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In the Mind of the Ophthalmology Residency Applicant: Deciding Where to Apply, Interview, and Rank

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Abstract

Objective This article characterizes the resources used by ophthalmology residency applicants when deciding where to apply, interview, and rank.

Design Cross-sectional, online survey.

Participants All applicants to the University of California–San Francisco ophthalmology residency program during the 2019 to 2020 and 2020 to 2021 application cycles.

Methods A secure, anonymous, 19-item post-match questionnaire was distributed to participants inquiring about demographic information, match outcomes, and resources used to learn and make decisions about residency programs. Results were analyzed using qualitative and quantitative methods.

Main Outcome Measures Qualitative ranking of resources used to decide where to apply, interview, and rank.

Results One hundred thirty-six of 870 solicited applicants responded to the questionnaire, for a response rate of 15.6%. Digital platforms were ranked as more important resources than people (i.e., faculty, career advisors, residents, and program directors) when applicants were deciding where to apply and interview. Digital platforms became far less important when applicants were formulating their rank lists, at which time the program's academic reputation, perceived happiness of residents and faculty, interview experience, and geographic location were more important. When learning about residency programs, 100% of respondents engaged with program Web sites, and the majority engaged with program emails ($n = 88$ [85.4%]), Doximity ($n = 82$ [79.6%]), Reddit ($n = 64$ [62.1%]), Instagram ($n = 59$ [57.3%]), the FREIDA residency program database ($n = 55$ [53.4%]), and YouTube ($n = 53$ [51.5%]). All 13 digital platforms included in the survey were utilized by at least 25% of respondents, largely passively (i.e., reading rather than producing content). Respondents indicated that the most important topics to include on program

Keywords

- ▶ ophthalmology
- ▶ applicant
- ▶ residency
- ▶ medical student
- ▶ digital media
- ▶ decision-making
- ▶ information gathering

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Web sites were the number of residents accepted per year, current resident profiles, and resident alumni job/fellowship placement.

Conclusion Applicants engage heavily with digital media in deciding where to apply and interview but rely heavily on their personal experiences with the program in deciding where to rank. Ophthalmology programs may facilitate recruitment of applicants by optimizing their digital media platforms.

Every year, hundreds of medical students dedicate significant time and energy to apply for ophthalmology residency using the San Francisco Residency and Fellowship Matching Services (SF Match), representing an important milestone that shapes the trajectory of their future careers. The recruitment process is expensive for both applicants and residency programs. Applicants spend an average of \$5,704 each application cycle.¹ Residency programs review an increasing number of applications each year despite funding cuts for graduate medical education from the Center for Medicare and Medicaid Services.¹ The average expense for each interview, including faculty, staff, and administrative time, is estimated to reach \$1,042. This excludes recruitment costs such as student tours, marketing, and review of non-interviewed candidates.^{2,3}

The application cycle itself spans an entire year and involves three distinct stages for applicants: deciding where to apply, interview, and, ultimately, rank. Prior literature exploring applicant decision-making have focused on financial and interview scheduling considerations,^{1,4} but have not explored the decision-making process at each stage. Deciding where to apply versus interview and rank are distinct decisions with widely variable levels of commitment. For example, applicants often decide where to apply with limited firsthand knowledge of most programs, while a decision to rank is often informed by additional, multifaceted considerations after visiting and interviewing at a program.

Online digital resources are increasingly used by applicants to gather information and make decisions.⁵ These resources include residency program Web sites as well as databases and interactive platforms such as Twitter, YouTube, Reddit, Doximity, and the FREIDA residency program database. Which resources are most important and the types of content applicants find most useful at each stage of the decision-making process have not been explored. These questions are particularly important in light of the coronavirus disease 2019 (COVID-19) pandemic, which rendered all interviews virtual.⁶ As a result, both applicants and residency programs rely exclusively on digital communication to make appropriate match decisions. In addition, while the match rate has remained relatively stable at 74 to 78%, the mean number of applications per person has risen from 48 in 2008 to 80 in 2021.^{7,8} This indicates that medical students are applying to a greater number of programs with which they arguably have little direct experience.

The purpose of this study is to evaluate the resources that applicants use at each stage of the residency application

process: deciding where to apply, interview, and rank. A secondary aim is to identify the types of digital content applicants find most useful in their decision-making process. These findings can aid residency program leaders in recruiting applicants who are a good fit for their program.

