



## Training and Professional Development

# Virtual Interviews for Breast Imaging Fellowship During the COVID-19 Pandemic: Perspectives of Program Directors and Applicants

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### Abstract

**Objective:** To compare in-person and virtual breast fellowship interview experiences from the perspective of fellowship program directors (PDs) and applicants.

**Methods:** Three separate voluntary, anonymous, e-mail delivered surveys were developed for PDs, in-person interview applicants in 2019–2020, and virtual interview applicants in 2020–2021. PD and applicant survey responses regarding the two interview cycles were compared.

**Results:** The response rate was 56% (53/95) for PDs, 19% (23/123) for in-person applicants, and 38% (49/129) for virtual applicants. PDs reported significantly lower cost for virtual compared to in-person interviews ( $P < 0.001$ ). They reported no significant difference in number of applications received, number of applicants interviewed, applicant pool geographic regions, number of interview days offered, or format of interviews. Most PDs (31/53, 58%) felt the virtual format still allowed them to get to know the applicants well. Cost was significantly higher for in-person compared to virtual applicants ( $P < 0.001$ ). More in-person applicants (11/23, 48%) listed cost as a barrier compared to virtual applicants (7/49, 14%) ( $P = 0.002$ ). Virtual and in-person applicants reported a similar number of program applications, but virtual applicants completed more interviews ( $P = 0.012$ ). Both groups preferred scheduled time to speak with the current fellows and a one-on-one interview format with two to four faculty members. Most applicants (36/49, 73%) felt the virtual format still allowed them to get to know each program well.

**Conclusion:** Virtual interviews provide a reasonable alternative to in-person interviews for breast imaging fellowship applicants, with decreased cost being the main advantage.

**Key words:** virtual interview; fellowship; medical education; COVID-19; equity.

### Introduction

The COVID-19 pandemic has led to many changes in the trainee experience, including the resident and fellowship application and interview process (1,2). In March 2020, the Association of American Medical Colleges released a statement encouraging virtual interviews for potential students, residents,

and faculty (1). Other medical organizations supported the concept of virtual interviews for the 2020–2021 application cycle, including the Society of Chairs of Academic Radiology Departments and the Society of Breast Imaging (2). Recent updates from these medical societies have recommended continuing virtual interviews for the 2021–2022 application cycle.

### Key Messages

- Breast imaging fellowship program directors reported no significant difference in the number of applications received, number of applicants interviewed, or geographic regions represented by the applicant pool when comparing in-person and virtual interview formats.
- From the perspective of applicants, the format of fellowship interviews (in-person versus virtual) did not affect the number of submitted applications to breast imaging programs but allowed virtual applicants to complete a larger number of interviews.
- Both program directors and applicants reported that decreased cost was a benefit of the virtual interview format.
- Virtual interviews could be an option for future breast imaging fellowship application cycles, beyond the COVID-19 pandemic, to reduce overall cost and improve equity while providing adequate information for decision-making for both applicants and program directors.

In 2020, residency and fellowship program directors (PDs) were forced to innovate to determine how to best present their program and connect with applicants digitally under the new virtual format. Applicants were also required to pivot quickly to the virtual interview experience by ensuring the professionalism of their background environment, adjusting to potential technical difficulties, and recreating an atmosphere that fostered genuine conversations to best convey their character and personal attributes. Furthermore, both PDs and applicants had to develop novel ways to provide and obtain as much information about each program as possible during a remote visit.

Many medical specialties have reported their experiences with virtual interviews for residency and fellowship programs during the COVID-19 pandemic, including lessons learned and advice for successful virtual interviews (3–19). Reported benefits of virtual interviews include decreased cost (3,7,20–22), decreased carbon footprint (3,22,23), and potential for increased diversity and more equitable access (3,24–26). Unfortunately, the virtual interview format does not allow applicants to visit the institution or the city, which can limit assessment of institutional culture and desirability of the geographic location (27,28). Additionally, programs have described other negative consequences of the virtual interview format, including unintended bias, limited ability to directly assess applicant behavior, and decreased ability to assess non-verbal cues (3,27,28).

Although there is some recent literature directly comparing in-person to virtual interview experiences, none is specific to breast imaging (29–31). Breast imaging is unique among radiology subspecialties because of the extent of patient interactions and emotionally charged conversations.

Traditionally, the in-person interview is used by PDs to attempt to identify candidates with the characteristics required of a skilled breast imaging radiologist, including compassion and effective interpersonal communication skills. PDs also look for candidates whose goals align with their individual program. In-person interviews allow the applicant to experience a program in real time, tour the physical location, speak with trainees on-site, and meet with faculty in the clinical setting. It is likely that the applicant gains insight into the culture of the program from their visit. Transitioning in-person interviews to a virtual format raises concerns about the ability of all parties to elicit enough information through the interview experience to make a well-informed decision. Therefore, a study to assess the impact of transitioning from in-person to virtual breast fellowship interviews is timely and relevant.

The aim of our study was to assess the experience of in-person interviews compared to virtual interviews for breast imaging fellowship, both from the perspective of PDs and applicants.

