abstracts, presentations, and publications of the matched integrated plastic surgery applicant has grown exponentially (Fig. 5).<sup>1</sup> With the transition to a P/F Step

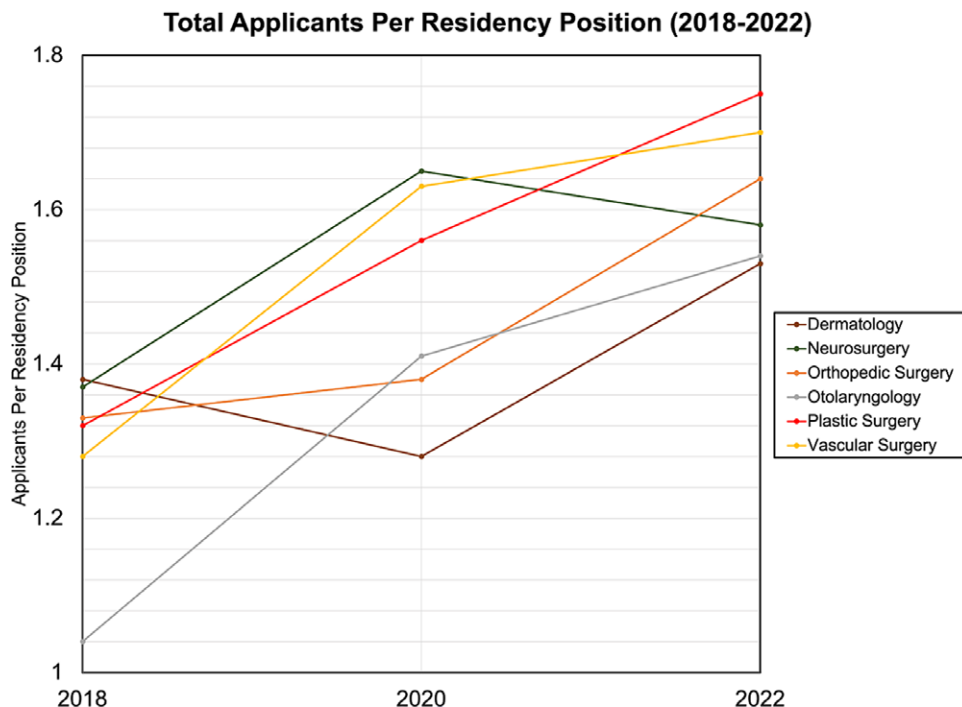
### Takeaways

**Question:** How are recent changes to the integrated plastic surgery match affecting those involved?

**Findings:** With the transition of USMLE Step 1 to pass-fail scoring, integrated plastic surgery programs will increasingly emphasize research productivity and applicant familiarity. The Plastic Surgery Common Application’s introduction appears to decrease costs for applicants while improving the recommendation letter upload process for writers. There is still debate over whether these changes will improve equity in the match.

**Meaning:** This article looks at recent changes in the match, which will provide transparency to medical students, while also providing a framework for other competitive specialties looking to increase accessibility into their fields.

1 examination, this trend is expected to continue, with many prospective applicants opting to complete research fellowships to demonstrate their interest in the field and capacity for research. A survey of integrated plastic surgery applicants indicated that most applicants complete research fellowships to strengthen their applications to the match.<sup>7</sup> With increased pressure to produce research, the intent of many applicants may shift away from pursuing projects that are slower to publish, such as those in the basic sciences, in favor of those that are easier or quicker to publish.<sup>22</sup>



**Fig. 1.** A graph that shows the total applicants per residency position for multiple specialties (2018–2022).<sup>2–4</sup>

