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How Has COVID-19 Affected the Costs of the Surgical Fellowship Interview Process?

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OBJECTIVE: To evaluate the effect of COVID-19 on the costs of the surgical fellowship interview process.

DESIGN: A literature review of the historical costs of surgical fellowship interviews and a summary of how the shift to virtual interviews has unintended positive and negative effects on costs for applicants and training programs.

RESULTS: Transitioning fellowship interviews to virtual platforms affects expenditures of finances and time. Each fellowship candidate saves close to \$6,000 in interview travel expenses. Applicants require less time off from their residency programs during this critical time of need for frontline healthcare workers. However, applicants miss some of the live aspects of interviewing, and training programs invest more effort upfront altering their interviews to virtual formats.

CONCLUSIONS: The COVID-19 public health crisis has had a significant impact on surgical education, including how selection is conducted. Virtual recruitment has the potential for cost savings but should continue to be refined. This is an opportune time to innovate and rethink how to recruit prospective surgical residency and fellowship candidates during the current and forthcoming interview seasons. (J Surg Ed 77:999–1004. © 2020 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

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COMPETENCIES: Systems-Based Practice, Practice-Based Learning and Improvement

INTRODUCTION

The COVID-19 pandemic has had an unprecedented impact on surgical residents and fellows. Rotation and didactic schedules have been modified, trainees have been redeployed, and innovative use of technology has been explored for patient care and trainee education.^{1,2} Amidst these adjustments, some of the most critical months in dictating a senior surgical resident's career are taking place with fellowship applications, interviews and match.

The interview seasons of surgical fellowships have been significantly affected by the coronavirus pandemic (Fig. 1). Six out of 8 currently active National Resident Matching Program subspecialty fellowship matches are from surgical fields.³ Likewise, 8 of 15 impacted fellowship matches in the San Francisco Matching Program (SF Match) are from surgical subspecialties.⁴ Non-National Resident Matching Program and non-SF Match fellowships (including the American Association of Endocrine Surgeons' Comprehensive Clinical Fellowship in Endocrine Surgery, the American Urological Association's subspecialty fellowships, the Fellowship Council's programs, and the Society of Surgical Oncology sponsored Breast Surgical Oncology Fellowship) are similarly in the course of reviewing applications, interviewing and ranking prospective candidates.⁵⁻⁸ Fellowship interviews have universally moved to videoconferencing or teleconferencing in this time of social distancing. This change from live to virtual interviews impacts the costs of interviewing for applicants and training programs and is worth reviewing further.

THE HISTORICAL COSTS OF FELLOWSHIP INTERVIEWS

Though an applicant's financial expenditures vary depending on the individual candidate, fellowship program and even geographical locations of both,⁹ there are published surveys that help guide an estimate of the

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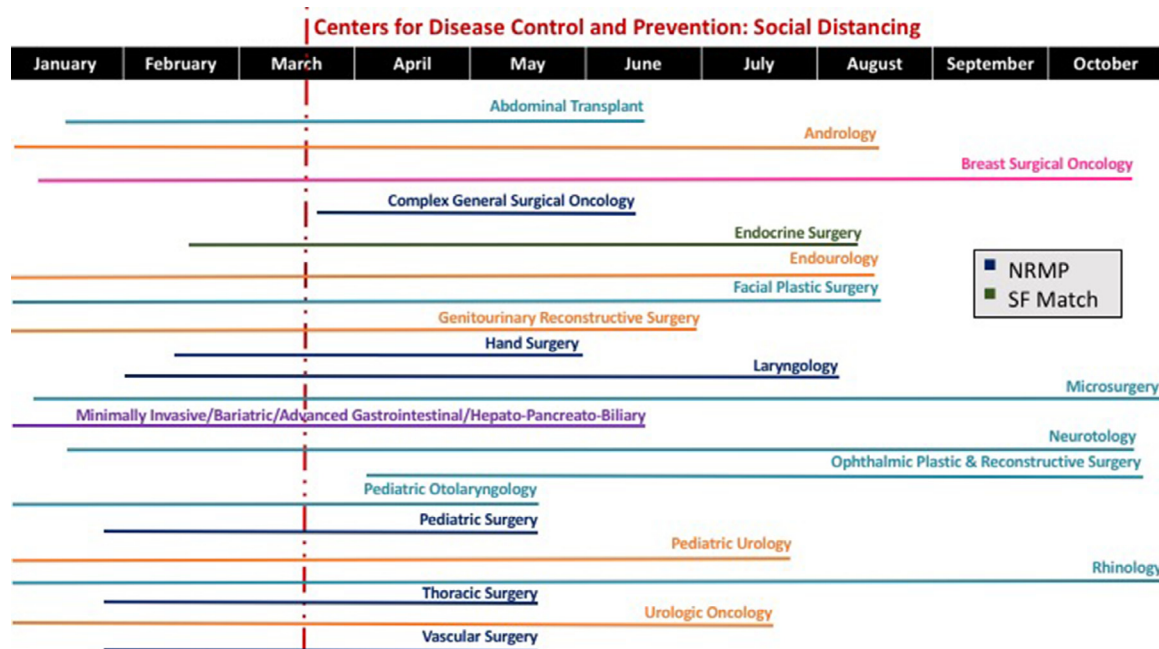