## Methods

### Survey Development

This study was approved by the corresponding author's institutional review board, which granted a waiver of consent. The study was compliant with the Health Insurance Portability and Accountability Act.

A series of surveys was developed—one for PDs, one for in-person interview applicants during the 2019–2020 application cycle, and one for virtual interview applicants during the 2020–2021 application cycle. Survey questions were developed by the authors of the study, who included three breast imaging fellowship PDs (L.A.M., J.T.K., and R.F.B.), one breast imaging radiologist who matched for breast imaging fellowship in 2017 (E.B.A.), and one radiology resident who participated in breast imaging fellowship virtual interviews in 2020–2021 (D.L.N.).

The PD survey included questions regarding virtual interviews, in-person interviews, and a comparison of the two interview formats. The in-person applicant survey and virtual applicant survey were identical, other than four questions posed to the virtual applicants regarding how the virtual format affected applications and interviews. The three survey instruments are provided in the [Supplementary Material](#) online.

### Survey Distribution

An e-mail with an electronic link to the Research Electronic Data Capture (REDCap, Vanderbilt University, Nashville, TN) survey was sent to the 95 PDs for all breast imaging fellowship programs in the U.S., according to a list of programs provided by the Society of Breast Imaging. The initial e-mail was sent on June 10, 2021, with a reminder e-mail sent on July 14, 2021.

PDs were asked to provide a list of applicants for the last two years that included those who interviewed in-person in 2019–2020 and those who interviewed virtually in 2020–2021.

As applicant lists became available, e-mails with appropriate survey links (for in-person or virtual applicant surveys) were sent to applicants between June 10, 2021 and July 21, 2021.

In 2020 (for 2021 appointment), there were 134 applicants who entered the breast imaging fellowship match, according to the National Resident Matching Program (NRMP) (32). The pooled applicant lists included 92% (123/134) of the in-person applicants. Of the e-mails sent to the in-person applicants, 17 were undeliverable, meaning that they were delivered to 79% (106/134) of these applicants.

In 2021 (for 2022 appointment), there were 136 applicants who entered the breast imaging fellowship match, according to the NRMP (32). Our pooled lists included 95% (129/136) of the virtual applicants. None of the e-mails to the virtual applicant group were returned as undeliverable.

Participation in the survey was voluntary and anonymous. Survey respondents were not required to answer all survey questions. Survey collection began on June 10, 2021 and concluded on September 8, 2021. Survey responses were collected and managed through REDCap electronic data capture tools (33).

### Statistical Analysis

Summary statistics of survey responses are presented. Paired Wilcoxon signed-rank test was used to analyze the PD responses to questions regarding the two interview cycles. The chi-square and Fisher exact tests were used to analyze the applicant responses from the two interview cycles. All analyses were performed using the computer program R (R Foundation for Statistical Computing, Vienna, Austria).  $P$ -values  $< 0.05$  were considered statistically significant.

### Results

Survey responses were received from 56% (53/95) of PDs, 19% (23/123) of in-person interview applicants, and 38% (49/129) of virtual interview applicants.

#### Program Director Survey Responses

Table 1 shows PD survey responses for the two application cycles. PDs reported no significant difference in the number of applications received, number of applicants interviewed, geographic regions represented by the applicant pool, number of interview days offered, or format of interviews. Most PDs conducted one-on-one interviews rather than panel interviews. The cost of interviews was significantly lower for virtual interviews compared to in-person interviews ( $P < 0.001$ ). Regarding preference, PDs offered a range of responses, with similar numbers expressing a preference for virtual and in-person interviews (Figure 1).

Figure 2 shows the Likert scale responses to questions specifically related to the virtual interview format for PDs. Many PDs (31/53, 58%) either strongly agreed or agreed that the virtual interview format allowed the interview committee to get to know the applicants well. However, some PDs (19/53, 36%) either disagreed or strongly disagreed that

the virtual interview format was preferred over the in-person interview with respect to getting to know applicants. Many PDs (30/53, 57%) either strongly agreed or agreed that virtual interviews were more convenient than in-person interviews. The majority of PDs (37/53, 70%) either strongly agreed or agreed that they were satisfied with the overall virtual interview experience.

#### Applicant Survey Responses

Table 2 shows the comparison of survey responses between in-person and virtual interview applicants. Virtual applicants reported no significant difference in the number of programs applied to or the geographic region of programs compared to their in-person counterparts. However, some of the virtual applicants interviewed at a larger number of programs, with 22% (11/49) interviewing at more than 15 programs, compared to 0% (0/23) in the in-person group. Some virtual applicants reported that they applied to more programs overall (15/49, 31%) and applied to more programs outside their geographic region (13/49, 27%) because of the virtual format. Slightly over half of virtual applicants reported that they interviewed at more programs overall (25/49, 51%) and interviewed at more programs outside their geographic area (25/49, 51%) because of the virtual format (Table 3).