Materials and Methods

This study was conducted in accordance with the tenets of the Declaration of Helsinki and Good Clinical Practice Guidelines, and designated exempt by the University of California, San Francisco (UCSF), Institutional Review Board. The study is a cross-sectional survey of 2019 to 2020 and 2020 to 2021 ophthalmology residency applicants who applied to the UCSF program. After obtaining informed consent, participants were queried via anonymous questionnaire through the Qualtrics (Qualtrics XM) software. Given that no similar studies had been conducted for ophthalmology,⁹ the questionnaire was created after extensive literature review and input from ophthalmology program directors (PDs) and directors of medical student education at various institutions, and validated by current ophthalmology residents at UCSF.

A total of 14 content topics (19 items) were included in the questionnaire (→ **Appendix A**, available online only), which consisted of four sections inquiring about demographic information, match outcomes, how students gathered resources when learning about programs, and how students made decisions at each stage of the application process: deciding where to (1) apply, (2) interview, and (3) rank. Specific questions pertained to the importance applicants placed on digital mediums such as social media, online databases, and residency program Web sites compared with more traditionally surveyed considerations such as program structure and faculty when making their residency application decisions.^{1,10} For instance, applicants were queried about the information they sought on residency program Web sites, how they engaged with various digital platforms, and the content topics they felt were most important to include when learning about programs.

The questionnaire remained open for completion between July 12, 2020 to August 31, 2020 and from February 11, 2021 to March 31, 2021, with three email reminders during both periods. Responses were collected anonymously, written consent was obtained at the start of the questionnaire, and the invitation to participate in the study was sent to the applicants only after the completion of each ophthalmology residency match cycle to ensure that applicants'

participation status would not affect residency program rank lists. Statistical analysis and data visualizations were conducted using RStudio Team (2020) and Microsoft Excel Version 16.47.1 (Microsoft), with $p < 0.05$ considered statistically significant.

Results

Demographics

Of 870 invited participants, 136 responses were received, for a response rate of 15.6% (► **Table 1**). The mean (standard deviation [SD]) age of applicants was 27.7 (2.56) years. Most respondents were single ($n = 98$ [72.1%]) and had no children ($n = 125$ [91.2%]). The mean (SD) number of ophthalmology

residency program applications per respondent was 74.8 (22.4), with a range of 30 to 120 programs. In addition to these numerical values, write-in responses ($n = 8$) included students who expressed the need for having an application cap moving forward; one respondent commented that they and their peers generally took every interview offered and “were not in any position to turn down any sort of opportunity.” Among respondents, 63.2% ($n = 86$) were first-time applicants, 3.7% ($n = 5$) were not first-time applicants, and 33.1% ($n = 45$) chose not to respond. Additionally, 61.8% ($n = 84$) matched to an ophthalmology residency program, 5.1% ($n = 7$) did not match, and 33.1% ($n = 45$) did not respond. Additional demographics broken down by application cycle (2019–2020 vs. 2020–2021) are shown in ► **Table 1**.

Table 1 Applicant demographics

Question	2019–2020 Applicant ($n = 63$)	2020–2021 Applicant ($n = 73$)
Gender identity		
Male	34 (54.0%)	44 (60.3%)
Female	29 (46.0%)	29 (39.7%)
Nonbinary	0 (0%)	0 (0%)
Prefer to self-identify	0 (0%)	0 (0%)
Prefer not to state	1 (1.6%)	0 (0%)
Ethnicity		
American Indian or Alaska Native	1 (1.6%)	1 (1.4%)
Asian	25 (39.7%)	23 (31.5%)
Black or African American	0 (0%)	8 (11.0%)
Hispanic or Latinx	5 (7.9%)	6 (8.2%)
Native Hawaiian or Pacific Islander	0 (0%)	0 (0%)
White	30 (47.6%)	35 (47.9%)
Prefer to self-describe	3 (4.8%)	1 (1.4%)
Prefer not to state	1 (1.6%)	1 (1.4%)
Age (y), mean \pm SD	27.3 \pm 2.03	28.0 \pm 2.91
Marital status		
Single	47 (74.6%)	51 (69.9%)
Married	15 (23.8%)	20 (27.4%)
Divorced	0 (0%)	1 (1.4%)
Separated	0 (0%)	0 (0%)
Widowed	0 (0%)	0 (0%)
Prefer not to state	1 (1.6%)	1 (1.4%)
Applicant with children?		
Yes	3 (4.8%)	8 (11.0%)
No	59 (93.7%)	65 (89.0%)
Prefer not to state	1 (1.6%)	0 (0%)
Location of medical school		
U.S. - West	8 (12.7%)	12 (16.4%)
U.S. - Southwest	6 (9.5%)	6 (8.2%)
U.S. - Southeast	8 (12.7%)	15 (20.5%)

