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SPECIAL REPORT

JAHA at Scientific Sessions 2023: Moving Toward Social Justice in Cardiovascular Health in the United States

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ABSTRACT: Attention to social justice is essential to improving cardiovascular health outcomes. In the absence of social justice, equitable cardiovascular health is impossible. This viewpoint provides a brief synopsis of the 2023 *Journal of the American Heart Association (JAHA)*–sponsored session titled “Moving Towards Social Justice in Cardiovascular Health.” We define social justice and summarize the burden of cardiovascular disease inequity in the United States. We also highlight strategies for achieving social justice, including addressing workforce diversity, integrating social determinants into cardiovascular research, designing cardiovascular interventions to close the equity gap, and improving inclusivity in cardiovascular disease trials.

Key Words: cardiovascular health and disease ■ clinical trial inclusion ■ health equity ■ social justice

During the 2023 American Heart Association (AHA) Scientific Sessions in Philadelphia, Pennsylvania, the *Journal of the American Heart Association (JAHA)* sponsored a session titled: “Moving Towards Social Justice in Cardiovascular Health.” The session convened an interdisciplinary panel of nationally renowned academics, policy makers, and health system stakeholders to address the topic of social justice in US cardiovascular care. Four panelists were invited to describe the current state of social justice and cardiovascular health (CVH) inequity and to propose solutions for achieving sustainable social justice in CVH in the United States. The session was moderated by 2 experts in cardiovascular disease (CVD) management, social determinants of health (SDoH), and disease prevention (C. Baker-Smith and B. Boden Albala).

This viewpoint provides a brief synopsis of the session, takeaways, and recommendations for achieving social justice in clinical care and CVD-related research. In this viewpoint, we define social justice, summarize

the burden of CVD inequity in the United States, and highlight solutions, including those proposed by the session presenters: addressing workforce diversity, integrating social determinants into cardiovascular research, designing cardiovascular interventions to close the equity gap, and strategies to improve inclusivity in CVD trials. Attention to social justice is essential. In the absence of social justice, equitable CVH is impossible.

DEFINITIONS: SOCIAL JUSTICE AND HEALTH EQUITY

Social justice is a fundamental value and “belief in the dignity of all people to be afforded equitable access to healthcare,” equitable access to health care knowledge, and equitable access to health care resources (Figure). Health equity is the “state in which everyone has a fair and just opportunity to attain their highest level of health and wellbeing” (Table 1).^{1–5} A social

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Nonstandard Abbreviations and Acronyms

AHA	American Heart Association
ARIC	Atherosclerosis Risk in Communities
CVH	cardiovascular health
EBI	evidence-based intervention
MESA	Multi-Ethnic Study of Atherosclerosis
SDoH	social determinants of health

justice approach is required to address US health inequities, including inequities in CVD-related risks and outcomes.

CURRENT STATE OF SOCIAL JUSTICE AND CARDIOVASCULAR HEALTH INEQUITY IN THE UNITED STATES

Inequities in CVH exist across a variety of populations, including across race, ethnicity, language, geography, sex, sexual orientation, physical disability, and socioeconomic status. Limitations in access to care, quality hospitals, and effective care models contribute to inequities in outcomes. The COVID-19 pandemic only widened the gap in CVD inequity because of disruptions in health care access and affordability attributable to financial strain.⁶

According to the most recent National Health and Nutrition Examination Survey data (2017–2020), the greatest burden of CVD can be attributed to hypertension.⁷ Starting from preconception and extending throughout the lifespan, health inequities in hypertension and CVD exist. Data from the PRAMS (Pregnancy Risk Assessment Monitoring System), a study of 9907 live births, revealed non-Hispanic Black individuals have the highest rates of hypertension during pregnancy (21.8%). The study also found that racial and ethnic disparities in hypertension were reduced when perceived experiences of racism and/or discrimination were included in the model.⁸

