








Evaluation of pharmacy residency recruitment and interview processes during the COVID-19 pandemic (2020-2021 application cycle)

Mary Joyce B. Wingler Pharm.D.¹ | David A. Cretella Pharm.D.¹ |
 Jamie L. Wagner Pharm.D.²  | Katie E. Barber Pharm.D.² |
 P. Brandon Bookstaver Pharm.D., FCCP³  | Lauren Freeman Pharm.D.⁴ |
 Elizabeth W. Covington Pharm.D.⁵  | Christopher M. Bland Pharm.D., FCCP⁶  |
 Bruce M. Jones Pharm.D.⁷  | Maicuc Tran Pharm.D.⁸ |
 Stefanie A. Stramel Pharm.D., M.S.⁸ | Michelle Turner Pharm.D.⁹  |
 Darrell Childress Pharm.D.¹⁰ | Kayla R. Stover Pharm.D., FCCP² 

¹Department of Antimicrobial Stewardship, University of Mississippi Medical Center, Jackson, Mississippi, USA

²Department of Pharmacy Practice, University of Mississippi School of Pharmacy, University of Mississippi Medical Center, Jackson, Mississippi, USA

³University of South Carolina College of Pharmacy, Prisma Health Richland Hospital, Columbia, South Carolina, USA

⁴Department of Pharmacy Services, WVU Medicine J.W. Ruby Memorial Hospital, Morgantown, West Virginia, USA

⁵Samford University McWhorter School of Pharmacy, Birmingham, Alabama, USA

⁶University of Georgia College of Pharmacy, Savannah, Georgia, USA

⁷St. Joseph's/Candler Health System, Inc., Savannah, Georgia, USA

⁸Department of Pharmacy, Memorial Hermann Memorial City Medical Center, Houston, Texas, USA

⁹Department of Pharmacy, Cone Health|Moses Cone Hospital, Greensboro, North Carolina, USA

¹⁰Department of Pharmacy, East Alabama Medical Center, Opelika, Alabama, USA

Correspondence

Kayla R. Stover, Department of Pharmacy Practice, University of Mississippi School of Pharmacy, University of Mississippi Medical Center, 2500 North State Street, Jackson, MS

Abstract

Introduction: Due to the COVID-19 pandemic, most pharmacy residency programs changed to an all-virtual format for recruitment and interviews for the 2020 to 2021 application cycle. There are no data evaluating the experiences and perceptions of these changes from the perspective of pharmacy residency programs and applicants.

Methods: An electronic cross-sectional survey was distributed via email to postgraduate year 1 (PGY1) and postgraduate year 2 (PGY2) pharmacy residency programs and applicants across the Southeastern United States. Results have been reported according to the Checklist for Reporting of Survey Studies (CROSS) guidelines (Enhancing the QUALity and Transparency Of health Research [EQUATOR] Network).

Results: Exactly, 142 residency applicants and 104 residency programs responded to the survey. Most respondents participated in virtual recruitment and interviews. In 2020 to 2021, less residency programs participated in local/regional showcases and personal placement services, but social media engagement increased. Of the applicants who responded, over half felt the need to apply to more programs during this application cycle, and a corresponding increase in applications were seen by residency programs. Residency interviews appeared shorter than previous years, and less programs offered an informal time to get to know the applicants. Overall, applicants and residency programs preferred on-site interviews, but both parties reported feeling confident creating rank lists after virtual interviews.

Conclusion: These results highlight the impact of COVID-19 on residency recruitment and the interview process. Residency programs should implement feedback for improving the virtual experience, as able. The ongoing pandemic may affect the 2022 to 2023 application cycle, and pharmacy leadership organizations should consider

39216, USA.

Email: kstover@umc.edu

developing guidance for applicants and residency programs on navigating another year of virtual events.

KEYWORDS

application, hybrid, pharmacy residency, postgraduate training, virtual

1 | INTRODUCTION

Coronavirus disease 2019 (COVID-19) has directly and significantly impacted the entire healthcare system not only in patient care, but in recruitment and education of healthcare trainees.^{1,2} Pharmacy residency and fellowship training was no exception. The 2019 to 2020 pharmacy residency application and interview cycle occurred immediately prior to the arrival of the pandemic in March 2020. Residency programs and applicants were faced with many unknowns when preparing for 2020 to 2021 recruitment. Recruitment approaches were variable amongst residency programs and included a dramatic shift to virtual recruitment platforms, which likely presented challenges to resident applicants. Traditional methods were used, such as disseminating information on residency program websites and updating online residency directories. Many programs also leveraged nontraditional strategies as well, including hosting virtual open houses and engaging on social media, as national residency showcases shifted to a virtual format. Colleges and schools of pharmacy (CSOPs) also sponsored school-specific virtual career fairs and showcases for programs.

Across the medical field, residency and fellowship interviews were similarly impacted by COVID-19. In May 2020, the Coalition for Physician Accountability issued recommendations to perform virtual interviews and visits.¹ Due to the continued pandemic, American Society of Health-System Pharmacists (ASHP) released a statement strongly discouraging in-person interviews to limit the spread of the virus in February 2021.² Many programs were forced to improvise and be creative to emulate in-person interviews, each developing their own format and using different platforms to accomplish this goal. The impact of virtual interviews has been evaluated by medical residencies and fellowships.³⁻¹² The majority of the published experiences appears positive, though most programs and applicants prefer in-person interactions.^{6,7,9-11} Importantly, rank lists did not seem significantly impacted by virtual interviews and certain advantages were identified, such as lower costs for applicants and programs.^{5,6,8}

The COVID-19 pandemic continued to impact 2021 to 2022 recruitment and interview season. In a qualitative study conducted by Wolcott and colleagues, 47 participants at a virtual symposium were invited to submit reflections regarding the 2020 to 2021 recruitment cycle.¹³ Specific benefits and challenges were identified by participants, but no quantitative data were presented. It is currently unclear what role virtual recruitment events and interviews will play in the 2022 to 2023 application cycle and beyond, and no formal guidance is currently available to direction applicants or residency programs. The purpose of this study was to assess the experiences and perceptions of residency applicants and residency program directors (RPDs) surrounding recruitment

and interviews during the 2020 to 2021 application cycle in order to understand how to improve virtual experiences in the future.