Both applicant groups reported that scheduled time to speak with the current fellows was very important. Both groups reported preferring to interview with two to four faculty members in a one-on-one format as opposed to a panel format.

Cost of attending interviews was significantly different for the two groups of applicants, with 71% (35/49) of virtual applicants reporting a cost of \$0 compared to 0% (0/23) of in-person applicants ( $P < 0.001$ ). Almost half of in-person applicants (11/23, 48%) reported cost as a barrier during the interview process ( $P = 0.002$ ). Personal commitments were reported as a barrier to interviews for more in-person applicants than virtual applicants (22% (5/23) compared to 4% (2/49);  $P = 0.03$ ) (Table 4).

There was no significant difference between applicant groups regarding ability to compare programs ( $P = 0.25$ ). In-person applicants were more likely to be satisfied with the interview experience ( $P = 0.038$ ). Regarding getting to know the program, more of the in-person applicants agreed or strongly agreed that they “got to know the program well” (23/23, 100%) compared to the virtual applicant group (36/49, 73%), but the difference between the overall responses of the applicant groups did not reach statistical significance ( $P = 0.06$ ) (Figure 3). In-person applicants preferred in-person interviews, and virtual applicants preferred virtual interviews ( $P = 0.01$ ) (Figure 4).

### Discussion

Our results suggest that, overall, virtual interviews and in-person interviews accomplish similar tasks from the standpoints of PDs and applicants.

**Table 1.** Program Director Responses to Questions Regarding In-Person Versus Virtual Interviews

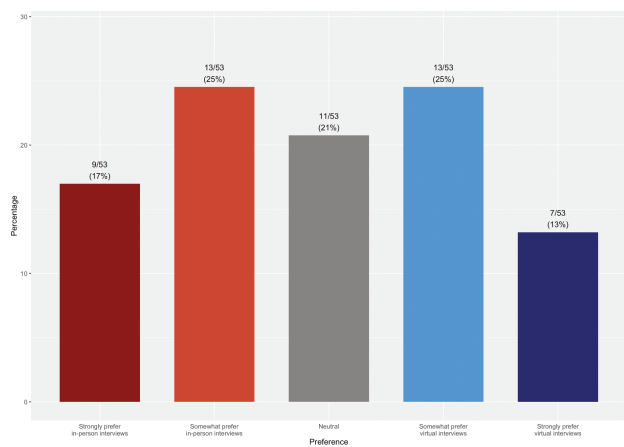
Survey Question	In-Person, n/N (%)	Virtual, n/N (%)	P-value <sup>a</sup>
How many applications did you receive?			0.35
5–10	16/53 (30%)	12/53 (23%)	
10–25	18/53 (34%)	23/53 (43%)	
>25	19/53 (36%)	18/53 (34%)	
How many applicants did you interview?			0.14
5–10	23/53 (43%)	18/53 (34%)	
10–25	20/53 (38%)	24/53 (45%)	
>25	10/53 (19%)	11/53 (21%)	
How many interview days did you offer applicants?			0.29
1 or 2	17/52 (33%)	11/52 (21%)	
3 or 4	20/52 (38%)	26/52 (50%)	
5 or greater	15/52 (29%)	15/52 (29%)	
What was the format of your virtual faculty interviews?			0.17
One-on-one	51/53 (96%)	49/53 (92%)	
Panel	1/53 (2%)	1/53 (2%)	
Other	1/53 (2%)	3/53 (6%)	
How many faculty members interviewed each applicant?			0.62
2	6/53 (11%)	6/53 (11%)	
3	16/53 (30%)	15/53 (28%)	
4	14/53 (26%)	18/53 (34%)	
>4	17/53 (32%)	14/53 (26%)	
What percentage of applications received was from outside your institution's regional area (regional area defined as Northeast, South, Midwest, and West)?			0.14
0%-25%	18/50 (36%)	13/53 (25%)	
26%-50%	17/50 (34%)	22/53 (42%)	
51%-75%	12/50 (24%)	16/53 (30%)	
76%-100%	3/50 (6%)	2/53 (4%)	
What was the overall cost of the interviews/recruitment?			<0.001
\$0-50	9/53 (17%)	34/53 (64%)	
\$51-500	26/53 (49%)	19/53 (36%)	
>\$500	18/53 (34%)	0/53 (0%)	0.55
Did applicants have an opportunity to interact with the current fellow?			0.023
Yes	51/53 (96%)	44/53 (83%)	
No	2/53 (4%)	9/53 (17%)	
Did applicants have an opportunity to interact with the former fellow?			0.27
Yes	17/53 (32%)	21/53 (40%)	
No	36/53 (68%)	42/53 (60%)	
Was a tour of some type given?			<0.001
Yes	52/53 (98%)	39/53 (74%)	
No	1/53 (2%)	14/53 (26%)	

<sup>a</sup>Paired Wilcoxon rank sum.

