

FRONTIERS IN CARDIOVASCULAR QUALITY AND OUTCOMES

Nurturing Diverse Generations of the Medical Workforce for Success With Authenticity: An Association of Black Cardiologists' Roundtable

Norrisa A. Haynes, MD, MPH, MSHP; Michelle Johnson, MD, MPH; Sabra C. Lewsey¹, MD, MPH; Kevin M. Alexander¹, MD; D. Edmund Anstey, MD, MPH; Tierra Dillenburg, BS; Joyce N. Njoroge¹, MD; Debra Gordon, MS; Elizabeth O. Ofili, MD, MPH; Clyde W. Yancy¹, MD, MSc; Michelle A. Albert¹, MD, MPH

ABSTRACT: The COVID-19 pandemic exposed the consequences of systemic racism in the United States with Black, Hispanic, and other racial and ethnic diverse populations dying at disproportionately higher rates than White Americans. Addressing the social and health disparities amplified by COVID-19 requires in part restructuring of the healthcare system, particularly the diversity of the healthcare workforce to better reflect that of the US population. In January 2021, the Association of Black Cardiologists hosted a virtual roundtable designed to discuss key issues pertaining to medical workforce diversity and to identify strategies aimed at improving racial and ethnic diversity in medical school, graduate medical education, faculty, and leadership positions. The Nurturing Diverse Generations of the Medical Workforce for Success with Authenticity roundtable brought together diverse stakeholders and champions of diversity and inclusion to discuss innovative ideas, solutions, and opportunities to address workforce diversification.

Key Words: COVID-19 ■ pandemic ■ systemic racism ■ United States ■ Workforce

For diverse racial and ethnic populations, the COVID-19 pandemic amplified the consequences of structural racism that permeate through society wherein Black, Hispanic, American Indian, and Alaska Native persons experience significantly higher deleterious health outcomes and mortality rates.^{1,2} Race and ethnicity and socioeconomic status underscore health disparity statistics as reflections of social conditions that dictate health outcomes. Ensuring that racial and ethnic minority groups receive the same quality healthcare as White individuals requires a healthcare workforce that can address the unmet needs of diverse populations, particularly through understanding their lived experiences. A diverse healthcare workforce represents a crucial component towards achieving health equity. However, racial and ethnic groups under-represented in medicine (URM), including Black, Hispanic, American Indian, Alaska Native, and Native Hawaiian or Pacific Islander

populations, experience numerous challenges in pursuit of careers in the medical field.²⁻⁸

To address challenges in diversifying the workforce, the Association of Black Cardiologists hosted the Nurturing Diverse Generations of the Medical Workforce for Success with Authenticity roundtable on January 23, 2021. The Association of Black Cardiologists was founded in 1974 with the goal of addressing the disparate impact of cardiovascular disease on diverse racial and ethnic populations. The organization comprises the largest cadre of Black Cardiologists along with allies committed to alleviating cardiovascular health disparities through health promotion, advocacy, and community engagement. The Association of Black Cardiologists is seen as a resource and is recognized as an invaluable collaborative partner by other cardiology organizations that seek its input on academic guidelines, policy statements, and diversity efforts.

The opinions expressed in this article are not necessarily those of the editors or of the American Heart Association.

Correspondence to: Michelle A. Albert, MD, MPH, University of California at San Francisco (UCSF), School of Medicine Center for the Study of Adversity and Cardiovascular Disease (NURTURE Center) 505 Parnassus Ave, San Francisco CA 94143. Email michelle.albert@ucsf.edu

Supplemental Material is available at <https://www.ahajournals.org/doi/suppl/10.1161/CIRCOUTCOMES.122.009032>.

For Sources of Funding and Disclosures, see page 72.

© 2022 American Heart Association, Inc.

Circulation: Cardiovascular Quality and Outcomes is available at <http://www.ahajournals.org/journal/circoutcomes>

Nonstandard Abbreviations and Acronyms

MCAT	Medical College Admission Test
NIH	National Institutes of Health
URM	under-represented in medicine

This virtual roundtable brought together diverse stakeholders and champions of diversity and inclusion in various healthcare-related fields to discuss innovative ideas, solutions, and opportunities to address medical workforce diversity, particularly in the discipline of cardiovascular medicine. This statement reinforces the findings of prior publications but also provides a unique call to action from an organization with a longstanding history of health equity and workforce diversity advocacy.

DIVERSITY DEFINED

Racial and ethnic diversity helps to promote organizational values, address complex social issues, and ensure organizational viability.^{8,9} Yet diversity efforts are often relegated to committees rather than wholly embraced by organizational leadership and shared by the entire institution. This fragmentation hinders the ability to institute upstream diversity and inclusion initiatives that would promote inclusive excellence. Inclusive excellence refers to providing opportunities for URMs to set agendas, lead discussions, and serve in positions of leadership.

