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## INVITED EXPERT REVIEW

# Showcasing Your Cardiothoracic Training Program in the Virtual Era



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As part of the response to the coronavirus disease 2019 (COVID-19) pandemic, cardiothoracic training programs quickly transitioned midinterview season toward a virtual format. This monumental and rapid undertaking led to the adoption of novel virtual interviewing techniques, many of which have been developed and partially rolled out by other specialties for years. The COVID-19 pandemic is still here, and when the end will be in sight is unclear. However, most, if not all, of the novel interview techniques that were rapidly adopted by cardiothoracic training programs during the 2020 interview season will continue to be relevant even after the pandemic and need for social distancing subsides. In this literature review, we highlight techniques that can be used by cardiothoracic training programs to virtually showcase their attributes and strengths to give applicants as realistic of a view of the program as possible. Such efforts include developing and emphasizing a social media presence, expanding information within training program websites, broadcasting virtual educational content, and creating virtual tours. In addition, we will review approaches toward structuring a virtual interview day to provide candidates with a deeper glimpse into the inner workings of the program. We can use this opportunity provided by the COVID-19 pandemic to develop innovative methods of conducting fellowship interviews that may persist long into the future, as we consider limitations historically caused by finances, scheduling, clinical responsibilities, and family needs.

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The coronavirus disease 2019 (COVID-19) pandemic has required monumental responses to contain its impact. Notably, most medical training programs, if not all, cancelled in-person interviews during the 2019-2020 interview season and transitioned to a virtual format, which has continued into the 2020-2021 season. In addition, visiting rotations for medical students applying to integrated residencies have largely been cancelled for the upcoming interview cycle. In this review, we will highlight the most recent recommendations regarding fellowship recruitment during the COVID-19 pandemic from leading national organizations, including the Thoracic Surgery Directors Association (TSDA) and the National Resident Matching Program (NRMP). In addition, we will highlight approaches that can be used to showcase fellowship programs in the virtual era. The fellowship recruitment process has been significantly disrupted by the ongoing

pandemic for both applicants and programs. Although the loss of in-person interaction is unfortunate, we can find an opportunity during this crisis to modernize, improve, and strengthen our fellowship recruitment methods in ways that can be used for many years to come.

## METHODS

A literature search was performed of PubMed and MEDLINE using the Medical Subject Heading search terms “virtual interview.” In addition, PubMed and MEDLINE were searched using the abstract/title search terms “virtual interview residency” and “virtual interview fellowship.” A snowballing strategy of searching citations within selected articles was used. The search was performed by an author (D.B.N.) between September and October 2020.

## TSDA AND NRMP RECOMMENDATIONS

The NRMP is a private, nonprofit organization that provides an orderly and fair mechanism for matching applicants to United States residency positions. The NRMP does not formally oversee or regulate the interview process that precedes the match. However, the NRMP released a policy statement on May 13, 2020, recommending that programs conduct virtual interviews in the upcoming match season, a policy stance by which most programs have abided.<sup>1</sup> The NRMP has additionally given additional guidance on other changes that would arise as recruitment transitions to a virtual format. These include the use of token gifts (such as pens, tote bags, etc), which are recommended to be of equitable value among applicants. In addition, expectations regarding the use of video recording during interviews should be clearly stated before the interview and may be subject to local and state laws.<sup>1</sup>

The TSDA was established in 1978 as a membership organization for cardiothoracic surgery residency program directors and provides resources and networking opportunities for program directors and residents to support cardiothoracic training. The TSDA held a virtual session on September 26, 2020, to address the needs for an upcoming virtual interview season.<sup>2</sup> With regard to integrated residency applications, the TSDA has stated that all visiting medical student rotations for the 2020-2021 academic year should be discouraged, with the only potential exceptions to be considered when an applicant's home institution does not have a cardiothoracic surgery program.<sup>3</sup> In accordance, given restrictions in visiting rotations, letters of recommendation from non-cardiothoracic surgeons should be given greater weight than would be customarily afforded. The TSDA is enacting efforts to implement a standardized recommendation letter to assist this process. Lastly, policies regarding mandating virtual interviews should be applied to all applicants, including local residents, to promote equality and fairness during the interview process.

