Implementing Holistic Review Practices in a Pulmonary and Critical Care Fellowship

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ABSTRACT

Background: Medical schools have used holistic review in admissions to increase mission-aligned enrollment of students from backgrounds underrepresented in medicine. Graduate medical education programs have increasingly followed suit. However, there is a paucity of literature regarding holistic review at the fellowship level.

Objective: Here, we share our experience implementing the Association of American Medical Colleges core principles of holistic review during the 2021 recruitment cycle.

Methods: We used a partially asynchronous and online learning strategy to train division members on the principles of holistic review. Following the match, we conducted a survey of faculty members and fellows to understand their opinions on our holistic review training and implementation.

Results: Although few of our colleagues clearly understood holistic review before the training, they were able to identify broad-based criteria that aligned with our division's mission and balanced applicants' experiences, attributes, competencies, and metrics. These were viewed as better selection criteria than traditional measures and were incorporated into the individualized consideration of applicants. Our survey had a 41.5% response rate, with 10 of 22 fellows and 24 of 60 faculty members responding. Most faculty members and fellows agreed that holistic review decreases socioeconomic disparities in fellowship recruitment (79.2% and 80.0%, respectively) and promotes inclusion and diversity (83.3% and 90.0%, respectively). Faculty members appeared

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more confident than fellows that our training efforts had influenced recruitment. All respondents agreed that it would be critical for such training to be repeated yearly.

Conclusion: Although this was a single-institution experience, implementing holistic review was feasible and well received by faculty and fellows.

Keywords:
bias; graduate medical education; health workforce/trends; cultural diversity; personnel selection

Within the undergraduate and medical education spectrum, there is strong evidence that diversity affects the development of important skills needed to thrive in a diverse workforce (1–8). Nevertheless, the percentage of fellowship trainees in pulmonary and critical care medicine (PCCM) from backgrounds traditionally underrepresented in medicine (URIM) has decreased during the past decade (9). This leaky pipeline feeding PCCM prevents equitable growth in our field and starves it of the benefits of diversity. Adapting medical school efforts to scale can help PCCM programs improve URIM representation. One such practice includes adopting holistic review of applicant portfolios in the selection process. The Association of American Medical Colleges (AAMC) defines holistic review as "a flexible, individualized way of assessing an applicant's capabilities by which balanced consideration is given to experiences, attributes, and academic metrics and, when considered in combination, how the individual might contribute value as a medical student [or trainee] and future physician" (10).

Holistic review has found increasing use in medical education. The AAMC has devoted considerable resources toward training faculty at the undergraduate medical education (UGME) level for some time (10–13). Adoption of holistic review at the UGME level is often facilitated by a large number of faculty, staff, and other personnel involved in the admission process. At the graduate medical education (GME) level, where resources are less robust, adopting holistic review can be challenging (14). Still, residency programs are increasingly sharing their experiences implementing holistic review (15–18). To our knowledge, there have been no fellowship programs, PCCM or otherwise, that have shared their experience implementing holistic review.

Here we describe how key stakeholders were educated on holistic review through an interactive grand rounds and developed a schema of the division's missions, goals, and selection criteria. Because holistic review is mission-driven and therefore varies across institutions, we then outline how this shared schema was used to incorporate the AAMC's core principles of holistic review into our own selection processes (10). We also discuss facilitators and challenges to the adoption of holistic review and provide limited match-cycle data to help contextualize this description.

METHODS

Division leadership requested a needs assessment on equity, diversity, and inclusion. All division members were invited to participate in a committee on

equity, diversity, and inclusion (CEDI). The CEDI was comprised of 15 faculty members and senior fellows. It reviewed divisional practices and processes and proposed interventions with iterative review, identifying goals that would have the greatest impact on divisional culture. The CEDI identified fellow recruitment as a high-impact area of focus through consensus agreement, which was ratified by divisional and training program leadership. This area of focus was chosen because our faculty members are highly committed to training the next generation of pulmonary critical care doctors, and we wanted to enhance the diversity of our applicant and match pool to better mirror our division's mission and goals.

As background, 10 faculty members conduct the initial file review of prospective applicants. These faculty members include fellowship and divisional leadership and our research council. Three of the 10 are members of the CEDI. File reviewers conduct a comprehensive review of the portfolio but are blinded to applicants' self-identification, photos, and dates of birth. There are 34 faculty members who interview applicants and are provided a scoring rubric that assists in the ultimate ranking of applicants. All initial file reviewers are included among these interviewers. All reviewers and interviewers are involved in ranking decisions. Although fellows are not involved in the selection and ranking process, they are an integral part of recruitment. As such, they were included in the activities described herein.