2 | METHODS

2.1 | Design and aims

This cross-sectional survey was conducted by members of the Southeastern Research Group Endeavor (SERGE-45). Five authors (M.J.B. W., K.R.S., D.A.C., J.L.W., and K.E.B.) developed a draft of survey questions, and the remaining authors provided feedback. The final survey questions were approved by all authors prior to distribution. All authors are involved in pharmacy residencies at their practice site in some capacity, including leadership, training, and/or recruitment. The primary aim of this study was to describe the recruitment and interview processes used during a global pandemic and assess resident and program perceptions of these techniques. Secondary aims included identifying avenues for future prospective applicants to find recruitment and general residency information; outlining residency applicants' preferred approaches for recruitment; and compiling information for pharmacy organizations to aid residency programs and prospective applicants in finding and disseminating recruitment as well as general residency details. This study was approved by the Institutional Review Board at the primary institution and approval was waived by other participating institutions.

2.2 | Instrument

Two surveys were developed for this study: one for residency applicants (25 questions) and another for residency program leadership (27 questions) (Appendix A). The survey incorporated multiple choice, multiple selection, matrix, and single line open response questions with a free text box at the end of both surveys for additional comments. Anonymous and confidential survey data were collected and managed using Research Electronic Data Capture (REDCap©) electronic data capture tool.^{14,15} The only identifiers collected in the surveys were year of graduation and state for applicants and state for residency programs.

2.3 | Participants/procedures

A list of postgraduate year one (PGY1) and postgraduate year two (PGY2) pharmacy residency programs across the Southeastern

United States was created from the ASHP online residency directory (states included were Alabama, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, West Virginia, and Texas). RPDs or designated contacts identified through the ASHP residency directory ($n = 643$) were emailed to request participation in the survey. The RPDs or designated contacts were asked to forward the survey to current PGY1 and/or PGY2 residents ($n = 1272$). Eight select pharmacy schools in the Southeast with author contacts were also asked to send the survey to 2021 graduates in a convenience sample of an estimated 538 students (duplicative to the 1272 residents). Pharmacy schools and residency programs were contacted once to request participation in the survey, had 7 weeks to respond, and were instructed to disregard the link if they received twice. Students who participated in any part of the residency recruitment process, current residents pursuing additional residency training, and RPDs were eligible for inclusion. Results were presented using the Enhancing the QUALity and Transparency Of health Research (EQUATOR) Network's Checklist for Reporting of Survey Studies (CROSS) guidelines.¹⁶

2.4 | Analysis

Descriptive statistics were performed. Free text responses were analyzed by one of the authors (M.J.B.W.) and categorized into broad themes. Statistical analyses were conducted using IBM SPSS Statistics 27.0 (IBM Corp, Armonk, New York, New York).

3 | RESULTS

This survey was sent to 643 pharmacy residency programs, and recipients were asked to forward the email to an associated 1272 residents. The survey was also forwarded to 8 pharmacy schools in the Southeast, representing an estimated 538 students duplicative to the associated 1272 residents. Assuming all residents received the email from at least one source, the total number of residents was 1272. Responses were received from 142 residency applicants and 104 residency programs, representing response rates of 11.1% and 16.2%, respectively. The most common states that applicants either attended school or completed PGY1 residency were Mississippi (17%), Alabama (11%), North Carolina (11%), Tennessee (8%), Florida (8%), Texas (6%), South Carolina (6%), and Arkansas (6%). Residency program respondents were most commonly from North Carolina (17%), Texas (13%), Alabama (13%), and Tennessee (12%).

3.1 | Recruitment—applicant perspective

Of the 142 residency applicants who responded to the survey, the majority (114/142, 80.3%) applied for PGY1 residency programs in

TABLE 1 Applicant characteristics

Variable, n (%)	Result (n = 142)
Residency program pursued	
PGY1	97 (68)
PGY1 community	11 (7.7)
PGY2 subspecialty	27 (19)
PGY1/2 combined	6 (4.2)
Other pharmacy-related residency	1 (0.7)
Type of PGY2 program	
Ambulatory care	10 (37)
Cardiology	2 (7.4)
Critical care	3 (11.1)
Infectious diseases	4 (14.8)
Internal medicine	1 (3.7)
Oncology	1 (3.7)
Pediatric	3 (11.1)
Pharmacy informatics	1 (3.7)
Psychiatric	1 (3.7)
Other	1 (3.7)
Phases of the match participated in	
Phase I	140 (98.6)
Phase II	12 (8.5)
Scramble	1 (0.7)

Abbreviations: PGY1, postgraduate year 1; PGY2, postgraduate year 2.

the 2020 to 2021 application cycle (Table 1). Applicants were asked to rank their top resources used to find information about programs. The top 5 resources used by applicants to find information about programs were the ASHP online residency directory (97.3%), individual residency program websites (93.9%), word-of-mouth (52.6%), local mentors/advisors (47.4%), and Instagram (21.9%) (Table 2). Similarly, the top recruitment events selected by applicants were the ASHP virtual showcase (71.9%), virtual open houses of individual programs (74.5%), and local virtual showcases (45.6%). An outline of overall resources used and recruitment events attended by applicants can be found in Table 2.

When comparing PGY1 and PGY2 candidate responses regarding recruitment questions, there were a few notable differences. PGY1 applicants showed a trend toward higher use of social media, including Twitter, Facebook, and Instagram, for gathering residency information compared with PGY2 applicants (50/115, 43.4% vs 6/27, 22.2%; $P = .051$). Between the different social media applications, Instagram had a significantly higher usage in PGY1s compared with PGY2s (30.4% vs 11.1%; $P = .041$), whereas Facebook and Twitter were only numerically higher. More PGY1s attended virtual open houses (79.8% vs 55.6%; $P = .011$), local virtual showcases (66.7% vs 25.9%; $P < .001$), and the ACCP virtual showcase (21.1% vs 0%; $P = .009$). PGY2s were more likely to use ASHP Personal Placement Services (PPS) than PGY1s (59.3% vs 13.1%; $P < .001$).

