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Applicant perception of virtual interviews in cardiothoracic surgery: A Thoracic Education Cooperative Group Study

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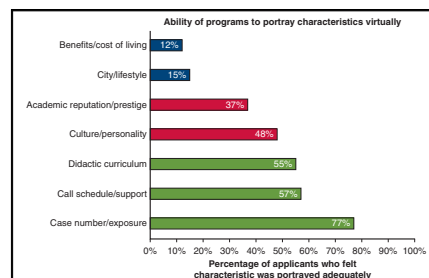
ABSTRACT

Objectives: Cardiothoracic programs used virtual interviews exclusively this year. As programs consider using virtual interviews permanently, our goal was to evaluate the experience of applicants with virtual interviews.

Methods: All 2020-2021 traditional cardiothoracic fellowship applicants received an anonymous electronic survey after the Match process ended. The survey assessed the number of interviews, strengths, and inadequacies of virtual interviews and factors that affected rank decision.

Results: Forty-three percent of applicants responded (60/139). The average number of interviews was 16.0. Eighty percent (48/60) of respondents successfully matched. Eighty-seven percent (52/60) of respondents had a favorable experience with virtual interviews, and 97% (58/60) found them to be convenient. However, only 50% (30/60) were able to evaluate a program fully. Respondents who matched were more likely to have a favorable experience ($P = .02$), but not more likely to be able to evaluate a program fully ($P = .35$). The most valued aspect was the informal meet and greet session with fellows (4.2 of 5). The least valued aspect was the program's social media site (2.0 of 5). The factors most frequently used to decide ranking were case numbers by 92% (55/60) and culture/personality by 82% (49/60).

Conclusions: Virtual interviews were perceived more favorably compared with last year, but half of applicants were still unable to evaluate a program fully. Fellow interactions were the most popular aspect of virtual interviews. As programs consider using virtual interviews permanently, more exposure to current trainees and a more robust social media/online presence will improve favorability. (*J Thorac Cardiovasc Surg* 2021; ■:1-8)



Rate at which program factors were adequately displayed during virtual interviews.

CENTRAL MESSAGE

Applicants have increasingly favored virtual interviews over time. Case numbers were thought to be portrayed well during virtual interviews, whereas the lifestyle was displayed poorly.

PERSPECTIVE

Applicants were more likely to prefer virtual interviews over an in-person format. The most important component of the virtual process was interaction with current trainees. The most important program characteristics needed to rank a program were case number, level of autonomy, program culture, and staff personality. Programs should consider permanently using a virtual component to interviews.

See Commentary on page XXX.

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The Coronavirus Disease 2019 (COVID-19) pandemic has uprooted all aspects of life worldwide for the past 18 months. The traditional cardiothoracic fellowship match process was no exception. Our group has previously reported on the effects of changing from an in-person interview process to a virtual format halfway through the



Scanning this QR code will take you to the table of contents to access supplementary information.

Abbreviations and Acronyms

COVID-19 = Coronavirus Disease 2019

recruitment season last year.¹ This survey-based study demonstrated that applicants strongly favored an in-person component to interviews, highlighting potential deficiencies in the virtual interview process. Several other studies have examined this issue, including recent articles that have highlighted strategies to create an effective virtual interview process.^{2,3} In particular, the website and social media presence of training programs have been examined for areas for improvement.⁴⁻⁶

As individuals have become more comfortable with the use of video conferencing, there are still questions about the best format and most effective aspects of the virtual interview process. In addition, many institutions are considering use of the virtual interview process permanently.^{7,8} As such, our goal was to determine the perception of applicants to the virtual interview process during the 2020-2021 traditional cardiothoracic surgery fellowship interview cycle. This season was the first fully virtual cycle in the history of the match process, and we sought to identify the aspects of the virtual interview process that were viewed most and least favorably.

MATERIAL AND METHODS**Population**

In collaboration with the Thoracic Education Cooperative Group, this study was conducted after Institutional Review Board approval was obtained (Institutional Review Board #20-169, 4/28/2021). After completion of the 2020-2021 National Resident Matching Program Thoracic Surgery MATCH for the 2022 appointment year, a list of all applicants was obtained from the Thoracic Surgery Directors Association and institutional sources. The list included all matched and unmatched applicants who had applied to at least 1 program registered in the MATCH.

Survey

An anonymous online survey was emailed to all applicants using a Google Forms platform (Table 1). Applicants were asked about the number of interviews attended, perceptions about the adequacy of the virtual interview format, and factors that affected their ranking choices. Additionally, demographic information and success in matching were also recorded. The survey was sent to applicants immediately after Match day on May 12, 2021.

