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Applicant Perceptions Regarding the 2020 to 2021 Virtual Ophthalmology Residency Interview and Match Season

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Abstract

Background The coronavirus disease 2019 pandemic has significantly impacted medical education, notably the mandate for all residency programs to implement virtual (rather than in-person) residency interviews. Understanding residency applicants' perceptions and approach to this novel virtual interview season will be beneficial as potential future interview formats are considered.

Objective The aim of this study was to examine perceptions of the 2020 to 2021 ophthalmology residency match applicants regarding the virtual interview season prior to the start of the interview season.

Patients and Methods Ophthalmology residency applicants during the 2020 to 2021 cycle were invited to complete the survey between October 20 and 29, 2020. Respondent demographic information, perceived importance of various application details in a normal versus virtual interview season, strengths and limitations of virtual interviews, and preferences for optimal virtual interview format were obtained.

Results There were 337 survey respondents, with at least 50% of the survey completed by 190 applicants (56%). Of these, 73% of respondents applied to more than 60 ophthalmology residency programs, and 78% felt that the evaluation of candidates would be impacted by the virtual interview format. Regardless of interview format, United States Medical Licensing Examination Step 1 score and letters of recommendation were perceived to be the two most important factors related to matching at an applicant's top ranked programs. The primary limitation of a virtual interview season was the inability to experience a program's culture in person, while largest strength was cost savings.

Conclusion The ophthalmology residency match is a competitive process made potentially more complex by a novel virtual interview format. A detailed postcycle analysis will be important to optimize future interview seasons.

Keywords
- virtual interviews
- COVID-19
- residency
- medical education
- interviews
- residency application
- ophthalmology

The coronavirus disease 2019 (COVID-19) pandemic has caused a tremendous impact on various aspects of medical education, from disruptions of clinical rotations and clerkships and cancellations of medical conferences, to significant changes to the 2021 residency application process.[1,2] In an effort to encourage social distancing measures, limit viral

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transmission, and ensure fairness in evaluation of all applicants, the Association of University Professors of Ophthalmology, in conjunction with the Association of American Medical Colleges and other medical organizations, recommended that all specialties, including ophthalmology residency programs, conduct virtual interviews instead of in-person interviews during the 2020 to 2021 application season.[3] Multiple advocates have called for reforms to the normal residency application process to improve the system and mitigate potential inequalities.[4–7] The purpose of this study was to investigate the pre-interview season perceptions and preferences of 2020 to 2021 ophthalmology residency applicants regarding the virtual interview season changes that were implemented this application cycle, to provide guidance for optimization of future interview cycles across all subspecialties.

Patients and Methods

The study was reviewed by the Mayo Clinic Institutional Review Board (IRB) and medical education research committee and declared to be IRB exempt, as the survey information was collected anonymously with no identifiable information or impact on the ophthalmology match.

A nonvalidated survey was built by using the institutional Research Electronic Data Capture (REDCap) software for 2020 to 2021 ophthalmology residency applicants. Questions assessed respondent demographic information, number of applications submitted, perceptions regarding the importance of various factors of the application in a normal versus virtual interview season, strengths and limitations of a virtual interview cycle, preferences for faculty to interviewee ratio and optimal interview time, resources used to prepare for interviews, and program attributes that would impact rank list. The survey questionnaire provided to applicants has been attached as a supplemental document.

The survey was anonymous with all questions optional for respondents to answer. The survey was shared as a public link on authors' public social media platforms including Instagram (Facebook LLC, Menlo Park, CA) and Twitter (Twitter LLC, San Francisco, CA). The survey remained open from October 20, 2020 to October 29, 2020, closing prior to the first scheduled ophthalmology virtual interview of the application cycle at any residency program to avoid bias. Information regarding residency program interview dates was obtained from the SF Match website (https://www.sfmatch.org). A screening question at the beginning of the survey inquired whether the respondent was applying for ophthalmology residency during the 2020 to 2021 application cycle. Respondents were only able to access the remainder of the questions if this screening question was answered "yes" and thus met inclusion criteria for the study. Write-in responses were grouped qualitatively. In the survey description, voluntary survey participation was strongly emphasized with no compensation provided to any respondent. To prevent any insinuation of coercion from our residency program to applicants, the survey was shared by using social media with clarification that there would be no impact on a respondent's residency application evaluation or outcomes. Reminders to recruit additional eligible respondents were sent 4 days and 1 day prior to the closing of the survey.

