



## AOA Critical Issues in Education

# Residents and Fellows of US Medical Residencies and Fellowships Strongly Prefer In-Person to Virtual Conference Format

### A Cross-sectional Survey

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*Investigation performed at Mayo Clinic Arizona, Phoenix, AZ*

#### ABSTRACT

**Introduction:** Medical conferences are an integral aspect of medical education as they allow attendees to stay up to date with recent advancements in medicine, to develop presentation and communication skills, and to network and establish connections with professionals in their field of interest. But, when the coronavirus disease 2019 (COVID-19) pandemic was declared in March 2020, face-to-face medical conferences were suspended, and conference organizers began shifting their meetings to virtual platforms. These new virtual conferences afforded medical residents and fellows the unique opportunity to attend conferences from the comfort of their own home or workplace; however, the virtual meeting platforms did not provide attendees with the same networking experiences as in-person conferences. Since the end of the COVID-19 public health emergency, medical conferences are now faced with the question of whether they should remain virtual, shift back to in-person meetings, or develop a hybrid model of both options. Thus, the purpose of this study was to analyze medical resident and fellow sentiments and preferences by comparing virtual and in-person conference formats.

**Methods:** A voluntary electronic survey was distributed to medical residents and fellows across the United States through their program coordinators and directors.

**Results:** The main findings of this study suggest that medical residents and fellows largely prefer in-person conferences (85%) as compared to a virtual format because of the networking opportunities afforded to them along with the development of camaraderie with their peers. The findings in this study suggest that the largest benefit in attending a virtual conference is the flexibility to attend from any location (79% important or very important), which offered convenience, flexibility, and comfort to participants (n = 100).

**Conclusion:** These results support our hypothesis that despite the convenience and portability afforded by attending conferences virtually, medical residents and fellows still ultimately prefer to attend conferences in person. Overall, the findings in this study are of relevance to conference organizers in understanding the driving forces behind attendance and should be considered in determining meeting format.

**Disclosure:** The **Disclosure of Potential Conflicts of Interest** forms are provided with the online version of the article (<http://links.lww.com/JBJSOA/A611>).

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## Introduction

Medical conferences are an integral aspect of medical education during residency and fellowship, and they allow attendees to stay up to date with the most recent advancements in medicine<sup>1</sup>. Beyond medical education, conferences also present the opportunity for those beginning their medical career to develop presentation and communication skills in front of large audiences and, potentially most importantly, allow them to network and establish connections with professionals in their field of interest<sup>2-4</sup>.

When the coronavirus disease 2019 (COVID-19) pandemic was declared in March 2020, in-person activities nationwide were restricted, and thus, face-to-face medical conferences were suspended<sup>5</sup>. Virtual meeting platforms such as Zoom (San Jose, California), Cisco WebEx (San Jose, California), GoTo (Boston, Massachusetts), and Microsoft Teams (Redmond, Washington) exploded in popularity as businesses and organizations were forced to adapt to in-person meeting restrictions. Conference organizers worked quickly to recreate events online through these virtual meeting platforms.

Virtual medical conferences provide unique benefits including convenience, accessibility, and decrease in cost. Many believed that virtual conferences would endure beyond the COVID-19 pandemic and permanently change the conference landscape through the introduction of blended or hybrid conference formats<sup>6-8</sup>. However, virtual conferences have their own disadvantages including limited networking opportunities<sup>9</sup>, absent hands-on experiences, technical challenges, distractions, and “Zoom fatigue,” all of which may decrease user engagement and attention<sup>10-12</sup>.

As the United States has begun to normalize since the height of the pandemic and with the May 2023 declaration of the end of the COVID-19 public health emergency<sup>13,14</sup>, medical conferences have been left with the difficult decision of whether to remain virtual or return to in-person meetings. Thus, it is of great interest to both conference organizers and attendees to understand public sentiments surrounding the 2 conference formats. To the best of our knowledge, no study has evaluated these sentiments and preferences in the medical resident and fellow population. Therefore, the purpose of this study was to analyze medical resident and fellow sentiments and preferences comparing virtual and in-person extra-institutional (e.g., local, regional, national, or international) conference formats. We hypothesize that despite the convenience and portability afforded by attending conferences virtually, residents and fellows will ultimately still prefer to attend conferences in person.

## Methods

### Survey Development and Distribution

The primary author (K.G.) developed an electronic survey using REDCap data capture tools, hosted at Mayo Clinic. The authors reviewed and tested the survey for format, content inclusivity, clarity, and functionality. The survey was pilot-tested among a group of 5 orthopaedic surgery residents and noted to take 5 to 10 minutes to complete. The Checklist

for Reporting Results of Internet E-Surveys was used to ensure the quality of reporting the findings of this study.<sup>15</sup>