Before the formation of the CEDI, division members involved in recruitment and selection received optional resources to improve antibias practices. These included journal articles, departmental grand rounds, and external webinars.

Based on the findings of their assessment, the CEDI recommended training and implementation of holistic review. This was also informed by previous literature describing its flexibility of application and applicability across various stages of medical education (15, 19, 20). A partially asynchronous and online learning approach was determined to best allow for participation while taking into account safety precautions and clinical duties related to coronavirus disease (COVID-19).

A brief introductory video (12 min) was prepared to describe: *1*) common concepts in diversity pertaining to the PCCM pipeline, *2*) core principles of holistic review, and *3*) current literature on its implementation. This was shared with faculty, fellows, and staff members in preparation for an hourlong grand rounds devoted to the topic of holistic review. As part of COVID-19 safety practices, the grand rounds was delivered via Zoom (Zoom Video Communications). During the grand rounds, we recapped concepts of holistic review, including the experiences, attributes, competencies, and metrics (EACM) model provided by the AAMC. Survey questions, a word-cloud exercise, and voter response polls were integrated into the grand rounds using the Poll Everywhere application to engage attendees and incorporate division members' opinions with respect to diversity, equity, and inclusion in the recruitment process. The word-cloud exercise was used to identify the most salient and shared elements of the division, fellowship, and CEDI mission statements by its members. These statements were provided during the exercise, and participants were asked to promulgate key goals, missions, and interests. A "cloud" was generated that comprised the words used by participants,

with individual words increasing in size based on their frequency of use. To enhance participation, responses were reported anonymously and in aggregate and were analyzed using an approach based on grounded theory (21, 22). Because words used more frequently are represented in larger font in a word-cloud exercise, we accounted for font size in our analysis. After removing superlatives and linguistic fillers, we coded responses and grouped them into themes. Related themes were conceptualized into domains.

We administered an anonymous follow-up survey to faculty and fellows after the match to query beliefs on diversity and holistic review. This was adapted from available literature on holistic review in GME, with a preference for literature related to fellowship programming (23, 24). Additional items specific to our trainings were developed by members of the authorship team and refined by those responsible for training materials, selection processes, and divisional leadership. The instrument was distributed via e-mail and administered via the Qualtrics survey software. All faculty members and fellows received the survey invitation to best preserve anonymity and maximize responses. We analyzed responses using SPSS Statistics for Macintosh (version 26.0; IBM), but found no statistically significant differences between faculty and fellow responses using the Fisher-Freeman-Halton exact test. The survey was certified as non–human subjects research by the University of California, San Diego, Institutional Review Board.

RESULTS

The holistic review video was viewed 64 times. Forty-six of the 82 members of the division participated in the live grand rounds session. To gauge the audience's familiarity with the topic, we first asked attendees how well they understood holistic review before these activities. Among 29 respondents, 11 (38%) had no prior understanding of holistic review, 17 (59%) had some familiarity with holistic review, and one individual had a clear understanding of holistic review.

Linking Program-Specific Mission and Goals with Broad-based Selection Criteria

The word-cloud activity resulted in 40 responses. We grouped responses into themes while accounting for font size (Table 1). In total, there were 31 codes, with nine in medium to large font. These were grouped into 10 themes, and related themes were conceptualized into three domains. Within the domain of character traits, empathy was identified as a key theme based on the number and font size of its constituent codes. The themes of science, clinical service, and teaching formed the domain of academic versatility. The domain of academic adaptability was constructed by the terms "well-rounded" and "teachability." The themes of equity, leadership, and competence did not fit into larger domains. Leadership was determined to be another key theme based on font size.