TABLE 2 PGY1 vs PGY2 applicant characteristics

Variable, n (%) or median (IQR)	PGY1 (n = 115)	PGY2 (n = 27)	P-values
Resources used to gather information about residency programs			
ASHP online directory	113 (99.1)	27 (100)	.490
ACCP online directory	15 (13.2)	3 (11.1)	.786
APhA online directory	13 (11.4)	0 (0)	.067
VA pharmacy residency website	18 (15.8)	5 (18.5)	.716
PGY1 or PGY2 program website	107 (93.8)	26 (96.3)	.532
Pharmacy school mailing list	22 (19.2)	0 (0)	.013
Local society mailing list/website	6 (5.2)	0 (0)	.225
Local mentor/advisor	51 (44.7)	11 (40.7)	.734
Word-of-mouth	70 (61.4)	14 (51.9)	.931
Twitter	28 (24.6)	4 (14.8)	.286
Facebook	15 (13.2)	1 (3.7)	.167
Instagram	35 (30.4)	3 (11.1)	.041
Reddit	8 (7.0)	1 (3.7)	.532
Other	6 (5.2)	1 (3.7)	.881
Recruitment events attended			
Virtual open houses	91 (79.8)	15 (55.6)	.011
Local virtual showcase	76 (66.7)	7 (25.9)	<.001
ACCP virtual showcase	24 (21.1)	0 (0)	.009
ASHP virtual showcase	98 (85.9)	24 (88.9)	.622
APhA virtual showcase	12 (10.5)	0 (0)	.079
Personal placement services	15 (13.1)	16 (59.3)	<.001
Other	2 (1.8)	1 (3.7)	.523
None	3 (2.6)	1 (3.7)	.757
Felt the need to apply to more programs due to the virtual nature of recruitment/interviews	64 (56.1)	10 (37.0)	.081
Number of programs applied to in Phase I and II	11 (7-13)	7 (4.5-8)	<.001
Interviews offered	6 (4-8)	4 (2-6.5)	.009
Number of in-person interviews			
0	92 (80)	26 (96.3)	.046
1	16 (13.9)	1 (3.7)	.196
2 or more	7 (6.1)	0 (0)	<.001
Information valuable in ranking programs			
Rotation/learning experiences	111 (97.3)	27 (100)	.326
Current resident list	45 (39.5)	7 (25.9)	.200
Current preceptor list	50 (43.8)	11 (40.7)	.796

TABLE 2 (Continued)

Variable, n (%) or median (IQR)	PGY1 (n = 115)	PGY2 (n = 27)	P-values
Teaching certificate availability	60 (52.6)	1 (3.7)	<.001
Precepting/teaching opportunities	46 (40.4)	11 (40.7)	.944
Presentation requirements	25 (21.9)	7 (25.9)	.639
Research requirements	36 (31.6)	8 (39.6)	.866
Previous resident or preceptor publications	11 (9.6)	3 (11.1)	.808
Application information	36 (31.6)	6 (22.2)	.352
City/location information	99 (86.8)	19 (70.4)	.050
Other	12 (10.5)	1 (3.7)	.275
Information that was difficult to gauge in virtual interviews	n = 61	n = 17	
Rotation/learning experiences	19 (16.7)	8 (29.7)	.118
Current resident list	4 (3.5)	1 (3.7)	.954
Current preceptor list	15 (13.1)	5 (18.5)	.462
Teaching certificate availability	0 (0)	0 (0)	—
Precepting/teaching opportunities	3 (2.6)	3 (11.1)	.083
Presentation requirements	8 (7.0)	3 (11.1)	.467
Research requirements	5 (4.3)	2 (7.4)	.509
Previous resident or preceptor publications	6 (5.2)	1 (3.7)	.744
Application information	5 (4.3)	1 (3.7)	.881
City/location information	28 (24.5)	6 (22.2)	.816
Other	24 (21)	6 (22.2)	.877

Abbreviations: ACCP, American College of Clinical Pharmacy; APhA, American Pharmacists Association; ASHP, American Society of Health-System Pharmacists; IQR, interquartile range; PGY1, postgraduate year 1; PGY2, postgraduate year 2.

3.2 | Recruitment—residency program perspective

Almost all respondents for residency programs were RPDs (95.2%) (Table 3). Sixty-one respondents (58.7%) were from PGY1 programs, and 42 (40.4%) were associated with PGY2 programs. Most programs used similar strategies for recruitment pre-COVID-19 and during the 2020 to 2021 application cycle (Tables 4 and 5). The main difference was an increase in programs engaging on social media (eg, Instagram, Twitter, and Facebook). Significantly more programs used Twitter (23.1% vs 3.8%; $P < .001$) and Instagram (23.1% vs 5.8%; $P < .001$) during the 2020-2021 year compared with previous years.