FIGURE 1. Surgical fellowship interview seasons affected by COVID-19.

economic burden of surgical fellowship interviewing (Table 1). As only 2 studies provide information about the monetary cost of fellowship interviews, additional reviews were performed of articles focusing on residency interview costs.^{9–22} Although limited by their retrospective nature and usual survey response rate biases, the aggregated information demonstrates the expensive nature of fellowship interviews. An interviewee would have spent approximately \$6,000 for live interviews applying for surgical fellowships in 2020, adjusting for inflation. Over fifteen hundred residents from surgical specialties applied for fellowships in 2019. If there are a comparable number of fellowship applicants in 2020, the cumulative saved cost of not having live interviews would be \$9 million ($\$6,000 \times 1,500$ applicants), though that total needs some correction as there are fellowship applicants who interviewed in person before the implementation of social distancing measures.

A prior survey of General Surgery Program Directors also revealed the substantial program costs of in-person recruitment.²³ There are around 600 General Surgery subspecialty fellowships nationwide. Mean hard costs, not including personnel effort, is approximately \$8,400 as adjusted for inflation. The cumulative financial savings for institutions presuming they held interviews after the start of social distancing is over \$5 million ($\$8,400 \times 600$ programs) and more when accounting for non-General Surgery subspecialty fellowship programs.

Furthermore, there is a decrease in the amount of time applicants are away from their residencies with virtual

interviews. Oladeji et al. found that Orthopedic Surgery residents missed an average of eleven days for fellowship interviews, and program directors generally perceived this to cause a high level of disruption.¹⁷ A separate study by Watson et al. reported fellowship interviews to be extremely disruptive to General Surgery residency programs, with 57% of residents missing at least a week and 61% needing to use vacation time.¹⁸ While virtual fellowship interviews still require applicants to ask for protected hours from their training programs, days are no longer lost to travel and there is an overall net recuperation of resident educational and clinical productivity.

POTENTIAL COSTS OF VIRTUAL INTERVIEWS

However, there is a significant upfront investment of effort by each fellowship program new to virtual recruitment. In contrast to time saved for interview applicants, there may not be savings in faculty and staff time. In fact, the program may expend more time troubleshooting connectivity problems with technical support staff and training faculty in the use of virtual platforms.²⁴

Previous interview applicants have additionally highlighted some concerns about virtual interviews, which have been sporadically implemented in various specialties before COVID-19.^{20,24–26} In a study by Pasadhika et al., applicants to the University of Arizona in the 2011 Ophthalmology match were given a choice of video or live

TABLE 1. Residency/Fellowship* Interview Costs

Author/Journal/Date	Applicants	Total Interviews Cost
Cabrera-Muffy et al. in <i>Otolaryngol Head Neck Surg</i> 2017	182 student applicants in the 2016 Otolaryngology residency match and 238 current residents	Median: \$4,000
Polacco et al. in <i>Otolaryngol Head Neck Surg</i> 2017	103 student applicants to 2 institutions in the 2016 Otolaryngology residency match	Mean: \$6,400 Range: \$1,200-\$20,000 95% CI: \$5,710-\$7,090
Fogel et al. in <i>Iowa Orthop J.</i> 2016	43 student applicants to a single institution in the 2015 Orthopedic Surgery residency match	Mean: \$7,119 Range: \$2,500-\$15,000
Camp et al. in <i>J Surg Educ</i> 2016	312 matched student applicants in the 2015 Orthopedic Surgery residency match	Mean \pm SD: \$5,415 \pm \$3,026 Range: \$450-\$25,000
Agarwal et al. in <i>J Neurosurg</i> 2016	130 student applicants in the 2014 Neurosurgery residency match	Mean \pm SD: \$7,180 \pm \$3,880
Nikonow et al. in <i>J Urol</i> 2015	173 student applicants in the 2014 Urology residency match	Median: \$7,000 IQR: \$3,000-\$9,000
Oladeji et al. in <i>Am J Orthop</i> 2015*	78 resident applicants in the 2014 Orthopedic Surgery subspecialty fellowship matches	Mean: \$5,875 Range: \$500-\$12,000+
Watson et al. in <i>J Surg Educ</i> 2017*	72 resident applicants in the 2014 General Surgery subspecialty fellowship matches	62.3% spent > \$4,000 21.7% spent > \$8,000
Claiborne et al. in <i>Ann Plast Surg</i> 2013	127 student applicants to a single institution in the 2012 Plastic Surgery residency match	Mean: \$6,073 IQR: \$1,848-\$11,037
Pasadhika et al. in <i>Ophthalmology</i> 2012	69 student applicants to a single institution in the 2011 Ophthalmology residency match	Mean: \$4,530 Range: \$1,200-\$10,000
Rogers et al. in <i>Plast Reconstr Surg</i> 2009	139 student applicants in the 2006 Plastic Surgery residency match	Mean \pm SD: \$4,001 \pm \$2,947 Range: \$0-\$15,000
Kerfoot et al. in <i>Urology</i> 2008	287 student applicants in the 2006 Urology residency match	Median: \$4,000 Range: \$2,000-\$5,200
2015 <i>Cost of Applying to Residency Questionnaire Report</i> from the Association of American Medical Colleges	Student applicants in the 2015 residency match	Neurosurgery Mean \pm SD: \$6,930 \pm \$2,374 Range: \$3,500-\$10,400 Ophthalmology Mean \pm SD: \$6,583 \pm \$5,812 Range: \$1,000-\$20,000 Otolaryngology Mean \pm SD: \$5,442 \pm \$2,778 Range: \$1,000-\$11,000 Plastic Surgery Mean \pm SD: \$4,750 \pm \$2,050 Range: \$1,000-\$7,000 General Surgery Mean \pm SD: \$4,264 \pm \$2,670 Range: \$810-\$10,900 Orthopedic Surgery Mean \pm SD: \$3,519 \pm \$2,759 Range: \$200-\$12,500 Urology Mean \pm SD: \$3,500 \pm \$1,979 Range: \$900-\$7,000