Survey results and data were collected and managed by using REDCap electronic data capture tools hosted at Mayo Clinic.[8,9] REDCap is a secure and web-based software platform designed to support data capture for research studies, providing (1) an intuitive interface for validated data capture, (2) audit trails for tracking data manipulation and export procedures, (3) automated export procedures for seamless data downloads to common statistical packages, and (4) procedures for data integration and interoperability with external sources. Statistical analysis, including the Mann–Whitney U-test, was performed by using Microsoft Excel (Microsoft Corporation, 2010). A $p < 0.05$ was considered statistically significant.

Results

Respondent Demographics

There were 337 total survey respondents. A total of SF match participants for the 2020 to 2021 cycle were 767, yielding a 44% survey response rate. At least 50% of the survey was completed by 190 applicants (56%). There were 71 (21%) applicants who completed the survey in its entirety. Analysis for each question was conducted based on the number of responses. The demographics and baseline characteristics of respondents are illustrated in ►**Table 1**. Most respondents were between the age of 26 and 30 (62%) or 21 and 25 (38%) years. Women comprised 53% of the respondents. The majority of respondents identified as White/Caucasian (43%) or Asian/Pacific Islander (35%). Applicants were mainly current fourth year American medical students (78%) or international medical graduates (IMG; 17%) applying for ophthalmology residency. Of 184 respondents, 70% were affiliated with an institution that had its own ophthalmology residency. Most respondents attended medical schools in the north or northeast (30%), midwest (22%), or southern (22%) regions of the United States. The majority of applicants (73%) applied to 61 to 100+ programs.

Respondent Perceptions

When asked whether the evaluation of candidates during the 2020 to 2021 ophthalmology residency cycle would change as a result of the virtual interview season, 78% (143/184) answered "yes," 16% (30/184) answered "no," and 6% (11/184) answered "maybe." Respondents who answered "maybe" endorsed a common concern via the write-in responses that programs may interview more candidates than usual as there is less resource utilization involved ($n = 3$). Others felt that objective metrics on the application such as the United States Medical Licensing Examination (USMLE) Step 1 score and Alpha Omega Alpha (AOA) membership will be utilized by programs more to extend interview invitations ($n = 4$). On the other hand, some applicants believed that programs were more likely to interview and rank-to-match home-institution candidates to minimize the "risk" involved with an unfamiliar candidate ($n = 4$). Most

Table 1 Baseline characteristics of survey respondents

	Number of respondents	Percentage
Age ($n = 121$)		
21–25 y	46	38.0
26–30 y	75	62.0
31–35 y	18	14.9
36–40 y	1	0.8
41+ y	2	1.6
Sex ($n = 142$)		
Male	67	47.2
Female	75	52.8
Ethnicity ($n = 184$)		
Asian or Pacific Islander	65	35.3
Black or African American	9	4.9
Hispanic or Latino	14	7.6
Native American or Alaskan native	0	0.0
White or Caucasian	79	42.9
Multiracial or biracial	6	3.3
A race/ethnicity not listed here	11	6.0
Type of applicant ($n = 184$)		
U.S. fourth-year medical student	144	78.3
U.S. nontraditional applicant	9	4.9
International medical graduate	31	16.8
Medical school/affiliated institution location ($n = 184$)		
Northeast United States	55	29.9
Midwest United States	40	21.7
Southern United States	40	21.7
Western United States	20	10.9
Outside the U.S. lower 48 states	29	15.8
Presence of Ophthalmology Residency Program at home/affiliated institution ($n = 184$)		
Yes	128	69.6
No	39	21.2
No home/affiliated institution	17	9.2
Number of applications submitted ($n = 184$)		
0–20	11	6.0
21–40	12	6.5
41–60	26	14.1
61–80	46	25.0
81–100	48	26.1
100+	41	22.3

respondents 91.4% (74/81) believed that their virtual interview experience would be somewhat to extremely important in how they would rank a residency program.

There were no statistically significant differences between the perceived weight of various application factors for candidates in an in-person versus virtual interview setting (►**Table 2**). Based on mean rankings, respondents believed the USMLE Step 1 score and letters of recommendations, respectively, were the two most important factors in one's application to match at a program toward the top of their rank list. Depending on whether the mean, median, or mode rankings are evaluated, other factors such as AOA membership, research publications, or clinical grades are also of high importance. On the other hand, based on mean rankings, Medical Student Performance Evaluation (MSPE), USMLE Step 2 score, and the personal statement were perceived to be the least important factors in one's application for a successful match outcome (►**Table 2**). Also based on mean rankings, respondents felt that geographical location of the program, surgical volume, and reputation/ranking of the program will be the most important factors in determining their rank list. Pre-interview communication from a program, resident call schedule, and presence of subspecialties were deemed to be the least important factors for applicants in terms of creating a rank list (►**Table 3**).