## THE TRADITIONAL INTERVIEW EXPERIENCE

Historically, the fellowship interview process has primarily been a single-day experience consisting of “winning and dining” the applicant, while trying to showcase the salient features of the program to the extent that can be done in a single day. This process has been developed and refined to work quite well, with many applicants stating that the interview day was the most important way to get to know a program,<sup>4</sup> and with programs' rank lists of applicants being formulated with significant weight on impressions after the interview.<sup>5</sup>

Although the traditional interview process is effective, unfortunately, it is also quite burdensome in financial costs and clinical time off. A recent survey found general surgery residents applying to fellowships often miss 7 or more days of clinical training to attend interviews, which leads to clinical burdens requiring shifts to be covered by other residents and lost training time.<sup>6</sup> In addition, 62% of the surveyed residents spent more than \$4000 on interviews. All together, most residents favored changing the interview process. Among more competitive specialties, the financial and clinical burden can be even more substantial than these stated numbers.<sup>7,8</sup>

In response to the concerns of the financial and clinical burden from traditional interviews, attempts have been made in the past to transition the interview process to a virtual format. In 2010, applicants to a urology program at the University of New Mexico were randomized to conduct virtual interviews, with those randomized to virtual interviews receiving subsequent in-person invitations. Applicants perceived the virtual interviews as being less effective than the traditional on-site interview, although many still favored continuing the virtual program as an adjunct to on-site interviews due reduced cost and improved convenience.<sup>9</sup>

Similarly, in 2017 a pediatric surgery program at Johns Hopkins All Children's Hospital attempted an initial virtual screen for the interview season.<sup>7</sup> In a postinterview survey, 75% of their applicants stated that the virtual interview screen was helpful; however, 80% preferred that the virtual interview would not be substituted for an on-site interview. Specifically, applicants raised concerns that it was challenging to determine whether the program was the correct “fit” using the virtual format alone. Based on these results, the authors concluded that virtual interviews may be able to best function as a screening tool before an on-site interview.

Interestingly, an anesthesiology program at Loma Linda University Health reviewed their results after offering virtual or in-person interviews to applicants and found that their admission rate was not statistically different among those completing in-person vs virtual interviews.<sup>10</sup> This finding suggested that programs were not significantly lowering the rank of applicants who completed a virtual interview. In this situation, applicants stated that they chose virtual interviews in lieu of in-person interviews due to interview date conflicts, travel concerns, or financial limitations. Similarly, an ophthalmology program at the University of Arizona offered virtual or in-person interviews to their ophthalmology applicants, and they found that there was no difference in the rate of being ranked among the top 25 applicants when comparing those who completed a virtual interview with those who interviewed face-to-face.<sup>11</sup>

<b>TABLE 1 Strategies to Modernize Fellowship Recruitment Through Virtual Methods</b>	
<b>Method</b>	<b>Key Content</b>
Expanded training program websites	Many cardiothoracic program websites are lacking key content. <sup>12</sup> Include operative case logs, research opportunities, hospital descriptions, training program history, ancillary benefits, housing information, and interview day details. <sup>13</sup>
Virtual educational content	Allow applicants to observe curricular efforts, engage in learning, and better understand the culture and training environment of an institution Examples include broadcasting journal club, boot camp, or other HIPAA-compliant conferences
Virtual Tours	Day-to-day logistics of training at the program, such as what options are available for lunch, where one would do the bulk of their documentation, or how the trainees interact with advanced practice providers. Additional information may include faculty members' involvement in education, presentation of simulation learning activities, and commentary on the program's efforts toward trainee professional development and research opportunities. <sup>14</sup>
Social media presence	Enhance and optimize program's digital footprint Opportunity to share with prospective trainees the accomplishments, awards, and innovations of the program
Online externship	Proposed as a novel means for applicants to better understand the training environment of a program and to benefit from the support and advocacy of a mentor. <sup>15</sup>
HIPAA, Health Insurance Portability and Accountability Act.	

### INNOVATIVE METHODS OF SHOWCASING YOUR PROGRAM: IT'S ABOUT THE ENTIRE YEAR, NOT JUST A DAY

A very reasonable concern from applicants may be that a virtual interview might not allow them to identify the best fit in a program as was possible through the process of an in-person visit and interview. One approach to address these concerns is to increase the exposure of the applicant to the program, potentially over a much longer period of time. This longitudinal approach toward virtual recruitment contrasts from simply attempting to replicate the traditional single-day interview format into a single-day virtual setting; rather, it aims to increase applicant exposure and familiarity with the activities, culture, values, and general vibe of a program. Several examples are highlighted in the subsequent sections (Table 1).<sup>12-15</sup>

**EXPANDED TRAINING PROGRAM WEBSITES.** Applicants place great importance on program websites, with their value undoubtedly heightened this interview season as trainees will be unable to visit programs in person. These

websites present an opportunity for fellowship programs to describe not only the “nuts and bolts” of their program but also the overarching training style and educational philosophy embedded within their institution. Consequently, training program websites have a significant impact in informing applicants of not only which programs to apply to but also their decision to interview.<sup>6,16</sup>