Statistical Analysis

Descriptive analyses were performed on the basis of survey responses. All survey responses were included in the results. Likert scale questions were asked concerning the adequacy of evaluating a program during the virtual process, the strengths of the virtual process, and how important a particular factor was in determining rank order. All Likert scales ranged from 1 to 5, with 1 being the least positive response to the question and 5 being the most positive response. For all Likert scale questions, a score of 4 or 5 was considered a positive response. For all Likert scale questions, independent *t* test analyses were used to compare results. For comparative statistics, chi-square and independent *t* test analyses were used. Informed consent was obtained for each participant in the study.

RESULTS**Demographics**

A total of 43% (60/139) of applicants responded to the survey. Demographics are listed in Table 2. Sixty-eight percent (41/60) of respondents were male. The racial distribution of respondents was 65% White (39/60), 15% Asian (9/60), 8% Hispanic (5/60), 3% African American (2/60), and 8% unknown (5/60). Respondents identified as married or in a committed partnership in 75% (45/60) of cases. Thirty-three percent of respondents had children.

Experience

Ninety-five percent (57/60) of interviews were performed in a single day. The mean number of days taken off was 6.0 (0-27 days). The average number of interviews attended by each respondent was 16.0. Seventy-eight percent (47/60) of respondents interviewed at more than 10 programs. Respondents who were applying for the first time attended a similar number of interviews as respondents who were reapplying (15.1 vs 17.1, $P = .15$).

Ranking and Matching

Eighty percent (48/60) of respondents successfully matched. Of those who matched, 17% (8/48) matched at a program at which they had prior clinical experience. Fifty-two percent (25/48) matched into 1 of their top 3 choices. Respondents who were applying for the first time and those reapplying had an identical rate of successfully matching at 80%. Respondents who interviewed at more than 10 programs were more likely to match successfully than those who interviewed at 10 or less programs (91% vs 38%, $P < .01$).

Strengths and Deficiencies of the Virtual Interview Process

Respondents found virtual interviews to be convenient in 97% (58/60) of cases. Eighty-seven percent (52/60) of respondents had a favorable experience with virtual interviews. Respondents who matched were more likely to have a favorable experience compared with those who did not match (92% vs 50%, $P = .02$).

Fifty percent (30/60) of respondents thought that they were able to evaluate programs fully during the virtual interview process. Respondents who matched had a similar rate of evaluating programs fully compared with respondents who did not match (52% vs 42%, $P = .51$).

The most valued aspect of the virtual interview process was the informal meet and greet with the current trainees (4.2 of 5), followed by the formal interview with the current trainee (4.1 of 5), the conference call with the attendings (3.2 of 5), the prerecorded video (3.1 of 5), and the reference to the program's social media site (2.0 of 5).

TABLE 1. Survey questions

Table 1: Questionnaire

1. How many programs did you interview with for the 2022 Thoracic Surgery National Resident Matching Program Match? (Fill in the blank)
2. Did you apply for the 2021 Thoracic Surgery Match?
 - a. Yes
 - b. No
3. For each program, over how many days were your interviews performed on average?
 - a. ½ d
 - b. 1 d
 - c. 2 d
 - d. Other
4. How many days did you take time off from work for interviews? (Fill in the blank)

Please rank the following questions: (1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree).

5. I had a favorable experience with the virtual interviews I took part in.
6. I felt I was able to fully evaluate a program through virtual interviews.
7. I found virtual interviews to be convenient.
8. Did you ultimately match at a program this cycle?
 - a. Yes
 - b. No (skip questions 9 and 10)
 - c. Other: I obtained an ACGME accredited Thoracic position outside of the MATCH
9. If you did match, did you match at a program in which you had prior in person experience or a clinical rotation?
 - a. Yes
 - b. No
10. Did you rank this same program in your top 3?
 - a. Yes
 - b. No

The following 4 questions inquire about demographics and are completely voluntary. You may skip these questions if desired.

11. What is your sex?
 - a. Male
 - b. Female
 - c. Other
12. What is your race?
 - a. Black or African American
 - b. American Indian or Alaskan Native
 - c. Asian, Native Hawaiian, or Pacific Islander
 - d. Hispanic/Latino
 - e. White/Caucasian
 - f. Other
13. What is your marital status?
 - a. Married or committed partnership
 - b. Widowed/Widower
 - c. Divorced/Separated
 - d. Single
14. Do you have children or dependents?
 - a. Yes
 - b. No

Evaluating components of a fellowship virtually. Rate each of the following interactions on providing the most helpful representation of a fellowship program (1 least helpful, 3 neutral, 5 most helpful). If you did not experience any of these interactions during virtual format, please skip.

