Avoiding the Virtual Pitfall: Identifying and Mitigating Biases in Graduate Medical Education Videoconference Interviews

Jyothi Marbin, MD, Y-Vonne Hutchinson, JD, and Sarah Schaeffer, MD, MPH

Abstract

Public health concerns related to the COVID-19 pandemic are leading many residency and fellowship programs to transition from in-person to videoconference interviews (VCIs). The magnitude and speed of the shift to VCIs, the lack of existing research around bias and VCIs, and the underlying stress on all involved related to the pandemic put programs and institutions at risk of implementing virtual interviews without fully exploring their implications for diversity and equity. VCIs can promote diversity efforts by reducing the need for travel, making interviews more convenient and cost effective for applicants. However, VCIs may also introduce new biases and amplify existing biases in recruitment. VCIs introduce a dependence on technology to conduct the interview process, which may amplify systemic inequities in access to broadband internet and high-quality hardware. Communication delays due to technology challenges may negatively affect interview scores. Additionally, users experience increased cognitive load when participating in videoconferences, which can activate implicit biases. Exposure to cues in the interviewee’s personal living situation previously unavailable to interviewers may lead to unconscious assumptions by interviewers, which may also influence scoring. Graduate medical education programs committed to maintaining equitable recruitment processes must be able to recognize potential biases in VCIs and implement strategies to mitigate them. This article identifies some of the biases VCIs can introduce to the recruitment process and offers strategies for programs to mitigate them. These include making interviewers aware of potential technology-based inequities, encouraging interviewers to minimize multitasking, and offering guidance on use of standardized backgrounds. The authors also recognize the limitations of offering behavioral strategies to mitigate systemic inequities and suggest that structural changes are needed to ensure equitable access to technology.

In light of the COVID-19 pandemic, the Association of American Medical Colleges (AAMC) “strongly encourages medical school and teaching hospital faculty to conduct all interviews with potential students, residents, and faculty in a virtual setting.” While video conference interviews (VCIs) can be both convenient and cost effective, they may also exacerbate existing biases and introduce new sources of bias into the recruitment process. Graduate medical education (GME) programs committed to equity and diversity in recruitment must be aware of these biases and implement strategies to mitigate them.

Recognizing the importance of a diverse physician workforce, the Accreditation Council for Graduate Medical Education requires that GME programs “engage in practices that focus on mission-driven, ongoing, systematic recruitment and retention of a diverse and inclusive workforce.” Implicit bias, or the unconscious and automatic preference for a social group, interferes with the recruitment of a diverse class of residents and fellows. For example, in-group bias—in which people prefer those who share similar experiences—has been shown to play a role in residency selection. Biases against physical attributes, such as candidates who are “facially unattractive” and/or obese, can influence the selection process as well. One study found that applicants who “smiled, wore glasses, and wore jackets in their photographs were more likely to match” into residency.

To mitigate such bias, GME programs have implemented strategies including structured interview questions, hiding applicant photographs during the review process, and involving a diverse group of faculty in recruitment. Some programs have adopted a more holistic review of applications, which de-emphasizes academic markers that can reflect structural bias, such as United States Medical Licensing Examination scores and membership in medical honor societies.

Using VCIs for GME interviews has the potential to introduce new sources of bias and amplify existing biases. Unfortunately, there is a paucity of literature—and thus little guidance—on mitigating bias in VCIs. The speed at which the transition is being made to VCIs, the magnitude of the change, the lack of research around bias and VCIs, and the underlying stress on all involved related to the COVID-19 pandemic put programs at risk of implementing virtual interviews without fully considering the role bias may play in VCIs. In an effort to support equitable implementation of VCIs, we highlight biases that may be exacerbated by VCIs and share strategies to mitigate them. These strategies are guided by one member of our author team (Y.H.), who has many years of professional expertise helping organizations identify and reduce the impact of bias, and by both other authors (J.M. and S.S.), who have led institutional efforts related to diversity and recruitment.
VCIs Can Promote Diversity and Connection

VCIs can be beneficial for both applicants and programs. Several studies have explored the feasibility of VCIs for residency and fellowship programs and have found them to be cost-saving, timesaving, and generally acceptable to both faculty and applicants.\textsuperscript{13-15} VCIs can reduce the cost of applicant recruitment for programs, in some cases by over 50%.\textsuperscript{17} The reduced financial burden on programs, in some cases by over 50%,\textsuperscript{17} the use of video cameras for interviews introduces another potential source of bias. Although there are fewer data published in this area, what we do know should give us pause. The concept of the “coded gaze” describes how bias can be embedded in machine learning. For example, by using nondiverse datasets to teach machines to recognize human faces, developers normalize whiteness, which can affect how people with darker skin appear on video.\textsuperscript{24} One study found that facial analysis software had an error rate of 0.8% for light-skinned men but ranged from 20.0% to 34.7% for dark-skinned women.\textsuperscript{25} If a camera is not programmed for optimal facial recognition, the subtleties of expression and nonverbal communication may be lost. Some cameras are calibrated to recognize white skin as default and require additional corrective lighting for people with darker skin.\textsuperscript{26} In the absence of published studies, anecdotal experience and stories from social media reveal an extra burden on people of color to ensure they have the proper lighting to show up well on camera. This puts additional stress on an already high-stakes interview experience. As we increase our reliance on technology, we should be mindful that computer algorithms underlying technology are subject to the same racial biases we see in American society.\textsuperscript{27}