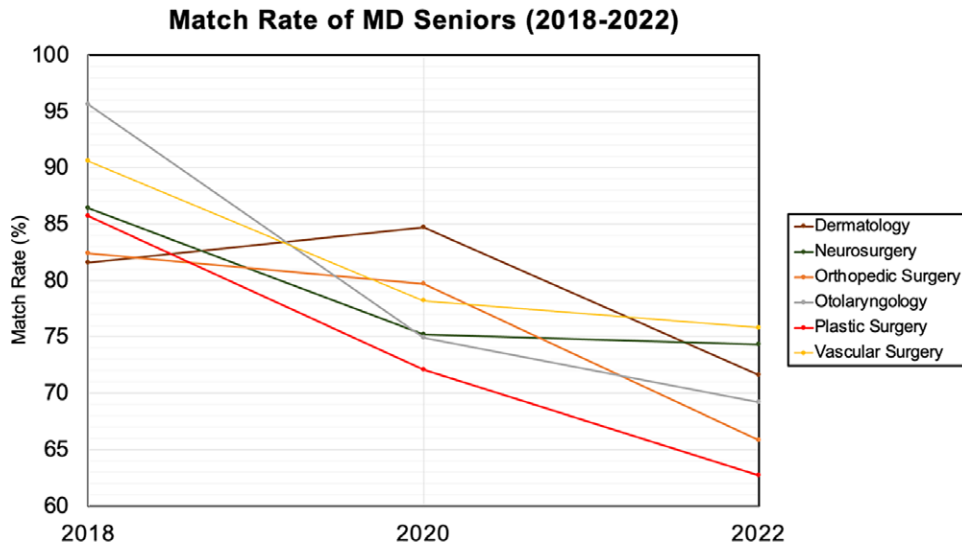


Fig. 2. A graph that shows the match rate of MD seniors for multiple specialties (2018–2022).<sup>2-4</sup>

However, an increased emphasis on research productivity is not without its pitfalls. Applicants without a home program in the top 40 of National Institutes of Health funding are clearly disadvantaged in research opportunities.<sup>23,24</sup> Furthermore, most integrated plastic surgery programs are at well-funded institutions, making this a compounding disadvantage for these applicants who lack both a home program and research prospects.<sup>25</sup> While not all substantially impactful articles require funding, available financial support increases opportunities and capacity to publish.<sup>26</sup>

Many applicants who complete research fellowships are not funded, causing an accumulation of interest on student loan debt.<sup>27</sup> This endeavor not only adds a year of medical school but is also financially costly, disadvantaging students from lower socioeconomic backgrounds. Transitioning to a P/F Step 1 pushes many integrated plastic surgery applicants toward pursuing a research fellowship. This change may exacerbate disparities for those from disadvantaged backgrounds rather than reducing inequalities as initially intended.