Balancing Experiences, Attributes, Competencies, and Metrics

During the grand rounds, the audience voted on criteria they believed were most important when evaluating applicants. Qualitative aspects of the EACM model were viewed as better selection criteria than quantitative aspects. Criteria within experiences received the most votes ($n = 31$), followed by attributes ($n = 21$), competencies ($n = 18$), and finally metrics ($n = 16$). Letters of recommendation was a write-in response in the metric section and

Table 1. Key aspects of shared goals grouped into themes and conceptualized into domains

Domain/Theme	Descriptor
Character traits	
Empathy	Compassionate*, compassion†, care*, empathetic‡
Collegiality	Social‡, personable‡
Academic versatility	
Science	Research†, scientist‡, science‡, physiologic‡
Clinical service	Clinical‡, clinicians‡, physician‡
Teaching	Education‡, teaching‡
Academic adaptability	
Well-rounded	Rounded†, comprehensive‡, well-rounded‡
Teachability	Intellectual‡, curiosity‡, innovative‡, thinking‡
Equity	Fairness†, justice†, inclusive‡, inclusivity‡, everyone‡, diversity‡
Competence	Skilled†, skill‡
Leadership	Leaders*

Originally presented within conference abstract (25).
Frequency of descriptor use: *most frequently used, †medium frequency, ‡low frequency.

received more votes ($n = 7$) than publications ($n = 4$). As noted previously, not all members of the division in attendance reviewed applicant files or perform interviews, but all were still invited to vote.

Individualized Consideration of Potential Applicant Contributions to Program Goals

After analysis, we reported our findings back to the division in a subsequent grand rounds. These same findings were used by the CEDI to formulate recommendations regarding the rubric and processes used in file review, interviews, and ranking. The previous iteration of our rubric requested faculty members to score applicants based on interpersonal and communication skills, academic potential, and clinical potential. Specific examples with corresponding ratings were provided for each. Interviewers were asked to include any comments that might help with ranking, including unique characteristics or hardships. Input from the grand rounds was used to modify the rubric as follows: *1*) the overall schema evaluating the three mentioned areas was the same, but the score distribution was adjusted to reflect the input received (e.g., a greater emphasis on communication skills); *2*) examples for each criterion were changed, with some being removed because of the likelihood of perpetuating bias (e.g., residency location) or included to capture a wider breadth of experiences (e.g., Gold Humanism Honor Society, community service); and *3*) faculty members were asked to list any unique characteristics and/or hardships that should be considered and to comment on any aspect of the file that may help the division achieve its diversity and health equity goals.

Aligning the Broader Mix of Factors with Mission-related Goals Associated with Diversity

Upon completion of the 2021 application cycle, 37.7% of URIM applicants were interviewed. Compared with the previous year's cycle, we observed an 8.7% increase in URIM applicants interviewed. Of the eight fellows who matched in the 2021 cycle, none identified as URIM, and three are women. Of the eight fellows who matched in the 2022 cycle, one identified as URIM, and seven are women. Of the six fellows who matched in the 2020 cycle, none identified as URIM, and three are women.

Our postmatch anonymous survey achieved a 41.5% response rate, with 10 of 22 fellows and 24 of 60 faculty members responding. Item responses by fellows and faculty members are included in Figure 1. Of those surveyed, 37.5% of faculty members and 40.0% of fellows agreed with the statement, "We want to increase diversity in our program and have a plan to do it." The majority of

