ORIGINAL RESEARCH

Pulmonary and Critical Care Fellowship Program Directors' Perspective on the Virtual Interview Process

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ABSTRACT

Background: Since the start of the coronavirus disease (COVID-19) pandemic, the residency and fellowship recruitment process has changed significantly with the use of virtual interview (VI) platforms. Pulmonary and critical care medicine (PCCM) candidates reported in a survey that VIs hindered their ability to evaluate their fit within the program. However, the program directors' (PDs') opinion of this process remains unknown.

Objective: We aim to provide insight into the PCCM fellowship PDs' perspective regarding the virtual recruitment process since the first class of fellows undergoing this process has now completed 1 year of training.

Methods: An anonymous survey was sent to the PDs of PCCM programs participating in the National Resident Matching Program match process in 2020 and 2021. The survey consisted of five sections and 26 closed-ended questions and was distributed via email using the SurveyMonkey platform. The survey was conducted for a total of 6 weeks. A follow-up email to nonrespondents was sent every week. The collected responses were divided into two categories: favoring VIs versus not favoring VIs.

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A multivariable logistic regression analysis was performed to determine the factors associated with favoring VIs.

Results: The survey was sent to 190 email accounts from the Fellowship and Residency Electronic Interactive Database Access System website. Over the course of 6 weeks, 64 respondents participated in the survey, with a response rate of 33.68%. Of 64 respondents, 56 (87.5%) fully completed the survey and 8 (12.5%) partially completed the survey. The final sample size was 59. Thirty-six (61.02%) of the PDs favored VIs for future recruitment, and 23 (38.98%) did not ($P < 0.001$). Ninety-seven percent of PDs who favored VIs versus 72.73% of those who did not perceived the current fellows to fit well in the program ($P = 0.007$). The multivariable logistic regression analysis showed a trend toward higher odds of favoring VIs if PDs believed they were able to represent the program well virtually (adjusted odds ratio, 6.99; 95% confidence interval, 0.79 – 61.58) and if they found that the current fellows fit the program well (adjusted odds ratio, 7.15; 95% confidence interval, 0.76–66.52); however, these results were not statistically significant.

Conclusion: In this survey research, we found that the majority of the PCCM fellowship PDs favored a virtual process for future recruitment.

Keywords:
pulmonary and critical care; fellowship interview; virtual interview; program director

Since the start of the coronavirus disease (COVID-19) pandemic, the residency and fellowship recruitment process has undergone a major change with the use of virtual platforms. The recruitment process has been undertaken with the help of a virtual platform since 2020. Survey studies had shown that the virtual recruitment process might be effective for hiring residents and fellows (1–4). A survey study suggested that obstetrics and gynecology subspecialty fellowship program directors (PDs) liked the virtual recruitment process, but, at the same time, 73% of them believed that they were not as confident in ranking the applicants after the virtual interview (VI) (5). Similarly, 78% of orthopedics trauma fellowship PDs believed that there is a role for VI in the future, despite 75% believing that VI limited their ability to familiarize themselves with an applicant (6).

In a survey of pulmonary and critical care medicine (PCCM) applicants regarding perspectives of the VI, 24% believed that the virtual recruitment process hindered their decision making, whereas 20% believed that the process was superior (7). Similarly, in a survey of first-year pediatrics pulmonary medicine fellows who were recruited via the VI process, although 96% of respondents agreed that their fellowship experience matched the VI experience, 87% preferred some form of an in-person interview (8). In a single-organization survey among PCCM aspirants and PCCM attendings, 59% of aspirants and 64% of interviewers favored a hybrid interview model (9). Although the candidates and the PDs seemed to like this new experience overall, there were variable responses to similar questions in the various surveys.

Although it is essential that candidates feel comfortable and favor the virtual

recruitment process, it is equally important that the PDs like the process as well. Although it is early to comment on the virtual recruitment's outcome because the first class of recruitment with a 3-year fellowship is yet to complete the training, it is crucial to know the perspective of PDs of the virtual recruitment process.