Unfortunately, many program websites are underdeveloped and in need of revision.<sup>17,18</sup> In a survey study of fellowship interviewees at MD Anderson Cancer Center, respondents indicated that the most important information they sought on program's website included faculty profiles, rotation schedules, and profiles of current and former fellows.<sup>13</sup> However, a recent national analysis of 89 cardiothoracic residency and fellowship programs websites found most lack this information and fall woefully short in several other content domains important to applicants.<sup>12</sup> Moreover, website accessibility from traditional educational platforms, such as the TSDA, Electronic Residency Application Service, and Accreditation Council for Graduate Medical Education, was deemed suboptimal due to sites lacking links or containing nonfunctioning links that redirected users to other sites.<sup>12</sup> Clearly, there is opportunity for improvement broadly.

Now is the time for fellowship programs to revamp their websites, with attention paid to aesthetic criteria, including design, layout, and ease of navigation for an increasingly technologically savvy generation of trainees. Regarding content, in addition to including the aforementioned criteria, programs should strive to include operative case logs, research opportunities, hospital descriptions, training program history, ancillary benefits, housing information, and interview day details.<sup>13</sup> Accessibility issues should be addressed, with program websites containing hyperlinks that are active and in working order. Moreover, programs would be well-served by taking a proactive approach to ensure links from other educational sites are functional.

The COVID-19 pandemic has compelled institutions to move swiftly as they seek to offer digital solutions for traditional formats. Similar to multidisciplinary tumor boards or heart failure conferences that have been moved online in the form of video teleconferencing, so too is it necessary to respond to the current crisis with web-based solutions for prospective trainees. Certainly, institutions will have to consider the costs of upgrading departmental websites. However, these changes will provide long-lasting benefits that will far surpass the duration of the pandemic.

**VIRTUAL EDUCATIONAL CONTENT.** As a result of social distancing requirements, many programs are now providing virtual didactics to current trainees. These virtual didactics sessions are a wonderful opportunity to

allow prospective trainees to observe current curricular efforts, to engage in learning, and to better understand the culture and training environment of an institution.

A novel debate-style journal club format, whereby trainees use the best available evidence to argue for, or against, a specific patient care management decision, was developed at MD Anderson Cancer Center and published in *The Annals*.<sup>19</sup> The journal club format was favored by participants over a traditional format and, before the pandemic, was expanded and disseminated to multiple institutions by the Thoracic Education Cooperative Group (TECoG). Social distancing requirements led to the meeting being temporarily suspended in March 2020; however, the meeting was transformed into a live webinar on May 11, 2020, and was subsequently broadcasted globally by Twitter, TECoG, and TSDA.

In addition to providing valuable educational content to trainees, allowing outside observation of institutional meetings provides applicants a glimpse at internal didactics and an opportunity to better the understand culture and environment of a training program. Other examples of didactics that have been broadcasted include the use of a virtual cardiovascular boot camp and institutional course conferences.<sup>20,21</sup> Given the restrictions on in-person visits conferred by the novel coronavirus pandemic, allowing applicants to observe Health Insurance Portability and Accountability Act-compliant virtual educational content will be instrumental toward giving applicants better exposure to the inner workings of an institution. Importantly, programs should check with their respective institutions to ensure compliance regarding broadcasting educational content.

**VIRTUAL TOURS.** Traditional interviews include a customary tour of the offices, clinics, hospital, and work areas in which the candidates could expect to spend their time at the institution. On the surface, it may appear routine to showcase similarly appearing infrastructure such as office examination rooms, patient care rooms in the hospital, trainee workrooms, call rooms, and cafeteria. However, these tours are often led by residents and fellows away from influence of the program director, chair, or other staff responsible for the creation of rank lists. It affords an invaluable opportunity to learn from the trainee the realities of the institution, the day-to-day details of learning and working there, and to ask questions that allow deeper insight into the program than what might otherwise occur in a mixed setting with staff. The coronavirus pandemic has abruptly disrupted this practice to the detriment of applicants and programs alike, as multiple specialty applicants rank the interactions with programs' current residents as one of the most important factors.<sup>22</sup>

Virtual tours are a logical alternative, and have been used by many programs to showcase their cities, hospitals, and trainees.<sup>2,23-25</sup> With thoughtful planning, these virtual tours can include additional segments directed at addressing important information that is usually provided during applicant-trainee interactions. This "insider information" can include the day-to-day logistics of training at the program, such as what options are available for lunch, where one would do the bulk of their documentation, or how the trainees interact with advanced practice providers. Additional video segments may also more broadly show some of the faculty members' involvement in education, discussions of simulation learning activities while touring a program's simulation center, as well as commentary from the tour guide on aspects of the program's efforts toward trainee professional development and research opportunities.<sup>14</sup>

A cohesive, well-planned virtual tour of not only the physical plant of the hospital and office buildings but also of the entire trainee experience can be incredibly useful in highlighting a training program and elevating its applicants' perceptions (Figure 1). While impossible to exactly replicate the tours and interactions with a video, virtual tours and experiences can mitigate the limitations of the postpandemic interview process and further feature program characteristics to all applicants in a cohesive manner.