Rates of maternal mortality in the United States are among some of the highest in the world and on the rise.⁹ The presence of hypertensive disorders of pregnancy, including chronic hypertension, gestational hypertension, preeclampsia, hemolysis, elevated liver enzyme, and low platelet syndrome, and eclampsia, are not only associated with greater pregnancy-related mortality but also predict higher lifetime CVD risk in affected women¹⁰ and greater risk for CVD among their offspring.¹¹ Hypertensive disorders of pregnancy are more common among non-Hispanic Black women, in part because of a higher prevalence of chronic hypertension prepregnancy but also because of complex

social factors.¹² Although the composite presence of gestational hypertension and gestational diabetes is associated with a doubling of the CVD risk,¹³ the morbidity and mortality associated with hypertensive disorders of pregnancy are not the same among all women.¹⁴ Non-Hispanic Black women are 2 to 3 times more likely to die from complications of hypertensive disorders of pregnancy than are non-Hispanic White women.¹⁵

The intergenerational risk for hypertension and other forms of CVD begins in early childhood and adolescence and contributes to the burden of CVD in later adulthood.¹⁶ Economic and neighborhood-level deprivation are associated with health inequities in CVD risk, including higher rates of childhood obesity and greater odds of hypertension diagnosis during childhood and adolescence.^{17,18} Among children born with congenital heart disease, inequities in outcomes also exist, such that among infants with a prenatal diagnosis of hypoplastic left heart syndrome, non-Hispanic Black infants experience a 2 times higher mortality rate compared with non-Hispanic White infants.¹

Inequities in CVD prevalence continue throughout the life course. CVD is prevalent in 58% of US men and 51% of US women by midadulthood.⁷ Although overall CVD prevalence across all racial and ethnic groups has declined in the United States, it has remained the highest among the geographically and socioeconomically disenfranchised.⁷ The decline in CVH has been less pronounced in non-Hispanic White adults than in non-Hispanic Black or Hispanic adults.⁷ Disparities in CVD prevalence and in the risk factors contributing to the development of CVD are strongly influenced by disparities in social structure, including neighborhood-level wealth and safety, community cohesiveness, resource access, and policies (past and present) that shape access to care and influence the quality of care received.^{19,20} It is well established that historic redlining, one of the many discriminatory housing policies and a policy “implemented in the 1930s designed to explicitly increase racial segregation, discriminatory housing practices, leading to systemic disinvestment in Black communities,” has been associated with higher rates of heart failure and higher rates of CVD among adults who reside within these historically redlined communities.¹⁹ Reported stroke mortality remains 4.5-fold higher among non-Hispanic Black versus non-Hispanic White individuals.²¹ However, between 2% and 13% of the non-Hispanic Black and non-Hispanic White difference in stroke mortality may be related to regional differences as stroke-mortality data obtained for non-Hispanic Blacks were obtained from the “Stroke Belt” (North Carolina, South Carolina, Georgia, Tennessee, Mississippi, Alabama, Louisiana, and Arkansas), a region historically associated with a 30% higher average stroke mortality than the rest of the nation.⁷