Our study aimed to answer the research question whether PCCM PDs favor the VI recruitment process and to identify the factors associated with the decision of favoring versus not favoring. Hopefully, the study can provide further insight into the virtual recruitment process now that the first class of fellows undergoing this process has completed the first year of fellowship, giving an opportunity for comparison with previous groups of fellows who were interviewed in person. We expect that this study will help us understand whether VI can be used for PCCM fellowship recruitment in the future.

The primary objective of the study was to identify the percentage of PDs who favored the virtual recruitment process. The secondary objectives were to evaluate the perception of PDs of current second-year fellows in terms of confidence, interpersonal skills, professionalism, work ethic, and if they fit into the program. An abstract of this study was presented at the American Thoracic Society 2023 International Conference (10).

METHODS

This anonymous survey research included PDs of PCCM programs that participated in the National Resident Matching Program (NRMP) in 2020 and 2021. The survey consisted of five sections and 26 closed-ended questions and was sent via e-mail (*see* the data supplement). The 190 email accounts of the PCCM PDs were accessed from the Fellowship and Residency Electronic Interactive Database Access System (FREIDA) website. Participation was voluntary and was carried out through the SurveyMonkey platform. The survey was conducted for 6 weeks from August 15 to September 26, 2022. A follow-up e-mail to nonrespondents was sent every week. We included all the e-mail addresses available in the FREIDA website; hence, no sample size was calculated. On the basis of similar previous survey research studies, we assumed a minimum 30% response rate would be required for the study (7, 11). The collected responses were stored in a password-secured SurveyMonkey account. The study protocol was reviewed and approved as an exempt category by the institutional review board of Carilion Clinic Health System (IRB-22-1694).

All three authors were involved in the literature review and development of the survey questionnaire. R.A. and C.J.P. developed the preliminary survey questionnaire on the basis of a literature review, the experience of the VI interview as the fellowship and residency applicants, and discussion with the various subspecialty PDs. The data from the NRMP specialties matching service PD survey with particular attention to the PCCM PDs responses were used (12). The preliminary survey questionnaire was inspired by the survey research conducted by Ponterio and colleagues (5). The preliminary survey questionnaire was reviewed by M.B.F., who has extensive experience in medical education. Expert-driven pretesting was done with faculty members of the PCCM department. Based on the results and feedback from the experts, the survey questionnaire was modified. The modified survey questionnaire was piloted with 10 PDs and

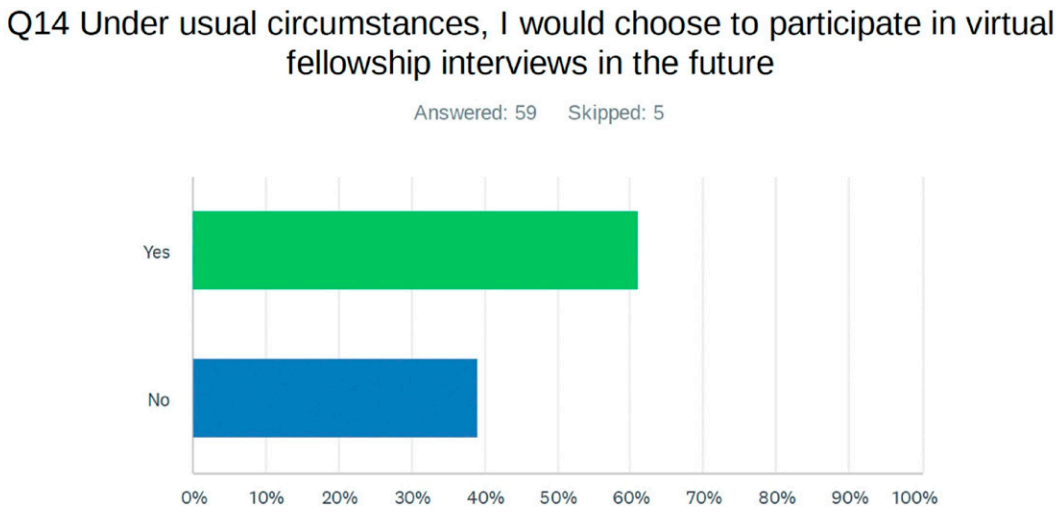
associate PDs to assess the feasibility of the study. The response rate was 80%, and the completion rate ranged between 81% and 100%. The pilot study's results resulted in the modification of the language of some questions for better understating, and the final version of the survey questionnaire was developed.