### Total Integrated Plastic Surgery Applicants and Positions Available in the Match

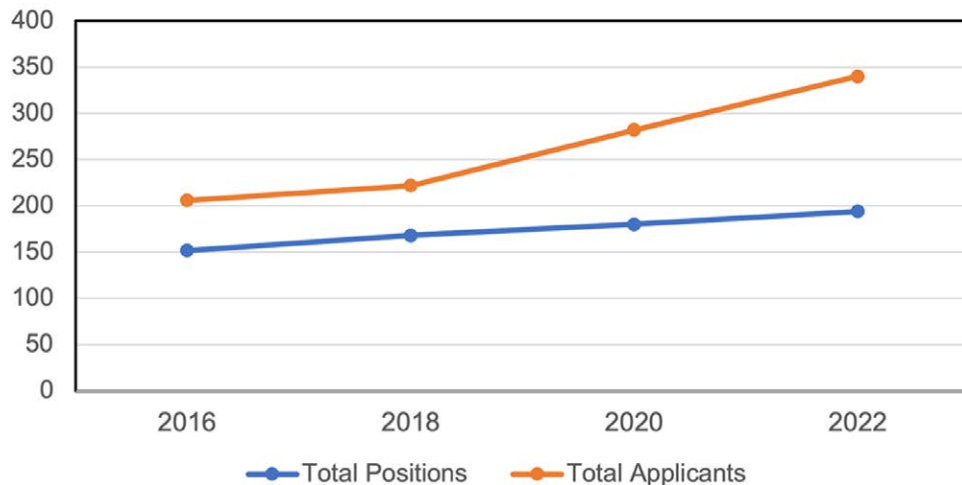
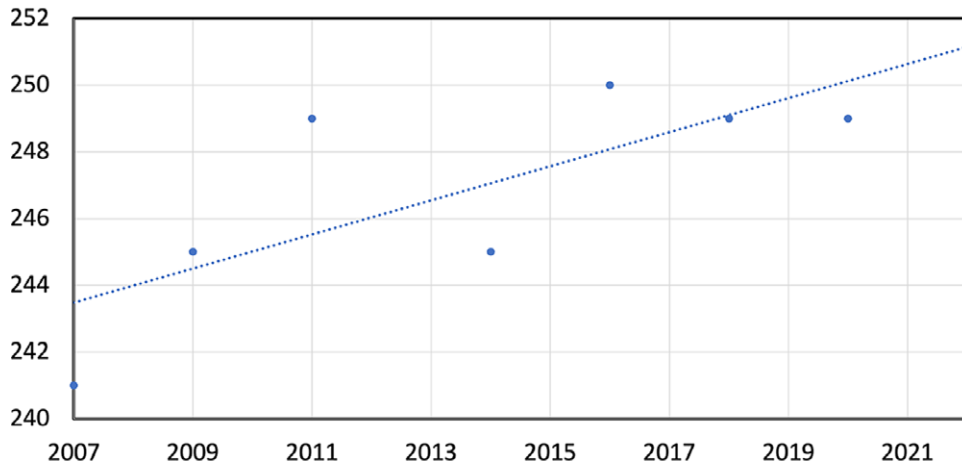


Fig. 3. A graph that shows the number of applicants and positions available in the integrated plastic surgery match (2016–2022).<sup>2-4</sup>

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### USMLE Step 1 Score of Matched Integrated Plastic Surgery Applicants



**Fig. 4.** A graph that shows the average USMLE Step 1 score of matched integrated plastic surgery residents with a linear growth trendline (2007–2022).<sup>1</sup>

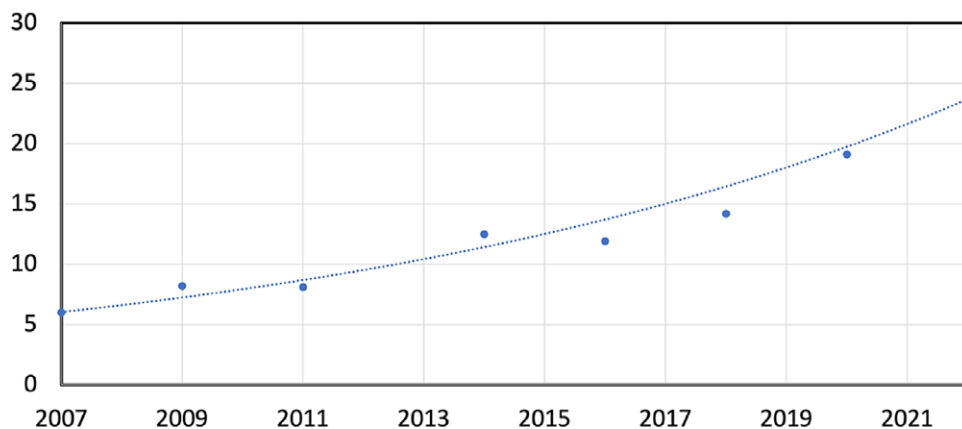
### THE INTRODUCTION OF THE PLASTIC SURGERY COMMON APPLICATION

The Electronic Residency Application Service (ERAS) was introduced over 20 years ago by the Association of American Medical Colleges as a computerized system intended to streamline the United States residency application process.<sup>28</sup> Before ERAS, many programs utilized their distinct application form only provided to applicants who requested the document.<sup>29</sup> Due to the effort required to apply to an individual program, most applicants only applied to around a dozen programs.<sup>30</sup> Since then, however, the average number of applications per applicant has skyrocketed alongside the average cost per application. An integrated plastic surgery applicant applying

to 90 programs through ERAS will pay over \$2000.<sup>31</sup> To cover these costs, 33.8% of applicants obtained supplemental funding, while 30.7% of applicants admitted to utilizing supplementary income. Numerous groups have described the process as a Prisoner’s Dilemma of game theory, where applying to as many programs as possible becomes the main tactic in the application process. At the same time, match rates remain relatively stagnant.<sup>32–34</sup>