Participation in the ASHP residency showcase remained high (90.4%); however, involvement in other recruitment events were significantly different during the pandemic. Fewer programs attended

TABLE 3 Residency program characteristics

Variable, n (%)	Results (n = 104)
Respondents' involvement in residency program	
Residency program director	99 (95.2)
Residency program coordinator	5 (4.8)
Type of program	
PGY1	61 (58.7)
PGY2	42 (40.4)
Combined PGY1/2	1 (1)
Type of PGY1 program	
Acute care	45 (75)
Ambulatory care	3 (5)
Community	9 (15)
Managed care	2 (3.3)
Other	1 (1.7)
Type of PGY2 program	
Ambulatory care	5 (11.9)
Cardiology	3 (7.1)
Critical care	4 (9.5)
Emergency medicine	4 (9.5)
Infectious diseases	7 (16.7)
Internal medicine	4 (9.5)
Oncology	4 (9.5)
Pediatric	2 (4.8)
Pharmacotherapy	2 (4.8)
Pharmacy informatics	1 (2.4)
Psychiatric	1 (2.4)
Other	5 (11.9)
ASHP accreditation status	
Pre-candidate	4 (3.8)
Candidate	9 (8.7)
Preliminary accreditation	1 (1)
Accredited	90 (86.5)
Type of institution	
Community	44 (42.3)
Academic	44 (42.3)
VA	7 (6.7)
Other	9 (8.7)
Number of resident spots, median (IQR)	
PGY1 programs	2 (2–4)
PGY2 programs	1 (1–1)
Offered virtual interviews	
Yes	97 (93.3)
No	3 (2.9)
Early commitment	4 (3.8)
Platform used for virtual interviews	
Phone	6 (6.2)
Zoom	53 (54.6)

TABLE 3 (Continued)

Variable, n (%)	Results (n = 104)
Skype	1 (1)
Webex	31 (32)
Microsoft Teams	11 (11.3)
Other	5 (5.2)
Length of virtual interviews	
≤2 h	14 (14.6)
>2–<4 h	51 (53.1)
>4–<6 h	25 (26)
≥6 h	6 (6.3)
Plans for virtual interviews in the future	
Yes, exclusively plan to do virtual interviews	5 (5.2)
Yes, plan to offer virtual and in-person interviews	16 (16.5)
No, plan to switch back to in-person interviews (if possible)	42 (43.3)
Undecided	34 (35.1)

Abbreviations: PGY1, postgraduate year 1; PGY2, postgraduate year 2; VA, Veterans Affairs.

local/regional showcases (87.5% vs 68.3%; $P = .001$) and participated in PPS (31.1% vs 16.3%; $P = .014$) during 2020-2021. When asked which recruitment events were most impactful in getting to know applicants, the top selections from residency programs were ASHP virtual showcase (46.2%), local/regional virtual showcases (35.6%), virtual open houses (29.8%), and PPS (22.1%).

3.3 | Applications/interview/ranking—applicant perspective

The median number of programs applied to was 10 (interquartile range [IQR], 7-12), and 69/115 (60%) applied to >10 programs. The median number of interviews offered from programs was 6 (IQR, 4-8). Seventy-four applicants (52.1%) felt they needed to apply to more programs during the 2020 to 2021 application cycle due to the virtual nature of recruitment and interviews. While 110/142 (77.5%) received interview offers to ≥50% of the programs they applied to, 6 PGY1 (5.2%) and 4 PGY2 (14.8%) applicants had an interview offer rate of ≤20%.

Most applicants (118 [83.1%]) exclusively had virtual interviews. Of the remaining 24 respondents, the majority had only 1 in-person interview (17/24, 70.8%). PGY2 applicants were significantly more likely to have only virtual interviews offered compared with PGY1 applicants (96.3% vs 80%; $P = .046$). Zoom (Zoom Video Communications, Inc., San Jose, California) was the most commonly used platform amongst applicants (131 [92.3%]). Additionally, Zoom was selected as the platform that worked best for virtual interviews by most applicants (103/133 [77.4%]).

TABLE 4 Residency programs recruitment and interview strategies prior to 2020 vs 2020–2021

Questions/Answers, n (%)	Results (n = 104)		
	Prior to 2020	2020–2021	P-values
How did you share general residency information?			
ASHP online directory	103 (99)	101 (97.1)	.313
ACCP online directory	40 (38.5)	48 (46.2)	.262
APhA online directory	3 (2.9)	3 (2.9)	1.000
VA pharmacy residency website	6 (5.8)	6 (5.8)	1.000
PGY1/PGY2 residency program website	88 (84.6)	86 (82.7)	.708
Pharmacy school mailing list	11 (10.6)	16 (15.4)	.302
Local society mailing list/website	12 (11.5)	16 (15.4)	.416
Word-of-mouth	72 (69.2)	68 (65.4)	.554
Twitter	4 (3.8)	24 (23.1)	<.001
Facebook	9 (8.7)	15 (14.4)	.193
Instagram	6 (5.8)	24 (23.1)	<.001
Other	15 (14.4)	24 (23.1)	.151
What recruitment events did you program attend/host?			
Local/regional showcases	91 (87.5)	71 (68.3)	.001
ASHP showcases	96 (93.2)	94 (90.4)	.622
Pharmacy placement services	32 (31.1)	17 (16.3)	.014
ACCP virtual showcase	—	27 (26)	—
Virtual open house	—	46 (44.2)	—
Other	2 (1.9)	5 (4.8)	.445
None	2 (1.9)	4 (3.8)	.683
Offered an informal time to get to know the applicants (eg, lunch, dinner)	83 (80.6)	30 (30.9)	<.001

Abbreviations: ACCP, American College of Clinical Pharmacy; APhA, American Pharmacists Association; ASHP, American Society of Health-System Pharmacists; PGY1, postgraduate year 1; PGY2, postgraduate year 2; VA, Veterans Affairs.

PGY1 and PGY2 applicants found similar information valuable when ranking programs with two exceptions. PGY1 applicants were more interested than PGY2s in teaching certificate availability (52.6% vs 3.7%; $P < .001$) and information about the city/location of the residency program (86.8% vs 70.4%; $P = .050$). Applicants found some information difficult to gauge in the virtual environment, primarily information about the city/location of the residency program (34/76, 44.7%) and rotations/learning experiences (27/76, 35.5%).

3.4 | Applications/interview—residency program perspective

Forty-nine (47.1%) programs reported an increase and 18 (17.3%) a decrease in the number of applicants during the 2020 to 2021 application cycle compared to the 2019 to 2020 application cycle. More community (56.8%) and Veterans Affairs (VA, 57.1%) institutions reported an increase in applicants compared with academic centers (34.1%).