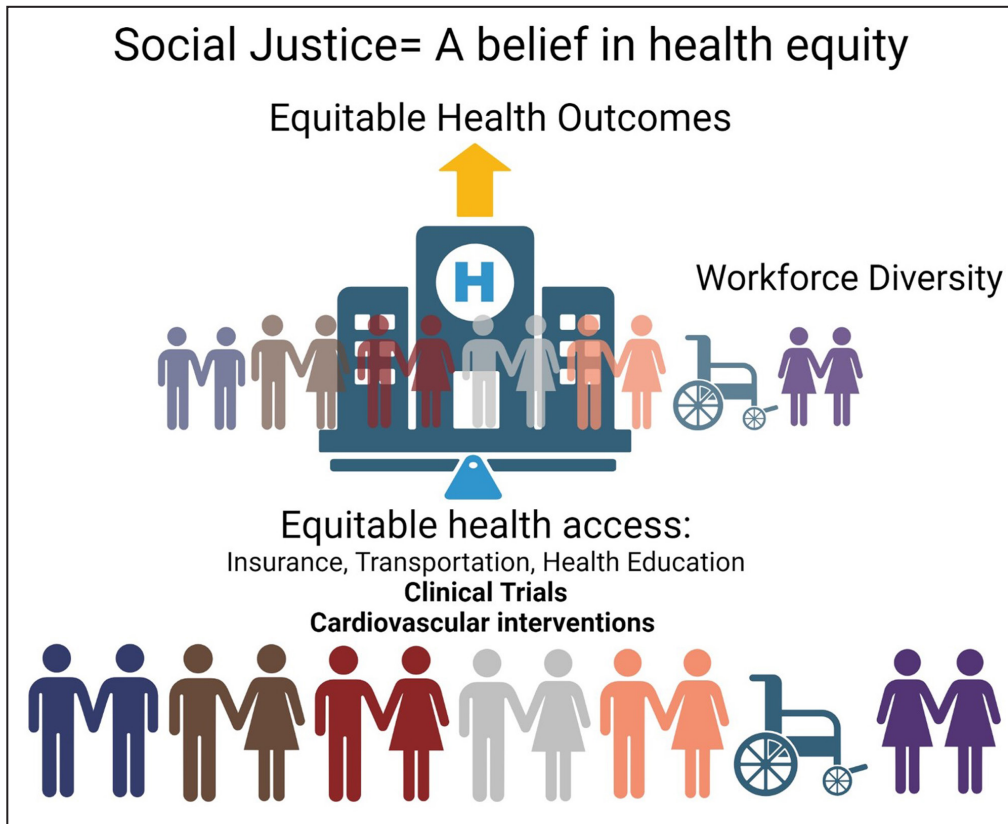


Figure 1. Conceptualization of social justice. Definitions of social justice, health equity, equitable access, and equitable health care delivery for equitable health outcomes. Image created using Biorender.

Disparities in CVD prevalence and the impact of SDoH are not isolated to differences between non-Hispanic Black and non-Hispanic White individuals but also apply to the US Asian²² and US American Indian and Alaska Native populations.²³ Within the US Asian population, there exist group differences in the prevalence of hypertension among Filipino and Chinese individuals, with Filipino adults experiencing an adjusted odds ratio (OR) of 2.4 (95% CI, 1.91–3.02). Similarly, Filipino adults are more likely to have coronary heart disease (CHD) (OR, 2.19 [95% CI, 1.32–3.56]), heart attack (OR, 2.79 [95% CI, 1.44–5.41]), angina (OR, 2.15 [95% CI, 1.06–4.32]), and stroke (OR, 2.54 [95% CI, 1.42–4.55]). These findings are significantly attenuated when adjusted for lifestyle factors and SDoH. This attenuation is also true for Asian Indians.²² Within US American Indian and Alaska Native populations, CHD is at least 12% more prevalent compared with a representative US adult population. According to the SHS (Strong Heart Study), rates of CHD and CHD-related mortality among American Indian and Alaska Native populations also exceed those of other US subpopulations.^{23,24} Diabetes is the strongest determinant of CHD in US American Indian populations, with 56% of

events in men and 78% of events in women attributed to the presence of diabetes. Hypertension is also predictive of CHD in US American Indian adults.^{23,24} The rate of death from CHD is higher in the United States for American Indian adults residing in North and South Dakota, Wisconsin, and Michigan.²³ Inequities in health outcomes have been attributed to “broken treaties, exclusionary policies, and structural discrimination.”²³

