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Plastic Surgery Residency Applicants' Perceptions of a Virtual Interview Cycle

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Short Running Head (40 characters): Applicant Perceptions of a Virtual Cycle

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Background: The 2020-2021 residency application cycle marked the first year of fully virtual integrated plastic surgery interviews. The virtual format was a double-edged sword for applicants with several advantages such as reduced costs and time lost from travel and disadvantages as the novel format introduced new stressors on top of an already demanding process. Concerns included unfair interview invitation (II) distribution, interview "hoarding," and assessing "fit" virtually. In this study, we aimed to understand applicants' experiences of the 2020-2021 virtual plastic surgery interview cycle.

Methods: A survey was sent to 330 applicants in the 2020-2021 integrated plastic surgery application cycle. The survey included questions about participant demographics, pre-interview preparation, virtual interview experiences, and post-interview process. Statistical comparisons were performed on responses using SPSS.

Results: Eighty-nine participants responded to the survey, representing a 27.0% response rate. Applicants received an average of 13.3 IIs (range 0-45) and attended an average of 11.4 interviews (range 0-30). Almost half (48.2%) did not feel IIs were distributed equitably and more than half (68.2%) reported that there should be a limit on the number of IIs an applicant can accept. The majority of respondents (88.1%) reported spending $500 or less on virtual interviews. Half (50.6%) participated in virtual sub-internships, of which 30.4% became significantly less interested in a program afterwards.

Conclusions: The inaugural virtual interview cycle had several advantages and disadvantages. Lessons learned from this year could be utilized towards building a more equitable, fair, and effective potential virtual cycle in years to come.

INTRODUCTION

In May 2020, the Association of American Medical Colleges published recommendations for all residency programs to offer online interviews for the 2020-2021 application cycle in response to the COVID-19 pandemic.[1] Soon after, the American Council of Academic Plastic Surgeons (ACAPS) posted guidelines for the recruitment season.[2] Residency programs adapted rapidly to the interruption of the traditional interview cycle by launching a series of virtual initiatives including informational webinars, grand rounds, journal clubs, program meet-and-greets, social events with residents and faculty, and virtual sub-internships (VSIs).[3] Many applicants, however, became quickly overwhelmed with the number of virtual opportunities and some reported concerns that inability to attend a particular event could be interpreted as a lack of interest in the program.[2]

As the 2020-2021 residency application cycle progressed, it became clear that the virtual interview format could be a double-edged sword. Although the elimination of cost and time-off restrictions theoretically broadened applicants' options by increasing the number of interviews they could attend, the novel format also introduced new stressors into an already demanding process. Applicants struggled with deciding which programs to apply to, determining how to demonstrate interest, and assessing fit in the absence of in-person interactions.[4] Fear of "interview hoarding" by a select group of top-tier candidates loomed large as applicants could potentially interview at a greater number of programs from the comfort of their own homes.[5, 6] For both programs and applicants, a completely virtual interview day came also with new logistical concerns including selection of a virtual platform, ensuring uninterrupted internet access, and obtaining necessary audio and visual equipment.[7-10]

As there is a possibility of additional virtual interview cycles in the years to come, it is crucial to understand how this unprecedented process impacted this years' residency applicants. While the option of video and online interviews was previously described in the pre-pandemic literature,[11, 12] no prior studies have examined applicants' perceptions of a completely virtual interview season. In this study, we aimed to understand the experiences of plastic surgery residency applicants with the 2020-2021 virtual interview process.

METHODS

Survey and Participants

An anonymous survey containing questions about participant demographics, pre-interview preparation, virtual interview experiences, and post-interview process was distributed and managed using REDCap (**See, Document**, **Supplemental Digital Content 1, which shows the Plastic Surgery Residency Applicants' Perceptions Survey, which included questions about participants' background, preferences towards virtual interviews vs in-person interviews, and experiences with the pre-interview, interview day, and post-interview process, INSERT HYPERLINK HERE**).[13, 14] Participants were recruited from databases supplied by two senior authors (J.E.J. and S.J.L.), and were composed of applicants who applied to the Beth Israel Deaconess Medical Center (BIDMC) and The Ohio State University integrated plastic surgery residency programs in the 2020-2021 application cycle. After merging the databases and removing duplicates, 330 applicants were invited to participate in the study, representing 79.3% of all plastic surgery applicants in the 2020-2021 cycle (416 total applicants reported by the Electronic Residency Application Service[15]).

The survey was initially released on March 4, 2021, the day after the rank list submission deadline, to reduce potential applicant concerns that participation in the study could affect how they were ranked at either program. Three reminder emails were sent and the survey was closed three weeks later on March 25, 2021. This study was approved by the BIDMC Institutional Review Board (IRB; Protocol #2021P000135).

Statistics

Statistical analysis was performed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, N.Y.). Power analysis was conducted using a 95% confidence interval and 10% margin of error, yielding a minimum sample size of 79 participants. We believe that a 10% margin of error was acceptable for our study that aimed to deduce trends and infer results in an exploratory manner. Data from partially completed responses were included in the study. To simplify statistical analysis, variables such as race/ethnicity and interview invitations (IIs) were dichotomized (e.g., White versus non-White, fewer than

13 interviews versus 13 interviews or more). Participants who identified as White and not of Hispanic, Latino/a/x, or Spanish origin were grouped as White, and those who identified otherwise were grouped as non-White. Thirteen IIs was determined as the cutoff point based on our cohort's average of 13.3 IIs. Five-point Likert scale responses were stratified into three categories to encompass negative (e.g., "extremely dissatisfied" and "somewhat dissatisfied"), neutral (e.g., "neither dissatisfied or satisfied") and positive (e.g., "extremely satisfied" or "somewhat satisfied") perceptions.

Descriptive statistics including frequencies, means, and standard deviations were used to report continuous and categorical variables. The unpaired t-test was used to compare mean differences of numeric variables between groups. The chi-square test (or the Fischer's exact test if $n < 5$) was used to determine differences between categorical variables. Odds ratios (OR) and 95% confidence intervals (95% CI) were calculated from contingency tables to examine relationships between demographic characteristics and participants' perceptions for variables with two value labels. Ordinal logistic regression, with the Likelihood Ratio (LR) Chi-Square test, the Chi-Square goodness-of-fit test (Person), and Nagelkerke's pseudo R^2 for model fitting, were used to analyze relationships between variables with three or more value labels (e.g., Likert-scale data). A p-value of 0.05 was used to determine statistical significance. Regression models with a Likelihood Ratio (LR) Chi-Square $p < 0.05$ and Chi-Square goodness-of-fit $p > 0.05$ were included for analysis.

RESULTS

Application demographics and participants

A total of 89 (of 330) participants responded to the survey, representing a 27.0% response rate. Almost all respondents were MD students (94.3%), three were DO students (3.4%), and nine were from international medical schools (10.2%). Twenty-one participants (23.6%) reported not having an integrated or independent plastic surgery residency program at their home institution. Full participant demographics and general characteristics are listed in **Table 1**.