Importantly, diversity connotes including people who bring different interests, perspectives, heuristics, and modeling to complex issues plaguing society, particularly sociopolitical determinants of health that affect diverse racial and ethnic populations.

A diverse workforce brings numerous benefits to organizations. Data show that organizations with inclusive cultures are more likely to meet or exceed financial targets, improve performance, innovate, demonstrate agility, and achieve better business outcomes than those without inclusive cultures.^{8,9} In addition, 87% of decisions made by teams with age, sex, geographic, racial, and ethnic diversity were deemed to be good decisions compared with 58% of those decisions made by all White male teams.⁹ However, there are numerous barriers to this level of diversity, including in politics and policy development, such as stereotyping, tokenism, isolation, and exclusion wherein persons from diverse racial and ethnic backgrounds have to be both hyper-visible and invisible at the same time. Diverse recruits are expected to fit into the organization rather than the organization changing to embrace them. They are also often viewed as the individuals responsible for improving diversity when, in fact, this should be everyone's responsibility. Additionally, they are placed in visible

committee and marketing positions, but not in positions of influence over organizational direction or strategy.

Racial and ethnic diversity in medicine is critical given the changing demographics in the United States. For example, over the past 2 decades, the number of White Americans has continued to decline. Currently, non-Hispanic White individuals comprise 60.1% of the population compared to nearly 80% in 1980.^{10,11} By 2030, the percentage of White persons is expected to decrease to 55.8% and by 2060 to 44.3%.^{10,11}

Although Black and Hispanic individuals account for 13% and 17% of the population respectively, these groups comprise approximately only 5% and 6% of practicing physicians.¹¹ In cardiovascular medicine, Black and Hispanic persons represent 2.7% and 5% of adult cardiology practitioners respectively.⁸ In addition, despite some improvement in diversity in medical school faculty since 1960, URMs still accounted for less than 10% of faculty in 2016 and only 3% of professors.⁵ Similarly, only 8.6% of medical school cardiology faculty were from URM groups.⁸

Without a physician and academic medicine workforce that reflects the broader population, it will be challenging to eliminate racial disparities in health outcomes, including those in cardiovascular health. Addressing discrimination throughout the medical education continuum requires changing success indices, rotation evaluation disparities, focusing on national and institutional pipeline goals, as well as understanding and addressing drivers of social isolation beyond critical mass. Additionally, it requires providing academic financial incentives, mentorship, and developing early and life course academic mentored programs that equitably prioritize all medical research and education disciplines.⁵

UNDERSTANDING THE HISTORY OF THE MEDICAL SCHOOL WORKFORCE PERTAINING TO BLACK PERSONS

The underrepresentation of minority clinicians in the US healthcare workforce, particularly in academic medicine has its roots in the 1910 Flexner report, the blueprint for today's science-based medical education system.¹² At the time, there were 7 predominantly Black medical schools, of which 5 were recommended to close by the Flexner report. Flexner also recommended the training of Black individuals in hygiene rather than surgery, given that they suffer from hookworm and tuberculosis.¹³ Within a few years, only Meharry Medical College in Nashville and Howard University in Washington, DC remained.¹⁴ Today, despite a large increase in the number of medical schools between 2000 and 2020, there are only 4 historically Black medical schools. If those 5 schools closed by the Flexner report had remained open, it is estimated that they would have trained between 27 773 to 35 315

clinicians between the year they closed and 2019, leading to a 39% increase in the number of Black physicians graduating in 2019.¹⁵ Indeed, increasing the number of URM medical school graduates at each of the nation's 151 medical schools by just 2 would contribute 300 new URM physicians a year.

IDENTIFYING THE BOTTLENECKS

Medical School

Although URM persons represent 30% of the general population, they only comprise 21% of medical school students.¹⁶ The medicine pathway bottleneck, however, begins before medical school. The lack of commitment to quality education and mentoring at the kindergarten, middle and high school levels disadvantages students from diverse racial and ethnic backgrounds from pursuing careers in healthcare, particularly as physicians. This lack of mentorship is further experienced by physicians across the medical professional life course and contributes to the lack of persons of color in leadership positions in medicine. For brevity, however, we will focus on medical school and beyond. In 2020, Black students made up 7.5% of medical school students, an unchanged statistic for over 40 years.¹⁷ According to the Association of American Medical Colleges, the percentage of US medical school graduates by race/ethnicity from 2018–2019 was as follows: 54.6% White, 21.6% Asian, 8% multiple ethnicities, 6.2% Black, 5.3% Hispanic, 1.6% non-US citizen or nonpermanent resident, and 0.2% American Indian or Alaska Native.⁴