This study received approval from the Mayo Clinic Institutional Review Board (#22-007231). Participants were recruited through email contact with residency and fellowship program directors and coordinators. Contact information for program directors and coordinators was found on publicly available institution websites, and an email containing an open link for survey access was sent to each director and coordinator with a request to distribute it among their respective residents and fellows as seen fit. Residents and fellows interested in participating in this voluntary survey were able to follow the link, which directed them to an opening letter from the primary and senior authors (K.G. and J.B.) explaining the study's purpose, voluntary nature, and eligibility criteria. Participants were granted access to the survey after selecting “yes” to the question indicating their informed consent to participate. Participation was completely anonymous because no identifying information was collected. Responses were collected between August 2022

**TABLE I Demographics of Study Respondents**

Characteristic	n (%)
Age	
18-25 years	3 (1.0)
26-35 years	253 (87.8)
36-45 years	28 (9.7)
46-55 years	3 (1.0)
Prefer not to answer	1 (0.3)
Sex	
Male	126 (43.8)
Female	159 (55.2)
Non-binary	2 (0.7)
Prefer not to answer	1 (0.3)
US region	
West	16 (5.6)
Southwest	43 (14.9)
Midwest	164 (56.9)
Northeast	21 (7.3)
Southeast	44 (15.3)
Attended in-person conference since March 2020? (yes)	225 (78.1)
1-3 conferences	185 (64.2)
4-6 conferences	19 (21.6)
7-10 conferences	3 (1.0)
> 10 conferences	18 (20.5)
Attended virtual conference since March 2020? (yes)	222 (77.1)
1-3 conferences	172 (59.7)
4-6 conferences	31 (10.8)
7-10 conferences	8 (9.1)
> 10 conferences	11 (3.8)

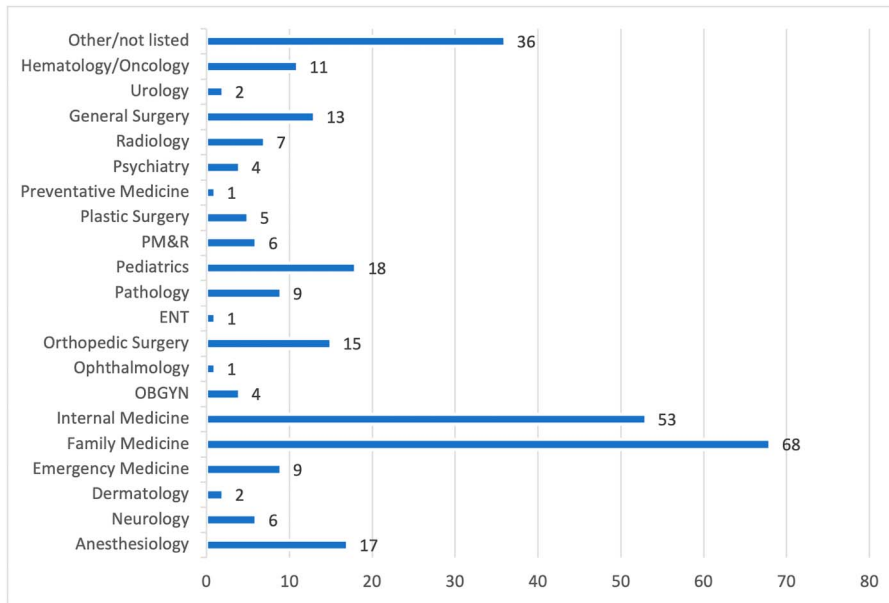


Fig. 1 Distribution of residency/fellowship program specialty. In-person conferences. ENT = ear, nose, and throat, OBGYN = obstetrics and gynecology, PM&R = physical medicine and rehabilitation.

and April 2023. Participants were eligible to complete the survey if they fulfilled both inclusion criteria of current enrollment in an accredited medical residency or fellowship in the United

States and attendance of at least 1 academic conference or meeting (either virtual or in-person) since the beginning of the COVID-19 pandemic in March 2020.