Interview invitations (IIs)

Participants received an average of 13.3 IIs (range 0-45) and attended an average of 11.4 interviews (range 0-30) (**Figure 1**). Five respondents (5.7%) received zero IIs. Forty-six participants received fewer than 13 IIs (average 5.4) and 41 received 13 IIs or more (average 22.1).

When asked if IIs were distributed fairly and equitably this cycle, 35 (39.3%) participants reported "No," 41 (48.2%) reported "Not sure," and 9 (10.6%) reported "Yes." Those with fewer than 13 IIs were significantly more likely to report that interviews were not distributed equitably than those with 13 or more IIs (OR 2.22; 95% CI 1.01-4.95; $0.049<p<0.050$). Applicants without home programs trended towards being more likely to have fewer than 13 IIs than those with a home program (OR 2.43; 95% CI; 0.863-6.83; p=0.09). White and non-White applicants were equally likely to receive 13 or more IIs (p=0.59).

To assess for potential interview hoarding, the percentage of IIs that were declined out of total interview offers was calculated for each participant (**Figure 2**). Compared with those with 13 or more IIs, applicants with fewer than 13 IIs were significantly more likely to attend all invited interviews (OR 8.13, 95 CI 3.08-21.4, $p<0.001$). When asked if there should be a limit on the number of IIs applicants can accept, 58 (68.2%) of respondents responded "Yes," 20 (23.5%) responded "No," and 7 (8.2%) responded "Not sure." The suggested II acceptance limit of those who reported 'Yes" ranged from 10 to 25 interviews, with 87.7% of answers falling between 15 and 20 interviews. Two participants suggested exceptions for those who couples match.

Satisfaction with virtual interviews

The majority (64.7%) of participants were either somewhat satisfied or extremely satisfied with the virtual interviewing experience. Those with 13 or greater IIs trended towards being more likely to be satisfied than dissatisfied than those with fewer than 13 IIs (OR 3.28; 95% CI 0.87-12.42, p=0.08). If given the choice, 35 (40.7%) reported they would strongly prefer and 28 (32.6%) would somewhat prefer in-person interviews, whereas 3 (3.5%) would strongly prefer and 17 (19.8%) would somewhat prefer virtual interviews. Participants' responses to how well they felt they were able to showcase themselves

and assess the strengths, weaknesses, fit, and culture of plastic surgery residency programs are illustrated in **Figure 3**.

When asked how the virtual interview cycle affected the number of IIs received, 40.5% felt that they received fewer IIs, 40.0% felt that the virtual cycle neither decreased nor increased their number of IIs, and 16.4% felt that they received more IIs. Those with fewer than 13 IIs were almost six times more likely to feel that the virtual cycle decreased the number of IIs they received compared to those with 13 or greater IIs (OR 5.92; 95% CI 2.03-17.24; p=0.001).

Overall, 62% of participants felt that the virtual cycle increased the number of interviews they could attend, while 35.7% felt it did not change and 2.4% felt it decreased. Unsurprisingly, those with 13 or greater IIs were 4.88 times more likely to feel that the virtual cycle increased the number of interviews they were able to accept and go on compared to those with fewer than 13 IIs (OR 4.88; 95% CI 1.78-13.43; p=0.002).

Additionally, participants were asked if they felt the virtual cycle put them at an advantage or a disadvantage compared to other applicants. Almost half (48.2%) reported that they felt they were put at a disadvantage, while 34.5% felt neither an advantage nor disadvantage and 17.2% felt an advantage. Those with fewer than 13 IIs were 11.89 times more likely to feel that the virtual cycle put them at a disadvantage rather than advantage compared to those with 13 or greater IIs (OR 11.89; 95% CI 2.29-61.74; p=0.003; goodness-of-fit χ^2=0.16, p=0.69; R^2=0.28). Race/ethnicity (White versus non-White) (p=0.82; goodness-of-fit χ^2=2.41, p=0.12; R^2=0.01) and having a home program (p=0.49; goodness-of-fit χ^2=0.95, p=0.33; R^2=0.02) were not significant predictors of whether applicants felt the virtual cycle put them an advantage or disadvantage.

Several reported that lower costs were an advantage of the virtual cycle, including decreased financial burden and reduced time taken off from other activities such as clinical rotations. When asked to estimate the total cost of interview-related expenses, 36.9% of participants reported spending between $1 and $100, 38.1% spent between $101 and $500, 3.6% spent between $501 and $1000, and 8.3% spent over $1000. Eleven participants (13.1%) reported spending zero dollars. Items purchased and whether or not

they were worthwhile are illustrated in **Figure 4**. When asked about the number of days of work or school missed in order to attend virtual interviews, 90.5% reported missing fewer than ten days total out of the entire duration of the interview cycle. Specifically, 33 (39.3%) reported zero days, 19 (21.4%) reported 1 to 2 days, 14 (16.7%) reported 3 to 5 days, and 11 (13.1%) reported 5 to 10 days missed.

Virtual experiences

Seventy-four (89.2%) participants attended virtual events hosted by residency programs before the interview season started (e.g., ACAPS meet-and-greet sessions, socials with residents and faculty. Although 49 (66.2%) participants became significantly more interested in a program after attending events, 27 (36.5%) became significantly less interested.

Half (50.6%) participated in virtual sub-internships (VSIs) hosted by plastic surgery residency programs, of which 37 (80.4%) felt that the VSIs were educational and worthwhile. Thirty-three participants (71.7%) became significantly more interested in a program after participating in their VSI, and 14 (30.4%) became significantly less interested. There were no statistically significant differences between applicants with fewer than 13 IIs and 13 or greater IIs with regards to participation in VSIs (p=0.17), impact of VSI on opinion of programs (p=0.92), and feeling if VSIs were worthwhile (p=0.28).

Mentorship and community

Resources used by applicants to finalize their rank lists, including mentors, residents, co-applicants, program websites, and social media, are demonstrated in **Figure 5.** When asked about how well they felt they were able to meet and connect with other applicants during the interview trail, 28.0% reported "not at all," 56.1% reported "slightly well," 11.0% reported "moderately," 3.7% reported "well," and 1.2% reported "extremely well." **Figure 6** illustrates the platforms applicants used to connect with other applicants. When asked about the potential for residency programs to allocate time for applicant-only virtual rooms, 50.6% of participants reported they would have appreciated these, while 30.9% reported they might have and 18.5% reported they would not have.

Match violations

When asked about Match violations (e.g., being asked illegal questions, post-interview communication with faculty), 36.1% reported that they had experienced at least one Match violation, 3.6% were unsure, and 9.6% preferred not to answer. Of the participants who felt comfortable identifying the roles of faculty members involved, 21.9% reported Match violations by departments chairs or division chiefs, 12.5% by program directors, and 65.6% by faculty members. Almost all (96.9%) of the violations occurred during the interview, and one occurred post-interview. There were no statistically significant differences between gender identity (p=0.56), race/ethnicity (p=0.61), or number of IIs (p=0.16) with regards to number of Match violations.