Statistical Analysis

The data were collected via the SurveyMonkey website. The collected responses were divided into two categories: favoring VIs versus not favoring VIs. Categorical variables were reported as the frequency with percentage. Differences in the categorical variables between the groups were analyzed using the chi-square test or Fisher's exact test. A multivariable logistic regression analysis was performed to determine the factors associated with favoring VIs. All statistical tests of significance were two sided and were conducted at the 0.05 level of significance. Statistical analysis was performed using STATA 17 (StataCorp LLP).

RESULTS

The survey included 190 email accounts from the FREIDA website. Over the study period of 6 weeks, 64 respondents participated in the survey, with a response rate of 33.68%. Of 64 respondents, 56 (87.5%) fully completed the survey and 8 (12.5%) partially completed the survey. The responders who skipped question 14, "Under usual circumstances, I would choose to participate in virtual fellowship interviews in the future," were excluded from the analysis. The final sample size was 59.



ANSWER CHOICES	RESPONSES	
Yes	61.02%	36
No	38.98%	23
TOTAL		59

Figure 1. Percentage of participant program directors who favor virtual interviews under usual circumstances in the future.

Primary Objective

Thirty-six (61.02%) PDs favored VIs in the future as the preferred modality of the interview, and 23 (38.98%) did not ($P < 0.001$) (Figure 1).

Secondary Objectives

Eighty-two percent of PDs who favored VIs versus 54.55% who did not favor VIs found fellows' confidence similar to that perceived during the VI ($P = 0.033$). Similarly, interpersonal skills perception was 79.41% versus 40.91% ($P = 0.013$), professionalism perception was 88.24% versus 31.82% ($P = 0.014$), work ethic perception was 70.59% versus 27.27% ($P = 0.001$), and fit to the program perceived was 97.06% versus 72.73% ($P = 0.007$) (Table 1). Fifty-eight percent of PDs who favored VIs versus 21.74% who did not favor VIs were totally confident in ranking the candidates ($P = 0.014$) (Table 2). The multivariable logistic regression analysis showed higher odds of favoring VIs if PDs believed that they were able to represent the program virtually (adjusted odds ratio, 6.99; 95% confidence interval, 0.79–61.58) and if they found current fellows fit to the program (adjusted odds ratio, 7.15; 95% confidence interval, 0.76–66.52); however, the results were not significant (Table 3).

DISCUSSION

In this study, we found that most of the PCCM PDs who participated in the survey favored VIs for fellowship recruitment in the future. Although the response rate was 34%, the majority of the participants believed that they could represent the programs using the virtual platform and were confident in ranking the applicants. After 1 year of working together, most of the PDs found that the first batch of virtually interviewed candidates had similar confidence, professionalism, work ethic, and dedication to the subspecialty that they perceived during the VI, and they fit well within the program.