Ninety-seven programs (93.3%) offered virtual interviews. Zoom (53/97, 54.6%) and Webex (Cisco Systems, Inc., San Jose, California)

(31/97, 32%) were the two most common platforms used, and the majority of interviews were ≤ 4 hours in length (67.7%). A limited number of programs changed candidate screening rubrics (5 [4.8%]) and interview rubrics (19 [18.3%]) due to the pandemic. Twenty-six programs (26/94, 27.7%) increased the number of applicants interviewed compared with previous years, whereas most other programs kept the same number of interview slots (57/94, 60.6%). Fewer programs offered an informal time to get to know the applicants in the 2020 to 2021 application cycle compared with previous years (30.9% vs 80.6%; $P < .001$).

Programs were asked to describe the benefits and challenges of virtual interviews. The most common benefits described were ease/convenience (28/85, 32.9%), decreased time needed for interviews (21/85, 24.7%), increased flexibility with interview dates (13/85, 15.3%), and reduced cost (11/85, 12.9%). The challenges described by programs included decreased ability to get to know the applicants (37/92, 40.2%), technology issues (21/92, 22.8%), inability to effectively present practice site (13/92, 14.1%), and fewer informal interactions (8/92, 8.7%).

Post-COVID-19, most programs either plan to revert back to in-person interviews (43.3%) or were undecided (35.1%).

TABLE 5 Residency applicants vs programs

Questions/Answers, n (%)	Residency applicants (n = 142)	Residency programs (n = 104)	P-values
How did you locate or share general residency information?			
ASHP online directory	140 (98.6)	101 (97.1)	.653
ACCP online directory	18 (12.7)	48 (46.2)	<.001
APhA online directory	13 (9.2)	3 (2.9)	.066
VA pharmacy residency website	23 (16.2)	6 (5.8)	.015
PGY1/PGY2 residency program website	133 (93.7)	86 (82.7)	.012
Pharmacy school mailing list	22 (15.5)	16 (15.4)	.981
Local society mailing list/website	6 (4.2)	16 (15.4)	.003
Word-of-mouth	84 (59.2)	68 (65.4)	.321
Twitter	32 (22.5)	24 (23.1)	.938
Facebook	16 (11.3)	15 (14.4)	.461
Instagram	38 (26.8)	24 (23.1)	.511
Other	6 (4.2)	24 (23.1)	<.001
What recruitment events did you program attend/ host?			
Local/regional showcases	83 (58.5)	71 (68.3)	.116
ASHP showcases	122 (85.9)	94 (90.4)	.290
Pharmacy placement services	31 (21.8)	17 (16.3)	.284
ACCP virtual showcase	24 (16.9)	27 (26)	.083
Virtual open house	106 (74.6)	46 (44.2)	<.001
Other	3 (2.1)	5 (4.8)	.239
None	4 (2.8)	4 (3.8)	.653
Platforms used			
Phone	16 (11.8)	6 (6.2)	.176
Zoom	131 (92.3)	53 (54.6)	<.001
Webex	104 (76.5)	31 (32)	<.001
Microsoft Teams	78 (57.4)	11 (11.3)	<.001
Other	25 (17.6)	6 (6.2)	.004

Abbreviations: ACCP, American College of Clinical Pharmacy; APhA, American Pharmacists Association; ASHP, American Society of Health-System Pharmacists; PGY1, postgraduate year 1; PGY2, postgraduate year 2; VA, Veterans Affairs.

3.5 | PGY1 vs PGY2 vs residency programs

Two Likert scale questions were asked as part of the survey that could be compared between applicants and residency programs. When asked preference for interview type, most respondents either strongly preferred or preferred in-person interviews to virtual ones (PGY1 43%; PGY2 76%; residency programs 68%; Figure 1). The most common reasons for preferring virtual interviews were decreased cost (22/29; 75.9%), reduced anxiety (11/29; 37.9%), and not having to take as much time off rotation (3/29; 10.3%). For those who preferred in-person interviews, the most common reasons were because virtual interviews decreased the ability to experience the “culture” of the program (33/57; 57.9%), tour the facility (24/57; 42.1%), and interact with the preceptors/staff (10/57; 17.5%).

Respondents were also asked how confident they felt about creating their rank list after virtual interviews. The majority of respondents from each group felt confident or very confident in ranking programs/applicants (PGY1s 69%; PGY2s 80%; residency programs 64%; Figure 2).

Figure 3 shows the differences in where residency applicants looked for information compared with where programs were posting information.

4 | DISCUSSION

COVID-19 presented numerous challenges to residency applicants and programs during the 2020 to 2022 application cycles. In the face

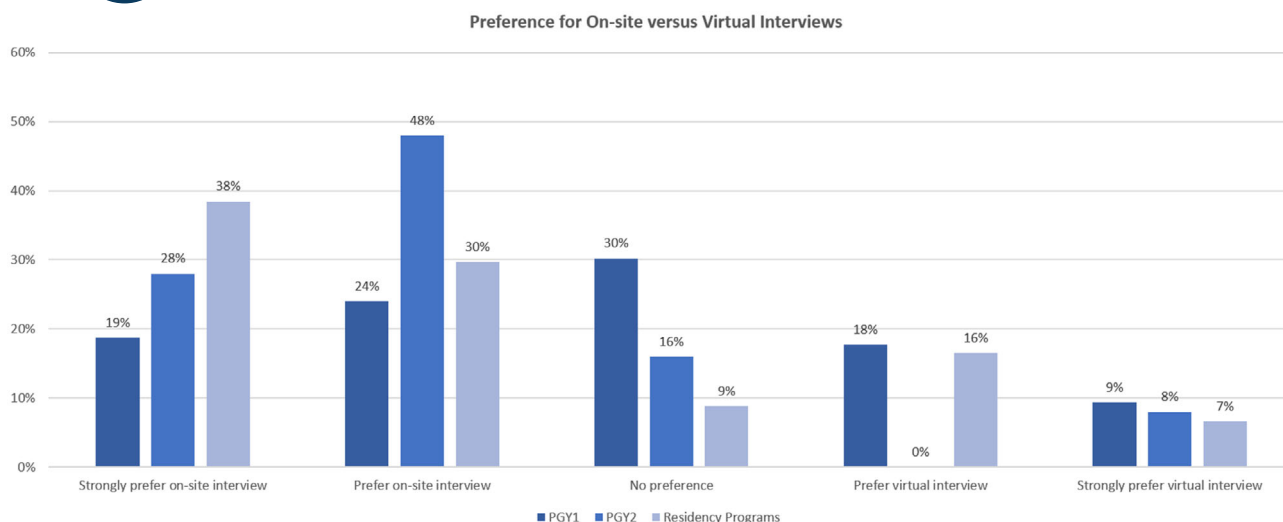


FIGURE 1 How would you rank your preference for virtual interviews in comparison to on-site interviews?