SYSTEMATIC STRATEGIES FOR ACHIEVING SOCIAL JUSTICE AND IMPROVED CARDIOVASCULAR HEALTH EQUITY

Clinical Recommendations for Achieving Social Justice

Addressing Individual Implicit Bias and Possibly Explicit Bias

Addressing CVD inequities through the lens of achieving social justice requires several steps. The first step is accepting “with grace and humility” that most, if not all, people possess implicit and possibly explicit bias

(combating implicit bias and stereotypes) (hhs.gov).²⁵ Implicit bias is defined as negative associations people unknowingly hold and express without conscious awareness. Explicit bias is conscious. It is when we are aware that we have preferences for groups based on race, ethnicity, or sex, including traditionally accepted concepts of race and sex.³ Bias, implicit and explicit, negatively impacts health care access, delivery, and outcomes.^{26,27} Confronting such biases via approaches such as stereotype replacement, individualizing, and mindfulness may be potentially effective strategies for combatting bias (Table 2).^{28–31}

Addressing Individual and Community-Level Factors

Consideration of individual and community-level interventions may help reduce CVD inequities and help move individuals and communities toward greater social justice. Individual health accountability is needed, including attention to one's diet, exercise, sleep, tobacco use, weight management, blood pressure, lipid, and blood glucose control. Greater adherence to recommended risk-reducing behaviors and adherence to therapeutic interventions, when prescribed, is required.³² However, adherence varies among individuals for a variety of reasons. Minoritized and under-resourced populations "often face multiple levels of mutually reinforcing structural disadvantage that contribute to poor health."³³ One framework, the SDoH framework by Powell-Wiley et al, explores these multilevel disadvantages and the importance of addressing structural and intermediary determinants of health equity for vulnerable populations.⁶ Socioeconomic status, neighborhood environment, systemic discrimination, and access to quality health care and education significantly influence social and community contexts, such as food and/or social environments and psychosocial factors.⁶ These broader determinants can contribute to food insecurity, financial strain, and housing instability and lead to chronic disease.⁶ Determinants interplay with daily lived personal experience, including implicit bias, health literacy, and discrimination, to have a combined effect on CVD outcomes and health equity.⁶ Exposure to chronic stress from SDoH can trigger biological mechanisms that have a long-term impact, including chronic inflammation and epigenetic modification, which contribute to an increased risk of CVD and poorer health outcomes.⁶ Community-level factors, including structural and intermediary determinants, impact the potential for individual health accountability. Thus, multilevel intervention strategies that address the complex socioeconomic, environmental, and system-level factors impacting health is essential. Interventions that do not address the social

and physical environment and only focus on individual or interpersonal factors have a limited ability to yield sustained improvement.³³ A community-based approach that addresses structural barriers to "health accountability," such as access to safe places to exercise, healthy food access, exposure to environmental pollutants, and social factors, such as noise and safety, may positively impact individual health accountability.³⁴ The most effective community-level interventions focus on addressing specific SDoH and include community mobilization, health education, information sharing, individual or group counseling, and provider training.³⁵

Encouraging Cultural Competency Among Providers

The preparation of culturally competent providers represents an added resource for achieving social justice. Health care settings equipped with culturally and medically competent professionals are key to addressing barriers to care, including at the patient level. These structures are also essential to promoting effective preventive care.³⁶ Provider training, including formal training on the barriers to care and effective communication, is paramount.³⁷ Communication at a patient's level of understanding and in a language that yields a high level of understanding fosters active engagement and adherence to treatment plans. Individualizing information to a patient's literacy and language capabilities or needs and promoting shared decision-making empowers them to take an active role in managing their health.