The PSCA was introduced as a potential cost-free alternative to ERAS for plastic surgery residency applicants (Table 1). The creators of the PSCA claimed that their service was superior to ERAS by limiting the number of experiences and research items in the application, making each application more concise and focused.<sup>35</sup> The program was

### Research Items of Matched Integrated Plastic Surgery Applicants



**Fig. 5.** A graph that shows the number of research items for matched integrated plastic surgery applicants with an exponential growth trend line (2007–2022).<sup>1</sup>

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**Table 1. Side-by-Side Comparison of the PSCA versus ERAS**

	PSCA	ERAS
Cost	Free of cost	Costly
Letter upload process	Streamlined process for academic plastic surgery letter writers	Letter writers must upload after email request
Output	Concise output	Lengthy output
Signaling	Program signaling	No program signaling
Application sorting	No formal application sorting mechanism	Applications can be sorted by examination scores
Personal statement and letter assignment	Only one personal statement and four uploaded letters of recommendation max that are visible to every program that applicant applied to	Allows for program-specific assignment of letters of recommendation and personal statements
Specialty-specific customization	Specialty customization with short answer questions	No specialty customization
Timeline	Timeline flexibility	Uniform application timeline
Familiarity	Medical school administrators are relatively unfamiliar with the system	More familiarity and visibility with medical school support administrators
Listing of accomplishments and activities	Applicants are limited in the number of activities, research items, and accomplishments they can list	Allows applicants to list all activities, research items, and accomplishments
Logistics	Technical difficulties in earlier versions	Relatively few technical issues

initially piloted for the 2020–2021 match cycle. All 86 integrated plastic surgery programs were invited to partake in the pilot, 20 of which agreed to participate. These 20 programs accepted applications through ERAS and PSCA. In a follow-up survey, applicants and reviewers believed that the PSCA could be a legitimate alternative to the status quo, citing cost-effectiveness as a major benefit over ERAS.<sup>36</sup>

The PSCA 2.0 was introduced for the 2021–2022 application cycle, intended for use as a side-by-side comparison with ERAS.<sup>37</sup> Only 17 programs participated in the second version of the PSCA. For the following 2022–2023 cycle, almost every program utilized the PSCA in some fashion, with 58 programs using both ERAS and PSCA, 22 programs using PSCA only, and five programs that solely used ERAS.<sup>38</sup> To our knowledge, this was the first instance of an outside electronic application service overtaking ERAS in terms of use for any medical specialty in the United States.

The 2022–2023 PSCA application also introduced signaling, a process where applicants could “signal” a total of five programs that they were especially interested in. Other specialties have successfully used signaling in the past, citing that signaling allowed programs to get the most out of limited interview dates and availability in the match.<sup>39–41</sup> Otolaryngology residency has implemented signaling, which increased interview offers relative to programs that did not signal.<sup>42</sup> Overall, the addition of signaling in the plastic surgery residency match has been viewed as an improvement to the application process; however, the number of signals for each specialty and how programs consider applicants they received signals from still need to be researched further.