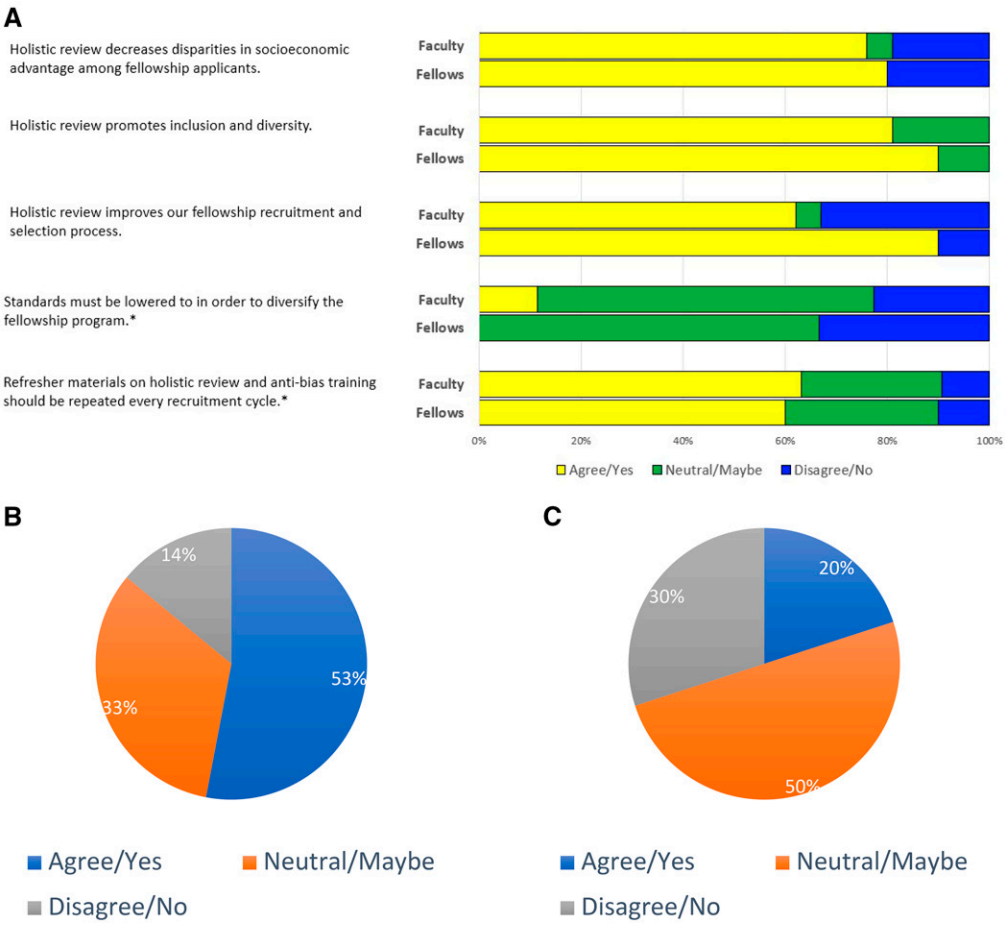

Figure 1. Results from 24 faculty members and 10 fellows of a survey on diversity and holistic review administered after a divisional presentation on holistic review and recruitment season. There were no statistically significant differences between the two groups. (*A*) Responses to individual questions by faculty members or fellows using a three-point Likert scale. (*B*) Faculty responses to a question—"Do you think focused sessions on holistic review and antibias training influenced how you evaluated application portfolios and ranked applicants?"—were yes, maybe, or no. (*C*) Fellows' responses to a question—"Do you think focused sessions on holistic review and antibias training influenced which applicants were invited to interview and how they were ranked?"—were yes, maybe, or no. *Asterisks indicate questions with yes/maybe/no answer options.

respondents (79.2% of faculty and 80.0% of fellows) agreed that holistic review decreases socioeconomic disparities in fellowship recruitment and promotes inclusion and diversity (83.3% of faculty and 90.0% of fellows). When asked if holistic review improves our fellowship recruitment and selection process, 66.7% of faculty members and 90.0% of fellows agreed. Most respondents also disagreed that standards must be lowered to diversify the fellowship program (70.8% of faculty and 80.0% of fellows). A narrow majority of faculty (54.2%) believed that sessions on holistic review and antibias training influenced how they reviewed and ranked applicants. Only 20.0% of fellows believed holistic review and antibias training influenced which applicants were invited to interview and how they were ranked. Most faculty members and fellows (66.7% and 60.0%, respectively) believed that refresher materials on holistic review and antibias training should be repeated every recruitment cycle.

DISCUSSION

Our experience implementing holistic review revealed some key points.

A majority of faculty and fellow respondents had familiarity with holistic review, but almost none had a clear understanding of it before our divisional grand rounds. We found that our colleagues believed that traditional metrics, such as National Board of Medical Examiners Step scores, were less helpful in evaluating prospective applicants compared with more descriptive components of the portfolio such as letters of recommendation. Favored aspects of the EACM model matched well with the emerging themes and domains from exploring divisional, fellowship, and CEDI goals together. Based on our survey, even though a majority of respondents had favorable opinions of holistic review, there appeared to be less confidence among fellows that our training efforts had influenced recruitment. However, the majority of faculty members and fellows thought it would be important that such trainings should be repeated yearly (Figure 2). Although these findings are subject to the limitations inherent in anonymous surveys of small samples, we found them informative for strategic planning.