DISCUSSION

Interviews for residency programs of all specialties transitioned to virtual platforms, marking the first fully virtual plastic surgery interview cycle in the 2020-2021 academic year. This, however, was met with mixed feelings. With regards to interview invitations (IIs), only 10.6% of our cohort felt that interviews were distributed fairly and equitably. Applicants without home programs, those who attended osteopathic medical schools, and international medical graduate applicants may also have been more disproportionately affected, though there was not a large enough sample size to detect any potential differences. Furthermore, it is unclear whether applicants without a home program have always received less interviews, or if these findings pertain to this virtual cycle alone. However, certain factors might have affected the decreased number of IIs offered to applicants without a home program, such as lack of sub-internships which generate opportunities for connections and letters of recommendation.[4] Relationships and mentorships harnessed at conferences which were moved to a virtual platform this year may also explain these findings. To improve equity in the interview distribution process, we recommend adopting a holistic application review process that considers unique challenges that applicants have overcome that may not be reflected in their academic record. Furthermore, we encourage programs to offer opportunities and financial support for students from diverse backgrounds to engage in research, clinical rotations, and

mentorship (e.g., through diversity scholarships for sub-internships, funded research years, and mentorship programs).

There were also concerns about interview hoarding, as without constraints such as travel time and costs, applicants had opportunities to attend more virtual interviews.[16] In our cohort, the majority felt they could attend more interviews virtually than they could have done in-person. Of 35 applicants who received fewer than 13 IIs, all but one attended all interviews offered to them, potentially due to prior research published in 2013 that demonstrated a 100% match rate for independent plastic surgery applicants with 13 IIs or more. In their cohort of 137 applicants, there was an average of 13.6 IIs received and 10.0 interviews attended.[17] It should be noted that a more recent study in 2014 showed that the Match rate of independent plastic surgery applicants was 96% for those with five or more IIs, suggesting a much lower number of IIs needed to ensure a high likelihood of matching.[18] Interestingly, our results report that some applicants with up to 22 IIs attended all interviews, and 17 applicants (19.5%) attended more than 20 virtual interviews. Given the novel and therefore less predictable virtual cycle, the increased interview attendance trend could be explained by heightened applicant anxiety. Alternatively, the decreased cost burden, less time off from school/work, and overall ease of attending virtual interviews, potentially encouraged these applicants to attend more interviews than they otherwise would have for in-person interviews. The majority of applicants thought there should be a limit in the number of IIs applicants can accept, with most suggestions between the range of 15 and 20. If an interview cap was introduced, it is unclear how this would be enforced and by whom.

A decreased cost burden was one of the most commonly referenced benefit of the virtual cycle, especially from avoiding travel expenses. Reported costs were far reduced compared with previous cycles, with the majority of respondents reporting spending $500 or less for the entire interview cycle. In comparison, a study that examined the 2018 to 2020 cycles reported that the average applicant spent an average of $531 per interview.[19]

In previous years, interactions between applicants, residents, and program faculty during interview experiences have been reported to be one of the most important factors for both applicants and programs

in making final rank list decisions.[10, 20, 21] Traditional in-person interviews allow for applicants to observe interactions between trainees and faculty to get a strong sense of a program's collegiality, and allow programs to assess applicants' interpersonal skills. Mutually benefitting both parties, in-person interviews also provide the opportunity to assess fit and how well applicants may integrate with the program's culture. This cycle, however, most applicants felt they were only able to showcase themselves moderately well at best, and the majority felt they were only able to understand the culture of a program either slightly well or not well at all.

Many programs offered pre-interview season virtual recruitment events this cycle, including meet-and-greets, resident socials, and virtual sub-internships. These appeared to be high-risk, high-reward events for programs: although the majority of applicants were significantly more interested in some programs after attending virtual recruitment events, almost a third of applicants became significantly less interested in other programs. Given this risk, those that elect to offer virtual programming should ensure that each session positively showcases their program and focus on quality, rather than quantity, of sessions.

Overall, 18.5% applicants reported that the rank lists made before their interviews were at most only partially impacted by their interview experiences. This perhaps may be due to a weaker ability of virtual interactions to influence preconceived notions and perceptions of residency programs compared to in-person interactions. Instead, most applicants used mentors, residents, and other applicants as resources for finalizing their rank lists.

The interview trail is typically regarded as one of the best ways to get to know other plastic surgery applicants. Twenty-eight percent of participants felt they did not get to know other applicants at all, and half of all respondents reported that they would have appreciated if residency programs had allocated time for applicant-only rooms on interview day. While applicants attempted to connect with each other through social media platforms, it is unclear if and how the lack of in-person networking may influence the close-knit nature of the plastic surgery community.

Strikingly, 36.1% reported that they had experienced at least one Match violation. Data published in 2013 showed that among 127 applicants, only 10% of applicants reported experiencing violations of the Match

communication guidelines.[22] The jump in incidence of Match violations may be attributed to faculty feeling more comfortable asking these questions virtually or applicants feeling more comfortable reporting now than in previous years. Programs and faculty participating in the interview process should review National Resident Matching Program (NRMP) and American Council of Academic Plastic Surgeons (ACAPS) policies and guidelines to review acceptable interview questions and the post-interview communication policy.[23, 24] Applicants should feel encouraged and empowered to report all violations that they experience so that appropriate action may be taken to effect change.

Limitations to note with this study include a lack of a non-virtual interview cohort for comparative purposes. However, there are several studies evaluating prior interview cycles that can be used. Another limitation is the overall response rate of 27.0%, which may be attributed to multiple factors. Despite our attempts at distributing the survey after the rank-list deadline in order to eliminate fear of reprisal, some applicants might have felt uneasy answering the survey prior to match date and responses, or the lack thereof, may have been subject to bias. Additionally, due to restrictions in the number of IIs sent out by each program, certain applicants who did not receive an interview at our programs might have been less inclined to participate in the survey. Furthermore, the survey was sent out to 79.3% of all applicants, derived from integrating applicant lists of two programs, and therefore may not capture the entire spectrum of opinions of the complete applicant pool in the 2020-2021 interview cycle. Finally, our survey was created in response to the unprecedented application cycle and was not previously validated.

This study provides insight into applicants' perceptions of the virtual interview cycle and serves as a primer for understanding the complexities involved with a virtual cycle. These lessons may potentially also be extrapolated to independent residency program and fellowship interviews.

CONCLUSION

The inaugural virtual interview cycle had several advantages and disadvantages. Future cycles should assess the feasibility and utility of introducing limits on the number of interview invitations applicants may accept. It is important to learn from this year as we may be looking towards future virtual interview cycles.