Applicants felt that the main limitation of a virtual interview season compared with an in-person residency interview season was an inability to experience a program's culture. Other limitations included a lack of exposure to residents, the program faculty, and physical facilities of a program (i.e., clinic setting, surgical center, resident workspace, surgical simulation laboratory). On the other hand, respondents acknowledged that a significant decrease in cost, an ability to participate in more interviews, and shorter interview day schedules were the biggest advantages of a virtual interview season (►**Table 3**). Applicants planned to use individual residency program websites as the primary resource to learn about each program, which followed by opinions and perceptions from mentors and colleagues. The program's social media platforms, such as an Instagram or Twitter accounts, were less preferred as information sources. Respondents favored a 1:1 applicant: faculty ratio for virtual interviews and a 20-minute video interview as the best interview format. Approximately 25% (18/71) of respondents felt that the virtual interview modality would be as effective as an in-person interview experience in evaluating a resident applicant, while 72% (51/71) felt that it would be only somewhat effective. If given a choice, 63% (45/71) of respondents would choose an in-person residency interview, 10% (7/71) would choose a virtual residency interview, 16% (11/71) would choose either option, and 11% (8/71) would choose a combination of the two formats.

Discussion

The global pandemic has caused a significant effect on the American medical education system including residency and fellowship application cycles. The nationwide implementation of virtual residency interviews in lieu of in-person interviews for the sake of public health and safety measures is a first time occurrence. While this may influence program perceptions of an applicant, just as importantly, this could also impact applicant perceptions of a program. This study

Table 2 Applicant perceptions of the most important application factors for a successful match

Factors of the residency application	Normal in-person interview season ($n = 113$)[a]				Virtual interview season ($n = 86$)[a]				*p*-Value[b]
	Mean rank	Standard deviation	Median (1−)	Mode	Mean rank	Standard deviation	Median (1−10)	Mode	
USMLE Step 1 score	2.7	2.6	1	1	3.3	2.9	2	1	0.14
Letters of recommendation	3.6	2.2	3	1	3.6	2.4	3	1	0.81
Research publications and projects	4.5	2.0	5	5	4.8	2.1	5	6	0.35
Medical school grades	5.1	2.2	4.5	4	5.0	2.4	4	4	0.70
Ranking of applicant institution	5.1	2.5	5	4	5.1	2.8	5	2	0.79
AOA[c] membership	5.2	2.4	5	3	5.4	2.3	5	3	0.60
Away/audition rotations	6.9	2.9	8	10	6.9	3.0	8	10	0.75
Personal statement	7.2	2.4	8	9	6.9	2.4	7	8	0.35
USMLE Step 2 score	7.2	2.7	7	10	7.0	2.7	7	10	0.59
MSPE[d]	7.6	2.0	8	8	7.1	2.4	8	9	0.17

Abbreviations: AOA, Alpha Omega Alpha; MSPE, Medical Student Performance Evaluation; USMLE, United States Medical Licensing Examination.
[a]Responses of importance were ranked from 1 (most important) to 10 (least important).
[b]A *p*-value obtained using the Mann–Whitney U-test.
[c]Alpha Omega Alpha Membership.
[d]Medical Student Performance Evaluation.

aimed to understand the perceptions and decision patterns of ophthalmology residency applicants for the 2020 to 2021 cycle regarding this novel season prior to the onset of interview season. The results of this study can be helpful in guiding protocols regarding interview formats in future application cycles, regardless of whether travel restrictions related to the pandemic will be in place. Specifically, it provides valuable information regarding applicants' approach to which institutions to apply to, as well as what factors are important to them in a virtual residency interview and creating a rank list in a normal versus virtual season.

Overall, we had a 44% survey response rate, with 337 of the supposed 767 applicants who participated in the 2020 to 2021 SF match responding to the survey. The demographics of our survey respondents were similar to the 2021 Ophthalmology Residency Match Summary Report[10] published by SF match for the 2020 to 2021 season. Similar to our survey results of 78%, 81% of the applicants in this application season were U.S. medical school seniors; however, only 6% were IMG applicants compared with 17% of our survey respondents. Based on our survey, the average number of applications submitted was 60 to 79 per person, which is on par with the 80 applications submitted on average by all applicants in this season.