**SOCIAL MEDIA PRESENCE.** In recent years, social media has become an outstanding way for training programs to showcase their strengths for prospective applicants, and this mechanism for sharing the day-to-day culture and events has become substantially more relevant in the pandemic-changed world. In fact, recently published recommendations for applicants preparing for virtual interviews in the COVID era specifically suggest viewing the social media accounts from members of the program to get a sense of the culture and location.<sup>26</sup> In recent years, experts have encouraged practicing surgeons and trainees alike to be proactive with social media and to take ownership of their online presence to ensure that the public's perception is consistent with individual values and goals.<sup>27</sup> Likewise, just as it is important for surgeons to get engaged in creating their own online narrative for patients and the public, surgeon educators must use this opportunity to enhance and optimize their program's digital footprint—an action that is sure to assist recruitment both during the pandemic and also well beyond (Figure 2).

While some training programs and/or their associated departments may have their own social media accounts, such online activity on the behalf of the training program may be challenging in some locations due to institutional regulations or lack of personnel to maintain





**FIGURE 1** Virtual tours can be used to showcase the program's physical structure as well as to get a glimpse into the daily program culture.

the accounts. Regardless, activity from representative faculty members, program coordinators, and existing trainees can go a long way in highlighting the program's activities. Moreover, one of the particular benefits to social media activity lies in its utility in sharing the scope of the program's activities throughout the year, garnering the attention of prospective trainees over a prolonged period of time.

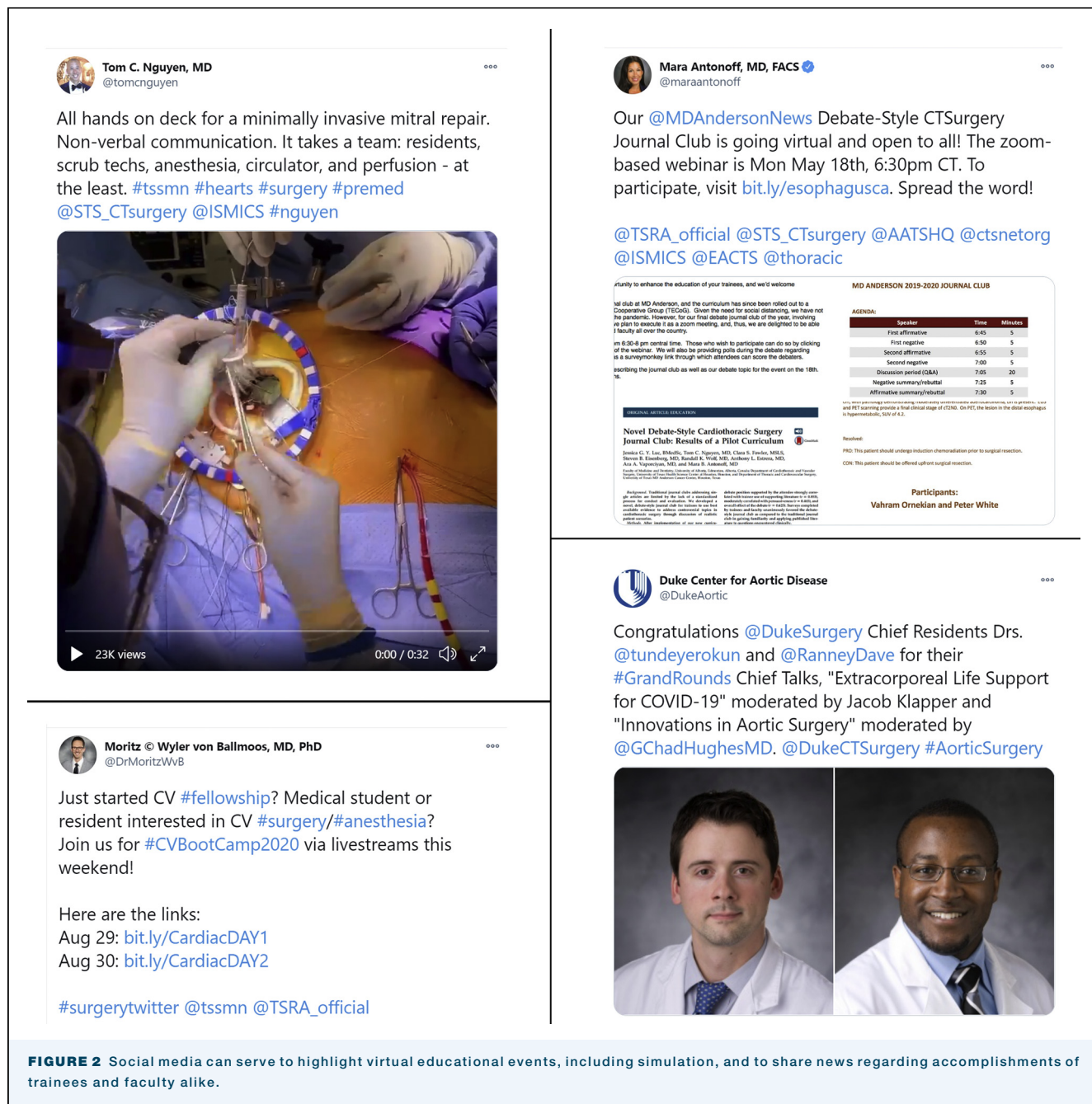
In considering social media strategies, there are a number of various outlets, including Twitter, Facebook, Instagram, YouTube, and more. Among all of these platforms, common traits of social media include the use of interactive internet-based applications, user-generated content, maintenance of user profiles through social media organizations, and facilitating social networks that connect users to other individuals or groups.<sup>28</sup> Each of these venues has its own distinct benefits and drawbacks as well as somewhat differing bodies of users. Ultimately, the preponderance of literature would suggest that Twitter's advantages are particularly valuable, given the lack of need for reciprocal relationships, the ability to share and amplify others' messages, and the ease of integrating a breadth of links, images, videos, and more.<sup>29-32</sup> Ultimately, data have shown that postings containing multimedia components, hyperlinks, and interactive content achieve greater viewership than text-only postings.<sup>29</sup>