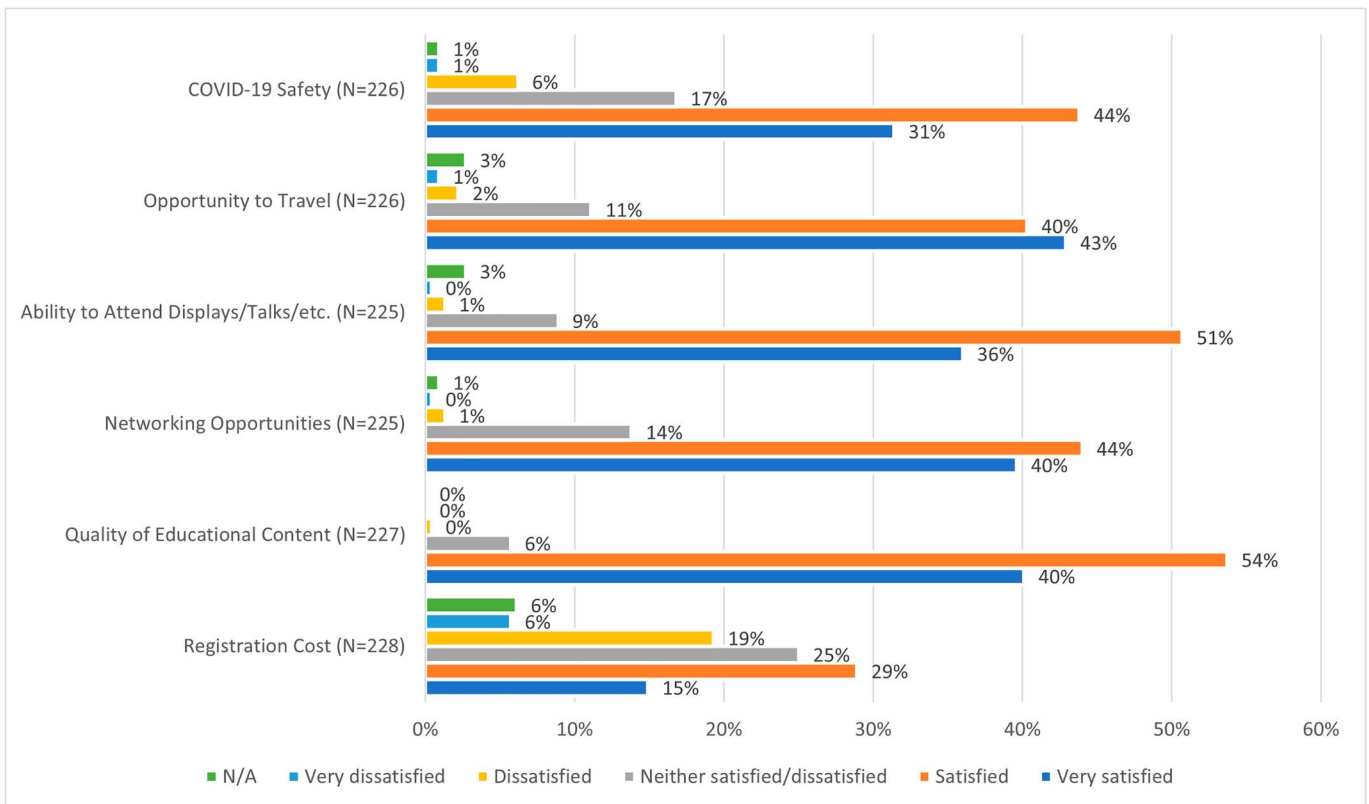


Fig. 2 How satisfied are you with the following aspects of in-person conferences?

The electronic survey used branching logic to maximize efficiency by propagating follow-up questions only if specific responses were chosen in previous questions. It consisted of 4 sections displayed over a total of 8 pages: (1) demographics, (2) in-person conferences, (3) virtual conferences, and (4) overall preferences and opinions (See Appendix 1). Between 2 and 8 items were displayed per page depending on activation of the branching logic. Only the first 2 questions of section (1) were marked as mandatory to determine the participant's eligibility for completing the survey. Participants were able to review their previously answered questions and save their responses and return using a unique link. Because of the branching logic, the total number of questions answered by each participant varied; however, the maximum number of questions answered was 41.

### Statistical Analysis

Descriptive statistics were used to summarize distribution, frequency, and dispersion of participant responses. Short answer responses were reviewed by the primary author (K.G.) and categorized based on thematic key phrases (e.g., “networking,” “cost-saving,” and “travel”). Once categorized, the key phrases were assessed for frequency and distribution within their respective questions. Data were analyzed using Microsoft Excel.

## Results

### Respondents' Profile

Four hundred eighty-eight responses were collected in total, and 448 of were eligible for inclusion (i.e., participants both provided consent and self-reported their status as current medical resident or fellow). Of the 448 eligible responses, 288 completed at least 50% of the survey and were thus included in data analysis (64% completion rate). Demographics and program specialties of all respondents are presented in Table I and Fig. 1.

Respondents were presented with a response grid and asked to rate their level of satisfaction with 6 different aspects typically associated with attending in-person conferences: registration cost, quality of educational content, networking opportunities, ability to attend displays/talks, opportunity to travel, and COVID-19 safety. Of these 6 aspects, quality of educational content received the highest amount of satisfied responses (either “very satisfied” or “satisfied”) at 94%, whereas registration cost received the highest amount of dissatisfied responses (either “very dissatisfied” or “dissatisfied”) at 25% (Fig. 2).

Respondents were presented with a second grid asking to rate their level of importance with the same 6 aspects mentioned above when considering registering for an in-person conference. Of these 5 aspects, quality of educational content received the highest amount of important responses (either “very important” or “important”) at 94%, whereas