CI, confidence interval; SD, standard deviation; IQR, interquartile range.

*Labels the two articles that relate to fellowship interview costs instead of residency interview costs.

interviews.²⁰ Interviewees responded favorably to video interviews but thought an on-site departmental tour should be mandatory for a comprehensive impression of the program. The cost reduction of video interviews was obviated

when applicants completed a “second look” live visit. Residency applicants to the University of New Mexico in the 2011 Urology match were randomized to web based interviews or traditional live interviews; all virtual interviewees

were later re-interviewed in person. Applicants in this study by Shah et al. felt less rapport with faculty and perceived virtual interviewing to be a less effective method to properly represent themselves.²⁵ Applicants and faculty favored web based interviews as an adjunct rather than a replacement of live interviews. Pediatric surgery applicants to Johns Hopkins All Children's Hospital in Saint Petersburg, Florida in the 2017 interview season participated in video interviews prior to on-site interviews. Chandler et al. found that in addition to technical difficulties, applicants expressed concerns about the limited number of faculty interviewers and inability to view the hospital; they also missed observing how surgical faculty and trainees interact.²⁶ Healy et al. reported that while in the minority, 15% of candidates who participated in videoconference interviews for adult reconstruction fellowship at Newton-Well- esley Hospital's Kaplan Joint Center between 2015 and 2017 did not feel they presented themselves to their satisfaction, 19% were not comfortable ranking the program, and 34% stated that videoconference interviews had an unfavorable impact on their ranking of the program.²⁴ These studies demonstrate that despite the reduction in financial spending, there are less quantifiable costs to applicants' abilities to convey themselves and assess a program with virtual recruitment.

OPPORTUNITIES TO IMPROVE THE COST EFFECTIVENESS OF VIRTUAL RECRUITMENT

With COVID-19, virtual interviews have been a necessary adjustment for fellowship training programs in match seasons, and they may be the future of residency and fellowship recruitment. With the Association of American Medical Colleges reporting median graduating student debt of \$200,000 in 2019, virtual interviews advantageously reduce additive costs to pre-existing economic hardship.²⁷ They minimize surgery resident absences from their training programs. Virtual interviews may be utilized in a 2-tiered screening program to narrow applicant pools and host candidates who have greater interest in the program.²⁴⁻²⁶ Nevertheless, there are concerns about the equivalency of virtual interviews to live recruitment. Thus, recommendations for improvement opportunities:

- Surgery programs should work closely with faculty and staff to become more facile with videoconferencing to diminish loss in productivity secondary to unfamiliarity or discomfort with technology.²⁵ They can use web streaming or pre-produced videos to highlight traditionally unique "live" aspects of interview days like the campus and city tour.²⁴ Websites can be supplemented with narrated slide decks and podcasts

to save on hard copy or emailed reproductions of program materials usually prepared for applicants.

- Further centralization of fellowship virtual interviews using uniform platforms may streamline processes for candidates and programs.
- Fellowship candidates and faculty members should prepare for virtual interviews as they would for live interviews to maximize the use of time.^{28,29} Fellowship programs should help accommodate applicants whose home environments may not be appropriate for professional interviews or who may need modifications of their interview days due to clinical responsibilities during the COVID-19 pandemic and recovery.³⁰
- Ongoing applicant and program surveys are needed to learn more about the cost benefits and disadvantages of the widespread use of virtual interviews.

As the global impact of the COVID-19 public health crisis continues to evolve, so must thinking about all aspects of surgical education, including how selection is conducted. The unintended effects on costs make this an opportune time to innovate and rethink how to recruit prospective candidates during the current and forthcoming interview seasons.

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