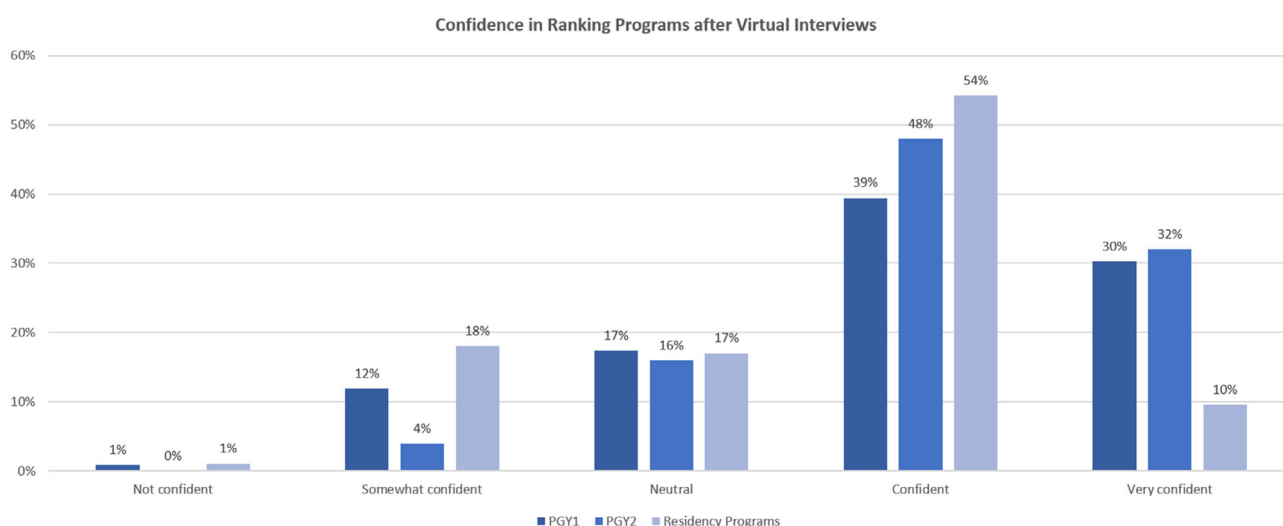


FIGURE 2 How confident did you feel ranking programs that only offered virtual interviews?

of this unprecedented event, national leaders and professional organizations offered limited guidance on how programs should standardize information sharing, recruiting, or interview formats. Recruitment was especially impacted as traditional avenues of recruitment were stymied by the pandemic. Last-minute changes to local, regional, and national meetings were common due to the constantly changing circumstances. Survey responses identified a large amount of heterogeneity amongst applicants and residency programs regarding obtainment and distribution of residency information and interviews. Generally, results are similar to those described from medical residencies and fellowships.³⁻¹²

This survey identified a number of changes in the 2020 to 2021 residency recruitment process as a result of the pandemic. Residency program respondents reported a significant reduction in participation at local and regional residency showcases, as well as a large drop in informal interview activities, such as a lunch or dinner. To make up for

this, residency programs increased their use of social media, particularly Twitter and Instagram, for recruitment. Unfortunately, few residency applicants reported locating information using social media, showing the limitations of these mediums. Also notable was the reduction in PPS participation among programs, potentially indicating financial impact from COVID-19 on many institutions. Of note, the implementation of travel restrictions and strict quarantine requirements related to travel during the COVID-19 pandemic may also have impacted showcase and PPS participation by many institutions. Virtual open houses were more popular with applicants than residency programs, suggesting the need for careful appraisal of these events for future years due to the time commitment needed from both parties.

There were also changes seen with applications and virtual interviews. Though a similar number of applicants went through ASHP Residency Matching Program in 2020 to 2021 compared with previous years,¹⁷ many programs received higher numbers of applicants