Although medical school applications in the United States increased by 47% between 1980 and 2016, Black and Hispanic applicants increased by only 1.2%. Alaska Native and American Indian applications declined 18.5%.¹⁸ Between 1980 and 2019, Black medical student matriculation increased just 1.1%, from 6% to 7.1%; and Hispanic matriculation increased only 1.3%, from 4.9% to 6.2%.¹⁷ There are numerous reasons for these statistics. One explanation is the reliance on Medical College Admission Test (MCAT) scores, and step 1 of the United States Medical Licensing Exam, albeit the latter results are now reported as pass or fail.¹² Mean MCAT scores are generally lower for persons from URM groups compared with their peers.¹² These differences exist due to inequitable educational opportunities, impostor syndrome, and unequal access to wealth due, in part, to structural discrimination and racism.¹⁹ MCAT scores can prevent students from receiving interviews at highly competitive medical schools thereby significantly reducing their chances of admission.

A validation study of the new MCAT introduced in 2015 found that students with a wide range of MCAT scores (502–528) progressed to the second year of medical school on time. It also found that using MCAT and

undergraduate grade point averages together provided a better indication of progression than either alone.²⁰ Prioritizing students with the highest MCAT scores misses a large pool of diversity.¹² Terregino et al¹⁶ showed that students with MCAT scores in the middle third (495–504) were 16% more likely to be URMs, as well as individuals who exhibited other diverse characteristics, such as being the first in their family to obtain a bachelor degree, having parents who work clerical or service jobs, growing up in rural or medically underserved areas, and being non-native English speakers. Schools admitting the highest percentage of students with middle-range MCAT scores were primarily public, and community-based institutions, with a stated goal of recruiting students who intended to practice primary care. Schools admitting nearly exclusively students with top-range MCAT scores were primarily research-focused institutions, with a reported goal of identifying the most academically capable applicants and maintaining or improving their US News and World Report rankings.¹⁶ It is important to note, however, that students with middle-range MCAT scores have comparable medical school performance to students with scores in the top 3rd as demonstrated by similar completion and graduation rates.¹⁶ Thus, the MCAT presents a major barrier to increasing the percentage of URMs, and students with diverse lived experiences in medicine.¹²

Indeed, the COVID-19 pandemic and heightened racial conversations have resulted in more holistic review of applications by many medical schools resulting in an increase in Black students admitted to medical school in the 2021 to 2022 cycle.¹⁷

GRADUATE MEDICAL EDUCATION

Another bottleneck occurs at the graduate medical education level with a disproportionately low representation of URMs reaching fellowship programs. In 2018, just 11.6% of cardiology fellows self-identified as URM.²⁰ This may in part be related to perceptions of leadership. In a recent survey, 31% of cardiology fellowship program directors did not believe that diversity was important; 63% believed that their program was diverse; and only 6% considered diversity among the top 3 priorities when ranking applicants.²¹ Increasing representation and shifting perceptions may be achieved through systemic change. For example, between 2006 and 2016, Duke University's cardiovascular fellowship program admitted an average of 16.2% women and 9.7% URMs as first-year fellows. In 2017, no women were admitted and just 1 URM fellow was admitted. That year, the medical school began an institutional effort to create a more diverse and inclusive class of cardiology fellows. Initiatives included but were not limited to reorganizing the fellowship recruitment committee, changing the applicant screening process to remove the MCAT from consideration, blinding reviewers to applicant pictures, ensuring that all applicants considered for interviews had 3

independent application reviewers, revising the structure of the interview and the applicant ranking process, and instituting postmatch interventions such as targeted mentorships. The initiatives required no substantial financial investment.²² Over 3 years, Duke increased the number of female fellows from 23% to 54% and the number of URM fellows from 10% to 33%. The program also noted a substantially higher number of women and URM interviewees, and a substantially higher percentage of applications from women compared with other US Accreditation Council for Graduate Medical Education fellowship programs.²² Other graduate medical education programs at Duke are now implementing similar programs. The Duke Cardiology fellowship example as well as other programs will be judged over time based on their ability to sustain these initiatives as well as the support provided to ensure the success of matriculants, and the systematic feedback from women and URM applicants who were ranked to match but did not attend.²³

DISPARITIES IN THE ACADEMIC SETTING

As it pertains to academic faculty positions, female representation has increased more rapidly than URM representation.²⁴ The proportion of URM faculty has remained stagnant or decreased relative to the US census.²⁴ These trends are particularly worrisome among Black faculty, especially among Black male faculty. Additionally, there remains insufficient data pertaining to American Indian and Alaska Native faculty representation over time.²⁴