Trainees are eager to hear as much as possible about prospective programs, and there are so very many opportunities to share your quotidian activities. As you engage your existing trainees in educational activities—

whether they are didactics, simulation, journal club, or teaching rounds—these are all situations that would be well-suited to capture and share on social media. (Just be mindful to consider ethical standards and patient confidentiality, always avoiding the sharing of private health data and patient identifiers.)<sup>27,32</sup>

If you are able to expand your educational endeavors to the virtual environment and extend invitations to participate beyond the doors of your institution, as previously suggested, you can use social media to inform trainees regarding these upcoming events. Moreover, beyond specific educational events, social media is a means of sharing with prospective trainees the accomplishments, awards, and innovations of your department. Sharing faculty and trainee achievements alike is a worthwhile practice when trying to gain the interest of candidates for training programs. In addition to sharing accomplishments such as scholarships and awards, social media is also a very useful tool for disseminating scholarly activity, and it can be used to live-tweet (virtual) presentations<sup>33,34</sup> from existing faculty and trainees as well as to bring attention to key publications from your department.<sup>32,35</sup> This will give prospective trainees a taste for the department's specific areas of research as well as the overall level of scholarly productivity.

Lastly, in developing a social media plan as a training program, recognize that content shared by the faculty and trainees will give a glimpse into the overall sentiment and team dynamics of the group. Depictions of pride, appreciation, collaboration, and respectfulness



**FIGURE 2** Social media can serve to highlight virtual educational events, including simulation, and to share news regarding accomplishments of trainees and faculty alike.

will be apparent to social media consumers. Moreover, demonstrations of physician wellness, sponsorship, and promotion of diversity and inclusion will be well-noted by prospective applicants. “You can’t be what you can’t see” has become a commonly repeated phrase on social media in recent years, advocating for the importance of showing role models who represent a diversity of potential applicants in the field.<sup>36</sup>

Previous authors have encouraged faculty and cardiothoracic trainees to engage and involve medical students virtually during this pandemic, with strategies

such as virtual program visits, engaging in digital communications, sharing remote didactics, and expanding the reach of educational programs.<sup>37,38</sup> However, it is clear that in cardiothoracic surgery, where critical dialogue centers around the importance of exposure, networking, and sponsorship of women and other underrepresented minorities, our social media activities must take this into account.<sup>39-41</sup> As program directors and educators, we can control the perceived face of our profession and of our individual training programs by ensuring that the outward-facing digital identity of our

training programs reflects the pool of talent and diversity of the faculty, trainees, and workforce members at our given institutions. Attention to such issues of diversity and inclusion in developing social media strategies will pay dividends in ensuring that we attract all talented applicants to our programs.<sup>36</sup>

