nism by which outdoor activities may provide a benefit in reducing myopia so the intervention can be precisely designed.

Given the popular appeal of increased outdoor activities to improve the health of school-aged children in general, the potential benefit of slowing myopia development and progression by those same activities is difficult to ignore. Although prescribing this approach with the intent of helping to prevent myopia would appear to have no risk, parents should understand that the magnitude of the effect is likely to be small and the durability is uncertain.

ARTICLE INFORMATION

Author Affiliation: Johns Hopkins University School of Medicine, Baltimore, Maryland.

Corresponding Author: Michael X. Repka, MD, MBA, Johns Hopkins University School of Medicine, 600 N Wolfe St, Baltimore, MD 21287 (mrepka@jhmi.edu).

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Addressing Disparities in Academic Medicine
Moving Forward

Carrie L. Byington, MD; Vivian Lee, MD, PhD, MBA

The potential of women in medicine and science, like those in many other professions, has not been fully realized.1 When compared with men, women in these fields are paid less,2,3 have higher rates of attrition,4 have fewer scientific publications,5 and are less likely to apply for NIH funding and to be principal investigators.6 It is not surprising therefore, that women are less likely to advance to the highest ranks in academic medicine.7

In this issue of JAMA, Jena and colleagues8 and Sege and colleagues9 add to the existing literature by providing data from new sources. The article by Jena et al, reports data regarding faculty rank obtained through Doximity, described as the largest social network for physicians and claiming half of all physicians in the United States as members. Sege et al present data from 2 biomedical research programs for junior investigators that included documentation of start-up support, a variable not previously reported.

Jena et al found that in a cohort of more than 90 000 physicians in academic medicine centers, including more than 30 000 women, women were less likely than men to be full professors (11.9% vs 28.6%). There are several possible explanations for this finding. The simplest explanation for the gender disparity at senior academic ranks is that female faculty members are younger than their male faculty colleagues. As such, it has been argued, women may not have been faculty members for sufficient time to advance to higher academic ranks.

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study suggests gender disparities transcend the historical differences stemming from fewer women than men matriculating in medical school until the past decade. Jena and colleagues noted that even after adjustment for age and years since residency, women were still less likely than men to be full professors. For example, in the cohort who completed residency in 1980, 53% of women remained at the assistant- or associate-professor level more than 30 years after completing their training, compared with 40% of the men. Others have reported that women are more likely than men to retire at these ranks. The lack of career progression may also be contributing to the relatively greater attrition of women faculty members. Another explanation for the difference in academic rank of women and men are differences in productivity. Although women have made progress since the 1970s, they continue to have fewer first- and last-author publications in the most influential journals than men. In the study presented by Jena et al, women had fewer publications than men (mean total publications 11.6 vs 24.8), were less likely to have NIH funding (6.8% vs 10.3%), and were less likely to have conducted a clinical trial (6.4% vs 8.8%). In part, these productivity differences may have reflected differences in faculty tracks between men and women, which the authors could not measure. Men are more likely to have tenure-track appointments, and women are more likely to have clinical appointments with different expectations for investigation and scholarship. Nevertheless, in the study by Jena et al, even among the faculty with NIH funding, women are presumably more likely to be on a research track, similar sex differences in senior faculty rank were found.

Sege et al suggest a possible explanation for what stymies women's advancement, particularly those engaged in basic research. They evaluated the start-up packages of 127 men and 92 women applying for grant support from the Medical Foundation Division of Health Resources in Action. Start-up packages are one of potentially many resources new faculty members receive from institutions and are provided with the intention of launching their careers as principal investigators. The authors found that although men and women had similar degrees and came from similar institutions, the median start-up packages for men engaged in basic science were approximately 67% greater than those of women ($980 000 vs $585 000). As individuals transition from postdoctoral fellows to junior faculty, the negotiation of the start-up package is a critical step, often aided by the postdoctoral mentor. Women are less likely to make the transition from postdoctoral fellow to faculty than men. Lack of mentorship has been identified as an important factor. Women are less likely to be hired in laboratories, be trained by elite male faculty members, and have more difficulty overall in identifying appropriate mentorship. Women are also less likely than men to negotiate for salary and other benefits. When they do negotiate, unlike men, women may be disadvantaged by lack of mentorship and by the stigma or penalties incurred due to biases about the appropriate behaviors of women held by both men and women.