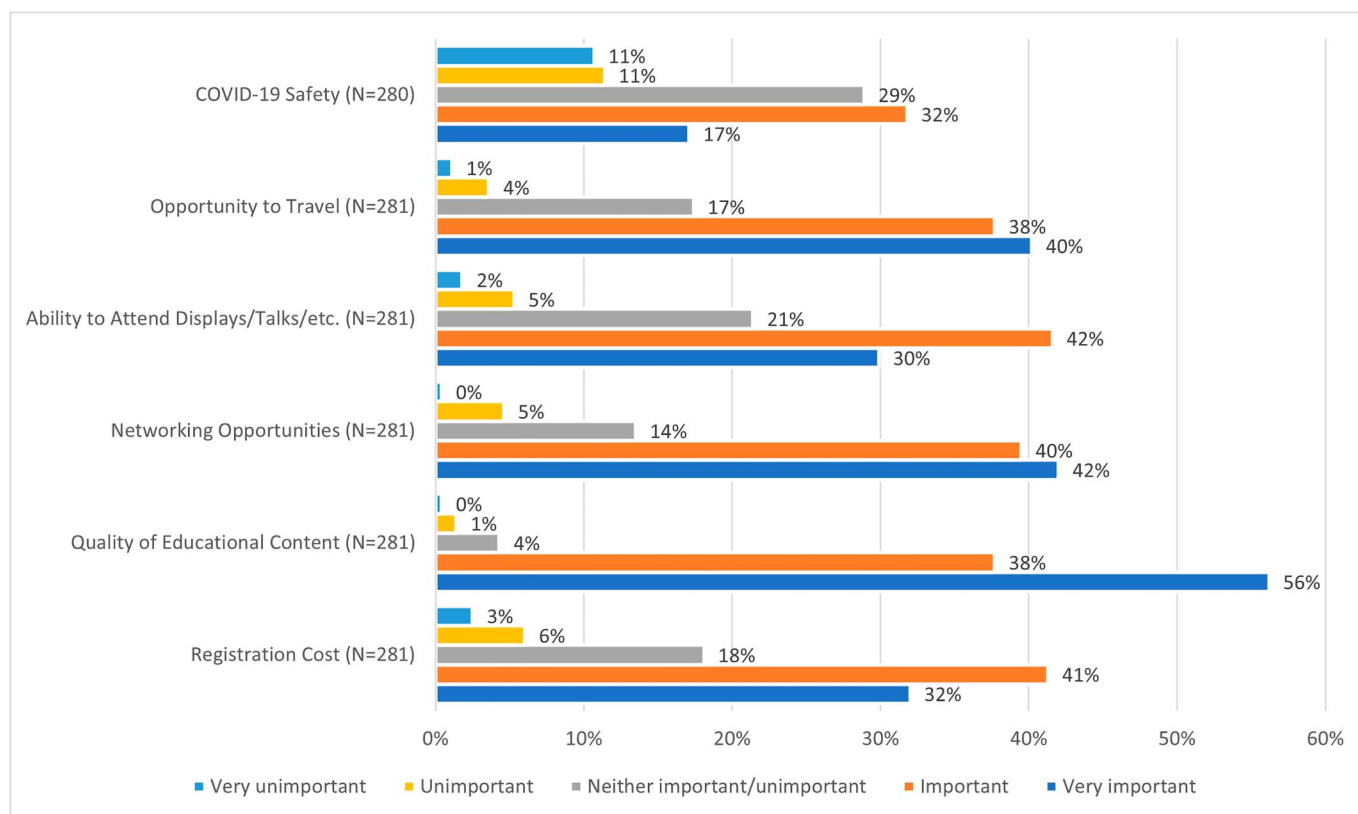


Fig. 3

How important do you consider these aspects when registering for an in-person conference?