(Continued)

Table 1 (Continued)

Question	2019–2020 Applicant (n = 63)	2020–2021 Applicant (n = 73)
U.S. - Midwest	17 (27.0%)	17 (23.3%)
U.S. - Northeast	21 (33.3%)	21 (28.8%)
International	3 (4.8%)	2 (2.7%)
Location of home		
U.S. - West	20 (31.7%)	21 (28.8%)
U.S. - Southwest	7 (11.1%)	6 (8.2%)
U.S. - Southeast	7 (11.1%)	9 (12.3%)
U.S. - Midwest	10 (15.9%)	14 (19.2%)
U.S. - Northeast	14 (22.2%)	22 (30.1%)
International	5 (7.9%)	1 (1.4%)
Number of residency programs applied, mean ± SD	74.3 ± 22.2	75.2 ± 22.8
First-time applicant?		
Yes	39 (61.9%)	47 (64.4%)
No	1 (1.6%)	4 (5.5%)
No response	23 (36.5%)	22 (30.1%)
Matched?		
Yes	37 (58.7%)	47 (64.4%)
No	3 (4.8%)	4 (5.5%)
No response	23 (36.5%)	22 (30.1%)

Abbreviation: SD, standard deviation.

Note: The ethnicity groupings were presented according to the official choices available to applicants under the Association of American Medical Colleges (AAMC), and applicants were able to select as many groups as they self-identified with. Results are displayed based on whether the respondent was an applicant from the 2019–2020 or the 2020–2021 interview cycle.

Factors Affecting Applicant Decisions to Apply to Ophthalmology Residency Programs

When asked to rank 12 information sources *when learning about* ophthalmology residency programs (►Table 2), the most important factors were current residents at the program, PDs at the program, faculty or faculty interviewers, and program Web sites. Factors such as direct personal experience with a program (e.g., away rotations) and ranking platforms (e.g., U.S. News and World Report, SF Match program directory) had the greatest variance in the evaluation of importance. Free-text responses ($n = 13$) included geography or family preference ($n = 4$ [30.8%]), mentor opinions ($n = 2$ [15.4%]), alumni careers ($n = 2$ [15.4%]), representation of fellowships ($n = 1$ [7.7%]), and webinars hosted during the virtual application cycle ($n = 1$ [7.7%]).

The most important resources when *deciding to apply* were ranking platforms, direct personal experience with programs, and digital platforms (►Fig. 1). Of secondary importance were faculty, career advisors, residents, and PDs. Free-text responses ($n = 10$) had a common theme of either location ($n = 4$ [40.0%]) or “applied to all programs” ($n = 2$ [20.0%]).

Factors Affecting Applicant Decisions to Interview at Ophthalmology Residency Programs

When *deciding to interview* at an ophthalmology program, the most important resources were ranking platforms, direct

personal experience with programs, residency program outreach/communications, and digital platforms (►Fig. 2). Similar to above, of secondary importance were faculty, career advisors, residents, and PDs. Free-text responses ($n = 11$) included whether they were invited to interview ($n = 5$ [45.5%]), program location ($n = 2$ [18.2%]), and ease of interview scheduling ($n = 1$ [9.1%]).

Factors Affecting Applicant Decisions to Rank Ophthalmology Residency Programs

When *deciding to rank* an ophthalmology program, the most important resources were direct personal experiences with a program, ranking platforms, residency program outreach/communications, and residents at the ophthalmology programs (►Fig. 3). Resources such as PDs, other faculty, and digital platforms were less important in making the decision to rank. Free-text responses ($n = 12$) had common themes of interview experience ($n = 4$ [33.3%]), location/cost of living ($n = 4$ [33.3%]), and program culture ($n = 3$ [25.0%]).