### INTERACTIONS WITH APPLICANTS: AWAY ROTATIONS, STANDARDIZED LETTERS OF RECOMMENDATION, AND VIRTUAL INTERVIEWS

The shift from narrative letters of recommendation (LORs) to standardized LORs has gained traction over the last few decades, beginning with emergency medicine

adopting this method, followed by otolaryngology and plastic surgery. LORs are instrumental in an applicant’s success with matching, often ranked as programs’ most crucial subjective factor in deciding on applicants to interview.<sup>43</sup> Program directors endorse familiarity with the author of the letter as being extremely valuable, and a survey found that “what LORs say” and “who says it” are among the most critical factors when evaluating an applicant.<sup>12,44</sup> However, research has shown that LORs are imprecise and fall short of stratifying applicants.<sup>45</sup> Narrative LORs are susceptible to racial bias, gender bias, and score inflation.<sup>46–48</sup> While the latter component is more challenging to navigate, the former can be made more equitable and permit a consistent evaluation of students.

Because LORs serve as an endorsement of an applicant and are critical to a successful match, a standardized form can save the letter writer time while ensuring that critical components are not withheld. The standardized plastic surgery residency recommendation form diverges from the narrative LOR by providing a scale with previously determined applicant attributes, granting an objective review of each applicant. A scale that brings forth the same vital components of an applicant’s qualifications dramatically reduces the chance of bias and stands to eliminate hyperboles that may influence a solely narrative LOR. This method can also bring the applicant’s performance to the surface rather than allowing the letter writer’s reputation to impact the applicant’s evaluation significantly.

The COVID-19 pandemic has significantly impacted the plastic surgery match process with limitations on the number of away rotations in the 2022 match cycle and the adoption of virtual interviews, ultimately resulting in a significant increase in home institution match rates. Geographic bias has historically played a significant role in the match, with many applicants matching at their home program or a nearby regional program.<sup>49</sup> In 2019, 14.61% matched at their home institutions versus 25.12% in 2021.<sup>50–52</sup> However, the 2022 match cycle resulted in home institution match rates similar to previous non-COVID-19-affected years.<sup>50,53</sup> Therefore, the return of away rotations without

a corresponding return to in-person interviews highlights the significance of away rotations for students matching to external programs. Furthermore, the National Resident Matching Program program director Survey results rank “audition elective/rotation in program director’s department” and “prior personal knowledge of applicant” among the highest factors when considering whom to rank.<sup>43</sup>

While reassuring applicants of the importance of away rotations, these data can also serve as a barrier for students from socioeconomically disadvantaged backgrounds where cost is a hindering factor. A survey found that applicants spent 9.2 weeks on away rotations, and the average cost of away rotations was \$3591 per applicant. This same survey also found that an away rotator filled 27% of post-graduate year 1 positions, and an additional 17% were filled by a home medical student.<sup>54</sup> These realities can hinder financially disadvantaged students and dissuade them from pursuing a plastic surgery residency, especially considering the documented importance of away rotations in a successful match.

A positive shift can thus be appreciated with the transition from in-person to virtual interviews when considering cost as a limiting factor for applicants. The financial burden of residency interviews on medical students is well documented; in an electronic survey of U.S. allopathic seniors, 64% of respondents reported spending at least \$2500, while 13% spent \$7500 or more.<sup>55</sup> Furthermore, this study showed that specialty competitiveness was predictive of higher interview costs. Plastic surgery was ranked among the most competitive specialties, with 24.7% of applicants turning down interviews for financial reasons. Another survey found that the average student spent \$3500 on interviews and that 63% stated that cost was a limiting factor in accepting interviews.<sup>56,57</sup> A retrospective analysis demonstrated that the average savings for plastic surgery residency applicants were estimated to be over \$9000.<sup>8,58</sup>

An encouraging finding from a study among program directors and candidates who participated in the Complex General Surgical Oncology 2020 fellowship recruitment was that virtual interviews are favored by faculty, possibly due to their convenience, and 60% of program directors agreed or strongly agreed that it allowed for an accurate representation of the candidate.<sup>59,60</sup> Another study evaluating virtual fellowship interviews specifically found that most applicants and program directors felt that virtual interviews were not a hindrance to matching at the top of their rank list.<sup>61</sup> This finding agrees with Menhaji’s study, which found that over 50% of female pelvic medicine and reconstructive surgery fellowship program directors would likely continue the virtual interview format.<sup>62</sup>