REFERENCES

1. (ACGME) AoAMC. Coronavirus (COVID-19) and ERAS. Accessed 3/31/2021, https://students-residents.aamc.org/applying-residency/article/coronavirus-covid-19-and-eras/

2. (ACAPS) ACoAPS. ACAPS Guidance on Virtual Interviewing for the 2020-2021 Application Cycle. Accessed 3/31/2021, https://acaplasticsurgeons.org/virtual-interview.cgi

3. Abi-Rafeh J, Azzi AJ. Emerging role of online virtual teaching resources for medical student education in plastic surgery: COVID-19 pandemic and beyond. *J Plast Reconstr Aesthet Surg*. Aug 2020;73(8):1575-1592. doi:10.1016/j.bjps.2020.05.085

4. Drolet BC, Brower JP, Lifchez SD, Janis JE, Liu PY. Away Rotations and Matching in Integrated Plastic Surgery Residency: Applicant and Program Director Perspectives. *Plast Reconstr Surg*. Apr 2016;137(4):1337-1343. doi:10.1097/PRS.0000000000002029

5. Boyd CJ, Ananthasekar S, Vernon R, King TW, Saadeh PB. Interview Hoarding: Disparities in the Integrated Plastic Surgery Application Cycle in the COVID-19 Pandemic. *Ann Plast Surg*. Mar 4 2021;doi:10.1097/SAP.0000000000002840

6. Whelan A. Open Letter on Residency Interviews. Accessed 17 Mar 2021, https://www.aamc.org/media/50291/download

7. Dean RA, Patel AA, Shen AH, Griffith LP, Lance SH. Preparing for Plastic Surgery Residency Interviews in a Virtual Era. *Plast Reconstr Surg Glob Open*. Oct 2020;8(10):e3178. doi:10.1097/GOX.0000000000003178

8. Phillips BT, Gosman AA, Maricevich RS, Rodriguez ED, Rohrich RJ. The Plastic Surgery Residency Interview Revisited: Virtual Interviews and Beyond. *Plast Reconstr Surg*. Nov 2020;146(5):1209-1211. doi:10.1097/PRS.0000000000007321

9. Sarac BA, Calamari K, Janis J. Virtual Residency Interviews: Optimization for Applicants. *Cureus*. Oct 26 2020;12(10):e11170. doi:10.7759/cureus.11170

10. Asaad M, Rajesh A, Kambhampati PV, Rohrich RJ, Maricevich R. Virtual Interviews During COVID-19: The New Norm for Residency Applicants. *Ann Plast Surg*. Apr 1 2021;86(4):367-370. doi:10.1097/SAP.0000000000002662

11. Vadi MG, Malkin MR, Lenart J, Stier GR, Gatling JW, Applegate RL, 2nd. Comparison of web-based and face-to-face interviews for application to an anesthesiology training program: a pilot study. *Int J Med Educ*. Apr 3 2016;7:102-8. doi:10.5116/ijme.56e5.491a

12. Pourmand A, Lee H, Fair M, Maloney K, Caggiula A. Feasibility and Usability of Tele-interview for Medical Residency Interview. *West J Emerg Med*. Jan 2018;19(1):80-86. doi:10.5811/westjem.2017.11.35167

13. Harris PA, Taylor R, Minor BL, et al. The REDCap consortium: Building an international community of software platform partners. *J Biomed Inform*. Jul 2019;95:103208. doi:10.1016/j.jbi.2019.103208

14. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. Apr 2009;42(2):377-81. doi:10.1016/j.jbi.2008.08.010

15. Colleges AoAM. *ERAS Statistics, Preliminary Data (ERAS 2021)*. 2021. Accessed 3/31/2021. https://www.aamc.org/data-reports/interactive-data/eras-statistics-data

16. Thalamus. 2020 Residency Recruitment Crisis? Data says, Not so much. 3/31/2021, Accessed 4/1/2021, https://thalamusgme.com/2020-residency-recruitment-crisis/

17. Harper JG, Given KS, Pettitt B, Losken A. The independent plastic surgery match: an in-depth analysis of the applicants and process. *Ann Plast Surg*. May 2011;66(5):568-71. doi:10.1097/SAP.0b013e31820b3cea

18. Malafa MM, Nagarkar PA, Janis JE. Insights from the San Francisco Match rank list data: how many interviews does it take to match? *Ann Plast Surg*. May 2014;72(5):584-8. doi:10.1097/SAP.0000000000000185

19. Sarac BA, Rangwani SM, Schoenbrunner AR, Drolet BC, Janis JE. The Cost of Applying to Integrated Plastic Surgery Residency. *Plast Reconstr Surg Glob Open*. Jan 2021;9(1):e3317. doi:10.1097/GOX.0000000000003317

20. Nguyen AT, Janis JE. Resident selection protocols in plastic surgery: a national survey of plastic surgery independent program directors. *Plast Reconstr Surg*. Aug 2012;130(2):459-469. doi:10.1097/PRS.0b013e318258d4dd

21. Janis JE, Hatef DA. Resident selection protocols in plastic surgery: a national survey of plastic surgery program directors. *Plast Reconstr Surg*. Dec 2008;122(6):1929-1939. doi:10.1097/PRS.0b013e31818d20ae

22. Claiborne JR, Crantford JC, Swett KR, David LR. The plastic surgery match: predicting success and improving the process. *Ann Plast Surg*. Jun 2013;70(6):698-703. doi:10.1097/SAP.0b013e31828587d3

23. Program NRM. Match Communication Code of Conduct. Accessed 5/25/2021, https://www.nrmp.org/communication-code-of-conduct/

24. Surgeons ACoAP. Post Interview Communication Policy. Accessed 5/25/2021, https://acaplasticsurgeons.org/Resources/

TABLE LEGEND

Table 1. General Characteristics (Integrated Program 2020-2021 Applicants). n, number of respondents; %*, percentage of respondents out of those who answered the survey question; M.D., Doctor of Medicine; D.O., Doctor of Osteopathic Medicine; U.S., United States; PRS, plastic and reconstructive surgery; SD, standard deviation.

FIGURE LEGENDS

Figure 1. Number of participants per number of interviews received or attended.

Figure 2. Percentage of interviews attended and dropped by participants based on the number of invitations received. The horizontal line marks the average percentage of interviews dropped (25%) and attended (75%) by all participants.

Figure 3. Likert scale responses of how well applicants felt they were able to showcase themselves and assess the strengths, weaknesses, fit, and culture of plastic surgery residency programs.

Figure 4. Interview-related items purchased by applicants and whether or not they were worthwhile. The inner ring illustrates the percentage of participants who reported purchasing (Above Left) lighting equipment, (Above Center) webcam, (Above Right) microphone, (Below Left) upgraded internet, (Below Center) plant(s), and (Below Right) other decorative items. The outer ring shows, of those, the percentage that found the purchase worthwhile.

Figure 5. Likert scale responses of how frequently applicants utilized various resources to aid in the finalization of their match rank lists.

Figure 6. Utilized communication platforms by integrated plastic surgery applicants during the 2020-2021 residency application cycle.

SUPPLEMENTAL MATERIAL

Document, Supplemental Digital Content 1. Plastic Surgery Residency Applicants' Perceptions Survey. The survey included questions about participants' background, preferences towards virtual interviews vs in-person interviews, and experiences with the pre-interview, interview day, and post-interview process.

Table 1. General Characteristics (Integrated Program 2020-2021 Applicants). n, number of respondents; %*, percentage of respondents out of those who answered the survey question; M.D., Doctor of Medicine; D.O., Doctor of Osteopathic Medicine; U.S., United States; PRS, plastic and reconstructive surgery; SD, standard deviation.