These 2 articles add to the abundance of literature focusing on the disparities of careers of women in academic medicine. Importantly, similar disparities exist for individuals from racial and ethnic minorities and for those from other marginalized communities. The roots of these disparities are multifaceted. For example, an unrecognized and unintended consequence of the 1910 Flexner report on medical training was the closure of most of the medical colleges serving women or African Americans. Some of the disparities are reflections of pervasive social injustices including the history of overt discrimination against African Americans by organized medicine in the United States for most of the 20th century. Today, unconscious bias and stereotypes continue to hinder the recruitment of diverse medical students, prevent the full participation of qualified individuals in the profession, and impede the nation's ability to address health care disparities.

What is needed to move forward? In academic medicine today, the decisions regarding hiring, distribution of resources, and advancement are often in the hands of individuals who are principal investigators, division chiefs, chairs, and deans, usually male and white. These individuals may not recognize their unconscious preferences or that their preferences for individuals who are like them may result in differential treatment that increases the relative advantages of those who are already advantaged (i.e., in-group favoritism). Among both men and women, unconscious bias can lead to decisions that perpetuate inequalities and reinforce cultural biases, like the association of men with intelligence, leadership, and science.

For those women and minority physicians who have overcome many obstacles and seek to enter the ranks of junior faculty in academic medicine, several institutional changes may help support their success. The first step is acknowledging that the system is not working effectively. The leadership of academic medical centers must address systematically the sources of imbalance openly and strategically. Within each organization, careful analysis of equity and representation should be performed regularly and should be considered part of the responsibility of all managers and leaders.

Acknowledging and managing the potential effects of unconscious bias in an organization requires education and training. At the University of Utah, leaders and participants in search committees are required to undergo training in implicit bias that includes taking the implicit association test. A comprehensive understanding of institutional and state policies, effective and fair interview processes that includes standardized questions, and empowering individuals to speak up if biases in the hiring processes are encountered can all improve the hiring process. Hiring decisions, especially for positions that will require significant institutional support, can be made by a group of experts, similar to a search committee rather than by individuals. Committees operating under a set of explicit guidelines can act much like treatment guidelines in the medical setting. Treatment guidelines and search committees can help to ensure that the treatment of everyone is similar and help avoid the pitfalls of stereotyping and implicit bias.

Transparency can be an important remedy. Transparency in the hiring process, including establishing institutional norms for salary and start-up packages and making them visible could benefit all applicants. Women in particular, may be more willing to negotiate if they understand the reason-
able parameters of negotiation. Those who are hiring may be more willing to tolerate women negotiating if their requests are considered normative.

Faculty policies and the promotion and tenure process at many academic institutions may also need revisiting. Recognition of activities performed by contemporary faculty members including clinical scholarship, education, mentorship, translational and team-based science, and technology commercialization in addition to basic science research may help a more diverse group of faculty members to advance. Policies that ensure salary equity with equal pay for equal work should be mandatory for the academic medicine environment. Policies that encourage flexibility, particularly those that support family formation, including paid parental leave and options for part-time positions for a period of time while remaining on the tenure track may increase the numbers of women (and men) who are retained in academic medicine. Some institutions have experimented with providing additional research funding support for women in science during child-rearing years. For example, in 1997 the Massachusetts General Hospital established the Claflin Distinguished Scholar Award, which provides 2 years of support to women researchers for laboratory personnel and supplies. Ten years later, the program was determined to be successful in terms of productivity and morale, promotion, and retention.24

Finally, mentorship is consistently recognized as vital for the career advancement. Support for mentorship that is available to all faculty members benefits both the individual faculty members and the institution. The University of Utah has sponsored a formal holistic mentoring program for junior faculty members that has increased inclusion and retention of women in the research enterprise and has resulted in extramural funding rates of more than 90% by completion of the program for both men and women.25

As the training ground for future generations of health care providers and biomedical scientists, academic medical centers should ensure that their students, faculty, and staff represent the people they serve and that all can contribute to their fullest potential. It is time for academic medicine to move forward.

ARTICLE INFORMATION
Author Affiliations: University of Utah, Salt Lake City.

Corresponding Author: Carrie L. Byington, MD, University of Utah, 265 2000 E, Salt Lake City, UT 84112 (Carrie.byington@hsc.utah.edu).

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