15. Individual virtual interviews with fellows
16. Conference call with fellows AND faculty/staff
17. Informal group virtual meeting with fellows AND applicants
18. Social media interactions (eg, Twitter, Instagram, Doximity)
19. Prerecorded video of the fellows and program
20. Please select the 3 most important factors in ranking a program
 - a. The city/lifestyle
 - b. Call schedule/support staff/workload
 - c. Available didactics/conference exposure/curriculum

(Continued)

TABLE 1. Continued

- d. Reputation
- e. Case numbers/exposure
- f. Culture/faculty/staff personality
- g. Benefits/cost of living
- 21. Please select the 3 factors MOST adequately portrayed in the virtual interview process
 - a. The city/lifestyle
 - b. Call schedule/support staff/workload
 - c. Available didactics/conference exposure/curriculum
 - d. Reputation
 - e. Case numbers/exposure
 - f. Culture/faculty/staff personality
 - g. Benefits/cost of living
- 22. Would you prefer interviews be performed:
 - a. Virtual only
 - b. In person only
 - c. Combination of virtual/in person

ACGME, Accreditation Council for Graduate Medical Education.

Despite the convenience, 63% (38/60) of respondents ideally would have preferred their interview to have both in-person and virtual components. Thirty percent (18/60) preferred a completely virtual process, and only 7% (4/60) wanted a completely in-person experience (Figure 1).

Factors Most Adequately Portrayed

Figure 2 shows the frequency at which characteristics of a program were adequately portrayed during the virtual process. Respondents thought that the characteristic most frequently portrayed adequately was the case number/exposure in 76% (46/60) of cases. The characteristics of a program that were least frequently portrayed adequately were the city/lifestyle in 15% (9/60) of cases and benefits/cost of living in 12% (7/60) of cases. In this year's survey, respondents thought that the culture and personality of a program were portrayed adequately in 48% (29/60) of cases. In last year's survey, the culture and personality were portrayed adequately in only 19% of cases.

TABLE 2. Applicant demographics

Male	68% (41/60)
Race	
White	65% (39/60)
Asian	15% (9/60)
Hispanic	8% (5/60)
African American	3% (2/60)
Unknown	8% (5/60)
Marital status	
Married or committed partnership	77% (46/60)
Single	18% (11/60)
Divorced or separated	5% (3/60)
Have children/dependents	33% (20/60)
Matched successfully	80% (48/60)

Factors Most Important in Ranking Decision

Figure 3 shows the most important factors respondents used to rank programs. The factors most frequently used were case numbers in 92% (55/60) of cases and culture/personality in 82% (49/60) of cases. The factors least frequently used were the didactic schedule in 13% (8/60) of cases and the benefits/cost of living in 5% (3/60) of cases.

PREFERRED INTERVIEW FORMAT PER APPLICANTS

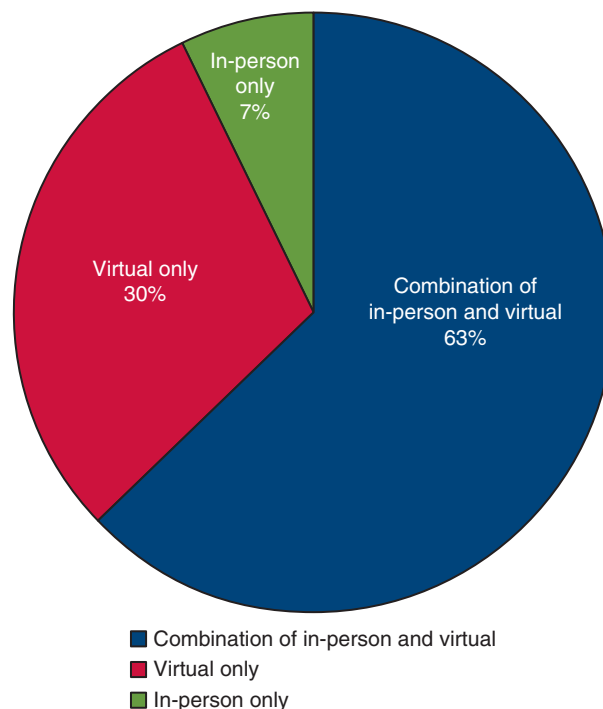


FIGURE 1. Applicant preference for fellowship interview format.