Respondent Characteristics	n	%*
Total	**89**	**100.0**
Complete	84	94.4
Incomplete	5	5.6
Applicant Type	**88**	—
M.D.	83	94.3
D.O.	3	3.4
Other International Degree	2	2.3
U.S. Medical School Graduate	**88**	—
Yes	79	89.8
No	9	10.2
Gender	**88**	—
Female	47	53.4
Male	39	44.3
Transgender Female	1	1.1
Prefer Not to Say	1	1.1
Race/Ethnicity	**88**	—
White	52	59.1
Asian	18	20.5
Hispanic/Latino/Spanish	9	10.2
Black/African American	6	6.8
Other	2	2.3
Prefer Not to Say	1	1.1
Home PRS Program	**89**	—
Yes, integrated	56	62.9
Yes, independent	19	21.3
No	21	23.6
In-Person Rotation(s) for Those with Home Program	**69**	—
Yes, at my home program	62	89.9
Yes, at another institution	4	5.8
No	3	4.3
	Mean±SD	**Range**
Programs Applied	68.9±17.6	12-84
Interviews Received	13.3±10.4	0-45
Interviews Attended	11.4±7.5	0-30

Figure 1

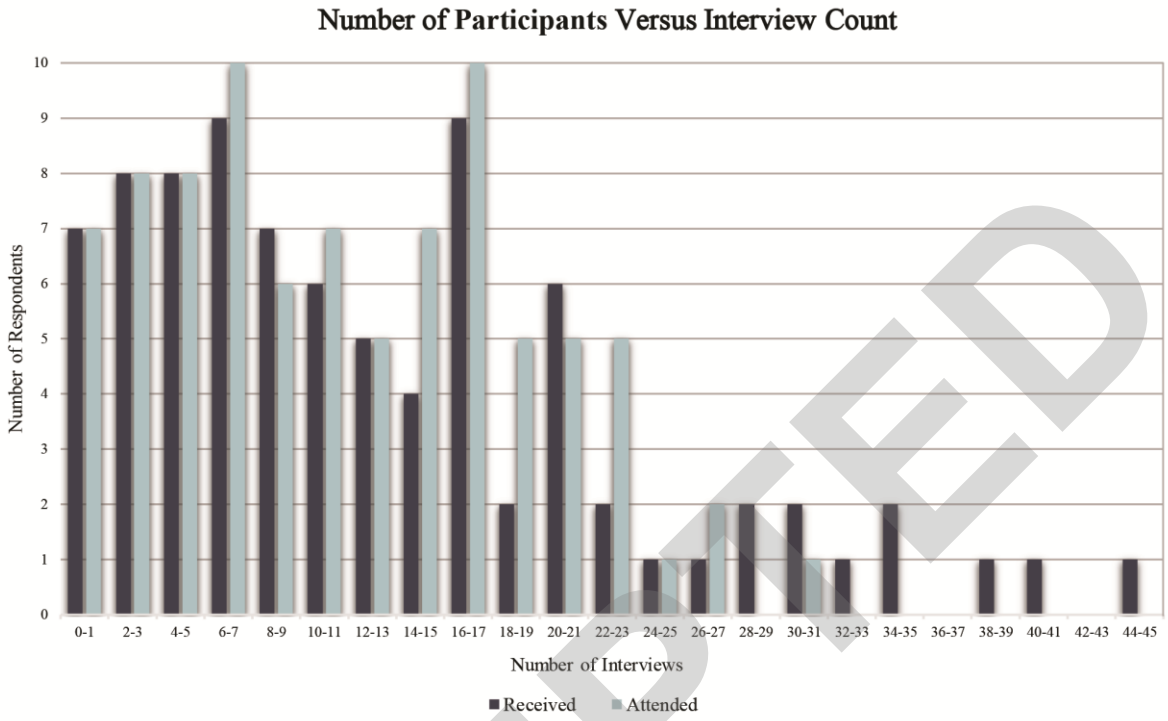


Figure 2

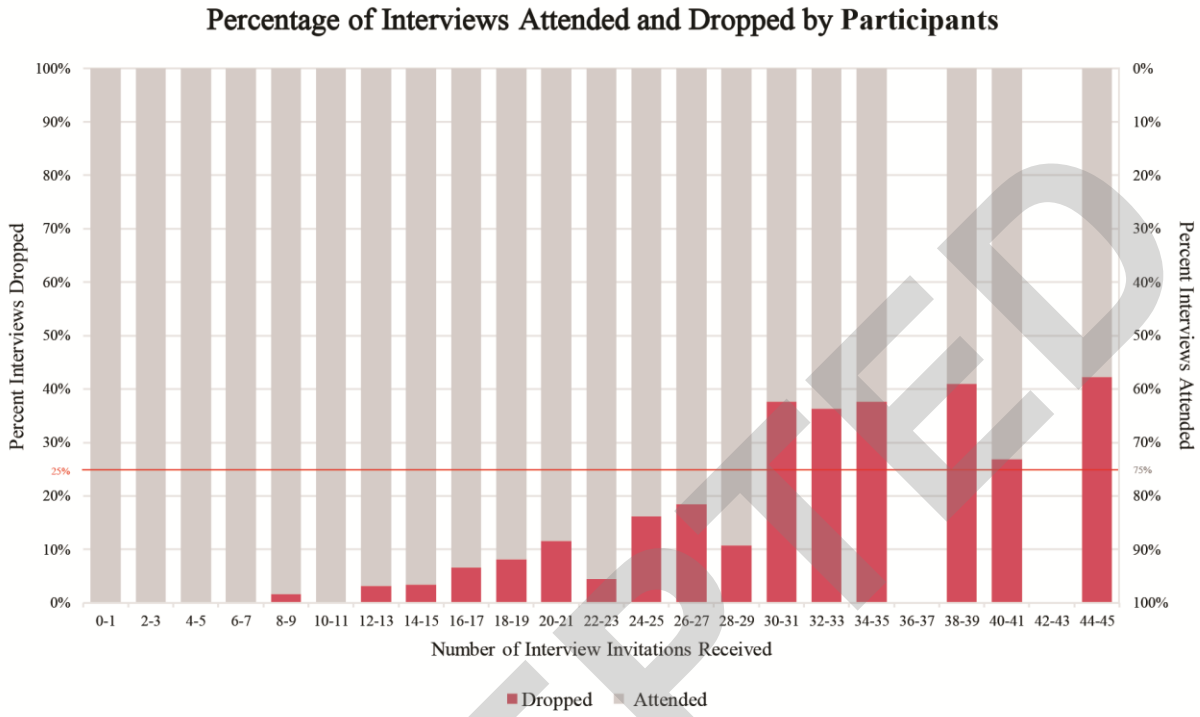


Figure 3

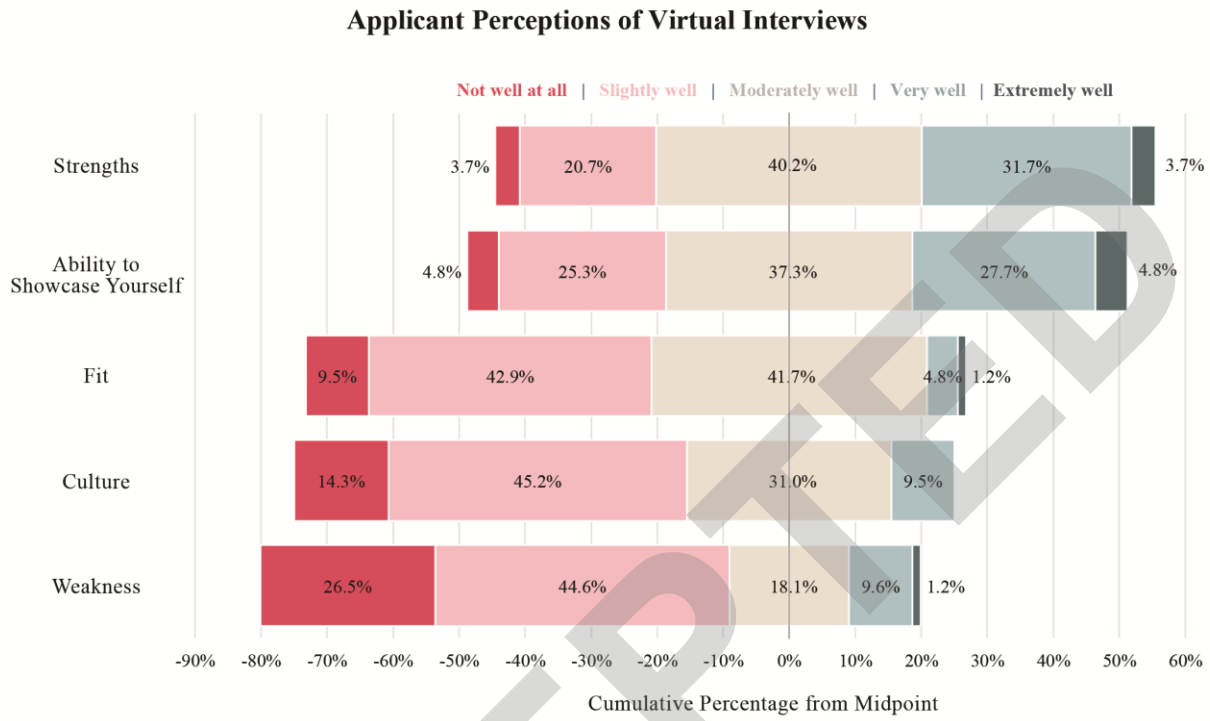


Figure 4

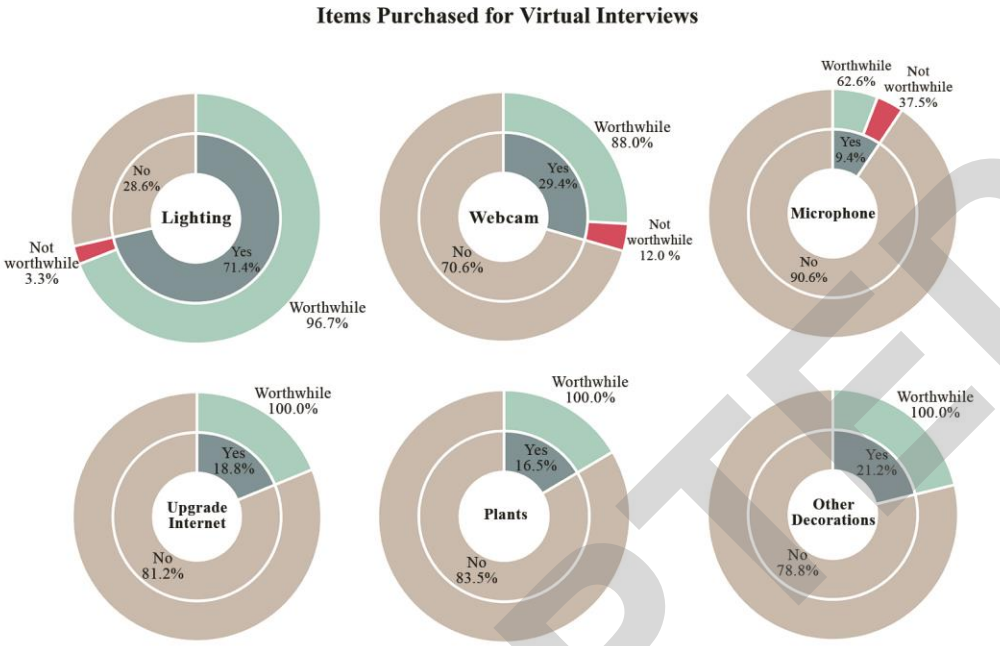


Figure 5

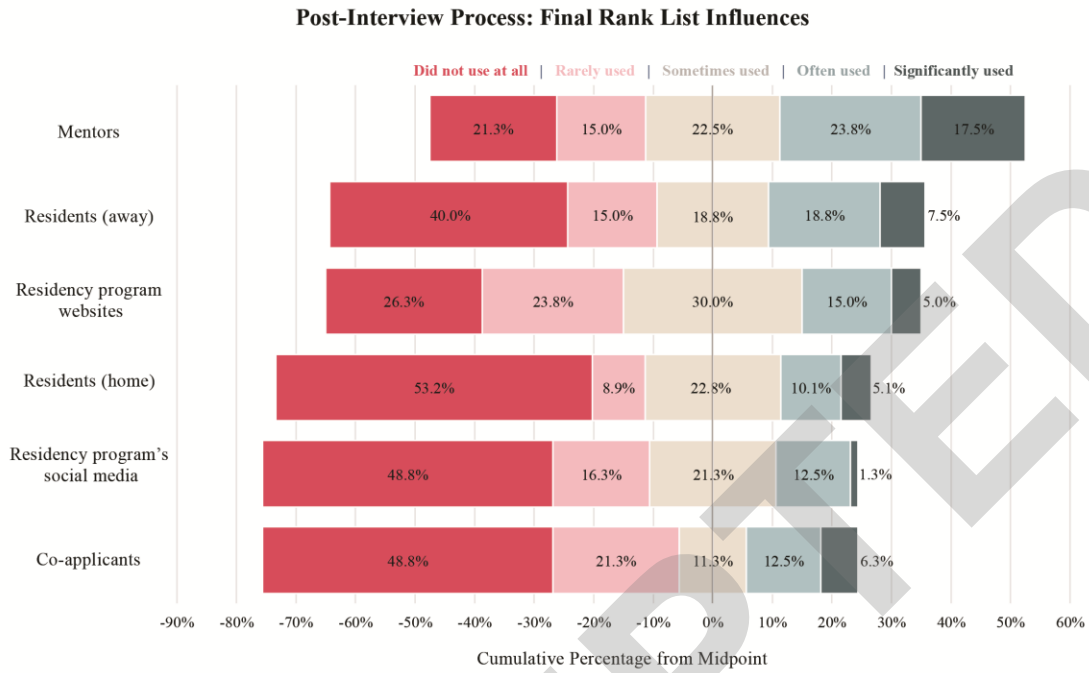
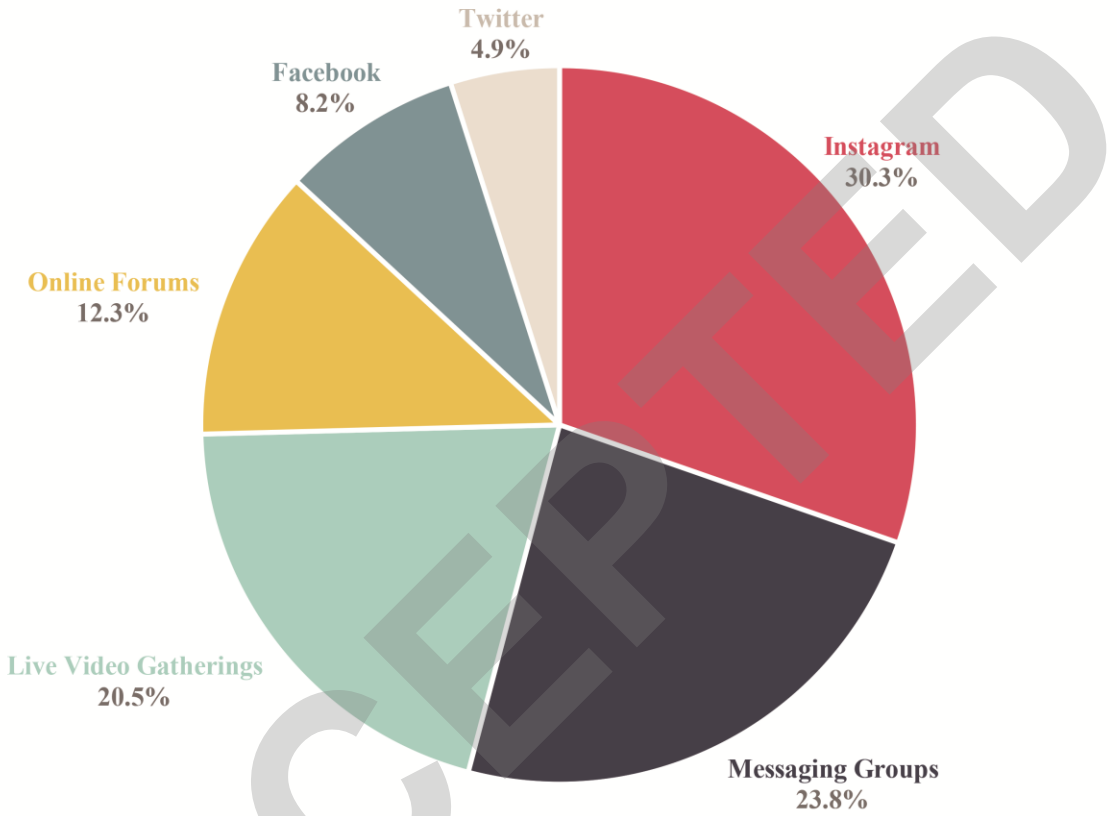


Figure 6



Plastic Surgery Residency Applicants Perceptions Survey

Hello,

Dr. Samuel Lin is conducting a study about the virtual interview cycle for plastic surgery residency programs. You are invited to participate in this study because you interviewed for integrated or independent plastic surgery residency programs this application cycle.

If you choose to be in the study, you will complete a survey. The survey will help us learn more about the experiences of plastic surgery applicants during the virtual interview cycle. The survey will take about 10 minutes for you to complete.