Diversifying the Workforce: Diverse Recruitment and Retention for Improving Health Equity

AHA Session: ENHANCING CARDIOVASCULAR DISEASE WORKFORCE DIVERSITY (T. Okwuosa)

Beyond the individual and community-level interventions, greater provider diversity and patient-provider congruence may be beneficial to achieving social justice in CVH in the United States. The current cardiovascular workforce does not reflect the population served.³ According to a recent study, Native, non-Hispanic Black, and Hispanic Americans comprise only 0.2%, 3%, and 4.2% of the cardiovascular workforce, respectively, even though each comprises 1.3%, 13.4%, and 18.5% of the overall US population.³⁸ In a 2020 Physician Specialty Data Report, only 15% of adult cardiologists were women.³⁹ A 2017 study reported that only 15.9% of female cardiologists were full professors, compared with 30.6% of male cardiologists.⁴⁰ In a contemporary 2022

Table 1. Terms and Definitions

Term	Definition
Cardiovascular health disparities	Unequal burden of cardiovascular disease and related factors among different populations
Control	Power or mastery of the environment as a means of maintaining homeostasis
Cultural competence	Care that respects diversity as well as cultural factors that can affect health and health care, including language, communication style, beliefs, attitudes, and behaviors ²
Distributive justice	Fairness of decision outcomes
Environmental justice	Fair distribution of exposure to environmental pollutants (eg, air pollution, carbon monoxide, bisphenol, and arsenic)
Ethnicity	Social characteristics people may have in common, such as language, religion, regional background, traditions, and culture not rooted in biology (eg, Hispanic)
Explicit bias	Conscious and overt preferences for groups based on race or sex, including traditionally accepted concepts of race and sex ³
Fair	Impartial and just, without favoritism or discrimination
Health care disparities	Differences between groups in health insurance coverage, access to and use of health care, and quality of care
Health disparities	When one population experiences a higher prevalence of adverse health outcomes than others. A particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. ⁴
Implicit bias	Negative associations people unknowingly hold and are expressed without conscious awareness
Microaggressions	Every day and often subtle verbal, nonverbal, and environmental slights, snubs, or insults that are intentional or unintentional ³
Privilege	Unearned advantage conferred by invisible systemic forces (sexism, heterosexism, racism ableism, settler colonialism, and classism). ³
Procedural justice	Equity in decision-making processes
Race	Social construct not rooted in biology (eg, White, Black, and Asian)
Racial inequity	When a racial group is not standing on approximately equal footing
Racism	Discrimination against individuals or groups based on beliefs of racial superiority or the belief that race reflects inherent differences in attributes and capabilities
Racism-related vigilance	A form of anticipatory stress faced by Black adults and associated with increased odds of hypertension ⁵
Social determinants of health	The conditions in which people are born and live, and are shaped by the distribution of money, power, and resources, and are mostly responsible for avoidable differences in health status
Structural racism	A system in which public policies, institutional practices, cultural representations, and other norms work in various, often reinforcing ways to perpetuate racial group inequity

Adapted from Lopez et al.¹

study of 243 adult cardiology program directors, only 53 (22.5%) were women, whereas 183 (77.5%) were male.⁴¹ Among these program directors, 122 (50.2%) were non-Hispanic White, 65 (26.8%) were Asian, 6 (2.5%) were non-Hispanic Black, and 12 (4.9%) were Hispanic. Numbers are similarly poor among pediatric cardiology subspecialists. Only 10% of pediatric cardiologists are Native, non-Hispanic Black, or Hispanic.⁴² Similarly, only 16% of pediatric cardiology division directors are women, and only 25% of endowed chairs are women.⁴²

Studies have demonstrated that diversifying the frontline health care workforce can be associated with improvements in health care quality.⁴³ Increasing the number of health care professionals from diverse backgrounds injects the multiple values and experiences of the entire population into the health care system. It increases cultural awareness in the delivery of health care. Meaningful community engagement achieved via forming partnerships with community leaders, establishing health forums, and involving local organizations can also help improve

system-level barriers to care and contribute to patient experience and care outcomes.⁴⁴

Key session take-aways: “A cardiovascular workforce that is diverse and inclusive and that can focus its energy, skills, and innovation on reducing the global burden of CVD” leads to global population equity. It also leads to research that is more likely to address health disparities and benefit underserved populations, an increase in public trust, an increase in the participation of underserved populations in research, an increase in bibliometric indexes, greater scientific innovation, enhanced US global competitiveness,⁴³ and higher Press Ganey survey scores.⁴⁵