The studies conducted so far for the evaluation of the virtual recruitment process involved survey research. The applicants and PDs seem to have a wide range of responses to VIs. In a survey study, Do Tran and colleagues reported that although 92% of the applicants were satisfied with the process (4), only 13% wanted to participate in exclusive VIs. In comparison, in a survey study conducted by Allam and colleagues on PCCM fellowship applicants, only 9% of candidates favored VI as the preferred modality in the future (7). Most of the candidates preferred VIs with an option of an in-person site visit or a hybrid model. Similarly, the PDs seem to believe that the VI has a role in the future, either exclusively or via a hybrid model, even in instances in which they believed the process limited them from fully expressing their program's potential (5, 6, 11, 13, 14). Our study found that 61% of PCCM PDs would like to conduct VIs in the future, even under usual circumstances. In our study, 77% of the PCCM PDs agreed that VIs allowed them to represent their programs (11), 64% would prefer VIs because they reduce financial burden (15), and 59% agreed that the number of applicants increased because of the VI format (16). This is in alignment with previous survey studies. Our study found that 95% of PCCM PDs were confident in ranking the candidates, 88% found fellows fit well within the program, and 89% believed they would have ranked the same candidates even if the interviews were in person. This is contrary to PCCM applicants' experience of the VIs, where they reported that VIs

Table 1. Comparison of groups favoring virtual interview and not favoring virtual interview

	Overall Participants ($N = 59$)	Favoring VI ($n = 36$)	Not Favoring VI ($n = 23$)	*P* Value
1. About program director				
How long as PD				0.639
Less than 5 yr	32 (55.17)	19 (52.78)	13 (59.09)	
Greater than 5 yr	26 (44.83)	17 (47.22)	9 (40.91)	
Program type				0.024
University	48 (81.36)	26 (72.22)	22 (95.65)	
Community	11 (18.64)	10 (27.78)	1 (4.35)	
Sex				0.964
Female	31 (52.54)	17 (47.22)	11 (47.83)	
Male	28 (47.46)	19 (52.78)	12 (52.17)	
2. Perspective on applicants' assessment using a virtual platform				
Interpersonal skills				0.004
Totally confident	11 (18.64)	11 (30.56)	0	
Partially confident	44 (74.58)	24 (66.67)	20 (86.96)	
Totally unconfident	3 (5.08)	0	3 (13.04)	
Not sure	1 (1.69)	1 (2.78)	0	
Professionalism				0.083
Totally confident	11 (18.64)	10 (27.78)	1 (4.35)	
Partially confident	42 (71.19)	24 (66.67)	18 (78.26)	
Totally unconfident	4 (6.78)	1 (2.78)	3 (13.04)	
Not sure	2 (3.39)	1 (2.78)	1 (4.35)	
Problem-solving skills				0.019
Totally confident	11 (18.64)	10 (27.78)	1 (4.35)	
Partially confident	33 (55.93)	20 (55.56)	13 (56.52)	
Totally unconfident	9 (15.25)	2 (5.56)	7 (30.43)	
Not sure	6 (10.17)	4 (11.11)	2 (8.70)	
Work ethic				0.066
Totally confident	10 (16.95)	9 (25)	1 (4.35)	
Partially confident	31 (52.54)	18 (50)	13 (56.52)	

Table 1. *Continued*.

	Overall Participants ($N = 59$)	Favoring VI ($n = 36$)	Not Favoring VI ($n = 23$)	*P* Value
Totally unconfident	13 (22.03)	5 (13.89)	8 (34.78)	
Not sure	5 (4.35)	4 (11.11)	1 (4.35)	
Dedication to subspecialty				0.222
Totally confident	25 (42.37)	17 (47.22)	8 (34.78)	
Partially confident	31 (52.54)	18 (50)	13 (56.52)	
Totally unconfident	2 (3.39)	0	2 (8.70)	
Not sure	1 (1.69)	1 (2.78)	0	
Research competency				0.784
Totally confident	22 (37.29)	14 (38.89)	8 (34.78)	
Partially confident	31 (52.54)	19 (52.78)	12 (52.54)	
Totally unconfident	3 (5.08)	1 (2.78)	2 (8.70)	
Not sure	3 (5.08)	2 (5.56)	1 (4.35)	
Applicant is fit for the program				0.007
Totally confident	9 (15.25)	9 (25)	0	
Partially confident	44 (74.58)	26 (72.22)	18 (78.26)	
Totally unconfident	4 (6.78)	0	4 (17.39)	
Not sure	2 (3.39)	1 (2.78)	1 (4.35)	
3. Perception of fellows after 1 yr of training as compared with perception during the virtual interview				
Fellows' confidence				0.033
About the same	40 (71.43)	28 (82.35)	12 (54.55)	
Much less	6 (10.71)	1 (2.94)	5 (22.73)	
Cannot decide yet	10 (17.86)	5 (14.71)	5 (22.73)	
Fellows' interpersonal skills				0.013
About the same	36 (64.29)	27 (79.41)	9 (40.91)	
Much less	9 (16.07)	3 (8.82)	6 (27.27)	
Cannot decide yet	11 (19.64)	4 (11.76)	7 (31.82)	
Fellows' professionalism				<0.001
About the same	37 (66.07)	30 (88.24)	7 (31.82)	
Much less	7 (12.50)	0	7 (31.82)	