Given that generation of new knowledge and investigation are core elements of the academic medicine enterprise, research funding represents another bottleneck for URM persons in medicine pertaining to retention, advancement, and leadership in medicine. A landmark study of National Institutes of Health (NIH) funding found that Black PhD applicants were 10% less likely than White applicants to be awarded R01 NIH grants after adjustment for important covariates; a follow-up study noted similar outcomes when comparing Black and White women. Additionally, Black PhDs resubmitted their scored grant applications significantly more times compared to White applicants before being awarded funding. Disturbingly, Black applicants were also less likely to resubmit an unfunded grant than White applicants.^{25,26}

These and other studies led the NIH and the National Heart, Lung, and Blood Institute to establish several programs designed to reduce disparities in NIH grant awards. The programs also sought to address the gap between URM PhD qualifications and the receipt of promotion for faculty positions while building a more diverse biomedical workforce. Examples of such NIH programs include Programs to Increase Diversity Among Individuals Engaged in Health-Related Research R25 career development awards, postdoctoral fellowship grants with diversity supplements, fellowship and training grants at the medical school and

graduate educational levels, and summer internships at the high school and college levels. A cornerstone of these efforts is the Maximizing Opportunities for Scientific and Academic Independent Careers program, which awards grants designed to facilitate the transition of promising postdoctoral researchers from diverse backgrounds to independent faculty careers at research-intensive institutions. The National Heart, Lung, and Blood Institute is also prioritizing diversity in its research agenda to address disparities in cardiovascular morbidity and mortality that affect communities of color. One such example is the Disparities Elimination through Coordinated Interventions to Prevent and Control Heart and Lung Disease Risk grants. Disparities Elimination through Coordinated Interventions to Prevent and Control Heart and Lung Disease Risk grants are awarded to test late-stage implementation strategies for effectively and sustainably delivering evidence-based, multilevel interventions to reduce or eliminate cardiovascular and or pulmonary health disparities. Additionally, the NIH Diversity Program Consortium and the National Research Mentoring Network have begun to accumulate evidence of successful grant models for Black and Hispanic early-stage investigators.²⁷ Also, the NIH Common Fund is investing in a faculty cohort model of inclusive excellence, by exploring evidence-based approaches across diverse NIH-funded institutions.^{28,29}

According to a article by Stevens et al,³⁰ from 2000 to 2006, despite equal academic achievement, the NIH award probability for Black principal investigators was 55% that of White principal investigators. Despite stated interest in addressing this issue, the disparity was present 10 years later and continues to persist. This disparity is significant given that promotion and tenure committees commonly use research funding and R01s to make the case for tenure. This, of course, impacts URM academic faculty retention. Due to this disparity in funding, URM faculty often need to put in more effort to obtain grant funding while also performing more service time.³⁰ This excessive burden leads to less protected time to conduct research, publish papers and attain promotion which contributes to increased burnout, attrition, and lack of diversity.

The landmark Ginther research fundamentally changed the landscape for all PhD investigators with more equity in NIH grant awards. Similar race and ethnicity data do not exist for MD investigators applying for NIH grants, although the root causes attributable to award inequity for PhD candidates is likely present across the board. Additional study is required.

NURTURING DIVERSE GENERATIONS OF THE MEDICAL WORKFORCE: RECOMMENDATIONS

Substantive improvement in medical workforce diversity requires that organizations and institutions address the

issue from a holistic perspective, reviewing all structures, policies, and practices for evidence of structural bias. This extends from the words and images lining the halls of hospitals to the diversity of those at the highest levels of leadership.

It also requires allyship, defined as an “active, consistent, and arduous practice of unlearning and re-evaluating, in which a person of privilege seeks to operate in solidarity with a marginalized group of people.” Allyship requires altruism, awareness, advocacy, accountability, and action against racism.³¹

Overall Strategies for Addressing Inequity in Healthcare

1. Create a robust health care workforce pipeline. Focus on how future doctors are groomed and recruited including who has access to the field and removal of barriers to entry.
2. Address diversity among research investigators and grant funding awardees.
3. Improve access to equitable and quality healthcare.
4. Advocate for policy and institutional initiatives that eliminate educational and economic disparities.
5. Recognize URM professionals for their leadership and talents and address inequality in promotion, advancement, and endowed chairs.

RECOMMENDATIONS FOR DEVELOPING A SUCCESSFUL PIPELINE ARE SUMMARIZED BELOW

Deep Pipeline: Elementary, Middle, and High School

To strengthen the deep pipeline which consists of elementary, middle, and high school students, we suggest developing tools such as guidebooks targeting young children. Additionally, students in elementary school should be engaged in activities that are related to medicine and cardiology. For high school and middle school students, mentorship is key. At-risk and marginalized high school students should be engaged early on in pipeline programs that help shape their perception of science and medicine.