VCIs Can Introduce New Sources of Bias

Relying on technology may introduce new sources of bias into the interview process.

“Digital redlining,” or decreased access to broadband internet in marginalized communities, is linked to existing structural racial and/or socioeconomic disparities.\textsuperscript{19,20} Digital redlining may limit access to broadband internet for some applicants. In addition, applicants may not be able to afford broadband connections or high-quality cameras, microphones, or computers. Low internet bandwidth and hardware or software problems can lead to glitches in video conferencing that hamper image and sound quality, leading to dysfluent communication. Communication delays of just over 1 second can cause conversation partners to be perceived as less extroverted, conscientious, and attentive.\textsuperscript{23} These glitches can affect interview scores; even when told to disregard audiovisual (AV) quality, interviewers still gave higher scores to applicants with higher AV fluency.\textsuperscript{22} Poor internet connections or audio quality may further disadvantage applicants who speak English with an accent\textsuperscript{23} or for whom English is a second language. VCIs may therefore disadvantage applicants who lack access to technology or have poor internet connections.

The use of video cameras for interviews introduces another potential source of bias. Although there are fewer data published in this area, what we do know should give us pause. The concept of the “coded gaze” describes how bias can be embedded in machine learning. For example, by using nondiverse datasets to teach machines to recognize human faces, developers normalize whiteness, which can affect how people with darker skin appear on video.\textsuperscript{24} One study found that facial analysis software had an error rate of 0.8% for light-skinned men but ranged from 20.0% to 34.7% for dark-skinned women.\textsuperscript{25} If a camera is not programmed for optimal facial recognition, the subtleties of expression and nonverbal communication may be lost. Some cameras are calibrated to recognize white skin as default and require additional corrective lighting for people with darker skin.\textsuperscript{26} In the absence of published studies, anecdotal experience and stories from social media reveal an extra burden on people of color to ensure they have the proper lighting to show up well on camera. This puts additional stress on an already high-stakes interview experience. As we increase our reliance on technology, we should be mindful that computer algorithms underlying technology are subject to the same racial biases we see in American society.\textsuperscript{27}

Time zone differences pose a practical challenge in VCIs and can disadvantage some applicants. Interviewing applicants in different time zones may lead to confusion in interview times. International applicants may be forced to interview during unusual hours to accommodate program interview schedules.

Video Interviews May Amplify Implicit Biases

Videoconference communication requires an increased cognitive load; this increased cognitive load can make interviewers lean more heavily on implicit biases when assigning interview scores to applicants.

Cognitive load is the “mental activity imposed on working memory.”\textsuperscript{28} The phenomenon known as “Zoom fatigue,” or the exhaustion we experience after videoconference meetings, is due in part to the increased cognitive load of communicating over videoconference.\textsuperscript{29-32} There are a number of factors adding to the burden of information processing in videoconferences. Eye gaze and gestures function differently during in-person interactions than they do in virtual settings.\textsuperscript{33} In normal conversation, we maintain and break eye contact periodically; in videoconferences, we focus on the screen for longer periods of time to signify interest and attention.\textsuperscript{34} Facial expressions, body language, and tone can all be interpreted differently over videoconference.\textsuperscript{35} Because our visual frame to observe others is limited to their shoulders and face, we lose many of the nonverbal communication cues we normally use; in the absence of these, we do more mental work to elicit meaning from conversation. Video conferences also give us a constant window into our own performance; we are not used to watching ourselves as we speak, and our attention to our own appearance as we talk and gesture can take up mental bandwidth.\textsuperscript{36} The combination of all of these factors increases our cognitive load during video communication.