Almost 84% of survey respondents believed that the evaluation of a candidate's application would be different (range of "maybe" to "definitively") as a result of the virtual interview season. Common concerns described in the write-in responses included a belief that programs may interview more candidates than usual; that objective factors on the application like the USMLE Step 1 score and AOA membership will be emphasized more this year; and that programs were more likely to rank-to-match home-institution candidates due to the familiarity that they may offer. These concerns are echoed throughout conversations across institutions and medical schools, as well as online forums, and are logical.

While it is difficult to draw conclusions on match patterns since this survey only evaluated pre-match perceptions, it is reasonable for some applicants to believe that some programs may interview and rank applicants who are familiar with their institution rather than depending on a virtual interaction with other applicants. It is also unsurprising that respondents believed the USMLE Step 1 score, letters of recommendation, clinical grades, and prolific research output were deemed by respondents to be some of the most important factors in yielding a successful match during a normal in-person interview season, as well as during this virtual season. Across multiple studies, USMLE Step 1 score has single-handedly been portrayed to be one of the main aspects of an application for residency selection and successful matching. While Grubbs et al show other objective clinical performance factors like clinical grades, AOA membership, and research involvement to be of importance, Behunin et al indicated that letters of recommendation may also be deemed to be of importance by program directors for interview invitations.[11–13] As indicated above by the write-in responses, applicants believe that objective facets of the application will be emphasized more during this virtual

Table 3 Applicant preferences and perceptions of various components related to a virtual interview/match season

	Mean rank	Standard deviation	Median	Mode
Limitations of virtual interviews ($n = 79$)[a]			(1–7)	
Lack of program culture/"feel" exposure	1.8	1.2	1	1
Lack of resident exposure	3.3	1.6	3	2
Lack of geographical location exposure	3.8	1.6	4	3
Lack of faculty exposure	4.4	1.8	4	3
Lack of ability to express applicant strengths	4.1	2.1	4	6
Lack of program facilities/structural exposure	4.4	1.5	4	5
Lack of logistical details exposure (i.e., call schedule, didactics time, and rotation blocks)	6.2	1.2	7	7
Strengths of virtual interviews ($n = 79$)[b]			(1–5)	
Cost savings	1.0	0.2	1	1
Ability to interview at more programs	2.7	1.1	2	2
Shorter interview day	3.0	1.0	3	3
Less risk of bad interview performance	4.1	0.9	4	4
Less pressure during interviews	4.2	0.8	4	5
Preferred sources for information about a residency program ($n = 79$)[c]			(1–5)	
Program website	1.6	1.0	1	1
Peer/current residents/mentor opinions	2.3	1.2	2	2
Online forums (i.e., reddit, student doctor network)	3.3	1.1	3	3
Program/institution Instagram account	3.6	1.0	4	4
Program/institution Twitter account	4.3	1.0	5	5
Preferred interview applicant: faculty ratio ($n = 85$)[d]			(1–4)	
1:1	1.5	0.9	1	1
1:2	1.9	0.6	2	2
1:3	2.8	0.6	3	3
1:4	3.7	0.8	4	4
Residency program factors that may influence applicant rank-lists ($n = 79$)[e]			(1–9)	
Geography/program location	3.8	2.7	3	1
Surgical volume	3.9	2.2	4	4
Program ranking/reputation	4.2	2.3	4	2
Job placement/fellowship match	4.8	2.4	5	7
Interview day experience	5.0	2.7	5	8
Mentorship opportunities	5.1	2.3	6	6
Presence of subspecialties	5.2	2.2	5	5
Resident call schedule	5.9	2.2	6	5
Pre-interview communication	7.1	2.7	9	9

[a]Responses were ranked from 1 (largest limitation) to 7 (smallest limitation).
[b]Responses were ranked from 1 (largest strength) to 5 (smallest strength).
[c]Responses were ranked from 1 (most preferred) to 5 (least preferred).
[d]Responses were ranked from 1 (most preferred) to 4 (least preferred).
[e]Responses were ranked from 1 (most important) to 9 (least important).

season, perceiving that high test scores and more research may reflect a studious and productive applicant. Strong letters of recommendation from well-established ophthalmologists in our relatively small specialty community can provide information about an applicant's personality and soft characteristics, which can be perceived as difficult to

assess over a virtual interview. The lack of ability to visualize and "feel" a program's culture was posed to be the largest limitation of the virtual interview season by our respondents. While programs came up with creative solutions including virtual rotations, virtual open-houses that allow for interactions with faculty and residents at a program, and video montages of programs, this will continue to remain a drawback of a virtual season.[14] Applicants may thus become more dependent on learning about a residency program's culture and reputation from peers that may be current residents or mentors who may have had prior exposure to a particular program.