Short-Term Pipeline: Premed, Medical Students, and Fellows

To strengthen the short-term pipeline which consists of premedical and medical students as well as fellows, several actionable items should be considered. Premedical and medical students need access to research fellowships and cardiovascular medicine mentors. Centering diversity instead of focusing primarily on

MCAT scores and undergraduate grade point averages can also assist in fortifying the short-term pipeline. Further exposure to cardiology and support for career development can be amplified by provision of complementary memberships to medical organizations committed to serving diverse racial and ethnic stakeholders. Leveraging innovation to engage students and fellows may also be effective. An example of this would be the development of a phone application to link students and fellows to mentors. Another strategy is engaging with organizations focused on helping diverse students pursue medical careers. Historically Black and Hispanic colleges and medical institutions play a major role in training URM physicians. Providing infrastructural and financial support for historically racial and ethnically diverse institutions could also strengthen workforce efforts. Furthermore, there should be increased accountability of majority medical schools and associated institutions to recruit and successfully nurture diverse racial and ethnic persons in medicine.

End Game: Faculty Pipeline

To strengthen the faculty pipeline, steps should be taken to ensure that faculty reflect the diversity of the surrounding geographic community as a start but the country as a whole. Hiring and promotion processes that account for implicit bias should be implemented to ensure inclusion throughout the professional life course. Loan forgiveness can be extremely helpful to faculty members. In academia, faculty need the time and support to complete necessary work required for promotion. Furthermore, transparency regarding compensation and promotion is critical; implementation of peer review and quality requirements can help to create an equitable working environment. To achieve the aforementioned goals, hospital and institutional leadership need to be intentional about improving diversity and inclusion. Leadership should create an expectation that equity and inclusion are part of the metrics for advancement. To ensure the success of diverse faculty, mentorship is important. Diverse faculty should be mentored to understand the unique value that they bring to an institution and their position and salary should reflect this value. Moreover, midcareer faculty should also have access to mentorship and sponsorship to reach senior leadership and other positions. To facilitate the acquisition of leadership positions, financially based retention programs with increased support for URM faculty to develop research centers and enter leadership programs are needed. Additionally, interdisciplinary and interinstitutional collaborations proven to be effective at increasing racial/ethnic diversity by Research Centers at Minority Institutions and Majority institutions should be established.^{32,33}

Strategic Partnerships Between Professional Organizations and Other Entities

Improving workforce diversity requires teamwork and collaboration. Strategic partnerships between professional organizations and other entities around the development of collaborative funding sources to establish scholarships, loan forgiveness, and research funding opportunities can be very effective. Partnerships with organizations outside of cardiology such as Association of American Medical Colleges can help fortify the early stages of the cardiovascular pipeline. Organizations can also codevelop career development programs based on blueprints established by successful preexisting pipeline programs with equitable leadership representation from all participating organizations. Another way for organizations to achieve strategic partnerships is through endorsement and cosponsorship of professional organizational events when appropriate. Additionally, implicit bias training and education pertaining to structural inequities must also occur for leadership and members of partnering organizations to

facilitate strategic partnerships with health equity as the main focus.

CONCLUSIONS

The value of a diverse workforce cannot be overstated. True diversity and inclusion in medicine leads to improved healthcare outcomes for diverse patient populations through innovative healthcare delivery models and improved organizational performance.⁹ Thus, it is imperative to diversify the medical workforce to achieve healthcare equity. The Association of Black Cardiologists sought to highlight key issues and strategies pertaining to medical workforce diversity aimed at improving racial and ethnic diversity in medical school, graduate medical education, faculty, and leadership positions. Instrumental to the success of diverse racial/ethnic groups in medicine is understanding the mechanisms through which inequities are perpetuated and taking deliberate action to achieve equity by instituting metrics to assess and address barriers, recruitment, retention, and senior