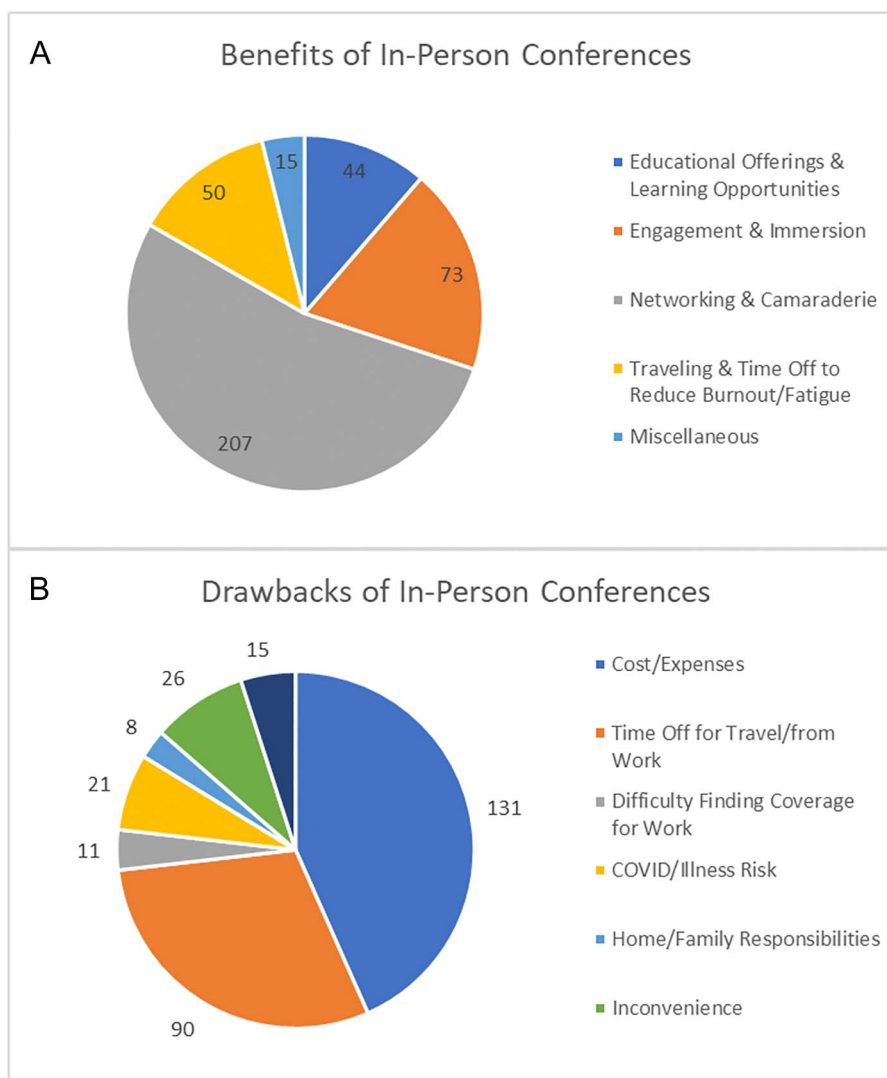


Fig. 4

**Fig. 4-A** Benefits and **(Fig. 4-B)** drawbacks of in-person conferences.

COVID-19 safety received the highest amount of unimportant responses (either “very unimportant” or “unimportant”) at 22% (Fig. 3).

Finally, respondents were given the option to list out any of their perceived benefits or drawbacks of attending in-person conferences in 2 separate short-answer areas. Five common categories emerged from the responses for benefits: educational offerings and learning opportunities, engagement and immersion, networking and camaraderie, traveling and time off to reduce burnout/fatigue, and miscellaneous (Fig. 4-A). Seven categories emerged throughout the responses for drawbacks: cost/expenses, time off for travel/from work, risk of COVID-19 or illness, home/family responsibilities, inconvenience of travel, and miscellaneous (Fig. 4-B). The most frequently reported benefit was networking and camaraderie (207 mentions), whereas the most frequently reported drawback was cost and expenses (131 mentions).

### Virtual Conferences

Respondents were asked to rate their level of satisfaction with 6 different aspects typically associated with attending virtual conferences: registration cost, quality of educational content, networking opportunities, ability to attend displays/talks, flexibility to attend from anywhere, and COVID-19 safety. Flexibility to attend from anywhere received the highest amount of satisfied responses at 88%, whereas networking opportunities received the highest amount of dissatisfied responses at 68% (Fig. 5).

Respondents were asked to rate their level of importance with the same 6 aspects mentioned above when considering registering for a virtual conference. Quality of educational content received the highest amount of important responses at 94%, whereas COVID-19 safety received the highest amount of unimportant responses at 25% (Fig. 6).

Finally, respondents were given the option to list out any of their perceived benefits or drawbacks of attending virtual