**ONLINE EXTERNSHIP: AN OPPORTUNITY FOR VIRTUAL MENTORSHIP.** Mentorship is of tremendous value to cardiothoracic surgeons who are progressing in their careers and is an especially essential feature so for those who have yet to start residency or fellowship.<sup>42</sup> Typically, identifying a mentor has been possible through an applicant's home institution or is available through networking with faculty at other institutions during visiting rotations. Visiting rotations are of unique importance for applicants who lack a cardiothoracic program at their home institution or who harbor career interests that align better with faculty at another institution. The loss of visiting rotations as a result of the coronavirus pandemic will place a major barrier for applicants to identify mentors and advocates at other institutions. Unfortunately, this disadvantage may impact women and underrepresented minorities to a greater extent.<sup>42</sup> Faculty and current trainees should make every attempt to encourage and foster mentorship in this pandemic era.

An online externship, in lieu of a visiting rotation, has also been proposed as a novel means for applicants to better understand the training environment of a program and to benefit from the support and advocacy of a mentor.<sup>15</sup> The TSDA has proposed that online externships be used in a structured manner, with virtual participation in conferences, journal clubs, and any non-Health Insurance Portability and Accountability Act restricted resident meetings and didactics.<sup>3</sup>

#### **THE INTERVIEW DAY: RECREATING A VIRTUAL EXPERIENCE**

Recreation of the interview day through a virtual experience should ideally convey much, if not all, of the information typically provided during an in-person interview. Important information to provide will include rotation schedules, opportunities for research, institutional history, benefits, and faculty profiles with contact information. These interview materials may be delivered virtually through the creation of online folders through shared drives (ie, Dropbox, Google Drive, etc), through sending packages by postal mail, or through narrating a PowerPoint presentation. An inexpensive piece of local memorabilia or food item can also be delivered through the postal mail to provide a small taste of the program.

A major source of information for applicants regarding programs also comes from one-on-one

interactions with current trainees through lunches, dinners, or tours. These honest encounters with trainees are a vital component of the interview process for applicants to better understand programs. They may be recreated virtually through separate applicant-trainee-only "virtual dinners" the night before the interview or through break-out rooms with only trainees while applicants rest in between virtual interview sessions.

#### **VIRTUAL INTERVIEWS DURING THE NOVEL CORONAVIRUS PANDEMIC: EARLY RESULTS**

The coronavirus pandemic impacted several surgical fellowship recruitment efforts concurrently during the Spring 2020 match. We are still awaiting publication of results after transitioning to virtual cardiothoracic fellowship interviews, although several programs for other surgical specialties have reported an overall positive experience.<sup>23,43</sup> However, some deficits were noted. Among a survey for the urology match, 64% of respondents stated that interactions with residents were the most important part of the interview day, and most expressed concerns regarding replicating resident interactions virtually.<sup>44</sup> In addition, respondents generally agreed that city visits could not be accomplished virtually. Encouragingly, 80% of applicants stated that they believed that faculty interactions could be well replicated virtually. These details may help guide our efforts for upcoming interview seasons to improve virtual resident interaction and provide the means for applicants to better understand the environment of a program.

#### **SUMMARY**

Adjusting to the coronavirus pandemic has shown the incredible nature of applicants and programs across the country to be flexible and to adapt to changing needs. The improvements in fellowship recruiting will surely provide long-lasting benefits that will persist long after the pandemic has subsided, making the upfront costs more than worth it. Careful attention will need to be exercised to consider applicants that may be disadvantaged as a result of the pandemic, including as a result of illness, delays in conducting research, or the loss of recommendation letters from cancelled visiting rotations. In addition, applicants may be juggling other responsibilities brought on by the pandemic, such as caring for sick family members or providing at-home learning for school-aged children. Lastly, applicants with stellar records may be able to attend an unexpectedly large number of virtual interviews, potentially providing a disadvantage toward middle-tier applicants from obtaining one of the coveted and fixed number of interview slots.<sup>45</sup>



These challenges offer a wonderful opportunity for us to support our future colleagues and to ensure an equitable recruitment process. Moreover, while these lessons will be vital in the current pandemic, they also provide insight about how we can accommodate

candidates in the future, allowing transparent and informative recruitment processes to occur with potentially limited financial burdens, lessened scheduling challenges, and fewer absences from clinical and personal commitments.