You can skip any survey questions that you do not want to answer. Even if you start the survey, you are not required to complete it. Partial responses will be saved. You can stop at any time. All your answers will be confidential and will not be shared with anyone outside the research team.

Being in this study is voluntary. Please contact Dr. Samuel Lin at sjlin@bidmc.harvard.edu with questions about this study. If you have questions about your rights participating in research or would like to speak with someone independent from the research team, please contact the Human Subject Protection Office (617) 975-8500.

Thank you,

Samuel J. Lin , MD

Background:

Did you apply to integrated or independent plastic surgery residency programs?	◯ Integrated ◯ Independent
Type of applicant:	◯ MD ◯ DO ◯ Other international degree
Are you/will you be a graduate from a US medical school?	◯ Yes ◯ No
If no, please list country of medical school education:	_____
What is your gender identity?	◯ Female ◯ Male ◯ Transgender female ◯ Transgender male ◯ Non-binary ◯ Agender ◯ Prefer not to say ◯ Other
What race do you identify with?	◯ American Indian or Alaskan Native ◯ Asian ◯ Black or African American ◯ Native Hawaiian or Other Pacific Islander ◯ White ◯ Prefer not to say ◯ Other
What is your ethnicity?	◯ Hispanic, Latino/a/x, or Spanish origin ◯ Not of Hispanic, Latino/a/x, or Spanish origin

Do you have a home plastic surgery program (either integrated or independent)?	☐ Yes, integrated ☐ Yes, independent ☐ No
Were you able to complete an in-person sub-internship in plastic surgery?	☐ Yes, at my home program ☐ Yes, at another institution ☐ No
Were you able to complete an in-person rotation in plastic surgery?	☐ Yes, at my home program ☐ Yes, at another institution ☐ No
How many programs did you apply to?	_____
How many interview invitations did you receive?	_____
How many interviews did you go on?	_____