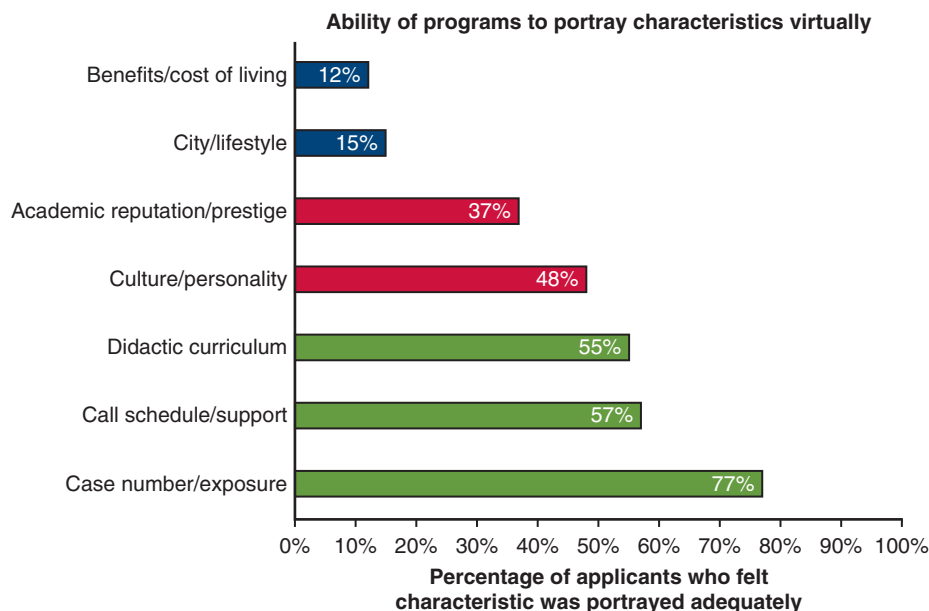


FIGURE 2. Frequency at which characteristics of a program were adequately portrayed during the virtual interview process.

DISCUSSION

Before the COVID-19 pandemic, thoracic surgery fellowship interviews were almost exclusively performed using an in-person format. The process of in-person interviews was considered the best method for applicants to familiarize themselves with a program.⁹ Previous studies have shown that applicants consistently did not think they could fully evaluate a “fit” for themselves virtually.¹⁰ For the 2019-2020 cardiothoracic surgery fellowship interview season, the pandemic required programs to convert to a

virtual format in mid-season. During this transition, only 29% of applicants could adequately evaluate a program virtually.¹ Our current study indicated that this year’s applicants had a favorable experience in 87% of cases and were able to evaluate a program fully in 50% of cases. This trend is likely the result of improved preparation by programs and increased familiarity with the virtual format by everyone.^{11,12} This trend also shows that there may be value in continuing with a virtual format as a component of the interview process.