AHA Session proposed solutions:

1. Address existing gaps in CVD workforce diversity
 - a. Increase diversity and inclusion in CVD training programs, including structured programs to recruit and retain women and individuals

Table 2. Proposed Solutions, Enhancing Social Justice

Task	Detail
Bias mitigation	Implicit bias training programs with clear guidelines and policies can help raise awareness and mitigate biases that may influence decision-making
Contact	Seek ways to get to know people from different social groups. Build your confidence in interacting with people who are different from you. Seek opportunities to engage in discussions in safe environments, spend time with people outside your usual social groups, or volunteer in a different community.
Counterstereotypic imaging	Remember or imagine someone from a stereotyped group who does not fit the stereotype
Cultural transformation	This requires a commitment from leadership to institute policies to address systemic barriers, and includes implementing diversity training programs, establishing diversity and inclusion committees, and ensuring equal opportunities for career advancement
Emotional regulation	Reflect on your “gut feelings” and negative reactions to people from different social groups. Be aware that positive emotions during a clinical encounter make stereotyping less likely
Health equity	The state in which everyone has a fair and just opportunity to attain their highest level of health ²⁸
Holistic recruitment	This involves considering a candidate’s diverse experiences, backgrounds, and perspectives in the admission decision-making process. Examples include using diverse interview panels and considering candidates from underrepresented communities. ³⁰
Individuating	See each person as an individual, not a group member; pay attention to things about them besides the stereotypes of their group
Interpersonal justice	Degree to which people are treated with politeness, dignity, and respect ²⁹
Mindfulness	Keep your attention on the present moment so you can recognize a stereotypic thought before you act on it
Other potential solutions to achieving workforce equity	Implicit bias training, diverse leadership representation, culturally competent health care education, and research funding that prioritizes diversity and inclusion. By implementing these strategies for a more inclusive health care system, the cardiovascular specialty can address health care disparities, and foster innovation, improve patient outcomes, and ultimately strengthen the health care sector
Perspective taking	Imagine the perspective of someone from a group different than your own (“Put yourself in the other person’s shoes.”)
Pipeline programs/nurturing early interest	Interest in cardiology among underrepresented individuals could be achieved through mentorship programs and outreach initiatives (such as collaborating with minority-serving institutions) to help students navigate the educational pathway toward a cardiovascular disease health care profession. Such interest could also be generated by providing scholarships or financial support and partnerships with minority-serving institutions, such as historically Black colleges and universities, Hispanic-serving institutions, and tribal colleges. Such collaborations can facilitate the recruitment and training of a diverse health care workforce, including physicians, nurses, and other health care professionals, who are more likely to understand and address the unique needs of minoritized populations.
Prioritization	Health care organizations and academic institutions prioritize and commit to including diversity and inclusion as core values. Example: Cardiovascular divisions strive to achieve a trainee and faculty composition that more closely reflects national demographics. Organizations establish and regularly monitor metrics to track institutional progress in incorporating diversity, equity, inclusion, and belonging.
Social justice	A belief in the value and dignity of all people to be afforded equitable access to health care, equitable health care knowledge, and equitable health care resources ³¹
Stereotype replacement	Become aware of the stereotypes you hold and create nonstereotypical alternatives to them
Supporting career advancement/partnership with professional societies	Example: AHA (AHA collaborates with health care institutions to provide mentorship programs, networking opportunities, and scholarships for underrepresented individuals). The AHA, for example, has initiatives like the Strategically Focused Research Networks that aim to increase diversity in cardiovascular research (https://professional.heart.org/en/research-programs/aha-funded-research/strategic-networks/sfrn-general-application-information). AHA indicates American Heart Association.