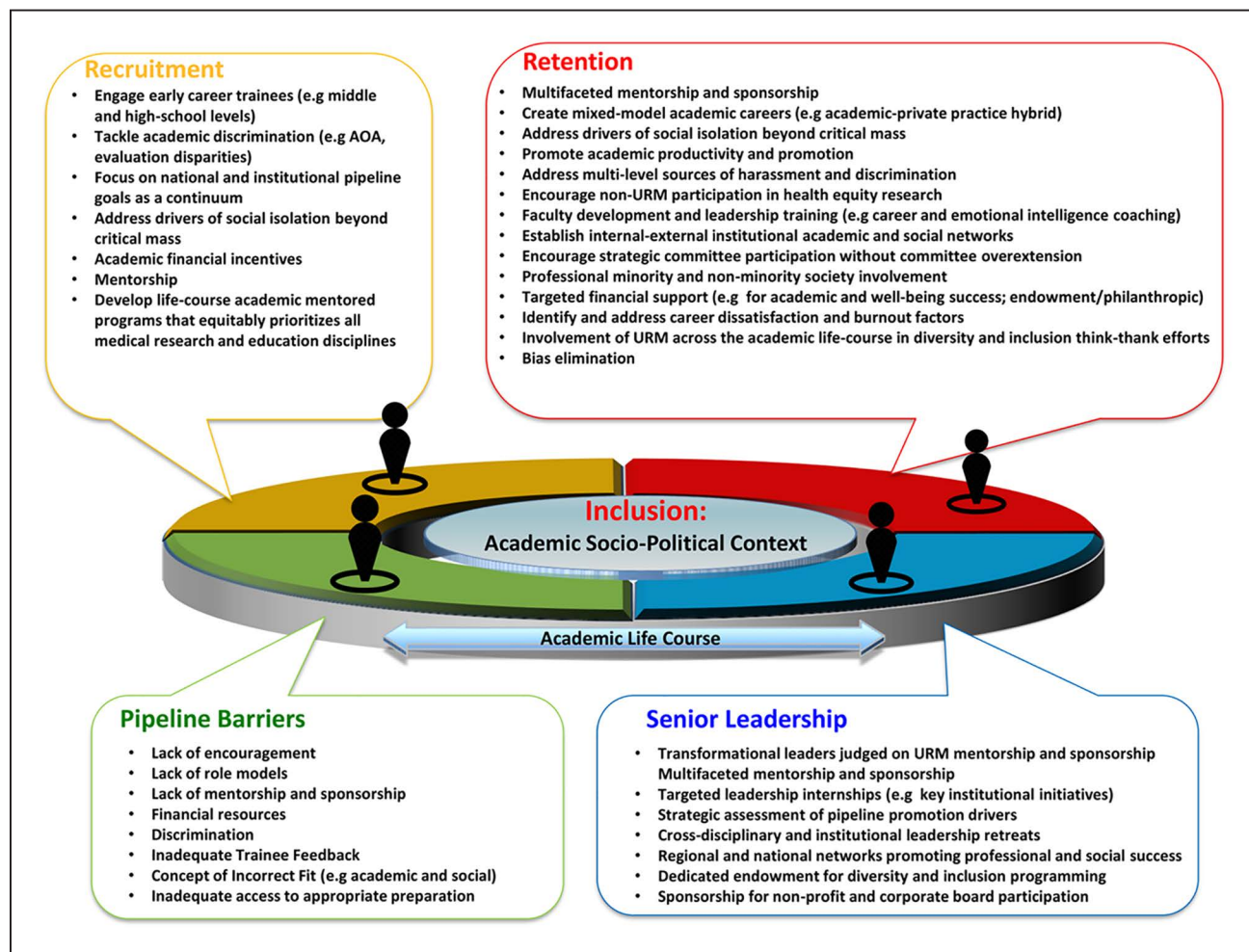


Figure. Academic medicine and under-represented racial and ethnic groups.

Figure shares suggestions for specific approaches for recruitment, retention, and attainment of a diverse medical workforce. Adapted from Albert et al⁶ with permission. Copyright ©2018, Wolters Kluwer Health, Inc.

leadership (Figure).⁶ Through the acknowledgment of structural racism in medicine and the implementation of comprehensive, and intentional strategies as outlined in Figure, we can begin to dismantle the systems that perpetuate inequities in medicine and build new systems that promote diversity, equity, and inclusive excellence.

ARTICLE INFORMATION

Affiliations

Division of Cardiology, Yale University, New Haven CT (N.A.H.). Division of Cardiology, Memorial Sloan-Kettering Cancer Center, New York NY (M.J.). Division of Cardiology, Johns Hopkins University, Baltimore MD (S.C.L.). Division of Cardiology, Stanford University, CA (K.M.A.). Division of Cardiology, Columbia University, New York NY (D.E.A.). Division of Cardiology, University of California, San Francisco (J.N.N., M.A.A.). Department of Medicine, Morehouse School of Medicine, Atlanta, GA (E.O.O.). Department of Medicine, Northwestern University Feinberg School of Medicine, Chicago, IL (C.W.Y.). Association of Black Cardiologists, Washington, DC (N.A.H., M.J., S.C.L., K.M.A., D.E.A., J.N.N., D.G., E.O.O., C.W.Y., M.A.A., T.D.).

Acknowledgements

The authors thank Cassandra McCullough, MBA; Melvin Echols, MD; Gary H. Gibbons, MD; Joan Y. Reede, MD MS MPH MBA; Gladys P. Velarde, MD; Keith C. Ferdinand, MD; Barbara Hutchinson, MD MPH; Felix Sogade, MD; Kevin L. Thomas, MD; Quinn Capers IV, MD.