How Applicants Used Digital Media during the Ophthalmology Residency Application Process

When asked to rate program Web site content topics by importance, respondents noted the number of residents accepted per year, resident alumni job or fellowship placement, the current resident listing, curriculum and didactics,

Table 2 Most important resources in learning about ophthalmology residency programs

Factor	Mean score ± SDV
Current residents at the program	3.34 ± 2.23
Program director(s) at the program	4.94 ± 2.32
Faculty or faculty interviewers at the program	5.02 ± 2.36
Residency program Web site	5.03 ± 2.61
Direct personal experience with a program (e.g., away rotations)	5.86 ± 4.57
Ophthalmology faculty at your medical school	6.02 ± 2.90
Ranking platforms (U.S. News and World Report, SF Match program directory)	6.06 ± 3.18
Online forums (Reddit, Student Doctor Network, Doximity, etc.)	6.66 ± 2.85
Ophthalmology residents at your medical school	7.25 ± 2.60
Classmates applying to ophthalmology from your medical school	8.36 ± 2.61
Residency program social media pages (e.g., Twitter)	8.61 ± 2.32
Other	10.84 ± 3.12

Abbreviations: SDV, standard deviation of volume; SF Match, San Francisco Residency and Fellowship Matching Services.
 Note: Respondents ($n = 136$) ranked a total of 12 information sources in order of importance (1 = most important, 12 = least important).

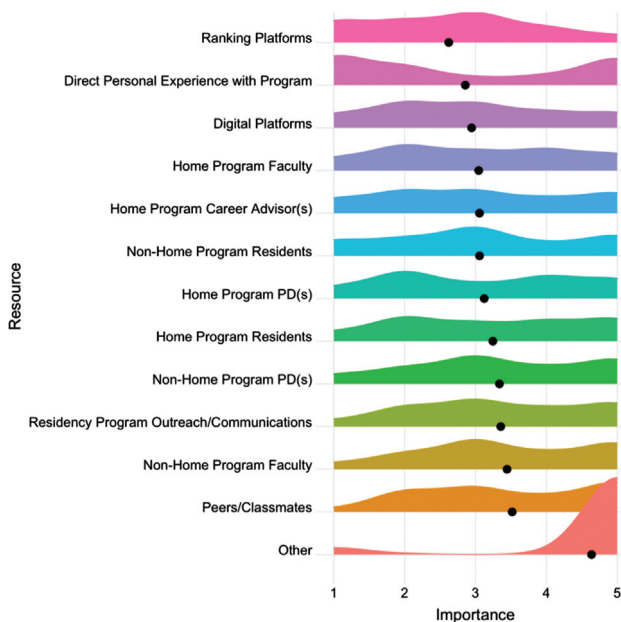


Fig. 1 Most important resources in deciding to apply. Respondents ($n = 136$) determined the importance of 13 resources on influencing their decision to apply to a particular residency program, using a 5-point Likert scale (1 = extremely important, 5 = not at all important). Resources are ordered in decreasing importance. The black dots indicate the mean numerical rating from respondents. PD, program director.

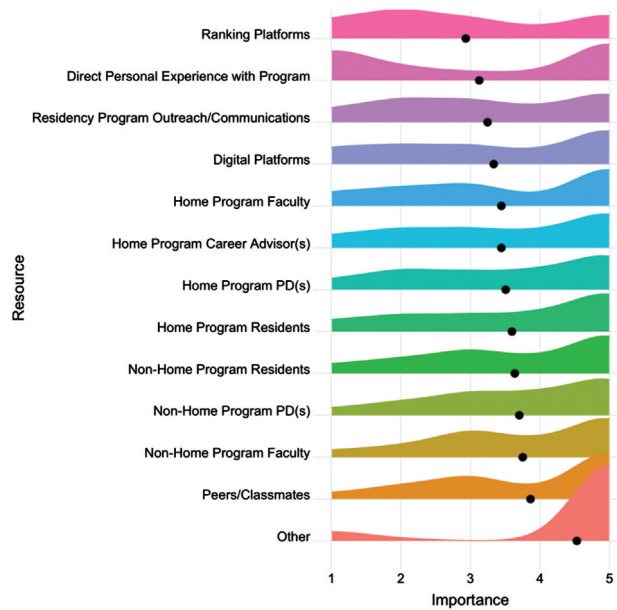


Fig. 2 Most important resources in deciding to interview. Respondents ($n = 136$) determined the importance of 13 resources on influencing their decision to interview at a particular residency program, using a 5-point Likert scale (1 = extremely important, 5 = not at all important). Resources are ordered in decreasing importance. The black dots indicate the mean numerical rating from respondents.