of diverse backgrounds into cardiology (eg, nurture early interest)

- b. Adopt evidence-based strategies shown to enhance diversity
- c. Promote institutional commitment to the diversification of the CVD workforce,³ bias mitigation, and zero tolerance for discrimination and harassment³⁰
2. Address the perception of a limited pool of women and underrepresented candidates
3. Address bias in recruitment practices
4. Address the need for diverse role models and mentors, create mentorship programs, and encourage intentional mentorship and equitable access to career advancement opportunities
5. Address bias, discrimination, and hostility in workplace culture; and inequitable compensation (“minority tax”)³⁰
6. Prioritize diversity, equity, and inclusion
7. Partner with professional societies to enhance diversity
8. Professional societies and organizations commit to diverse and equitable governance and leadership⁴⁶
9. Create training in leadership skills and increase the number of leadership opportunities
10. Diversify funding assessment panels and encourage equitable distribution of funding

Designing Cardiovascular Interventions to Close the Health Equity Gap

AHA Session: DESIGNING CARDIOVASCULAR INTERVENTIONS TO CLOSE THE EQUITY GAP (E. Pevrah)

Optimizing CVH outcomes also requires comprehensive and nuanced approaches tailored to the diverse needs and challenges faced by different populations.⁴⁷ Interventions designed to enhance health care access should account for and address the SDoH, such as socioeconomic status and cultural factors.^{21,48–50} Potential opportunities for improving access to health care services include telemedicine and digital health solutions.⁵¹ If introduced within a health equity framework, these technologies can be used to provide care in regions considered to be health care deserts and address disparities.⁵¹ Unfortunately, most health care–underserved communities in the United States are located in “digital deserts,” areas with limited to no access to high-speed internet.⁵² Although the use of digital technologies has the potential to reach underserved populations, addressing access to high-speed internet is a crucial first step. Once access is established and training provided to improve digital literacy,^{53,54} there may be an opportunity to provide remote health care services through virtual consultations, to provide remote monitoring services, and enhanced health education and support.^{55–57}

Strategies for modifying risk factors, such as introducing community-level policies and enhancing resources to eliminate health care deserts, should also be considered. By overcoming geographical barriers, these approaches facilitate access to specialized care.⁵⁷ Addressing disparities requires identifying underserved areas, allocating strategic resources to health care deserts, and deploying resources, like clinics, health facilities, and health care professionals, to bridge service gaps.⁵⁸ Expanding the use of community health workers and promoting models of care that bridge cultural and geographical gaps can be used.

Equitable Health Care Knowledge for Improving Health Equity

Community-based culturally tailored education programs for chronic disease management represent additional opportunities for achieving social justice.⁵⁹ Education on proper nutrition, regular exercise, stress management, and smoking cessation can significantly reduce disparities and may prove beneficial, particularly when initiated at an early age.^{60,61} Community workshops, educational campaigns, community gardens, and school-based programs are options. Such initiatives, including those designed to provide greater access to healthy foods in underserved areas, job training programs, and those that lead to the formation

of policies for tackling income disparities and access to quality education, are examples.⁶² Implementing such strategies would pave the way for a more equitable health care system, thus ensuring interventions are tailored, accessible, and address the broader determinants of health, ultimately reducing CVH disparities among diverse populations.^{63,64}

Equitable Health Care Resources for Improving Health Equity

Evaluation metrics, encompassing health outcomes and disparity indicators, play a pivotal role in shaping successful strategies to close the gap in CVH disparities. Evidence-based interventions (EBIs) targeting CVH disparities that prioritize long-term sustainability, incorporate ongoing research and innovation, and are scaled for broader impact are needed. Achieving long-term sustainability involves embedding equitable evidence-based CVD interventions into health care policies and regulations and requires collaboration between health care practitioners and public health advocates to reduce health disparities. Allocating adequate resources for the continued implementation of EBIs is essential, with advocacy efforts focused on securing funding and infrastructure to maintain and expand programs addressing CVH disparities. Empowering local communities to take ownership of these EBIs is vital and can be achieved by involving community leaders, creating health coalitions, and ensuring programs become integral parts of community culture and infrastructure.⁶⁵ Examples of such initiatives include the “AHA EmPOWERED to serve” initiative, which provides entrepreneurs, startups, and businesses focusing on health impact with the tools and support necessary for growth and scalability.⁶⁶