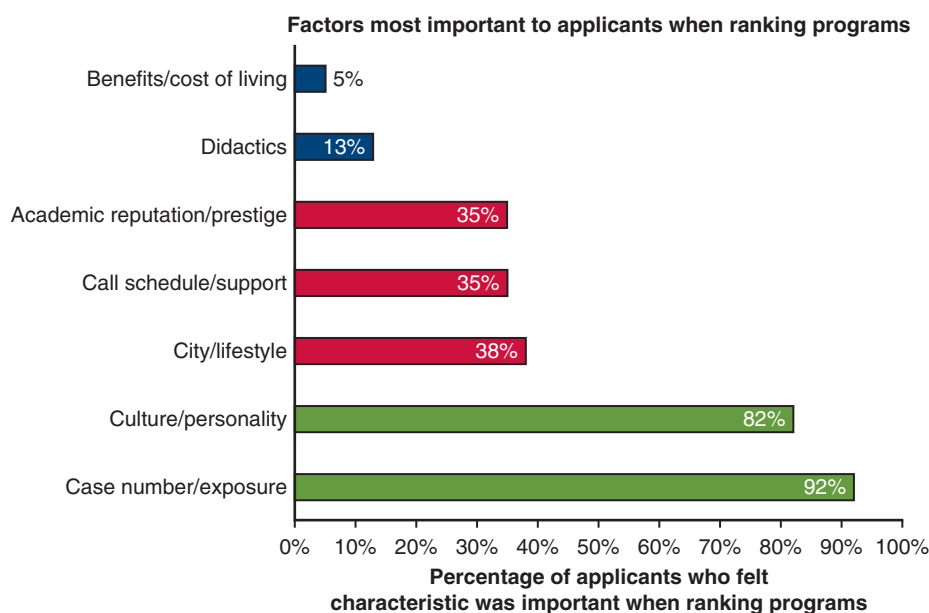
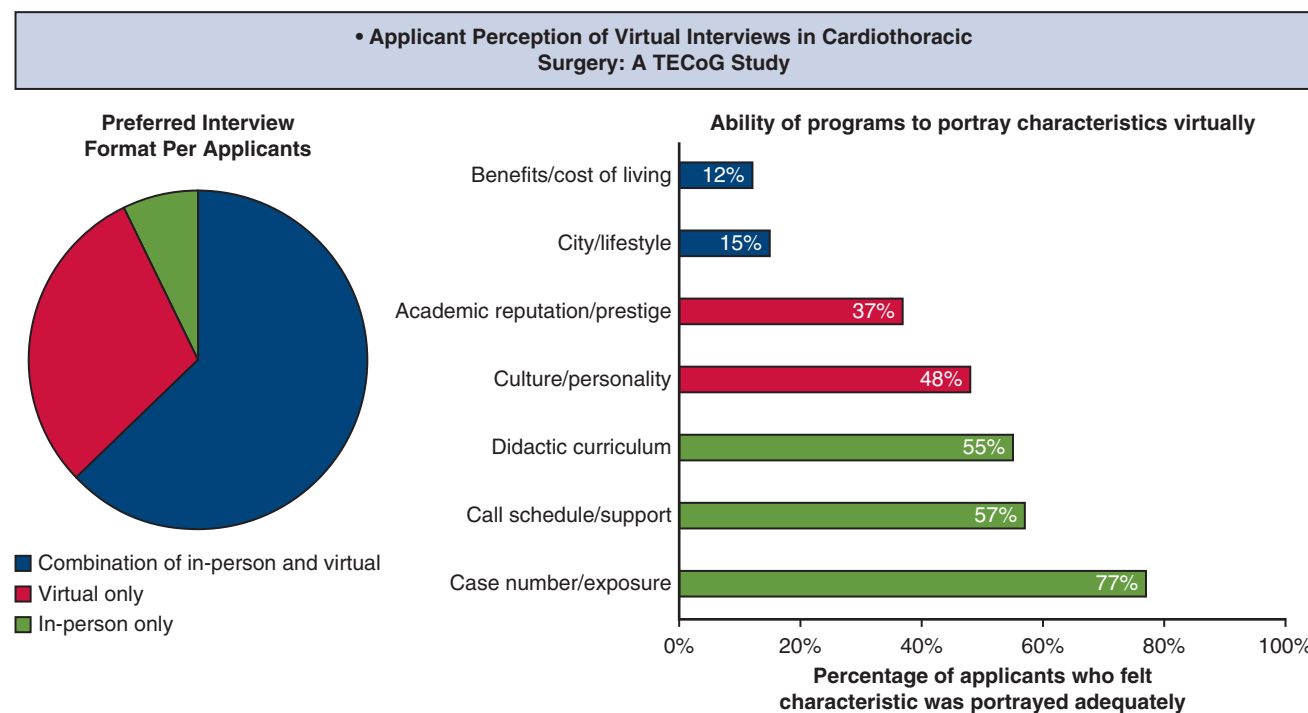


FIGURE 3. Factors critical for applicants to rank a program.



Applicants feel that the virtual interview process is convenient. Interaction with current trainees was the most popular aspect of virtual interviews.

TECoG—Thoracic Education Cooperative Group

FIGURE 4. Preferred interview format and ability of characteristics to be portrayed during interview process. *TECoG*, Thoracic Education Cooperative Group.

Program websites are a critical component of an initial evaluation by applicants. A recent study showed that applicants used program websites to determine key elements of that program, including faculty profiles, rotation schedules, current trainee information, and practice location of graduates.¹³ A review of cardiothoracic training program websites at the beginning of the pandemic determined that 100% of websites were suboptimal. In fact, approximately 60% of program websites contained less than half of the relevant content that applicants sought.¹⁴ In the future, programs should focus on making their websites more comprehensive and updated with the relevant information that applicants seek.