Table 1. *Continued*.

	Overall Participants ($N = 59$)	Favoring VI ($n = 36$)	Not Favoring VI ($n = 23$)	*P* Value
Cannot decide yet	12 (21.43)	4 (11.76)	8 (36.36)	
Fellows' problem-solving skills				0.014
About the same	27 (48.21)	19 (55.88)	8 (36.36)	
Much less	10 (17.86)	2 (5.88)	8 (36.36)	
Cannot decide yet	19 (33.93)	13 (38.24)	6 (27.27)	
Fellows' work ethic				0.001
About the same	30 (53.57)	24 (70.59)	6 (27.27)	
Much less	9 (16.07)	1 (2.94)	8 (36.36)	
Cannot decide yet	17 (30.36)	9 (26.47)	8 (36.36)	
Fellows' dedication to subspecialty				0.052
About the same	41 (74.55)	28 (82.35)	13 (61.90)	
Much less	6 (10.91)	1 (2.94)	5 (23.81)	
Cannot decide yet	8 (14.55)	5 (14.71)	3 (14.29)	
Fellows' research competency				0.035
About the same	36 (64.29)	26 (76.47)	10 (45.45)	
Much less	5 (8.93)	1 (2.94)	4 (18.18)	
Cannot decide yet	15 (26.79)	7 (20.59)	8 (36.36)	
Find fellow fit to program				0.007
Yes	49 (87.50)	33 (97.06)	16 (72.73)	
No	7 (12.50)	1 (2.94)	6 (27.27)	
Would have ranked the same fellows if interviews were face-to-face				0.146
Yes	50 (89.29)	32 (94.12)	18 (81.82)	
No	6 (10.71)	2 (5.88)	4 (18.18)	

Definition of abbreviations: PD = program director; VI = virtual interview.
The *P* value represents the difference between the favoring group versus not favoring group. Data are presented as frequency (percent).

hindered their ability to evaluate a program's facilities, culture, and their own fit within the program and ability to rank programs (7).

Even with this wide range of perceptions, the VI process seems to have a place in the fellowship recruitment process in the future. It is perhaps necessary to introduce

Table 2. Comparison between groups favoring virtual interview and not favoring virtual interview