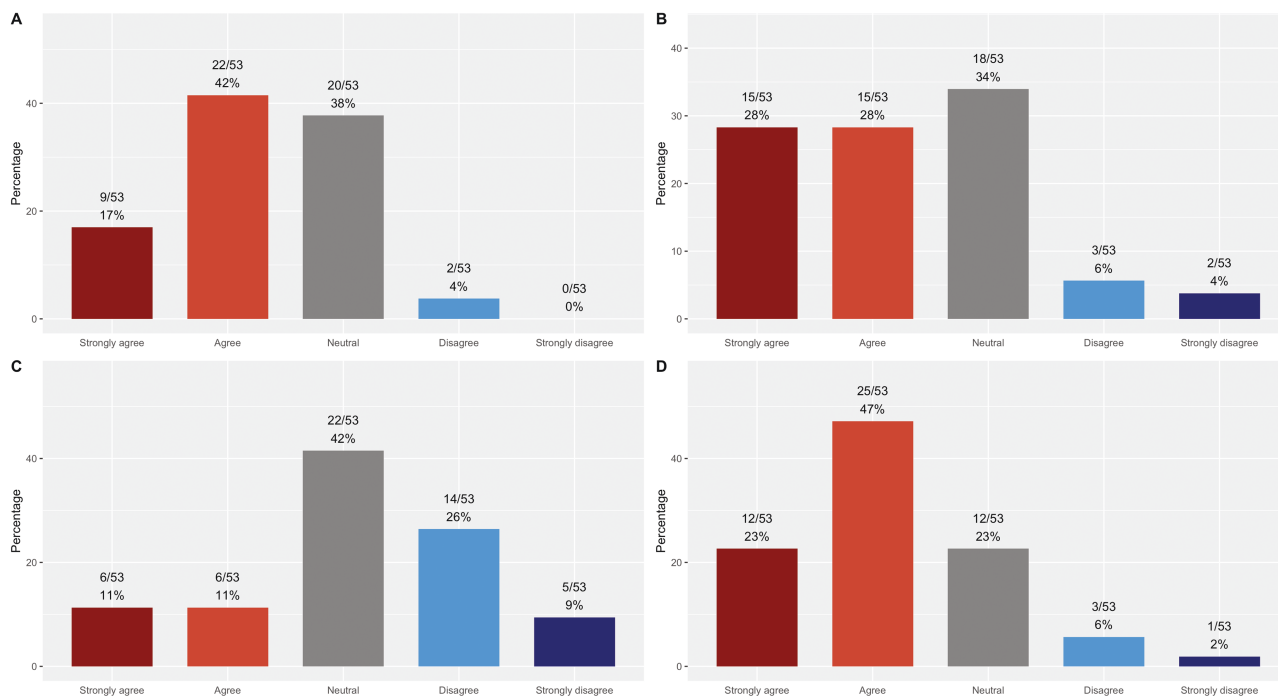
From the PD perspective, there was no significant difference in the number of applications, number of interviews offered, number of interview days, or interview format. Our survey results are in contrast to some prior studies that reported that during a virtual interview cycle, there was an increase in applicants and/or the number of interviews offered (9,14). The conclusions from these studies, however, were based on recruitment experiences for residency and not fellowship. Fellowship application is different from residency application. Application

to breast imaging fellowship is less competitive than application to radiology residency, with more unfilled positions each year in the breast imaging fellowship match compared to the radiology residency match. Since breast imaging fellowships joined the Specialties Matching Service of the NRMP in 2017, unfilled positions have ranged from 21.6% (32/148) to 26.5% (44/166) (32). In the radiology residency match, unfilled positions ranged from 0.5% (5/944) to 2.3% (23/990) during the same time period (34). In addition, there is a much smaller applicant pool for fellowship positions (the number of applicants for breast imaging fellowship ranged from 121 to 136 for matches in 2017–2021, while the number of applicants for diagnostic radiology residency ranged from 1480 to 1657 during the same time period, according to the NRMP) (32,34). Also, some applicants choose to stay at their residency institution for fellowship training and may apply only to their own institution. Remaining at their residency institution for an additional year is beneficial for many applicants, as they are already familiar with the breast imaging faculty, institution, and geographic location, and they can avoid the inconvenience and stress of relocation. These factors could influence applicant decision-making regarding the number of programs chosen for application and may explain the contrasting results.

Virtual and in-person applicants reported no significant difference in the number of fellowship programs they applied to or the percentage of programs outside the geographic region of their current training program. However,



**Figure 1.** Likert scale responses from program directors regarding preference for in-person versus virtual interviews.



**Figure 2.** Likert scale responses from program directors regarding their experiences with in-person and virtual interviews. **A:** Responses to the statement “The interview committee was able to get to know the applicants during virtual interviews.” **B:** Responses to the statement “With regard to convenience, the interview committee prefers virtual interviews to in-person interviews.” **C:** Responses to the statement “With regard to getting to know the applicants, the interview committee prefers virtual interviews compared to in-person interviews.” **D:** Responses to the statement “The interview committee was satisfied with the overall experience of virtual interviews.”