When our cognitive load is increased, we automatically rely on implicit associations to help us process information.\textsuperscript{36,37} When cognitive load is high, interviewers may unconsciously resort to social stereotypes, including appearance and voice, to make decisions. They may emphasize superficial factors—such as hometown, hobbies, or alma matersto connect with applicants, thus falling into the trap of the “in-group” or “affinity” bias. Perceived social similarities may influence how interviewers score applicants.\textsuperscript{4}

Implicit bias may also be triggered in the setting of high cognitive load as interviewers are exposed to previously unavailable environmental cues about applicants. Applicants may have child- or elder-care responsibilities and may not have access to a quiet, private space in which to conduct interviews. Interviewers may make assumptions about applicants based on this window into their living situations and may fill in the gaps with assumptions rooted in bias as they assign interview scores.
Applicants can also be subject to bias during interviews. Interviewers sharing aspects of their personal lives (verbally or via images in the background of their video frame) may think they are making themselves approachable but may instead alienate applicants, particularly if the “shared” experiences reflect privileges that have historically been limited to a subset of individuals. Such nonverbal cues can send implicit—and explicit—messages to applicants about belonging and inclusion. Table 1 provides examples of how other types of biases can show up in VCIs.

**Mitigating Bias in VCIs**

Programs seeking to implement equitable interview practices in VCIs should follow existing best practices for mitigating bias in interviews, including using standardized interview questions, increasing the involvement of diverse faculty in interview process, and avoiding assessment of vague, subjective qualities like “fit”. There are a number of tip sheets produced by organizations including the AAMC[40–42] that offer applicants, interviewers, and programs technology tips, recommendations for backgrounds, advice for interacting in an interview setting, and so forth. We refer applicants, interviewers, and programs to these tip sheets for their helpful suggestions.

Our recommendations in Table 2 focus specifically on mitigating bias in VCIs. Because of the dearth of research in this area, some of our recommendations are based on anecdotal experience. Given the power dynamics and differential resources between interviewees and interviewers, we put the burden of action on programs and not on individual applicants. Examples of program-level strategies include making interviewers aware of technology-related inequity, offering back-up plans if technology fails, and advocating for medical schools to provide quiet, protected spaces with strong internet connections and high-quality hardware for applicant interviews. Additionally, programs can help interviewers become aware of the relationship between cognitive load and implicit associations and can offer solutions including hiding the image of speaker’s own face to reduce distractions, avoiding multitasking, and standardizing virtual backgrounds.

We acknowledge our own discomfort in recommending behavioral changes to address structural inequities. At a systems level, programs and medical societies should advocate for upstream solutions to structural problems such as digital

### Table 1

**Potential Biases in Graduate Medical Education Interviews and Examples in VCIs**

<table>
<thead>
<tr>
<th>Type of bias</th>
<th>Definition</th>
<th>Example of the bias</th>
<th>Example of how bias might show up in VCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prove it again bias⁴¹</td>
<td>When someone from an underrepresented group has to work harder to prove competency.</td>
<td>A university laboratory evaluates female applicants as less competent than their White male counterparts with similar qualifications.</td>
<td>Though a Latinx candidate performed well on the interviews and made a connection with the interviewer, after noticing that the candidate conducted their interview in a small, shared bedroom, the interviewer wonders if they will be a culture fit.</td>
</tr>
<tr>
<td>Leniency bias⁴²</td>
<td>To give inflated ratings to a candidate or excuse a candidate’s performance in the interview process when the same behavior is not excused for a member of a marginalized group.</td>
<td>An interviewer fails to penalize a White candidate who stumbled in her interview because he believed she was nervous. He does, however, penalize a Latinx applicant who does the same.</td>
<td>A male candidate and an interviewer bond over the impracticality of Zoom when he is late because of technology difficulties. A female candidate who also experiences difficulties is perceived by the same interviewer as not being technologically savvy.</td>
</tr>
<tr>
<td>Accent bias⁴³</td>
<td>The assumption that a candidate is less competent or less of a “fit” because of their accent.</td>
<td>An interviewer dismisses a South Asian applicant with an accent as unintelligible and questions their ability to understand complex material.</td>
<td>An interviewer gets frustrated with a candidate over Zoom because sound difficulties make it harder to understand their accented speech. The interviewer questions the candidate’s competency.</td>
</tr>
<tr>
<td>Performance attribution bias⁴⁵</td>
<td>Attribution of accomplishments of those from high-status groups to abilities, while attributing accomplishments from low-status groups to outside intervention, help, or luck.</td>
<td>A female applicant’s successes are attributed to luck, while a male applicant’s success is attributed to intellect.</td>
<td>A White candidate does well in the video interview, and the interviewer notes that they must have prepared diligently. An African American candidate also performs well, and the same interviewer concludes that they must have had help setting up.</td>
</tr>
<tr>
<td>Stereotype bias⁴⁶</td>
<td>A bias reliant on an exaggerated belief about a person or group, a generalization that allows for little individual differences or social variation.</td>
<td>An interviewer doubts that an Asian American candidate has strong leadership skills.</td>
<td>A female candidate’s child makes noise while she is being interviewed. The interviewer assumes that this candidate may not be fully committed to the program if admitted.</td>
</tr>
<tr>
<td>In-group vs out-group bias⁴⁷</td>
<td>The likelihood that we will experience feelings of trust, intimacy, and favoritism with those who we identify as being part of our group.</td>
<td>The head of a division, who is an alum of an Ivy League University, only hires alums from that university.</td>
<td>An interviewer has a hard time connecting with a candidate until they notice a pennant from their old college rowing team hanging in the background.</td>
</tr>
<tr>
<td>Affinity or like me bias⁴⁸</td>
<td>The tendency to seek out and warm up to people like ourselves.</td>
<td>A prominent White male professor consistently highly ranks and mentors those who remind him of himself.</td>
<td>An interviewer cannot help but feel warmth toward a candidate when she notices that the bedroom in which the candidate is conducting the interview reminds her of her own.</td>
</tr>
</tbody>
</table>