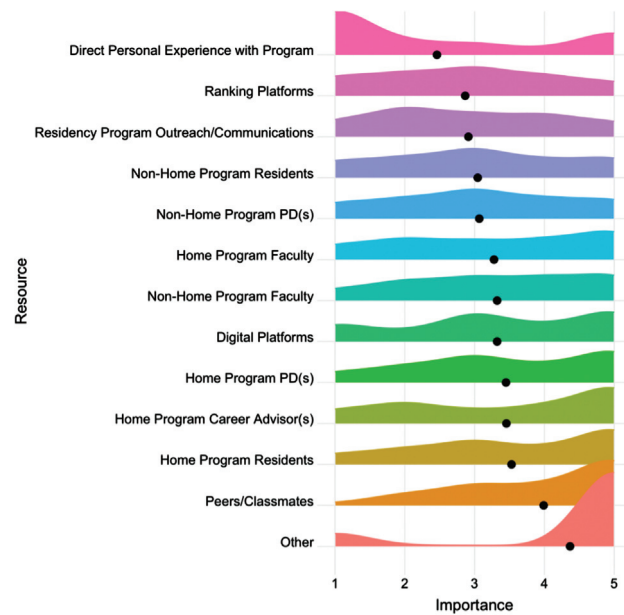


Fig. 3 Most important resources in deciding to rank. Respondents ($n = 136$) determined the importance of 13 resources on influencing their decision to rank a particular residency program, using a 5-point Likert scale (1 = extremely important, 5 = not at all important). Resources are ordered in decreasing importance. The black dots indicate the mean numerical rating from respondents.

call schedule, and rotation schedule as “extremely important” (► Fig. 4). Resident benefits (e.g., salary, housing, vacation), research opportunities, extracurricular opportunities, comprehensive faculty listing, media, published research projects by residents, message from the PD/chair/faculty,

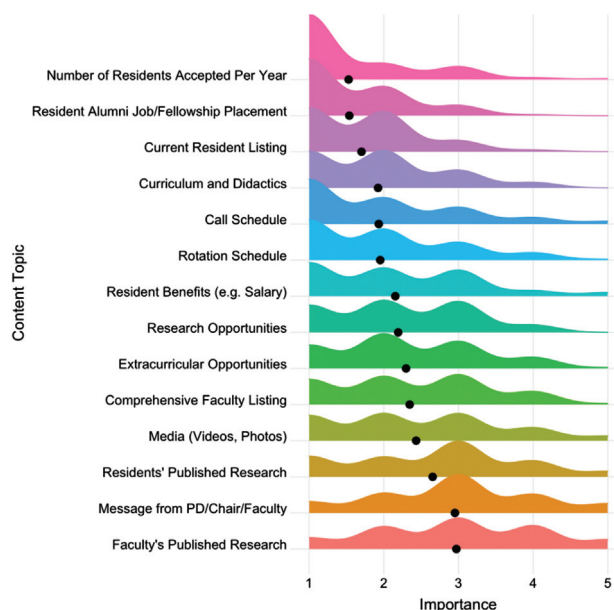


Fig. 4 Content most important to applicants on ophthalmology residency program Web sites. Respondents ($n = 136$) ranked a total of 14 content topics on a 5-point Likert scale (1 = extremely important, 5 = not at all important). Content topics are ordered in decreasing importance. The black dots indicate the mean numerical rating from respondents.

and published research projects by faculty were all felt to be “very important” to include on ophthalmology program Web sites, in decreasing order of importance. Notably, on average, applicants felt that all 14 content topics were at least moderately important to display on program Web sites.