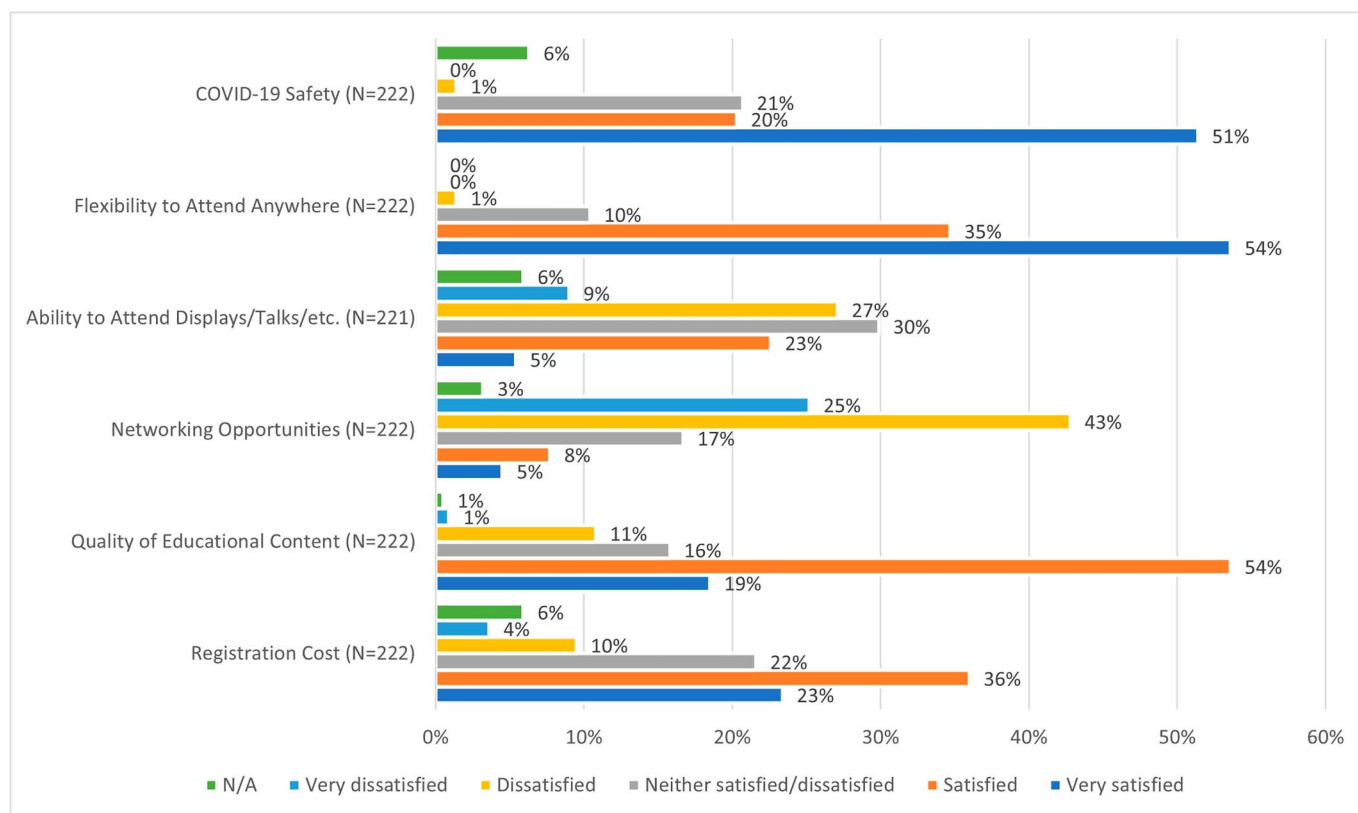


Fig. 5  
How satisfied are you with the following aspects of virtual conferences?

conferences. Seven common categories emerged from the responses for benefits: convenience/flexibility/comfort, lower cost, accessibility/availability of recorded materials, no travel/logistics, health and COVID-19 safety, no need for time off work/home, and miscellaneous. Six categories emerged throughout the responses for drawbacks: lack of networking/camaraderie, poor quality content/no hands-on skills, distractions/hard to focus, poor engagement/impersonality, no opportunity to travel/explore, and miscellaneous (Fig. 7-B). The most frequently reported benefit was convenience/flexibility/comfort (100 mentions), whereas the most frequently reported drawback was lack of networking and camaraderie (141 mentions).

#### Overall Preferences and Opinions

The final section asked respondents to choose which type of conference they ultimately prefer to attend, and 85%, or 245, reported that they ultimately prefer in-person conferences. Respondents were also asked to choose which factor they considered most and least important to consider before attending any type of conference: registration cost, quality of educational content, networking opportunities, ability to attend poster displays/podium talks, flexibility to attend from anywhere, opportunity to travel, or COVID-19 safety. Almost half (49% or 140 responses) reported that quality of educational content is their most important factor, and 48% (138 responses) reported that COVID-19 was least important.

#### Discussion

The purpose of this study was to analyze medical resident/fellow sentiments and preferences comparing virtual and in-person extrainstitutional conference formats. The main findings of this study suggest that medical residents and fellows largely prefer in-person conferences (85%) as compared to a virtual format because of the networking opportunities afforded to them along with the development of camaraderie with their peers. These results support our hypothesis that despite the convenience and portability afforded by attending conferences virtually, medical residents and fellows still ultimately prefer to attend conferences in person. Overall, the findings in this study are of relevance to conference organizers in understanding the driving forces behind attendance and should be considered in determining meeting format.

Web-based or online versions of scientific meetings are not a novel concept, but a larger emphasis has been placed on them after the COVID-19 pandemic and subsequent social distancing requirements<sup>16</sup>. The findings in this study suggest that the largest benefit in attending a virtual conference is the flexibility to attend from any location (79% important or very important), which offered convenience, flexibility, and comfort to participants. This is echoed in the literature with previous studies, suggesting that not only does the virtual format save time<sup>6,7</sup> but also that it provides an opportunity for an increased number of conference participants from distant locations<sup>17</sup>.