Virtual Interview versus In-Person Interview:

How satisfied are you with the virtual interviewing experience?	◯ Extremely dissatisfied ◯ Somewhat dissatisfied ◯ Neither satisfied nor dissatisfied ◯ Somewhat satisfied ◯ Extremely satisfied
If you had the choice, would you prefer in person or virtual interviews?	◯ Strongly prefer in person ◯ Somewhat prefer in person ◯ No preference ◯ Somewhat prefer virtual ◯ Strongly prefer virtual
How well do you feel you could understand the STRENGTHS of a program with virtual interviews?	◯ Not well at all ◯ Slightly well ◯ Moderately Well ◯ Very well ◯ Extremely well
How well did you feel you could understand the WEAKNESSES of a program with virtual interviews?	◯ Not well at all ◯ Slightly well ◯ Moderately Well ◯ Very well ◯ Extremely well
How well did you feel you could understand the CULTURE of a program with a virtual interview?	◯ Not well at all ◯ Slightly well ◯ Moderately Well ◯ Very well ◯ Extremely well
How well did you feel you could showcase yourself with virtual interviews?	◯ Not well at all ◯ Slightly well ◯ Moderately Well ◯ Very well ◯ Extremely well
How well did you feel you could assess fit with virtual interviews?	◯ Not well at all ◯ Slightly well ◯ Moderately Well ◯ Very well ◯ Extremely well
How do you feel the virtual interview cycle affected the number of interview invitations you received?	◯ Significantly decreased ◯ Somewhat decreased ◯ Neither decreased nor increased ◯ Somewhat increased ◯ Significantly increased
How do you feel the virtual interview cycle affected the number of interviews you were able to accept and go on?	◯ Significantly decreased ◯ Somewhat decreased ◯ Neither decreased nor increased ◯ Somewhat increased ◯ Significantly increased
Did you feel interviews were distributed fairly and equitably?	◯ Yes ◯ No ◯ Not sure