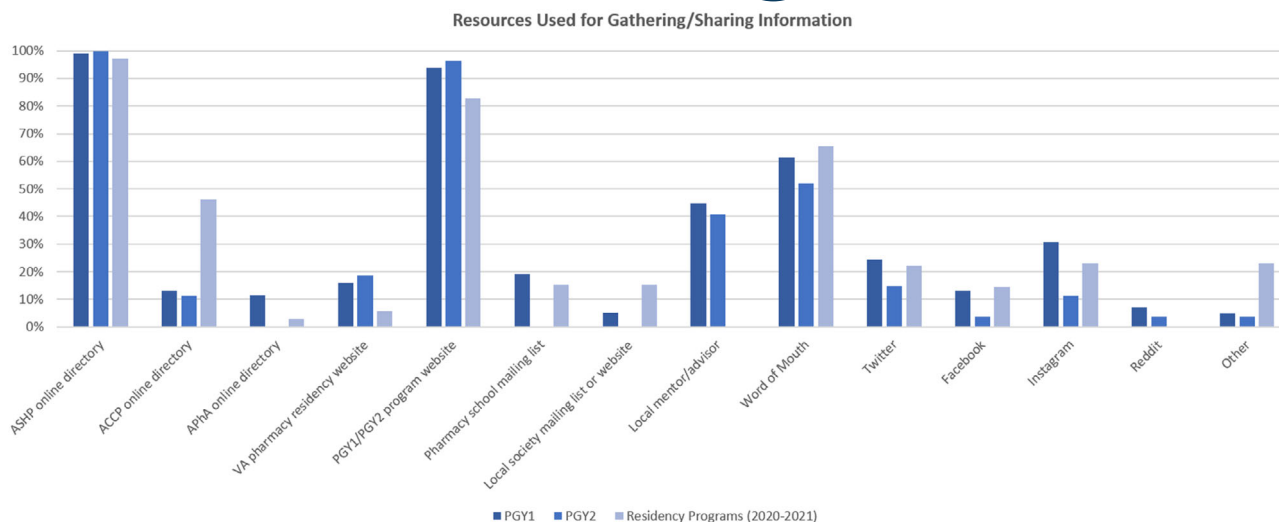


FIGURE 3 Where PGY1/PGY2 went to gather information vs residency programs posted information

during this application cycle. The increase in applicants was reported by programs from all types of institutions but was most prevalent in community- and VA-based residency programs. Increased applications were not matched by a large increase in interview slots, but the Match rate remained comparable to previous years.¹⁷ This may be a signal of “application inflation” which is a well-known problem in medical residencies and fellowships.¹⁸ A solution for this problem has not been found for medicine residencies and fellowships and has only worsened over time; therefore, pharmacy organizations should consider what strategies might be implemented to counteract this problem now.

Interview day was impacted by the virtual format with programs using a diverse array of platforms, which created some difficulty for applicants as they had to learn and navigate multiple systems throughout the process. In addition, interviews were ≤ 4 hours for most programs, a shift from previous years where many programs held half- to full-day interviews.^{19,20} Decreased time may have impacted the ability to observe the culture and determine fit for applicants and programs alike. In contrast, virtual interview days may have reduced the time students were required to take off from rotations and/or the paid time off for travel required by PGY1 residents. Despite all of these changes, applicant and program respondents both felt confident or very confident in creating rank lists following virtual interviews, which aligns with what has been published for medical residencies and fellowships.^{6,8,10}

Survey respondents identified a clear preference regarding the 2021 to 2022 year: a return to in-person activities. This desire was strongest among residency programs. Despite the interest in most programs to transition back to in-person recruitment and interviews, the COVID-19 pandemic continues to have a worldwide impact. The delta variant forced multiple national conferences to return to virtual formats for a second year in a row. In addition, there is an important question regarding the role of virtual communications moving forward for both conferences and the residency process. Some program

respondents suggested they will use a form(s) of virtual interviews in the future. This coincides with the growing role of virtual communication in instruction and other professional interaction.²¹⁻²³ Determining and promulgating best practices for virtual interviews should be a primary goal of national pharmacy organizations to assist applicants and programs for the future.

The respondent group with the highest opinion of the virtual interview process was PGY1 applicants. There are many possible reasons for this preference, including the significant burden of cost and time students face during their fourth year of pharmacy school (eg, time spent away from rotations and time/cost of travel). The median PGY1 applicant applied to 10 programs, which could amount to many travel days with thousands of dollars in expenses for in-person interviews.²⁴ In addition, the American Association of Colleges of Pharmacy (AACCP) reported in their 2021 Graduating Student Survey the mean amount borrowed for a Pharm.D. degree was \$173 561 (\$143 302 for public and \$204 617 for private institutions).²⁵ As the financial cost of pharmacy education continues to climb, programs and professional organizations should evaluate the cost burden this places on applicants and consider mechanisms to minimize this impact. Special care will have to be given to the blending of in-person and virtual activities to limit the impact of bias on virtual applicants.

Based on the results of this study, several recommendations can be made to improve virtual recruitment and interviews in the future. Almost all applicants used the ASHP residency directory and program websites to gather information. These online resources should be kept updated regularly, and plans regarding participation in virtual or in-person recruiting events should be made readily available. In addition, pharmacy schools and mentors/advisors can encourage applicants to engage with programs using their preferred online communication tools, including social media. Another recruitment strategy that applicants viewed favorably were virtual open houses, but these events may not be sustainable in the future due to the time commitment

required. Applicants noted it was difficult to gauge certain information in virtual interviews, such as information about the city and rotation experiences. Residency programs should consider how to highlight this information during the interview and on websites, if possible. Lastly, virtual platforms are likely to impact candidates and program representatives differently based on interview anxiety and individual personalities. One strategy that pharmacy residency programs can take is trying to incorporate a small-group or informal virtual session to replace the resident meal or lunch that was common pre-pandemic, which may improve ability to showcase applicants and preceptor personalities, culture, and fit.

These results do have limitations. The survey was distributed through email directly to RPDs and pharmacy schools located in the Southeast, with limited other demographics included. It is possible that preferences would vary in different geographic regions. It is also possible that survey results were skewed by select applicant response, especially given the small number of respondents. As a result, generalizing survey results to all residency programs and applicants may not be appropriate. In addition, there were a small number of responses from PGY2 applicants, limiting the ability to compare virtual and in-person strategies. Finally, this survey was distributed and completed before the surge of COVID-19 specifically due to the delta and omicron variants. It is possible that the strong preference for returning to in-person learning is now diminished after a second year of virtual recruitment and interviews.

5 | CONCLUSION

While it is unclear how the COVID-19 pandemic will affect the 2022 to 2023 application cycle, these results shed light on a few areas that applicants and programs can utilize to improve their virtual strategies. In addition, some residency programs may choose to make the change to virtual recruitment and interviews for the foreseeable future due to cost or other variables. Pharmacy leadership organizations, including ASHP and ACCP, should strongly consider offering guidance to both programs and applicants to improve the virtual recruitment and interview experience.