**Table 2.** Comparison of Responses From Breast Fellowship Applicants During the In-Person 2019 Interview Cycle and the 2020 Virtual Interview Cycle

Survey Question	In-Person, n/N (%) or Mean (SD)	Virtual, n/N (%) or Mean (SD)	P-value*
How many fellowship programs did you apply to?			0.55
1 to 6	6/23 (26%)	9/49 (18%)	
7 to 9	4/23 (17%)	11/49 (22%)	
10 to 15	8/23 (35%)	12/49 (24%)	
>15	5/23 (22%)	17/49 (35%)	
What percentage of programs you applied to were outside your current training program geographic region (geographic region defined as Northeast, South, Midwest, and West)?			0.85
0%-25%	9/23 (39%)	15/49 (31%)	
26%-50%	3/23 (13%)	10/49 (20%)	
51%-75%	5/23 (22%)	11/49 (22%)	
76%-100%	6/23 (26%)	13/49 (27%)	
At how many programs did you interview?			0.012
1 to 6	8/23 (35%)	14/49 (29%)	
7 to 9	4/23 (17%)	14/49 (29%)	
10 to 15	11/23 (48%)	10/49 (20%)	
>15	0/23 (0%)	11/49 (22%)	
Which material provided by programs was the most valuable in getting to know the program?			0.15
Applicants interviewed with current fellows	3/22 (14%)	4/47 (8.5%)	
Current fellows gave the applicants a tour	2/22 (9%)	1/47 (2%)	
Introductory PowerPoint presentation	2/22 (9%)	13/47 (28%)	
Links to information about the city or geographic area	0/22 (0%)	1/47 (2%)	
Live tour	1/22 (5%)	0/47 (0%)	
Opportunity to attend departmental conference	1/22 (5%)	0/47 (0%)	
Pre-recorded video tour	0/22 (0%)	2/47 (4%)	
Scheduled time for applicants to talk to the current fellows during interview day	10/22 (45%)	23/47 (49%)	
Session before/after interview day with current/former trainees	3/22 (14%)	3/47 (6%)	
What was your preferred number of faculty members to interview with?			0.73
1 to 2	0/23 (0%)	4/49 (8%)	
2 to 3	10/23 (43%)	21/49 (43%)	
3 to 4	11/23 (48%)	19/49 (39%)	
>4	0/23 (0%)	1/49 (2%)	
No preference	2/23 (9%)	4/49 (8%)	
What was your preferred interview format?			0.82
One-on-one	21/23 (91%)	40/49 (82%)	
Panel	0/23 (0%)	3/49 (6%)	
Other	0/23 (0%)	1/49 (2%)	
No preference	2/23 (9%)	5/49 (10%)	
What was your preferred method of interaction with current fellows?			0.18
Contact information (e-mail) for the current fellows	0/22 (0%)	1/49 (2%)	
Getting a tour from the current fellows	2/22 (9%)	0/49 (0%)	
Interviewing with the current fellows	1/22 (4%)	6/49 (12%)	

Table 2. Continued

Survey Question	In-Person, n/N (%) or Mean (SD)	Virtual, n/N (%) or Mean (SD)	P-value <sup>a</sup>
Scheduled time to talk to the current fellows during interview day	19/22 (83%)	34/49 (69%)	
Virtual session before/after interview day	1/22 (4%)	7/49 (14%)	
No preference	0/22 (0%)	1/49 (2%)	
Did you have an opportunity to interact with former fellows?			0.80
Yes	18/23 (78%)	37/49 (76%)	
No	5/23 (22%)	12/49 (24%)	
What was the optimal number of applicants participating in one interview session?	6 (3)	5 (3)	0.42
What was your preferred method of touring the program's facilities?			<0.001
Live tour	18/23 (78%)	0/49 (0%)	
Live video tour	0/23 (0%)	10/49 (20%)	
Pre-recorded video tour	2/23 (9%)	21/49 (43%)	
Pictorial slideshow tour	0/23 (0%)	4/49 (8%)	
Other	1/23 (4%)	0/49 (0%)	
No preference	1/23 (4%)	13/49 (27%)	
Unsure	1/23 (4%)	1/49 (2%)	
How many days did you spend away from residency interviewing?			0.16
0 to 3 days	4/23 (17%)	17/49 (35%)	
4 to 10 days	10/23 (43%)	22/49 (45%)	
Greater than 10 days	9/23 (39%)	10/49 (20%)	
How much money did you spend attending interviews?			<0.001
\$0	0/23 (0%)	35/49 (71%)	
\$1-1000	10/23 (43%)	14/49 (29%)	
>\$1001	13/23 (57%)	0/49 (0%)	

<sup>a</sup>Fisher exact test; Pearson chi-square test; *t* test. The *t* test was used for continuous variables. The Pearson chi-square test was used for categorical variables, and the Fisher exact test was used when at least one count was below 5.

more virtual applicants reported interviewing at more than 15 programs than the in-person applicants. When specifically questioned about how the virtual format affected application and interview choices, 31% of virtual applicants reported applying to more programs overall and 27% reported applying to more programs outside their geographic region. About half of virtual applicants reported interviewing at more programs overall and interviewing at more programs outside their geographic area. These results suggest that the virtual format offers applicants the opportunity to explore programs they otherwise would not have considered. Further research in future virtual interview cycles could determine whether the increase in completed interviews persists or was related to the novelty of the first virtual application cycle.