Do you think there should be a limit in the number of interviews invitations applicants can accept?	◯ Yes ◯ No ◯ Not sure
If yes, what do you think the limit should be?	_____
Do you feel the virtual interview cycle put you at an advantage or disadvantage compared to other applicants?	◯ Strong disadvantage ◯ Somewhat disadvantage ◯ Neither advantage nor disadvantage ◯ Somewhat advantage ◯ Strong advantage
Please share any additional thoughts you have about the advantages and disadvantages of virtual interviews.	_____

Pre-Interview:	
Did you participant in any virtual sub-Is (VSIs) hosted by plastic surgery residency programs?	◯ Yes ◯ No
If yes, how many?	_____
How did your experiences with VSIs impact your opinions of programs?	◯ Did not impact me at all ◯ Partly impacted me ◯ Neutral ◯ Somewhat impacted me ◯ Impacted me significantly
Did you become significantly MORE interested in a program after participating in their VSI?	◯ Yes ◯ No
Did you become significantly LESS interested in a program after participating in their VSI?	◯ Yes ◯ No
Do you feel the VSIs were educational and worthwhile?	◯ Not at all educational and worthwhile ◯ Somewhat not educational and worthwhile ◯ Neutral ◯ Somewhat educational and worthwhile ◯ Very educational and worthwhile
Did you attend any virtual events hosted by residency programs before the interview season started (e.g., ACAPS meet and greets, socials with residents and/or faculty)?	◯ Yes ◯ No ◯ Not sure
Did your experience(s) impact your opinion of programs?	◯ Did not impact me at all ◯ Partly did not impact me ◯ Neutral ◯ Somewhat impacted me ◯ Impacted me significantly
Did you become significantly MORE interested in a program after participating in their virtual events?	◯ Yes ◯ No
Did you become significantly LESS interested in a program after participating in their virtual events?	◯ Yes ◯ No
Did you purchase an external lighting (e.g., ring light) for your interview set-up?	◯ Yes ◯ No
Was the external lighting (e.g., ring light) worthwhile?	◯ Worthwhile ◯ Not worthwhile
Did you purchase a webcam for your interview set-up?	◯ Yes ◯ No
Was purchasing the webcam worthwhile?	◯ Worthwhile ◯ Not worthwhile
Did you purchase a microphone for your interview set-up?	◯ Yes ◯ No

Was purchasing the microphone worthwhile?	◯ Worthwhile ◯ Not worthwhile
Did you purchase other electronic equipment for your interview set-up?	◯ Yes ◯ No
Was purchasing the other electronic equipment worthwhile?	◯ Worthwhile ◯ Not worthwhile
Did you upgrade your internet/wifi for your interview set-up?	◯ Yes ◯ No
Was upgrading your internet/wifi worthwhile?	◯ Worthwhile ◯ Not worthwhile
Did you purchase plants for your interview set-up?	◯ Yes ◯ No
Was purchasing plants worthwhile?	◯ Worthwhile ◯ Not worthwhile
Did you purchase other decorative items for your interview set-up?	◯ Yes ◯ No
Was purchasing other decorative items worthwhile?	◯ Worthwhile ◯ Not worthwhile
Taking into account all interview-related expenses, how much did you spend in total this interview season?	◯ $0 ◯ $1 - 100 ◯ $101 - 500 ◯ $501 - 1,000 ◯ >$1,000
Taking into account travel time, how many days of work or school did you miss in order to attend interviews this season?	◯ 0 ◯ 1-2 ◯ 3-5 ◯ 5-10 ◯ >10
Do you think a "token system" would have been helpful for the virtual interview cycle? Example: ENT applicants were able to "signal" strong interest to five residency programs with a "token."	◯ Yes ◯ No ◯ Not sure
Please share any additional thoughts you have about the pre-interview process.	_____

Interview Day:	
What was your ideal interview day length?	◯ 1-2 hours ◯ 3-4 hours ◯ 5-6 hours ◯ 7-8 hours ◯ 9+ hours
Did you prefer live program introductions or recorded ones sent ahead of time?	◯ Live ◯ Pre-recorded ◯ No preference
Did you prefer a pre- or post-interview social hour, or opportunities to speak with residents throughout the interview day?	◯ Pre- or post-interview social hour ◯ Opportunities throughout interview day ◯ Both ◯ Neither ◯ No preference
Please share any additional thoughts about the interview day structure.	_____

Post-Interview Process:

How much did your interview experiences impact your pre-interview rank list?	◯ Did not impact at all ◯ Partly impacted ◯ Neutral ◯ Somewhat impacted ◯ Impacted significantly
After your interview, did you use your mentor to finalize your rank list?	◯ Did not use at all ◯ Rarely used ◯ Sometimes used ◯ Often used ◯ Significantly used
After your interview, did you use residents at your home program to finalize your rank list?	◯ Did not use at all ◯ Rarely used ◯ Sometimes used ◯ Often used ◯ Significantly used
After your interview, did you use residents at programs you were interested in to finalize your rank list?	◯ Did not use at all ◯ Rarely used ◯ Sometimes used ◯ Often used ◯ Significantly used
After your interview, did you use co-applicants to finalize your rank list?	◯ Did not use at all ◯ Rarely used ◯ Sometimes used ◯ Often used ◯ Significantly used
After your interview, did you use program's websites to finalize your rank list?	◯ Did not use at all ◯ Rarely used ◯ Sometimes used ◯ Often used ◯ Significantly used
After your interview, did you use program's social media to finalize your rank list?	◯ Did not use at all ◯ Rarely used ◯ Sometimes used ◯ Often used ◯ Significantly used
After your interview, did you use other resources to finalize your rank list?	◯ Did not use at all ◯ Rarely used ◯ Sometimes used ◯ Often used ◯ Significantly used
Did you feel comfortable reaching out to residents at programs about additional questions?	◯ Yes, for all programs ◯ Yes, for most programs ◯ Yes, for a few programs ◯ No
Please share any additional thoughts you have about the post-interview process.	_____

Applicant Community:

How well do you feel you were able to meet and connect with other applicants during the interview trail?	◯ Not at all ◯ Slightly ◯ Moderately ◯ Well ◯ Extremely well
What platforms were you able to best connect with other applicants?	☐ Facebook ☐ Instagram ☐ Whatsapp ☐ Twitter ☐ Messaging groups ☐ Live video gatherings (e.g., Zoom, Skype, etc.) ☐ Online forums
Would you have appreciated residency programs allocating time for applicant-specific rooms/social times?	◯ Yes ◯ No ◯ Maybe

Other:	
Did you experience any Match violations? (e.g., being asked illegal questions, post-interview communication with faculty)	◯ Yes ◯ No ◯ Not sure ◯ Prefer not to answer
If you feel comfortable, who did the Match violation?	◯ Trainee ◯ Program director ◯ Chief of division/Chair of department ◯ Other faculty
When did the Match violation happen?	◯ During the interview ◯ Pre-interview communication ◯ Post-interview communication