Several published studies have selectively evaluated virtual interviews in graduate medical education (GME) prior to widespread implementation this cycle.[15] A single urology residency program evaluated both in-person and video interviews and found that while the video interview was beneficial in terms of the time commitment for the program/applicants and cost, it limited applicants' ability to fully represent themselves.[16] In another study, an anesthesiology residency program provided applicants the option to choose between an in-person and video interview, and found that the format of interview did not affect the proportion of applicants ranked in the upper half of the program rank-order list or accepted to their program.[17] A study in which gastroenterology fellowship applicants underwent five in-person and one virtual interview at one institution showed that the video interview session exceeded applicant expectations, with 25% of applicants considering it to be an equivalent option to the in-person interviews.[18] A single ophthalmology program also offered applicants the option for a face-to-face interview (FFI) versus a video conferencing interview (VCI), and found no statistically significant difference in the percentage of FFI and VCI applicants ranked in the top 25 for the program.[19] More applicably, the complex general surgical oncology fellowship conducted virtual interviews as a result of the COVID-19 pandemic[20,21] and found that 81.3% of the applicants felt they were able to convey themselves "very well" or "well" over a video platform, with benefits of cost/time savings, increased efficiency, and decreased stress.[22] Survey respondents in our study seem to have a lesser degree of confidence in the efficacy of virtual interviews, with only 25% feeling that it would be as effective as in-person interviews in assessing candidates. On the other hand, with an average cost to participate in the ophthalmology match between $5,704 and $6,613 per applicant in recent years, if the evaluation of the candidate indeed is comparable to in-person interviews as these single-center studies indicate, the benefit of cost savings with virtual interviews would be extravagant.[23,24]

Limitations of this study include the nonvalidated survey design. The number of responses to the survey was limited by recruitment via social media platforms, thus potentially limiting reach to ophthalmology applicants that may be inactive on social media. Additionally, the survey was distributed via a public link to truly anonymize applicant responses with no biases or traceable personalized applicant information that authors could collect. This limited our ability to confirm that all respondents were truly applying to ophthalmology residency during the 2020 to 2021 cycle. However, the initial screening question was placed to exclude respondents who did not meet the study criteria. It is important to note that recruitment was strategically not performed by using the contact information of individuals applying to the Mayo Clinic ophthalmology residency program during the 2020 to 2021 cycle to prevent any perception of coercion by applicants or to bias survey responses. Since the survey was anonymous, we are unable to examine trends in responses to questions based on certain applicant demographic or medical graduate status. Due to all questions on the survey being optional, there was a large attrition rate in full survey completion, resulting in only 56.4% completing more than half of the survey and 21% of all respondents answering all questions in the survey. Finally, due to the survey being anonymous, we were unable to track respondent perceptions after the completion of the interview season; hence, this study only focuses on pre-interview season applicant perceptions. Future studies may focus on assessing changes in perceptions of the virtual interview format by collecting pre- and postinterview survey responses from every applicant. Rather than using social media, the SF match database of all applicants could be utilized to comprehensively recruit participants.

The residency match for all medical specialties, including ophthalmology, is an intricate process that requires remarkable coordination and effort from applicants and programs to allow for a mutually successful result. The implementation of a virtual interview and residency season implies significant changes to the applicant experience in terms of assessing a program's culture, characteristics, and fit based on a fragmented, virtual interaction over a few hours. Similarly, a residency program must now evaluate a candidate solely on a short, virtual interview without being able to visualize the "soft skills," or personality of the candidate in a face-to-face interaction. For applicants of this most-recent cycle, in addition to the typical anxiety associated with matching into a competitive specialty like ophthalmology, there was added apprehension related to this substantial transition in the interview experience. Further dialog will be necessary to establish the best and most fair approach for future virtual residency selection processes based on what we have learned from 2020 to 2021 application season.

Authors' Contributions

S.M.S. involved in conceptualization, data curation, investigation, visualization, and writing the manuscript. L.A.D. helped in conceptualization, reviewing, and editing. A.J.B. supported in visualization, reviewing, and editing. A.A.T. contributed in supervision, reviewing, and editing.

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Conflict of Interests
None declared.

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