Sources of Funding

None.

Disclosures

Dr Alexander has received consulting fees from Alnylam, Eidos, or Pfizer. Elizabeth Ofili's contribution is supported by the following National Institutes of Health (NIH) Awards: U24MD015970; U24MD01718; U01GM132771; UL1TR002378. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH. Dr Albert serves as Immediate-Past President of the Association of Black Cardiologists and President of the American Heart Association. The other authors report no conflicts.

REFERENCES

- Centers for Disease Control and Prevention. Risk for COVID-19 Infection, Hospitalization, and Death by Race/Ethnicity. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html>. Published April 16, 2021. Accessed April 16, 2021.
- Haynes N, Cooper LA, Albert MA. At the heart of the matter: unmasking and addressing the toll of COVID-19 on diverse populations. *Circulation*. 2020;142:105–107. doi: 10.1161/circulationaha.120.048126
- Centers for Disease Control and Prevention. Risk for COVID-19 Infection, hospitalization, and death by race/ethnicity. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html>. Published June 21, 2021. Accessed June 23, 2021.
- AAMC. Diversity in medicine: facts and figures 2019. Accessed April 20, 2021. <https://www.aamc.org/data-reports/workforce/report/diversity-medicine-facts-and-figures-2019>
- AAMC. Analysis in brief: faculty diversity in us medical schools: progress and gaps coexist. December 2016. Available at: <https://www.aamc.org/data-reports/analysis-brief/report/faculty-diversity-us-medical-schools-progress-and-gaps-coexist>. Accessed June 23, 2021.
- Albert MA. #Me_who anatomy of scholastic, leadership, and social isolation of underrepresented minority women in academic medicine. *Circulation*. 2018;138:451–454. doi: 10.1161/CIRCULATIONAHA.118.035057
- Laurencin CT, Murray M. An American crisis: the lack of black men in medicine. *J Racial Ethn Health Disparities*. 2017;4:317–321. doi:10.1007/s40615-017-0380-y
- Mehta LS, Fisher K, Rzeszut AK, Lipner R, Mitchell S, Dill M, Acosta D, Oetgen WJ, Douglas PS. Current demographic status of cardiologists in the United States. *JAMA Cardiology* 2019;4:1029–1033. doi: 10.1001/jamacardio.2019.3247
- Bourke J. *Which Two Heads Are Better Than One? How Diverse Teams Create Breakthrough Ideas and Make Smarter Decisions*. Sydney, Australia: The Australian Institute of Company Directors; 2017.
- Frey W. The nation is diversifying even faster than predicted, according to new census data. The Brookings Institute; 2020. Available at: <https://www.brookings.edu/research/new-census-data-shows-the-nation-is-diversifying-even-faster-than-predicted/>. Accessed June 23, 2021.
- Vespa J, Medina L, Armstrong DM. Demographic Turning Points for the United States: Population Projections for 2020 to 2060. Census Bureau; February 2020. Available at: <https://www.census.gov/library/publications/2020/demo/p25-1144.html>. Accessed June 23, 2021.
- Johnson AE, Talabi MB, Bonifacio E, Culyba AJ, Davis PK, De Castro LM, Essien UR, Maria Gonzaga A, Hogan MV, et al. Racial diversity among american cardiologists: implications for the past, present, and future. *Circulation*. 2021;143:2395–2405. doi: 10.1161/CIRCULATIONAHA.121.053566
- Flexner A. The Flexner Report. Carnegie Foundation for the Advancement of Teaching; 1910. Available at: http://archive.carnegiefoundation.org/publications/pdfs/elibrary/Carnegie_Flexner_Report.pdf. Accessed June 23, 2021.
- Whitcomb ME. The development of new md-granting medical schools in the united states in the 21st century. *Acad Med*. 2020;95:340–343. doi: 10.1097/ACM.0000000000003048
- Campbell KM, Corral I, Infante Linares JL, Tumin D. Projected estimates of african american medical graduates of closed historically black medical schools. *JAMA Netw Open*. 2020;3:e2015220. doi: 10.1001/jamanetworkopen.2020.15220
- Terregino CA, Saguil A, Price-Johnson T, Anachebe NF, Goodell K. The diversity and success of medical school applicants with scores in the middle third of the MCAT Score scale. *Acad Med*. 2020;95:344–350. doi: 10.1001/jamanetworkopen.2020.15220
- AAMC. 2020 FACTS: Applicants and Matriculants Data. Available at: <https://www.aamc.org/data-reports/students-residents/interactive-data/2020-facts-applicants-and-matriculants-data>. Published 2020. Accessed April 12, 2021.
- AAMC. Trends in Racial and Ethnic Minority Applicants and Matriculants to U.S. Medical Schools, 1980-2016. Available at: <https://www.aamc.org/data-reports/analysis-brief/report/trends-racial-and-ethnic-minority-applicants-and-matriculants-us-medical-schools-1980-2016>. Published 2017. Accessed May 20, 2022.
- Lucey CR, Saguil A. The consequences of structural racism on mcats scores and medical school admissions: the past is prologue. *Acad Med*. 2020;95:351–356. doi: 10.1097/ACM.0000000000002939
- Busche K, Elks ML, Hanson JT, Jackson-Williams L, Manuel RS, Parsons WL, Wofsy D, Yuan K. The validity of scores from the new MCAT exam in predicting student performance results from a multisite study. *Acad Med*. 2020;95:387–395. doi: 10.1097/ACM.0000000000002942
- Crowley AL, Damp J, Sulistio Melanie S, Berlach K, Polk DM, Hong RA, Weissman G, Jackson D, Sivaram CA, Arrighi JA, et al. Perceptions on diversity in cardiology: a survey of cardiology fellowship training program directors. *J Am Heart Assoc*. 2020;9:e017196. doi: 10.1161/JAHA.120.017196
- Rymer JA, Frazier-Mills CG, Jackson LR, Thomas KL, Douglas PS, Wang A, Patel MR, Crowley AL. Evaluation of women and underrepresented racial and ethnic group representation in a general cardiology fellowship after a systematic recruitment initiative. *JAMA Netw Open*. 2021;4:e017196. doi: 10.1001/jamanetworkopen.2020.30832
- Njoroge J, Rodriguez F, Albert MA. Dismantling structural discrimination in cardiology fellowship recruitment. *JAMA Netw Open*. 2021;4:e2031473. doi: 10.1001/jamanetworkopen.2020.31473
- Kamran SC, Winkfield KM, Reede JY, Vapiwala N. Intersectional Analysis of U.S. Medical faculty diversity over four decades. *N Engl J Med*. 2022;386:1363–1371. doi: 10.1056/NEJMSr2114909
- Ginther DK, Kahn S, Schaffer WT. Gender, race/ethnicity, and national institutes of health r01 research awards: is there evidence of a double bind for women of color? *Acad Med*. 2016;91:1098–1107. doi: 10.1097/ACM.0000000000001278
- Ginther DK, Schaffer WT, Schnell J, Masimore B, Liu F, Haak LL, Kington R. Race, ethnicity, and NIH research awards. *Science*. 2011;333:1015–1019. doi: 10.1126/science.1196783
- Weber-Main AM, McGee R, Eide Boman K, Hemming J, Hall M, Unold T, Harwood EM, Risner LE, Smith A, Lawson K, et al. Grant application outcomes for biomedical researchers who participated in the National Research Mentoring Network's Grant Writing Coaching Programs. *PLoS One*. 2020;15:e0241851. doi: 10.1371/journal.pone.0241851
- Williams D, Berger JB, McClendon SA. Presidential task force on inclusion and belonging. Association for American Colleges & Universities; 2005.

