



Promising Practices For Addressing the Underrepresentation of Women in Science, Engineering, and Medicine: Opening Doors (2020)

In recent years, the absolute number of women earning degrees across science, engineering, and medical fields has increased relative to men. Despite these gains, women—especially women of color—remain underrepresented with respect to their presence in the workforce and the U.S. population. The number of women enrolled in medical schools, for example, exceeded men for the first time in 2018, but there is still a persistent underrepresentation of women at senior academic or leadership positions, with women accounting for only 18% of hospital CEOs and 16% of deans and department chairs.

The report offers a comprehensive overview of strategies for improving recruitment, retention, and advancement of women in science, engineering, and medical fields. Its focus is not on “fixing the women,” but on promoting systemic change in an effort to mitigate structural inequities, bias, discrimination, and harassment that research shows significantly undermines the education and careers of women in these fields.

This summary highlights barriers that drive the underrepresentation of women in medicine and offers recommendations for interventions by colleges and universities to improve the recruitment, retention, and advancement of women in science, engineering, and medicine.

BARRIERS THAT DRIVE THE UNDERREPRESENTATION OF WOMEN IN MEDICINE

Women encounter a number of barriers to education and careers in medicine:

- The number of women medical school applicants, admitted students, and graduates has steadily increased from around 10% in 1973 to gender parity today, although gender imbalances exist in some specializations.
- In research publications, women have low proportions of first authorships (29.3%) and senior authorships (19.3%) relative to male peers.
- Women in medicine experience conflicts between their biological and professional clocks, with women physicians reporting challenges of timing childbearing in relation to their careers and of obtaining childcare, particularly during residency years.



- Women of color face a double bind in medicine, experiencing biases related to both their gender and their race and ethnicity, and are more underrepresented at higher academic ranks. Although minority women make up 18% of the U.S. population, they represent 3.2% of full professors in medicine.
- Of the disciplines examined in the 2018 National Academy of Sciences report, Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine, medical students had the highest rates of sexual harassment compared with students in engineering, the sciences, and the non-sciences.
- The hierarchical and hostile training landscape many physicians experience introduces considerable bias, which is harmful to both patients and the physicians themselves. Hostility and incivility have adverse effects on medical teams' efficacy in diagnosis and treatment, with biases regarding weight, gender, race, and other factors leading to missed diagnoses, delayed treatment, and poorer outcomes for patients.

RECOMMENDATIONS FOR INTERVENTIONS BY COLLEGES AND UNIVERSITIES

RECOMMENDATION: College and university deans and department chairs should annually collect, examine, and publish data on the number of students, trainees, faculty, and staff, disaggregated by gender and race/ethnicity, to understand the nature of their unit's particular challenges with the recruitment, retention, and advancement of women and then use this information to take action.

Collect and Track Data: Deans and department chairs should request the following types of data and track these data over time:

- The demographic composition of the students currently enrolled and recently graduated in a given department or college. These data should be disaggregated by gender and race/ethnicity and should be tracked over time.
- The longitudinal demographic composition of the faculty disaggregated by faculty rank, department, gender, and race/ethnicity.
- The longitudinal demographic composition of postdoctoral researchers, residents, clinical fellows and staff scientists, disaggregated by department, gender, and race/ethnicity.

RECOMMENDATION: College and university administrators should dedicate resources to carry out qualitative research on the climate in the school or department and the experiences of underrepresented groups and use this information to shape policies and practices aimed at promoting an inclusive climate and supporting underrepresented groups enrolled or employed at the institution.

Evaluate Campus Climate: Administrators should work with an evaluator outside the relevant unit to support periodic research to assess the climate in the school or department in a manner that is methodologically sound, independent, objective, and free from bias and conflict of interest. Climate research can take the form of surveys, focus groups, and/or interviews.

Protect Anonymity of Women of Color: Given the extremely low representation of women of color in these fields, those conducting climate research should employ methods of data collection and aggregation that protect the anonymity of such individuals while accurately capturing their experiences. In some instances, interviews may serve as the most appropriate means to gather this information. It should be noted that, in some settings, researchers from a single institution may not be able to sufficiently protect the anonymity of women of color, who make up an extreme minority in certain fields, and so it may be best to conduct such research across an institutional system. Protecting sensitive, personal information will also be aided by the use of an external consultant that can hold the raw data and report only aggregated findings to the departmental leadership.