Only a small percentage of PDs in our study reported that they were not able to get to know applicants well through the virtual interview format, and the majority of PDs reported overall satisfaction with the virtual interview experience. Despite this, our results showed that most PDs preferred the in-person format for getting to know the applicants. Our

results align with the conclusions of Sarac et al, who also found that although the majority of PDs of plastic surgery residencies were satisfied with virtual interviews, more than 75% of them still preferred the in-person interview format (16). As breast imaging is one of the subspecialties of diagnostic radiology that has the most direct patient interaction, it is crucial for PDs to feel confident in their ability to adequately assess an applicant's interpersonal communication skills and non-verbal body language, which are key components in providing compassionate patient care. While the virtual interview format has provided a reasonable alternative, it is understandable that some PDs would still prefer the in-person interview format, as subtle non-verbal cues that are apparent during in-person interactions can be lost when viewed through a computer screen. Further research could elucidate whether other subspecialties of diagnostic radiology share these same fellowship interview format preferences.

Both groups of applicants preferred the one-on-one interview format and preferred to interview with two to four faculty

**Table 3.** Responses of Virtual Applicants to Questions Regarding the Effect of the Virtual Format on Decision-making

Characteristic	n/N (%)
Was the number of programs you applied to affected by virtual interviews?	
I applied to fewer programs than I would have for in-person interviews	1/49 (2%)
I applied to more programs than I would have for in-person interviews	15/49 (31%)
I would have applied to the same number of programs if interviews were in-person	32/49 (65%)
Unsure	1/49 (2%)
How was the geographic distribution of your applications affected by virtual interviews?	
I applied to more programs outside my geographic region than I would have for in-person interviews	13/49 (27%)
I would have applied to the same number of programs outside my geographic region if interviews were in-person	34/49 (69%)
Unsure	2/49 (4%)
Was the number of programs at which you interviewed affected by virtual interviews?	
I interviewed at fewer programs than I would have for in-person interviews	1/49 (2%)
I interviewed at more programs than I would have for in-person interviews	25/49 (51%)
I would have applied to the same number of programs if interviews were in-person	22/49 (45%)
Unsure	1/49 (2%)
Was the geographic distribution of your interviews affected by the virtual format?	
I interviewed at more programs outside my geographic region than I would have for in-person interviews	25/49 (51%)
I would have interviewed at the same number of programs outside my geographic region if interviews were in-person	24/49 (49%)

**Table 4.** Responses of Applicants Regarding Perceived Barriers to In-Person Versus Virtual Interviews

Characteristic	In-Person, n/N (%)	Virtual, n/N (%)	P-value <sup>a</sup>
Cost	11/23 (48%)	7/49 (14%)	0.002
Time away from rotations	14/23 (61%)	22/49 (45%)	0.21
Weather-related delays	2/23 (9%)	4/49 (8%)	>0.99
Time away from studying for the ABR Core exam <sup>b</sup>	4/23 (17%)	12/49 (24%)	0.50
Personal commitments	5/23 (22%)	2/49 (4%)	0.030
Technical/connectivity issues	NA	6/49 (12%)	NA <sup>c</sup>

Abbreviations: ABR, American Board of Radiology; NA, not applicable.

<sup>a</sup>Pearson chi-square test; Fisher exact test. Fisher exact test was used when at least one count was below 5.

<sup>b</sup>The ABR Core exam was canceled in June 2020, which may have affected responses from the virtual interview applicants.