When queried about how they engaged with digital platforms (→ **Table 3**), all respondents ($n = 103$ [100.0%]) reported engaging with residency program Web sites, while the majority also engaged with emails from residency pro-

grams ($n = 88$ [85.4%]), Doximity ($n = 82$ [79.6%]), Reddit ($n = 64$ [62.1%]), Instagram ($n = 59$ [57.3%]), the FREIDA residency program database ($n = 55$ [53.4%]), and YouTube ($n = 53$ [51.5%]). Platforms such as Student Doctor Network, the Texas STAR survey, Twitter, American Medical Association resources, and Facebook were less popular, but these digital platforms still received engagement from at least 25% of survey respondents. Among all resources, passive engagement such as reading and watching videos was the most popular form of use, ranging from 91.5 to 100.0%, while active engagement such as sharing, commenting, and asking questions varied depending on the platform. Write-in responses ($n = 11$) included the OphthoMatch Google spreadsheet ($n = 10$ [90.9%]) and webinars hosted by the residency program ($n = 1$ [9.1%]). OphthoMatch is an applicant-managed, shared spreadsheet tracking applicant statistics, interview offers, postinterview reviews, impressions of programs from away rotations or interviews, and advice from applicants in prior years. Active engagement was most commonly noted for the OphthoMatch Google spreadsheet ($n = 8$ [80.0%]), Twitter ($n = 9$ [26.5%]), and emails from residency programs ($n = 18$ [20.5%]).

Discussion

The annual ophthalmology residency match requires considerable participation and investment from faculty, residents, program coordinators, and other staff. In recent years, digital platforms such as program Web sites and online forums have played an increasingly important role in this process, given that the average applicant applies to 80 residency programs.⁷ The digitization of information has been further accelerated by the implementation of virtual interviews during the COVID-19 pandemic. The majority of applicants and PDs now indicate that a virtual or hybrid

Table 3 Applicant engagement with digital platforms

Resource	Total engagement	Passive engagement	Active engagement
Residency program Web sites	103 (100.0%)	102 (99.0%)	4 (3.9%)
Emails from residency programs	88 (85.4%)	84 (95.5%)	18 (20.5%)
Doximity	82 (79.6%)	82 (100.0%)	2 (2.4%)
Reddit	64 (62.1%)	61 (95.3%)	11 (17.2%)
Instagram	59 (57.3%)	54 (91.5%)	9 (15.3%)
FREIDA residency program database	55 (53.4%)	55 (100.0%)	3 (5.5%)
YouTube	53 (51.5%)	53 (100.0%)	0 (0.0%)
Student Doctor Network (SDN)	50 (48.5%)	50 (100.0%)	4 (8.0%)
Texas STAR Survey	36 (35.0%)	36 (100.0%)	0 (0.0%)
Twitter	34 (33.0%)	34 (100.0%)	9 (26.5%)
American Medical Association (AMA) resources	29 (28.2%)	29 (100.0%)	1 (3.4%)
Facebook	26 (25.2%)	26 (100.0%)	2 (7.7%)
Other	12 (11.7%)	12 (100.0%)	9 (75.0%)

Note: Respondents ($n = 103$) interacted with 13 digital resources when learning about ophthalmology residency programs. Results are ordered by most to least amount of total engagement (n , %). Percentages for passive engagement (reading) and active engagement (sharing, commenting, asking questions) were calculated as a fraction of the total engagement for each digital platform.

(virtual/in-person) interview format will likely continue for future application cycles; a recent cross-sectional study found that if given a choice regarding the future direction for interviews, 73.4% of applicants would prefer to hold interviews virtually or were unsure.⁶ Therefore, understanding the resources that applicants use to decide where to apply, interview, and rank is critical to conveying relevant information and fostering effective matches for both programs and applicants.

One of our goals was to understand whether applicants used different resources and factors to make decisions at each of the three stages of the application process. This distinction has not been examined previously, and respondents to this study indeed noted that surveys often fail to distinguish between factors that lead one to apply to, versus interview or rank, a program, which are very different decisions for the applicant.^{1,4}

Our analyses demonstrate the importance of digital platforms for applicant decisions on where to apply and interview, but not necessarily rank. Digital platforms were rated as more important resources than faculty, career advisors, residents, and PDs during these first two stages of the application process. However, these same platforms became far less important for the final rank list decisions. These findings imply digital platforms are one of the most high-yield resources that PDs should utilize early in the application cycle to target applicant recruitment, as online content most directly impacts whether an individual will apply to the program. As a result, it may be beneficial to time digital platform interactions and content (e.g., emails, videos) to the summer before the residency application deadline.