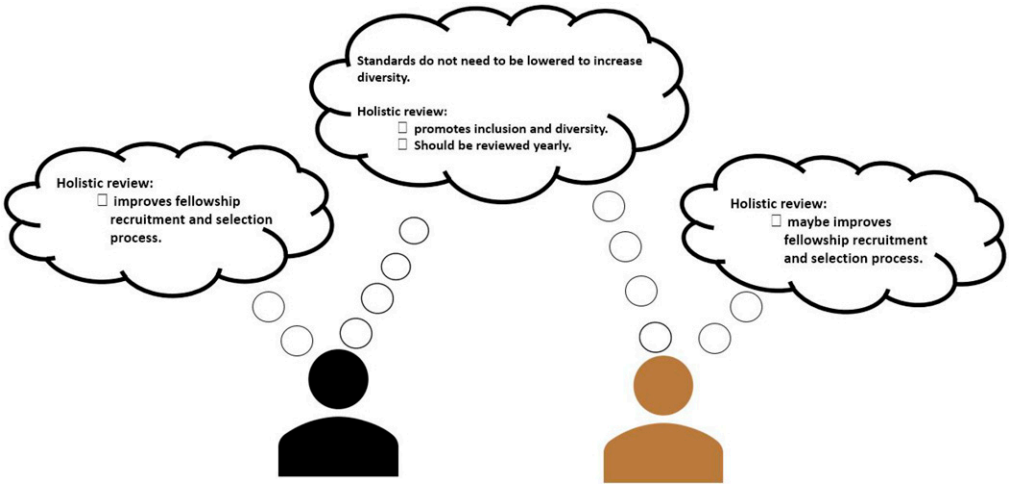

Figure 2. Statements in agreement and disagreement between 24 faculty members (left) and 10 fellows (right) based on a survey administered after a divisional presentation on holistic review and recruitment season.

Consistent with other experiences, we saw that a holistic review of applicants' portfolios allowed division members to conceptually devalue aspects that may perpetuate structural biases (16, 17). Similarly to the work of Aziz and colleagues, our faculty and fellows believed that holistic review decreases socioeconomic disparities (24). However, there was much greater agreement within our division. This could be for myriad reasons, including our single-institutional experience, their surgical study population, and the timing of our survey administration after holistic review training. In a national survey, Sweet and colleagues found internal medicine program directors less likely to use holistic review in response to higher application volumes (14). Thus, we interpret our decision to adopt its practice during this time as further evidence of our commitment to diversity engagement.

Despite challenges imposed by COVID-19, our dependence on multimedia and videoconferencing allowed us to maximize engagement in education and implementation. These same methods facilitated data collection, analysis, and reporting back of our findings. We also found that it facilitated gathering support for tangible changes to our rubrics and processes in a timely manner. Despite overall support for holistic review, we found a difference between faculty and fellows' opinions regarding its immediate impact. This may be from familiarity with its use and participation in rank meetings. It also may represent differences in priorities, with some favoring process whereas others favor results. Regardless, we believe further exploration and diversity engagement will continue to improve our efforts.

Although our single institution's approach and experience may not be fully generalizable, holistic review is designed to be adaptable at the institutional level. Thus, our lessons learned may still help inform other programs attempting to implement holistic review. Although we had a robust discussion during the grand rounds, it is unclear how videoconferencing may have altered participation. Furthermore, because our diversity, equity, and inclusion efforts extended beyond this grand rounds, our results may reflect more than the effects of this training. Similarly, for some division members, a single grand rounds and the recommended antibias training may not have sufficiently provided an adequate framework. Our survey results could also be reflective of a maturation effect with regard to diversity.

The grand rounds incorporated multiple interactive components in addition to being recorded. The holistic review introductory video and grand rounds were made available for repeat viewing. Involvement of our CEDI committee and support of program leadership ensured necessary input on learning materials and guidance on implementation. With our findings now incorporated into recruitment and selection processes, our next steps include using a structure-process-outcome framework as part of evaluation of implementing holistic review and revisiting recruitment materials.

An important aspect of holistic review is tracking data to refine and maximize alignment of mission-driven educational outcomes. Although we observed an increase in the percentage of URIM applicants who were interviewed, caution should be taken in interpreting this datum. We are still early in our experience with implementation. Furthermore, our analysis was not designed for causal inference, and we did not attempt to control for

confounders such as trends in the applicant pool through statistical means.

Conclusions

Long practiced by many medical schools, holistic review provides a framework by which GME programs can expand evaluation criteria, thereby linking program-specific missions and diversity goals in the recruitment and selection process. We found the adoption of holistic review to be not only feasible, with increasing numbers of applications, but well received by our colleagues. Adoption of other UGME strategies may help improve the URIM pipeline for PCCM programs.

Author disclosures are available with the text of this article at www.atsjournals.org.

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