Our study showed that the culture/lifestyle of a program was influential in how applicants ranked programs, but there was a wide gap between how important culture/lifestyle was to applicants compared with how well applicants thought it was portrayed during interviews. This gap exposes an opportunity for programs to improve the interview process by highlighting the culture of a program more adequately. Use of social media and vignettes about the trainees and their families and pictures of gatherings outside the hospital should help to make applicants more aware of a program's culture.^{15,16}

Our study demonstrated that applicants found that the informal group meeting with the current trainees was the most helpful aspect of the virtual interview. Applicants likely thought that they could have open conversations with current trainees about their level of autonomy in the operating room, the ability of the faculty to teach, and the overall level of trainee satisfaction with the program. This preference has been seen in other studies and emphasizes the importance that applicants place on interacting with people closer in training level to themselves. A urology residency study indicated that 64% of respondents thought that interactions with current residents were the most important part of the interview day.¹⁷ In the future, virtual interviews may be enhanced by expanding the role of current trainees during the process. Many programs do not have their current trainees conduct one-on-one interviews during the process. Our data suggest, however, that a formal interview between a trainee and an applicant may be effective and received well by applicants.

We believe that the experiences of virtual formats by applicants in our study argue that there should be at least a component of the interview process that is virtual. The benefits of a virtual format include the elimination of travel time, which is subject to uncontrollable variables such as



VIDEO 1. Applicant perception of virtual interviews narrated by Melissa Taylor, MD. Video available at: [https://www.jtcvs.org/article/S0022-5223\(21\)01702-5/fulltext](https://www.jtcvs.org/article/S0022-5223(21)01702-5/fulltext).

the weather and the costs associated with travel.¹⁸ Applicants also have a fair amount of comfort with electronic communication, and connectivity or disruption issues do not appear to be major drawbacks for most young people. Our study revealed that applicants who interviewed at 11 or more programs were more likely to match successfully than those who interviewed at 10 or less programs. Because most interview processes include an informal gathering the day before, applicants would typically require weeks of time off from their training program to attend that number of interviews. In a virtual format, conversely, many applicants can maintain their usual resident obligations without missing the entire workday. In addition, the expense to applicants is reduced tremendously with the virtual format. Previous literature estimated that in 2020 applicants could save up to \$6000 with virtual-only interviews. The same study estimated that programs could save approximately \$9000 by converting to virtual interviews.¹⁹ Future use of virtual formats as a screening process for both applicants and programs would be ideal. Virtual interviews could be followed by in-person interviews reserved for the top applicants. Many institutions follow this paradigm when considering faculty to hire, and it seems that this process would be successful for cardiothoracic surgery interviews as well. However, it is important that a standardized hybrid interview process be adopted by every program to make the system as fair as possible for all programs.

Study Limitations

There were some limitations to our study. We had a 43% response rate, but this rate is higher than in most national surveys concerning resident education. The demographic information of our respondents and the entire applicant group were similar. For the entire applicant group, 70.2% were male and 60.4% were White. For our respondent group, 68% were male and 65% were White. In addition, 80% of respondents matched, which is higher than the 59.1% match rate reported by the National Resident

Matching Program.²⁰ We found that individuals who did match had a more favorable experience in virtual interviews than those who did not match. Our respondents may have regarded virtual interviews more favorably because they successfully matched at a higher rate than the national average. Of note, 97% of applicants found virtual interviews to be convenient, so it appears there is a strong affinity in this generation toward the virtual format. Also, we did not ask about specific platforms, their ease of use, and the level of functionality and reliability during virtual interviews (eg, Microsoft Teams, Zoom, Skype). We expect that most users felt very comfortable with the logistics of virtual interviews because most training programs have been using virtual conferencing and meetings for more than 12 months now. Several articles in the COVID-19 era have been published on optimizing the technical aspects of a virtual interview.^{21,22}

CONCLUSIONS

Our study showed that applicants have become more familiar with virtual interviews and regard them more favorably now compared with last year (Figure 4). Programs still do not portray their culture and personality well, however, and this aspect of a program is very important to applicants (Video 1). Virtual interviews could be enhanced by creating more comprehensive websites and social media pages. In the future, a virtual component to the interview process may become permanent.

For this upcoming season, the Thoracic Surgery Directors Association has recommended that all interviews for integrated, 4/3, and congenital cardiac surgery fellowships be done virtually. The recommendations for the traditional program application cycle beginning in February 2022 will be made later.

Conflict of Interest Statement

The authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

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Key Words: cardiothoracic, fellowship, residency, virtual interviews