RECOMMENDATION: Taking into account the institutional context, college and university presidents, deans, department chairs, and other administrators should adopt or adapt the actionable, evidence-based strategies and practices that directly address particular gender gaps in recruitment, retention, and advancement of women in science, engineering, and medicine within their institution, as observed by quantitative and qualitative data analysis and monitoring.

Recruit a Diverse Applicant Pool: To increase the effectiveness of recruitment, admissions officers, human resources offices, and hiring committees should:

- Work continuously to identify promising candidates from underrepresented groups and expand the networks from which candidates are drawn.
- Write job advertisements and program descriptions that appeal to a broad applicant pool and use a range of media outlets and forms to advertise these opportunities broadly.
- Eliminate or lessen the emphasis given to admissions requirements that are particularly subject to bias or may be poor predictors of success (e.g., certain standardized test scores).
- Decide on the relative weight and priority of different admissions or employment criteria before interviewing candidates or applicants.
- Hold those responsible for admissions and hiring decisions accountable for outcomes at every stage of the application and selection process.
- Educate evaluators to be mindful of the childcare and family leave responsibilities often faced by women, especially when considering “gaps” in a resume.
- When possible, use structured interviews in admission and hiring decisions.
- Educate hiring and admissions officials about biases and strategies to mitigate them.
- Increase stipends and salaries for graduate students, postdocs, non-tenure track faculty, and others to ensure the positions are feasible for a broad range of applicants.

Improve Retention: To improve retention, university and college administrators should:

- Ensure that there is fair and equitable access to resources for all employees and students.
- Broadly communicate about the institutional resources that are available to students and employees and be transparent about how these resources are allocated.
- Set and widely share standards of behavior, including sanctions for disrespect, incivility, and harassment.
- Provide private space with appropriate equipment for parents to feed infants, and (if needed) to express and store milk.
- Create and widely advertise policies and practices that address workers’ need to balance work and family roles throughout their education or careers. Pay particular attention to circumstances where family and personal life demands are high, such as raising young children, supporting school-age children, caring for elderly parents, etc.
- Limit department meetings and functions to specified working hours that are consistent with family-friendly workplace expectations.

Support Mentoring: In order to be effective mentors, faculty and staff should recognize that identities influence academic and career development and thus are relevant for effective mentorship. As such:

- Institutional leaders should intentionally support mentorship initiatives that recognize, respond to, value, and build upon the power of diversity.
- Mentors should use approaches such as listening actively, working toward cultural responsiveness, moving beyond “colorblindness,” and reflecting on how their biases and prejudices may affect mentees and mentoring relationships, especially for underrepresented mentees.

- Mentees should reflect on and acknowledge the influence of their identities on their academic and career trajectory and should seek mentorship that is intentional in considering their individual lived experiences.

Prevent Sexual Harassment: Colleges and university leaders should provide direct and visible support for targets of sexual harassment and convey that reporting sexual harassment is an honorable and courageous action. They should provide means of accessing support services, as well as less formal means of recording information about the experience, and develop approaches to prevent retaliation.

Create Counterspaces for Women of Color: Colleges and universities should create “Counterspaces” on their campuses that provide a sense of belonging and support for women of color and serve as havens from isolation and microaggressions. Counterspaces can be physical or virtual and can operate within the context of peer-to-peer relationships; mentoring relationships; national STEM diversity conferences; campus student groups, and academic departments.

RECOMMENDATION: Leaders in academia and scientific societies should put policies and practices in place to prioritize, reward, recognize, and resource equity, diversity, and inclusion efforts appropriately.

Ensure Continuation of Diversity, Equity, and Inclusion (DEI) Positions: University administrators should institutionalize effective policies and practices so that they can sustain transitions in leadership by, for example, writing them into the standing budget and creating permanent diversity, equity, and inclusion-related positions.

Support DEI Personnel: University and college administrators should appropriately compensate and recognize individuals responsible for equity and diversity oversight and equip them with sufficient resources and authority.

Revise Criteria for Faculty Review: Academic senates of universities should adopt amendments to faculty-review committee criteria that formally recognize, support, and reward efforts toward increasing diversity and creating safe and inclusive research environments. Adopting this criteria sets the expectation that promoting inclusivity is everyone’s responsibility and encourages faculty involvement in university diversity initiatives.

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