Among all digital platforms, ophthalmology program Web sites were the single most important resource for applicants, used by 100% of respondents. The three most important content topics that applicants sought on Web sites were the number of residents accepted, alumni job placement, and current resident listings. Although ophthalmology residency program Web sites have not been studied in detail, a 2018 study of urology residency program Web sites showed that only 76% included the number and names of current residents, while only 39% listed alumni names, fellowships, and jobs.¹¹ A 2020 analysis of physical medicine and rehabilitation residency program Web sites found similar rates of current resident listings at 71.3%.⁹ The ease of navigating to such information on program Web sites is important but often lacking.¹² Our survey demonstrates the importance of resident listings and alumni placements, which should be made clear on program Web sites. The inclusion of other topics such as curriculum, call schedule, benefits, and extracurricular opportunities are also highly valuable to applicants seeking to learn about ophthalmology residency programs.

A significant proportion of respondents engaged with other digital platforms such as Doximity, Reddit, Instagram, the FREIDA residency program database, and YouTube. The vast majority (91.5–100%) of applicants who used digital platforms passively engaged with the content, reading

posts and text written by others. In contrast, few applicants (0–26.5%) actively engaged with digital platforms, including sharing information or asking questions. These findings suggest that while an ophthalmology program's articles and posts online may appear to have low levels of engagement (e.g., few "likes" and comments), the true readership of this content is likely to be much higher. Thus, it remains important for residency programs to maintain a presence on these digital platforms despite seemingly low rates of reader interaction.

More generally, applicants felt that the most important resources in learning about ophthalmology residency programs were current residents at the program, followed by PDs and faculty. Many of the most important factors in formulating applicant rank lists were subjective factors such as the perceived happiness of residents and faculty, interview experiences, and geographic location. These results are in line with studies in other specialties that point to the importance of resident happiness and other subjective features.^{10,13–15} A well-organized interview day involving extensive interaction with ophthalmology faculty and trainees can provide applicants a critical window into program culture and camaraderie and allow them to evaluate their own fit within the program.

There are several limitations to our study. The 872 applicants invited to participate in this study represented 66.5% of the 1,312 participants in the 2019 to 2020 and 2020 to 2021 ophthalmology residency match. While they constitute a majority of the entire applicant pool, only individuals who applied to the UCSF ophthalmology residency program were invited to participate in the study, which represents a selection bias. However, while limited demographic data are available through the SF Match Ophthalmology Residency Match Summary Report, the demographics of our respondents (including gender, race, and geographic location) are similar to those of applicants reported in recent studies, supporting the external validity of our study.^{1,6} Our survey only captured responses from 7 of 179 (5.1%) unmatched applicants, although a sizeable proportion of respondents (33.1%) did not indicate whether they had matched or were first-time applicants. Furthermore, we did not assess how many interviews each respondent received, which impacts how interviews were chosen and how rank lists were developed. Despite the assurance that all responses were anonymous, applicants may have been concerned that their answers may influence future applications, which has been shown in previous studies in other specialties.¹⁰ Applicant access to faculty mentors at home programs was also not assessed.

Importantly, the COVID-19 pandemic may have affected results in ways that the survey was unable to assess for the 2020 to 2021 application cycle. For example, students were unable to participate in away rotations, which may have impacted the degree of their direct personal experience with programs. Additionally, as some medical schools adjusted their clinical curricula, students may have had more free time to peruse digital media when making residency application decisions. Furthermore, the survey

questions did not assess whether student engagement with digital media differed between residencies or whether students viewed all digital media available to each program. Finally, this study is subject to both recall bias (applicants completed the survey after they had matched) and memory bias (questionnaire was administered at two different times in the calendar year for the two application cycles).

In conclusion, ophthalmology residency applicants consult a multitude of digital resources and consider numerous factors when deciding where to apply, interview, and rank. Given an increasing number of program applications each year and greater reliance on virtual components, it is critical for residency programs to dedicate attention to the information they share online. Digital platforms such as residency program Web sites and online forums should be utilized early in the application cycle, as the vast majority of applicants consult these resources when deciding where to apply. Personal interactions with residency programs through interviews and emails are critical late in the application cycle when applicants craft their rank lists. In the advancing digital era, understanding applicants' decision-making is critical to fostering effective matches for both programs and future residents.

Compliance with Ethics Guidelines

The study was approved by the UCSF Institutional Review Board (IRB) as IRB #20–30869 (Reference #281581) and qualifies as Exempt under the Revised Common Rule (January 2018) category 2: research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).

Disclosures

The authors have no funding, sponsorship, or conflicts of interest to disclose.

Conflict of Interest

None declared.

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