## REFERENCES

1. National Resident Matching Program. NRMP FAQs During COVID-19 Pandemic. Updated September 8, 2020. Available at: <https://www.nrmp.org/covid-faqs-3/>. Accessed September 8, 2020.
2. The Thoracic Surgery Directors Association. TSDA Virtual General Session. E-Conference. Available at: <https://tsda.org/tsda-meetings/meetings-archive/2020-tsda-general-sessions/>. Accessed September 26, 2020.
3. The Thoracic Surgery Directors Association. TSDA Recommendations on Visiting External Medical Student Rotations During the COVID-19 Pandemic. Available at: <https://tsda.org/wp-content/uploads/2020/05/Final-TSDA-Recommendations-5-27-2020.pdf>. Accessed October 9, 2020.
4. Pretorius ES, Hrung J. Factors that affect national resident matching program rankings of medical students applying for radiology residency. *Acad Radiol*. 2002;9:75-81.
5. Downard CD, Goldin A, Garrison MM, et al. Utility of onsite interviews in the pediatric surgery match. *J Pediatr Surg*. 2015;50:1042-1045.
6. Watson SL, Hollis RH, Oladeji L, et al. The burden of the fellowship interview process on general surgery residents and programs. *J Surg Educ*. 2017;74:167-172.
7. Chandler NM, Litz CN, Chang HL, Danielson PD. Efficacy of videoconference interviews in the pediatric surgery match. *J Surg Educ*. 2019;76:420-426.
8. Tseng J. How has COVID-19 affected the costs of the surgical fellowship interview process? *J Surg Educ*. 2020;77:999-1004.
9. 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;187:1380-1384.
10. Vadi MG, Malkin MR, Lenart J, Stier GR, Gatting 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.
11. Pasadhika S, Altenbernd T, Ober RR, Harvey EM, Miller JM. Residency interview video conferencing. *Ophthalmology*. 2012;119, 426-426.e5.
12. Miller VM, Padilla LA, Schuh A, et al. Evaluation of cardiothoracic surgery residency and fellowship program websites. *J Surg Res*. 2020;246:200-206.
13. Rajaram R, Abreu JA, Mehran R, Nguyen TC, Antonoff MB, Vaporciyan A. Using quality improvement principles to redesign a cardiothoracic surgery fellowship program website. *Ann Thorac Surg*. 2021;111: 1079-1085.
14. Nguyen JK, Shah N, Heitkamp DE, Gupta Y. Covid-19 and the radiology match: a residency program's survival guide to the virtual interview season. *Acad Radiol*. 2020;27:1294-1297.
15. Boyd CJ, Inglesby DC, Corey B, et al. Impact of COVID-19 on away rotations in surgical fields. *J Surg Res*. 2020;255:96-98.
16. Gaeta TJ, Birkhahn RH, Lamont D, Banga N, Bove JJ. Aspects of residency programs' web sites important to student applicants. *Acad Emerg Med*. 2005;12:89-92.
17. Chu LF, Young CA, Zamora AK, et al. Self-reported information needs of anesthesia residency applicants and analysis of applicant-related web sites resources at 131 United States training programs. *Anesth Analg*. 2011;112:430-439.
18. Hashmi A, Policherla R, Campbell H, Khan FA, Schumaier A, Al-Mufarrej F. How informative are the plastic surgery residency websites to prospective applicants? *J Surg Educ*. 2017;74:74-78.
19. Luc JGY, Nguyen TC, Fowler CS, et al. Novel debate-style cardiothoracic surgery journal club: results of a pilot curriculum. *Ann Thorac Surg*. 2017;104:1410-1416.
20. Houston Methodist. Cardiovascular Fellows' Boot Camp. Available at: <https://www.houstonmethodist.org/education/medical/debakey-cv-education/courses/cv-fellows-bootcamp/>. Accessed December 8, 2020.
21. UPMC Center for Continuing Education in the Health Sciences. Minimally Invasive Approaches to the Management of Achalasia and Other Benign Esophageal Diseases. July 16-20, 2020. Available at: [https://cce.upmc.com/Benign\\_Esophageal2020#group-tabs-node-course-default1](https://cce.upmc.com/Benign_Esophageal2020#group-tabs-node-course-default1). Accessed December 8, 2020.
22. Luk L, Maher MD, Desperito E, Weintraub JL, Amin S, Ayyala RS. Evaluating factors and resources affecting ranking of diagnostic radiology residency programs by medical students in 2016-2017. *Acad Radiol*. 2018;25:1344-1352.
23. Molina G, Mehtsun WT, Qadan M, Hause KC, Raut CP, Fairweather M. Virtual interviews for the complex general surgical oncology fellowship: the Dana-Farber/Partners experience. *Ann Surg Oncol*. 2020;27:3103-3106.
24. Williams K, Kling JM, Labonte HR, Blair JE. Videoconference interviewing: tips for success. *J Grad Med Educ*. 2015;7:331-333.
25. Healy WL, Bedair H. Videoconference interviews for an adult reconstruction fellowship: lessons learned. *J Bone Joint Surg Am*. 2017;99:e114.
26. Chou DW, Pletcher SD, Bruss D, et al. Otolaryngology residency interviews in a socially distanced world: strategies to recruit and assess applicants [e-pub ahead of print]. *Otolaryngol Head Neck Surg*. <https://doi.org/10.1177/0194599820957961>, accessed December 8, 2020.
27. Luc JGY, Antonoff MB. A call to action: ensure the accuracy of your professional online image. *Ann Thorac Surg*. 2020;109:1628.
28. Varghese TK Jr, Entwistle JW 3rd, Mayer JE, Moffatt-Bruce SD, Sade RM. Ethical standards for cardiothoracic surgeons' participation in social media. *Ann Thorac Surg*. 2019;108:666-670.
29. Antonoff MB. Using social media effectively in a surgical practice. *J Thorac Cardiovasc Surg*. 2016;151:322-326.
30. Luc JGY, Ouzounian M, Bender EM, et al. The Thoracic Surgery Social Media Network: early experience and lessons learned. *Ann Thorac Surg*. 2019;108:1248-1255.
31. Luc JGY, Archer MA, Arora RC, et al. Does tweeting improve citations? One-year results from the TSSMN prospective randomized trial. *Ann Thorac Surg*. 2020;111:296-300.
32. Luc JGY, Antonoff MB. A cardiothoracic surgeon's playbook for social media and digital scholarship. *Innovations (Phila)*. 2020;15:416-422.
33. Luc JGY, Antonoff MB. Live tweet The Society of Thoracic Surgeons Annual Meeting: how to leverage Twitter to maximize your conference experience. *Ann Thorac Surg*. 2018;106:1597-1601.
34. Luc JGY, Antonoff MB. Live-tweet to get the most out of the American Association for Thoracic Surgery Virtual Annual Meeting. *J Thorac Cardiovasc Surg*. 2021;161:e241-e242.
35. Luc JGY, Archer MA, Arora RC, et al. Social media improves cardiothoracic surgery literature dissemination: results of a randomized trial. *Ann Thorac Surg*. 2020;109:589-595.