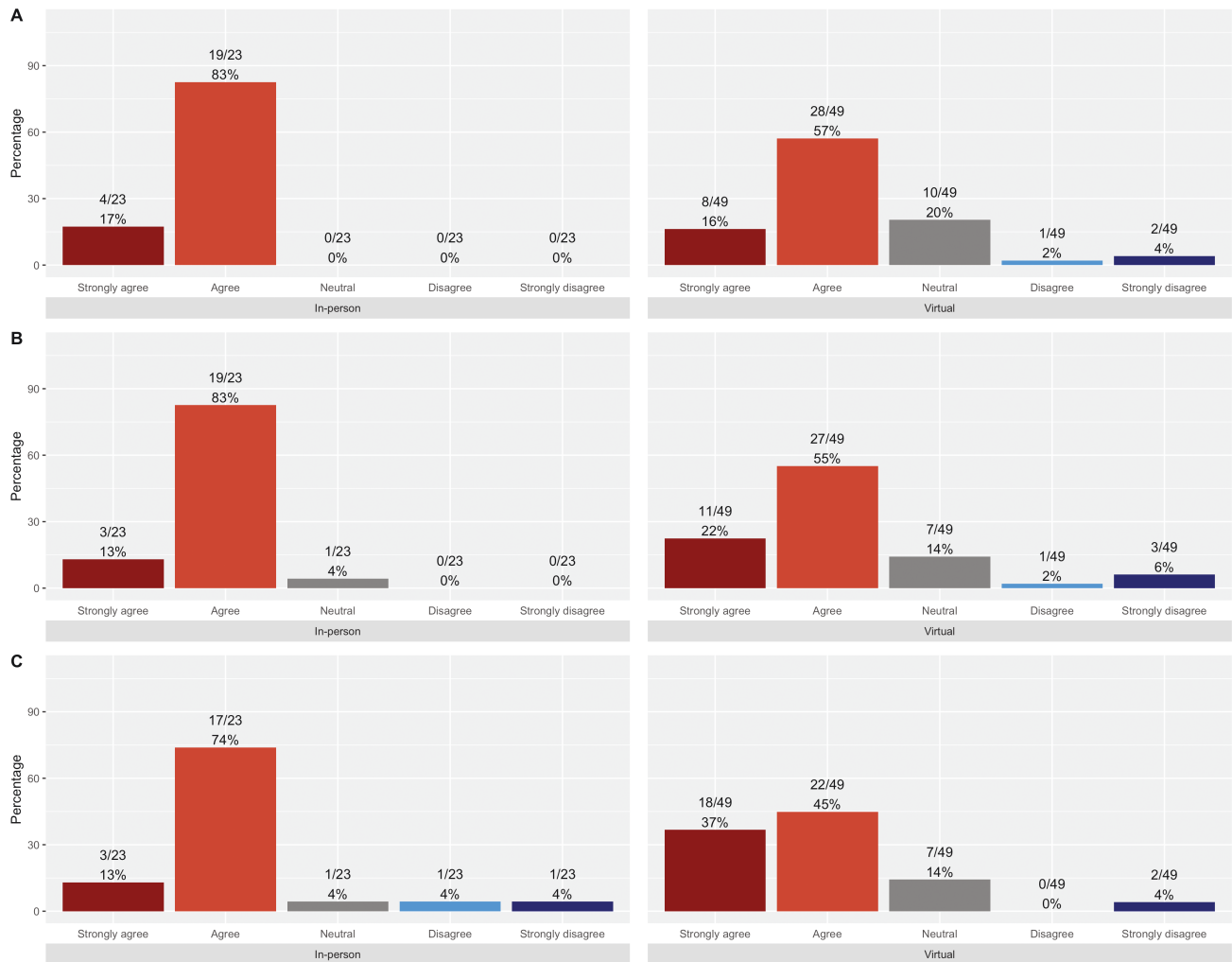
<sup>c</sup>In-person applicants were not asked about technical/connectivity issues, and therefore, a P-value was not calculated.

members. Both groups strongly preferred to have time to speak with current fellows during the interview day. These results could be used to help programs design a virtual interview day that meets the needs of both applicants and PDs. These tips are similar to the best practice recommendations from other reports (3,9).

For both PDs and applicants, cost was the main benefit of the virtual interview format over in-person interviews. For PDs, there is minimal cost to conducting interviews virtually. In the setting of recently proposed Medicare reimbursement cuts for radiology, minimizing fellowship interview expenses would be beneficial for radiology departments (35). Furthermore, not only was cost significantly lower for the virtual applicant group compared to the in-person group, but cost was also listed as a barrier

to attending interviews for the in-person group. These results are similar to those from other studies showing that cost is higher for in-person interviews compared to virtual interviews (20–22). Because travel is the greatest expense related to interviews, the virtual format can decrease cost significantly, resulting in a more equitable process for all applicants. An added benefit is that the virtual format can allow applicants to apply for and interview at a greater number of programs than previously possible because of time, cost, and travel barriers. Increased access would benefit applicants at all competitive levels. Weaker applicants could apply to more programs, including smaller programs and a larger geographic range, increasing their chance of matching. More competitive applicants could