FUNDING INFORMATION

No specific funding was received for this project.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

ORCID

Jamie L. Wagner  <https://orcid.org/0000-0002-6006-7894>

P. Brandon Bookstaver  <https://orcid.org/0000-0002-4409-0963>

Elizabeth W. Covington  <https://orcid.org/0000-0002-2018-4316>

Christopher M. Bland  <https://orcid.org/0000-0001-8806-4583>

Bruce M. Jones  <https://orcid.org/0000-0003-0461-2365>

Michelle Turner  <https://orcid.org/0000-0003-2791-3259>

Kayla R. Stover  <https://orcid.org/0000-0002-8635-0137>

REFERENCES

- Coalition for Physician Accountability. Final report and recommendations for medical education institutions of LCME-accredited, U.S. osteopathic, and non-U.S. medical school applicants. 2020. [cited 2021 Oct 1]. Available from: https://www.aamc.org/system/files/2020-05/covid19_Final_Recommendations_05112020.pdf.
- ASHP Accreditation Services. Pandemic effects on residency programs: Q&A. American Society of Health-System Pharmacists. 2021. [cited 2021 Oct 1]. Available from: <https://www.ashp.org/-/media/assets/professional-development/residencies/docs/pandemic-effects-on-residency-programs.ashx>.
- 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*. 2016;7:102–108.
- Daram SR, Wu R, Tang S. Interview from anywhere: Feasibility and utility of web-based videoconference interviews in the gastroenterology fellowship selection process. *Am J Gastroenterol*. 2014;109(2):155–159.
- Shah SK, Arora S, Skipper B, Kalishman S, Timm TC, Smith AY. Randomized evaluation of a web based interview process for urology resident selection. *J Urol*. 2012;187(4):1380–1384.
- Rockney D, Benson CA, Blackburn BG, et al. Virtual recruitment is here to stay: A survey of id fellowship program directors and matched applicants regarding their 2020 virtual recruitment experiences. *Open Forum Infect Dis*. 2021;8(8):ofab383.
- Day RW, Taylor BM, Bednarski BK, et al. Virtual interviews for surgical training program applicants during covid-19: Lessons learned and recommendations. *Ann Surg*. 2020;272(2):e144–e147.
- Hill MV, Ross EA, Crawford D, et al. Program and candidate experience with virtual interviews for the 2020 Complex General Surgical Oncology interview season during the COVID pandemic. *Am J Surg*. 2021 Jul;222(1):99–103.
- Menhaji K, Gaigbe-Togbe BHA, Hardart A, et al. Virtual interviews during covid-19: Perspectives of female pelvic medicine and reconstructive surgery program directors. *Female Pelvic Med Reconstr Surg*. 2021;27(9):575–580.
- Bamba R, Bhagat N, Tran PC, Westrick E, Hassanein AH, Wooden WA. Virtual interviews for the independent plastic surgery match: A modern convenience or a modern misrepresentation? *J Surg Educ*. 2021;78(2):612–621.
- Grova MM, Donohue SJ, Meyers MO, Kim HJ, Ollila DW. Direct comparison of in-person versus virtual interviews for complex general surgical oncology fellowship in the covid-19 era. *Ann Surg Oncol*. 2021;28(4):1908–1915.
- Lewit R, Gosain A. Virtual interviews may fall short for pediatric surgery fellowships: Lessons learned from covid-19/sars-cov-2. *J Surg Res*. 2021;259:326–331.
- Wolcott MD, Welles Sasser C, Morbitzer KA, Eckel SF. Exploring shirts in resident recruitment during COVID-19: Initial preceptions from residents, preceptors, and residency program directors. *J Am Coll Clin Pharm*. 2022;5:436–441.
- 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*. 2009;42(2):377–381.
- Harris PA, Taylor R, Minor BL, et al. The REDCap consortium: Building an international community of software partners. *J Biomed Inform*. 2019;95:103208.
- Sharma A, Minh Duc NT, Luu Lam Thang T, et al. A consensus-based checklist for reporting of survey studies (CROSS). *J Gen Intern Med*. 2021;36(10):3179–3187.
- National Matching Service, Inc. ASHP Match statistics. 2021. [cited 2021 Oct 1]. Available from: <https://natmatch.com/ashprmp/stats.html>.

18. Pereira AG, Chelminski PR, Chheda SG, et al. Application inflation for internal medicine applicants in the match: Drivers, consequences, and potential solutions. *Am J Med.* 2016;129(8):885–891.
19. Oyler DR, Smith KM, Elson EC, Bush H, Cook AM. Incorporating multiple mini-interviews in the postgraduate year 1 pharmacy residency program selection process. *Am J Health Syst Pharm.* 2014;71(4):297–304.
20. Mancuso CE, Paloucek FP. Understanding and preparing for pharmacy practice residency interviews. *Am J Health Syst Pharm.* 2004;61(16):1686–1689.
21. Lyons KM, Christopoulos A, Brock TP. Sustainable pharmacy education in the time of COVID-19. *Am J Pharm Educ.* 2020;84(6):ajpe8088.
22. Mirzaian E, Franson KL. Leading a digital transformation in pharmacy education with a pandemic as the accelerant. *Pharmacy.* 2021;9(1):19.
23. Kebodeaux CD, Mak V. Using technology to enhance teaching and learning in pharmacy education. *Pharmacy.* 2021;9(3):150.
24. Hammond DA, Russell N, Davis NC, et al. Financial costs of pursuing postgraduate residency training. *Am J Health Syst Pharm.* 2018;75(17):1266–1267.
25. AACP Office of Institutional Research and Effectiveness. American Association of Colleges of Pharmacy graduating student survey: 2021 national summary report. American Association of Colleges of Pharmacy. 2021. [cited 2021 Oct 1]. Available from: <https://www.aacp.org/sites/default/files/2021-07/2021-gss-national-summary-report.pdf>.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Wingler MJB, Cretella DA, Wagner JL, et al. Evaluation of pharmacy residency recruitment and interview processes during the COVID-19 pandemic (2020-2021 application cycle). *J Am Coll Clin Pharm.* 2022;1-11. doi:[10.1002/jac5.1684](https://doi.org/10.1002/jac5.1684)