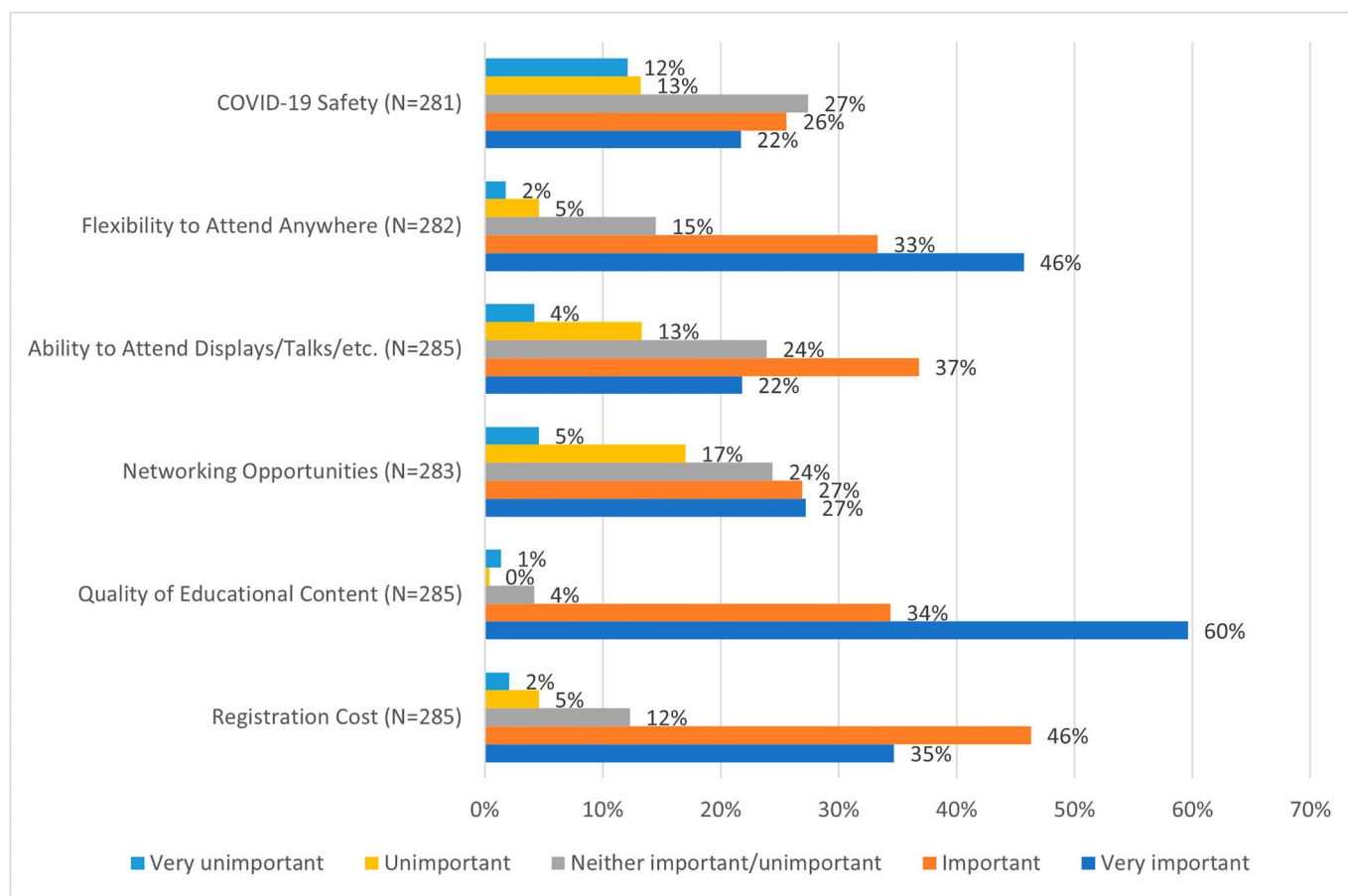


Fig. 6  
How important do you consider these aspects when registering for a virtual conference?

while having a positive environmental impact<sup>18</sup>. Virtual conferences are also inherently more inclusive than in-person conferences to those who may not have previously been able to attend secondary to economic, geographic, and disability-related barriers<sup>19-21</sup>.

However, virtual conferences also have notable weaknesses largely centered around networking and camaraderie development. The findings in this study show that 68% of virtual conference participants were either dissatisfied or very dissatisfied with networking opportunities and camaraderie development, which was also the most frequently reported drawback of this conference format. This drawback is a common theme in the literature with previous studies<sup>16,22-24</sup>, emphasizing a remarkable lack of traditional professional and personal networking opportunities with a reduction in ad-hoc discussions that promote new idea generation. Notably, these relationship-building opportunities are particularly relevant to those in the early stages of medical training such as residents and fellows who could benefit greatly. This absence of opportunities highlights a need for more effectively designed networking in the virtual setting<sup>23</sup>.

Attendees of previous virtual education formats have also noted difficulties in attention span, especially when they do not

have dedicated time to attend remotely<sup>7</sup>. Contributing factors to this could also be fatigue from spending extended periods on videoconferencing platforms, a phenomenon dubbed “zoom fatigue”<sup>11</sup> as well as technical barriers to access<sup>6</sup>.

Attending in-person conferences has previously been cited as providing excellent opportunities for continued education, professional development, networking, and fostering relationships with professional peers<sup>3</sup>. Regarding in-person conferences, the results of this study found that the largest drivers of attendance were networking and camaraderie and engagement and immersion in educational material, with the largest drawbacks being cost/expense and time off required for travel. These findings contrasted with those related to virtual conferences, suggesting that networking and engagement/immersion are perceived to be at the cost of convenience/flexibility and travel expense.