- 36.** Antonoff MB. Reply: diversity of our future workforce is contingent upon our virtual pandemic presence. *J Thorac Cardiovasc Surg.* 2020;161:e46-e47.
- 37.** Do-Nguyen CC, Hong JC, Luc JGY. The importance of mentorship and sponsorship for thoracic surgery residency applicants during the coronavirus disease 2019 (COVID-19) pandemic. *J Thorac Cardiovasc Surg.* 2020;161:e45-e46.
- 38.** Boskovski MT, Hirji SA, Brescia AA, Chang AC, Kaneko T. Enhancing thoracic surgical trainee competence in the coronavirus disease 2019 (COVID-19) era: challenges and opportunities for mentorship. *J Thorac Cardiovasc Surg.* 2020;160:1126-1129.
- 39.** Corsini EM, Boeck M, Hughes KA, et al. Global impact of social media on women in surgery. *Am Surg.* 2020;86:152-157.
- 40.** Stamp NL, Luc JGY, Ouzounian M, Bhatti F, Hici TN, Antonoff MB. Social media as a tool to rewrite the narrative for women in cardiothoracic surgery. *Interact Cardiovasc Thorac Surg.* 2019;28:831-837.
- 41.** Cooke DT, Olive J, Godoy L, Preventza O, Mathisen DJ, Prager RL. The importance of a diverse specialty: introducing the STS Workforce on Diversity and Inclusion. *Ann Thorac Surg.* 2019;108:1000-1005.
- 42.** Odell DD, Edwards M, Fuller S, Loor G, Antonoff MB. The art and science of mentorship in cardiothoracic surgery: a systematic review of the literature [e-pub ahead of print]. *Ann Thorac Surg.* <https://doi.org/10.1016/j.athoracsur.2020.06.051>, accessed December 8, 2020.
- 43.** Vining CC, Eng OS, Hogg ME, et al. Virtual surgical fellowship recruitment during COVID-19 and its implications for resident/fellow recruitment in the future. *Ann Surg Oncol.* 2020;27(Suppl 3):911-915.
- 44.** Kenigsberg AP, Khouri RK Jr, Kuprasertkul A, Wong D, Ganesan V, Lemack GE. Urology residency applications in the COVID-19 era. *Urology.* 2020;143:55-61.
- 45.** American College of Surgeons. Bulletin Brief. It May Be Too Late to Avoid a Crisis in the Surgery Match This Year. Available at: <https://www.facs.org/publications/bulletin-brief/120820/announcements>. Accessed January 10, 2021.
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