- Available at: <https://inclusionandbelongingtaskforce.harvard.edu/>. Accessed June 23, 2021.
29. National Institutes of Health. Faculty Institutional Recruitment for Sustainable Transformation (FIRST) Program. Available at: <https://commonfund.nih.gov/FIRST>. Published 2022. Accessed May 20, 2022.
 30. Stevens KR, Masters KS, Imoukhuede PI, Haynes KA, Setton LA, Cosgriff-Hernandez E, Lediju Bell MA, Rangamani P, Sakiyama-Elbert SE, Finley SD, et al. Fund black scientists. *Cell*. 2021;184:561–565. doi: 10.1016/j.cell.2021.01.011
 31. The Anti-Oppression Network. Allyship. Available at: <https://theantioppressionnetwork.com/allyship/>. Accessed May 20, 2022.
 32. Ofili EO, Tchounwou PB, Fernandez-Repollet E, Yanagihara R, Akintobi TH, Lee JE, Malouhi M, Garner ST, Hayes TT, Baker AR, et al. The research centers in minority institutions (rcmi) translational research network: building and sustaining capacity for multi-site basic biomedical, clinical and behavioral research. *Ethn Dis*. 2019;29:135–144. doi: 10.18865/ed.29.S1.135
 33. Ofili EO, Sarpong D, Yanagihara R, Tchounwou PB, Fernández-Repollet E, Malouhi M, Idris MY, Lawson K, Spring NH, Rivers BM. Research centers in minority institutions (RCMI) consortium: a blueprint for inclusive excellence. *Int J Environ Res Public Health*. 2021;18:6848. doi: 10.3390/ijerph18136848