Ultimately, 85% of medical residents and fellows reported that regardless of any contributing factors, they prefer in-person conferences over virtual conferences. This is in contrast to the findings of Kim et al. who surveyed delegates at a single medical conference and found that the majority preferred a virtual format<sup>6</sup>. However, the population studied in that analysis was significantly older (71% older than age 40 years) than our

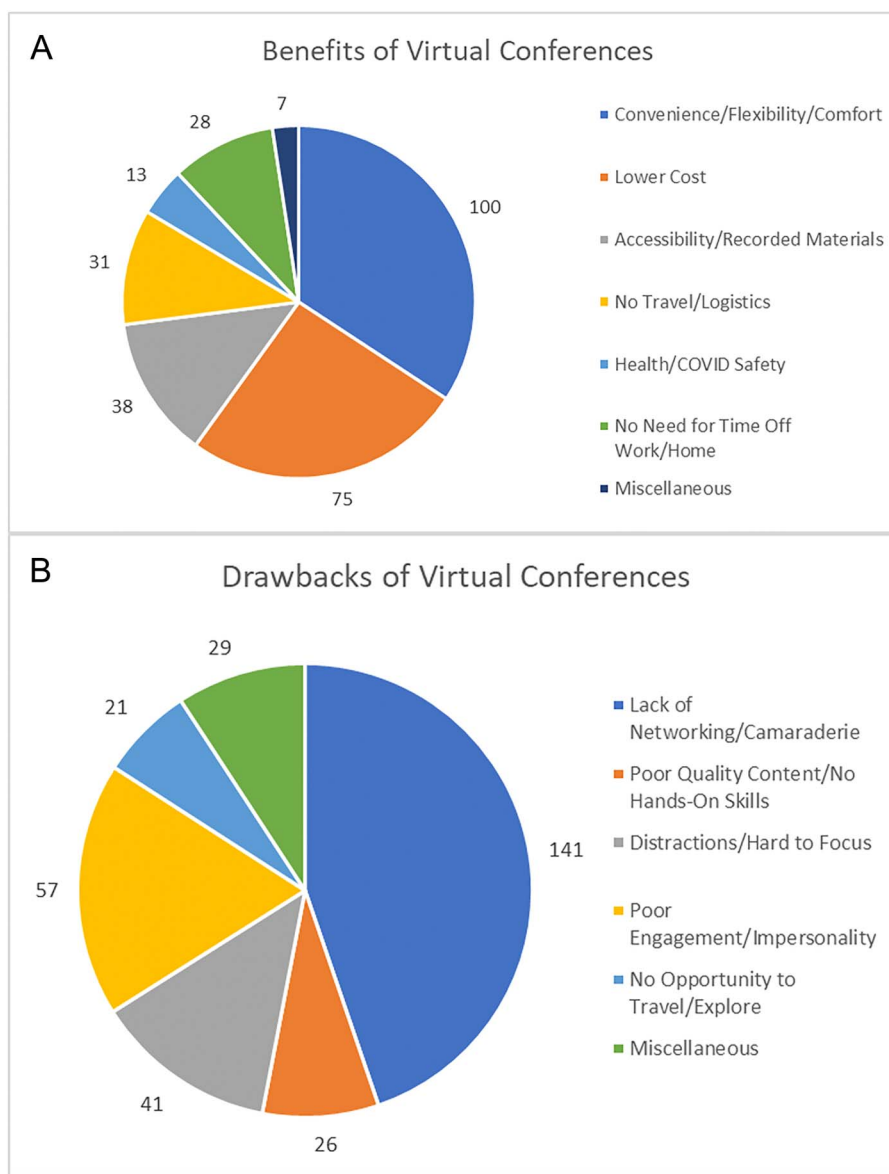


Fig. 7

**Fig. 7-A** Benefits and **(Fig. 7-B)** drawbacks of virtual conferences.


investigation with a limited cross-sectional analysis from a single conference in Korea, therefore limiting generalizability. Other studies have investigated preferences of medical trainees with regards to intrainstitutional didactic learning opportunities and have found that trainees report difficulties with virtual learning (e.g., distractions from the physical environment)<sup>25</sup> similar to our findings. Looking forward, the data from this study suggest that a hybrid model may be an appropriate future direction to offer flexibility to attendees to attend remotely while preserving networking opportunities<sup>17,25-27</sup>.

This study has limitations. First, most respondents reported an age of 26 to 35 years; thus, it can be inferred that these individuals are likely in the early stages of their careers. This may limit the generalizability of results to those who are

more advanced in their careers; however, these demographics are largely representative of the US resident and fellow demographics. A second limitation is that due to the voluntary nature of our online survey, self-selection bias may have occurred. This risk was mitigated by indiscriminately distributing our survey to program directors and coordinators, who could then distribute the survey link to give all participants an equal chance of participating. Finally, although efforts were made to ensure the validity and reliability of the survey through predistribution testing, all survey questions have some degree of subjectivity and thus have the potential to unintentionally influence participants' responses, thereby leading to misinterpretations. Nevertheless, surveys are widely accepted and used tools to assess the sentiments of a group.



## Appendix

 Supporting material provided by the authors is posted with the online version of this article as a data supplement at <http://links.lww.com/JBJSOA/A612>. This content was not copy-edited or verified by *JBJS*. ■

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