	Overall Participants ($N = 59$)	Favoring VI ($n = 36$)	Not Favoring VI ($n = 23$)	*P* Value
1. Perspective on the virtual interview process				
Represent the program				0.003
Totally confident	15 (25.42)	14 (38.89)	1 (4.35)	
Partially confident	31 (52.54)	18 (50)	13 (56.52)	
Totally unconfident	12 (20.34)	3 (8.33)	9 (39.13)	
Not sure	1 (1.69)	1 (2.78)	0	
High number of low-quality applications				0.031
Strongly agree	11 (18.64)	3 (8.33)	8 (34.78)	
Partially agree	24 (40.68)	15 (41.67)	9 (39.13)	
Strongly disagree	14 (23.73)	12 (33.33)	2 (8.70)	
Not sure	10 (16.95)	6 (16.67)	4 (17.39)	
Prefer virtual because of financial considerations				0.001
Strongly agree	18 (31.03)	18 (51.43)	0	
Partially agree	19 (32.76)	14 (40)	5 (21.74)	
Strongly disagree	19 (32.76)	2 (5.71)	17 (73.91)	
Not sure	2 (3.45)	1 (2.86)	1 (4.35)	
2. Ranking candidates after the virtual interview				
Ranking applicants				0.014
Totally confident	26 (44.07)	21 (58.33)	5 (21.74)	
Partially confident	30 (50.85)	14 (40)	16 (69.57)	
Totally unconfident	2 (3.39)	0	2 (0.70)	
Not sure	1 (1.69)	1 (2.86)	0	
As compared with the face-to-face interview				<0.001
Totally confident	17 (28.81)	16 (44.44)	1 (4.35)	
Partially confident	28 (47.46)	17 (47.22)	11 (47.83)	
Totally unconfident	12 (20.34)	1 (2.78)	11 (47.83)	
Not sure	2 (3.39)	2 (5.56)	0	

Table 2. *Continued.*

	Overall Participants ($N = 59$)	Favoring VI ($n = 36$)	Not Favoring VI ($n = 23$)	*P* Value
Most influential factor in ranking				0.170
Interview experience	36 (61.02)	25 (69.44)	11 (47.83)	
CV and USMLE scores	12 (20.34)	4 (11.11)	8 (34.78)	
LoR	5 (8.47)	3 (8.33)	2 (8.70)	
Referral from a colleague	6 (10.17)	4 (11.11)	2 (8.70)	

Definition of abbreviations: CV = curriculum vitae; LoR = letter of recommendation; PD = program director; USMLE = U.S. Medical Licensing Examination; VI = virtual interview.
The *P* value represents the difference between the favoring group vs. not favoring group. Data are presented as frequency (percent).

a unified interview format adopted by all PCCM fellowship programs to give candidates more access to the program information and resources. This will potentially allow a better fellow-to-program fit and improve the overall interview experience.

Limitations

Our study has a few limitations. First, we had a lower response rate than expected. This limited our data from being highly representative. Second, our study lacks PDs' perspectives of a hybrid model; a hybrid model or a tiered interview seemed to be liked by the candidates. Most of the PDs, however, opted to conduct VIs even under normal circumstances, which suggested that the PDs are not ready to return to the exclusive in-person interview format. Third, we had a low response rate from community hospital–based fellowship programs. This is important because almost half of the PCCM fellows graduate from community programs or university-based community programs. Fourth, we did not know the reason behind the responses, because this survey had dichotomous options to respond

Table 3. Logistic regression analysis calculating odds of favoring virtual interview process

Variable	aOR	95% CI	*P* Value
Community (referent: university) programs	0.24	0.02–2.30	0.220
Can represent the program virtually	6.99	0.79–61.58	0.080
Finding fellows fit after 1 yr	7.15	0.76–66.52	0.084

Definition of abbreviations: aOR = adjusted odds ratio; CI = confidence interval.
Logistic regression controlled for university programs in reference to community programs, can represent the program virtually (totally confident in reference to others), and finding current fellows fit in reference to not finding fit to the program.

but no free text option. For example, it was not possible to understand why the PDs who did not favor the VI perceived work ethics and professionalism less in person than in the VI. Despite some limitations, this is the first survey study done to understand the perspective of PCCM PDs regarding the VI process. After a few batches of fellows are recruited via the VI process, future studies must fully appraise the feasibility of the exclusive virtual recruitment process versus a hybrid model.

Conclusions

In this survey research, we found that the majority of the PCCM fellowship PDs favored a virtual interview process. The PDs found that the fellows had similar qualities as perceived during the VI and preferred to conduct the interviews virtually for fellowship recruitment even under the usual circumstances in the future.

Author disclosures are available with the text of this article at www.atsjournals.org.

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