Although virtual interviews are a practical option that reduces applicant costs and paves the way for a more equitable match, program directors have reported weaknesses of virtual interviews.<sup>63</sup> Among these is a decrease in the ability of interviewers to connect with residents and an inability to assess the applicant’s interaction with administrative staff and faculty, which hinder the program’s ability to determine if the applicant is a “good fit” for the program.<sup>64</sup> Furthermore, a survey of program directors found that 75% disagree or strongly disagree that virtual

interviews made it easier to assess an applicant’s fit with the program.<sup>65</sup> There can also be discrepancies observed among program directors and candidates, as only 50% of candidates agreed or strongly agreed that the video interview allowed for an accurate representation of the interviewer, and only 39% agreed or strongly agreed that it allowed for a precise representation of the program.<sup>59,66</sup> Importantly, virtual interviews are not immune from all inequities. These include but are not limited to the applicant having a designated, distraction-free environment for the interview and a high-quality internet service.

Despite the weaknesses and limitations of virtual interviews, they hold the potential to significantly reduce the financial barriers applicants face, especially as away rotations become of utmost importance to a successful match. A commonality of LORs and away rotations is that they stand to introduce the applicants to the program, therefore establishing them as familiar personalities. Research has shown that although virtual interviews fall short of painting a complete picture of an applicant, program directors will likely continue them, and it can be assumed that this is the new landscape for applicants.

## DISCUSSION AND FUTURE DIRECTIONS

Recent changes to the integrated plastic surgery match process intend to reduce inequities between applicants and increase the efficacy of the application process. With a decreased emphasis on Step 1 scores, medical schools may reduce the preclinical portion of the curriculum and increase clinical experiences. This trend toward increased longitudinal clinical experiences has occurred throughout medical schools worldwide.<sup>67</sup> Medical schools that still use a traditional curriculum may need to consider whether their students appropriately utilize time in medical school. An increased emphasis on clinical curriculum could better prepare students for the Step 2CK examination and future clinical practice.

Early mentorship at outside institutions with plastic surgery residency programs is essential for students without a home plastic surgery program. Studies have shown that proximity to a plastic surgery residency program correlates with the number of mentoring relationships for mentors and mentees.<sup>68–70</sup> Recent educational opportunities, such as the “Prepped” Sub-Internship Preparatory Program, the American Society of Plastic Surgeons Roadmaps Program, and the Plastic Surgery Diversity, Equity, and Inclusion Mentorship Program, are all new initiatives aimed at addressing disparities and improving equity for those pursuing a career in plastic surgery.<sup>46</sup> Currently, the Plastic Surgery Diversity, Equity, and Inclusion Mentorship Program is only offered by several plastic surgery residency programs on the west coast. The introduction of similar nationwide programs could further improve equity in the plastic surgery match nationwide.

The PSCA—an alternative to ERAS—appears to be gaining momentum in terms of utilization by plastic surgery residency programs. Programs should investigate a complete transition to the PSCA from ERAS due to the difference in cost, specialty-specific improvements, and flexibility. PSCA includes a search function for familiar letter writers and a

standardized letter format for plastic surgery built into the system. While there were some technical issues with the earlier versions of the program, the latest version appears to have had no problems to our knowledge. Within the PSCA, students were given five signals, each intended to signal interest in different programs. The ideal number of signals for applicants and their resulting advantage in gaining interview invites need to be researched further.

The authors recommend that other medical specialties investigate and potentially follow some of the changes made by plastic surgery programs to improve the residency application process. By creating a system like the PSCA, specialties can reduce barriers for applicants, simplify the process for all involved, and include specialty-specific actions, which could aid in applicant selection. While this transition would require a momentous effort, the benefits outweigh the costs, particularly in increasingly competitive specialties.

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#### DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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Research is ethical and does not include specific data on animal or human subjects. All data used are available and accessible to the public.

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