Abbreviation: VCI, videoconference interview.
Consulting.

management consultant with ReadySet Y. Hutchinson is a diversity Academic Medicine, Vol. 96, No. 8 / August 2021

Funding/Support:  

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intentional efforts to mitigate them, we  

can continue to work toward equity and  

inclusion in recruitment.

Funding/Support: None reported.

Other disclosures: Y. Hutchinson is a diversity management consultant with ReadySet Consulting.

Table 2  

Suggested Strategies for Graduate Medical Education Programs to Mitigate Bias in VCIs

<table>
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<tr>
<th>Source of bias</th>
<th>Program solutions</th>
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</table>
| Structural                     |   • Conduct all virtual interviews consistent with AAMC recommendations.  
|                                |   • Offer all virtual or all-in-person interviews.  
|                                |   • Allowing some applicants to visit in-person and others to do virtual interviews may provide unintended advantage to those able to interview in-person.  
|                                |   • Support policies on a larger program/institutional level for equitable technology access in low-income communities and  
|                                |   • Communities of color.  
|                                |   • Encourage affiliated medical schools to offer space to applicants to interview and share high-quality hardware with  
|                                |   • Applicants who request it.  
| Technology                     |   • Make technology tip sheets, such as the ones produced by the AAMC, 40 available to applicants and interviewers to help  
|                                |   • Them prepare for their interviews. These sheets provide useful guidance on technology set up.  
|                                |   • Encourage applicants to interview at a medical school or other facilities with a strong internet connection. 40  
|                                |   • Be aware that some students may not have access to high-quality hardware (cameras, microphones, computers). Some  
|                                |   • Schools may allow students to borrow equipment; offer to support applicants who may need assistance finding resources.  
|                                |   • Consider offering virtual, standardized backgrounds to applicants and interviewers. Be aware that some older computers  
|                                |   • May not be able to support backgrounds.  
|                                |   • Offer to test technology with applicants before their interview day.  
|                                |   • Offer a back-up phone number to reach program administrative staff in case there are problems with the VCI.  
|                                |   • Offer to reschedule VCIs if technology is not working.  
|                                |   • Ask applicants what time zone they will be in and work to schedule mutually convenient times to interview. 41 This may  
|                                |   • Require some flexibility on the part of the interviewer/program.  
|                                |   • Provide clear, consistent guidance on whether cameras should be on or off for the interview (having some audio only may  
|                                |   • Again introduce additional biases).  
|                                |   • Consider assigning an on-call person for technology troubleshooting for applicants and faculty. This may require negotiating  
|                                |   • Special Service Level Agreements with institutional information technology departments during recruitment season.  
|                                |   • Consult with IT departments to see if the institution’s video conferencing platform can default to the minimum audiovisual  
|                                |   • Requirements; this can help standardize audiovisual quality between applicants.  
| Reduce cognitive load to mitigate implicit biases |   • Encourage interviewers to find a quiet place for interviews and to minimize other distractions, including closing tabs and  
|                                |   • Windows on their computers that are not related to the interview.  
|                                |   • Suggest interviewers to minimize the speaker window so they are not watching themselves during the interview.  
|                                |   • Avoid scheduling interviews back-to-back.  
|                                |   • Make interviewers aware of the risk of bias during interviews.  
|                                |   • Discuss how bias can show up during VCIs, and ensure they  
|                                |   • Are aware of the potential technology inequities in VCIs.  
|                                |   • Facilitate space for faculty to reflect on implicit biases before interviews begin—this allows for difficult discussions to take  
|                                |   • Place before evaluating an applicant.  
|                                |   • Prepare interviewers for technology glitches and interruptions and remind them not to penalize applicants for these.  

Abbreviations: VCI, videoconference interview; AAMC, Association of American Medical Colleges.

Ethical approval: Reported as not applicable.

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