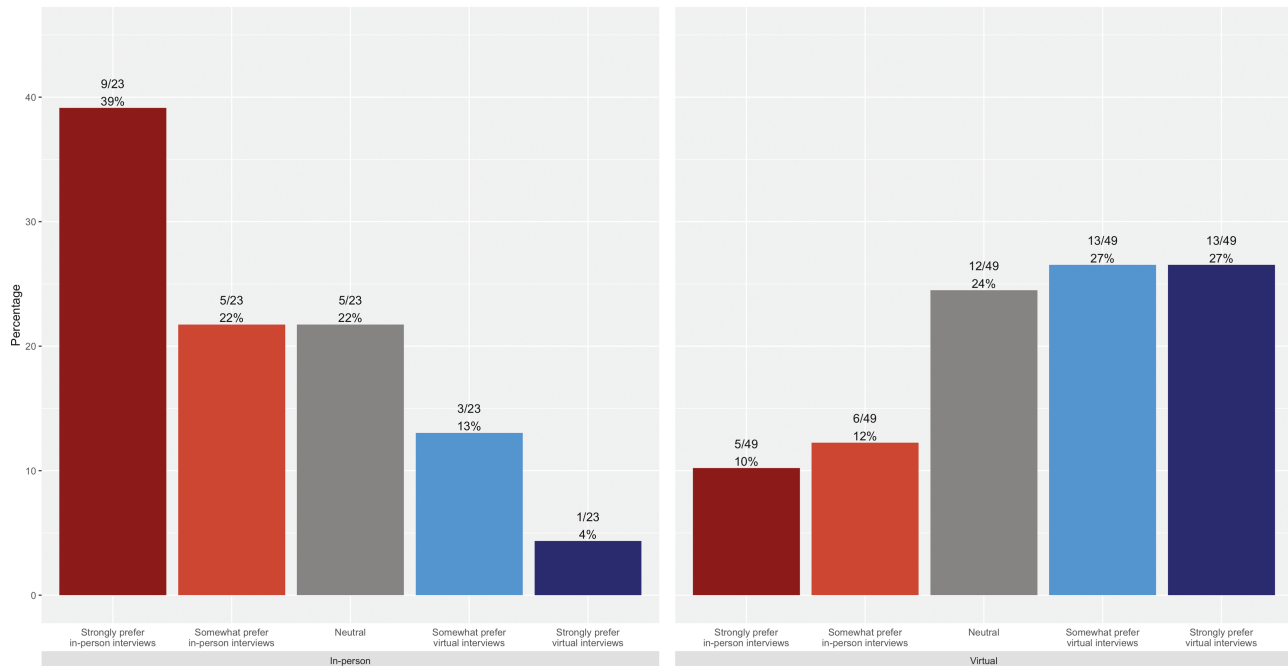
**Figure 3.** Comparison of in-person and virtual applicant responses regarding interview experience. **A:** Responses to the statement "I felt I got to know the program well." **B:** Responses to the statement "I felt I could compare programs well." **C:** Responses to the statement "I was satisfied with the overall experience."

apply to strong programs outside their geographic region that they may not have considered previously because of the cost and time for travel to those regions.

In our study, both virtual and in-person applicants reported that they could adequately compare programs, were able to get to know each program well, and were satisfied with their interview experience. Our results are similar to those from a study by Huppert et al in which applicants for eight internal medicine subspecialty fellowship programs were surveyed. Nearly all respondents (97.3%) reported being able to assess the clinical experience offered by the training program and most (93.2%) reported that they could adequately assess program culture via the virtual format (11).

Our results contrast with those from studies by Grova et al and Lewit et al, both of which surveyed applicants for surgical fellowships in 2020 (31,33). The applicants in these studies were unique because the pandemic shutdown occurred in the middle of the 2020 interview season, allowing direct comparison of the virtual interview experience to

the in-person experience within one interview cycle. Survey results from the study by Grova et al showed that virtual applicants were less likely to get an understanding of the culture of the program (64% of virtual applicants compared to 100% of in-person applicants) and that they were also less likely to report sufficient information to make a ranking decision (54% of virtual applicants compared to 92% of in-person applicants) (29). Survey results from Lewit et al demonstrated that the majority of faculty (75%) and applicants (87.5%) preferred in-person interviews, and many of the applicants (57%) felt that they did not get to know the program as well with the virtual interview format (31). Since the applicants in these studies experienced traditional in-person interviews and then had to pivot to unfamiliar virtual interviews for only a portion of the cycle, and since the surgical programs had no time to develop online resources or become familiar with video conferencing, it is intuitive that the virtual format would be reviewed unfavorably. Future research should address best practices for virtual interviews



**Figure 4.** Likert scale responses from in-person (left) and virtual (right) applicants regarding their preference for in-person versus virtual professional interviews.

and whether a hybrid system (ie, a combination of virtual and in-person interviews) would be valuable.

There were limitations to this study. The lists of applicants who participated in virtual and in-person interviews were incomplete, as the lists were provided by PDs at the request of the authors. Not all PDs provided lists of applicants to their programs, which may have introduced bias. Participation was incomplete in all three groups, and there may be selection bias for those that participated. The lowest participation rate was in the in-person group (19%). It was not possible to obtain correct e-mail addresses for all the in-person applicants, as many had moved on to their fellowship institution by the time the surveys were distributed. Also, some of the e-mails sent to the in-person applicant group were undeliverable, as their e-mail addresses had changed. The in-person and virtual application cycles were temporally separated, with in-person interviews occurring one year prior to the survey, which could result in recall bias. Given the relatively small sample size, the study was underpowered for subset analyses.

## Conclusion

In conclusion, our survey results indicate that the virtual interview format provides a reasonable alternative to in-person interviews for breast imaging fellowship, with decreased cost being the most significant benefit. Responses about the interview experience can help programs tailor the interview day to applicants' needs. Virtual interviews could be an option for future breast imaging fellowship application cycles to reduce

overall cost and improve equity while providing adequate information for decision-making for both applicants and PDs.

## Supplementary Material

Supplementary material is available at the *Journal of Breast Imaging* online.

## Funding

None declared.

## Conflict of Interest Statement

None declared.

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