Key session take-aways: “Addressing equity in cardiovascular interventions is crucial for creating a fair and just health care system. It is not merely about providing everyone the same standard of care but ensuring that all individuals have access to the resources, opportunities, and support needed to attain good cardiovascular health. By focusing on equity, intervention eliminates the systemic barriers leading to health care outcomes disparities. Reducing these disparities enhances the overall health of communities and fosters a more inclusive, healthier society.”

AHA Session proposed solutions:

1. Improve access to health care services (telemedicine, addressing health care deserts, and resource allocation)
2. Provide culturally competent care and outreach, including the creation of tailored interventions to provide care across diverse cultural and linguistic groups (eg, community-based culturally tailored education programs)⁵⁹

3. Advance health education and behavioral interventions that promote healthy lifestyle choices and that address SDoH
4. Implement and evaluate EBIs/practices for CVH equity⁶⁷
 - a. Design and pilot interventions
 - b. Use rigorous measurement and evaluation metrics for interventions, including health outcome assessments and equity metrics
5. Iterative improvement and adaptation of EBIs/practice using a health equity lens
6. Encourage long-term sustainability of equitable interventions (community ownership, policy integration, resource allocation, and data monitoring); research and innovation in CVH (targeted research, innovative solutions, knowledge translation, and implementation research, education, and training; scalability, including scaling up successful models for wider impact).

RESEARCH RECOMMENDATIONS FOR ACHIEVING SOCIAL JUSTICE

Like clinical practice, a SDoH-based framework can be integrated into multilevel research designs to achieve the goal of social justice. This goal considers individual, community, and policy-level interventions that are available, accessible, and affordable.⁶ Future research to improve CVH outcomes and address SDoH can focus on strategies that enhance health care access, promote healthy behaviors, improve health equity, and mitigate biological mechanisms related to adversity.⁶ These efforts involve using targeted intervention strategies that promote health equity through clinical trial design, big-data research, and institutional support. Diversifying editorial boards, allocating specific grants for social justice initiatives, and promoting organizational justice are additional key strategies for advancing social justice within the field of research.

AHA Session: Integration of Social Determinants Into Cardiovascular Research (M. Mujahid)

Key session take-aways: CVH inequities are persistent and key drivers of these inequities are social determinants and structural racism. However, addressing education access and quality, health literacy, and neighborhood environment are some ways to address the social determinants that may lead to improved outcomes.

AHA Session proposed solutions:

1. Social determinants and structural racism are key drivers of cardiovascular health outcomes,⁶⁸

but there is a feasible path to achieving CVH. Steps include:

- a. Improving representation in CVH studies (ARIC [Atherosclerosis Risk in Communities], MESA [Mult-Ethnic Study of Atherosclerosis], etc)
- b. Addressing the needs of all individuals, including those of minoritized background
- c. Using efforts such as the National Heart, Lung, and Blood Institute strategic vision to address SDoH and health inequities, preserve and promote resilience, promote CVH, and prevent CVD across the lifespan
- d. Encouraging “call to action,” such as the “AHA’s call to action” to draw attention to the need for greater health equity, including providing education to health care professionals and the public, applying new knowledge, teaching individual prevention, focusing on health impact, fighting against systems, laws, and customs perpetuating inequities; funding (eg, \$100 million dollars in new research programs), and soliciting community-led solutions to address social inequity

AHA Session: Strategies to Improve Inclusion in CVD Trials (S. Waddy)

Inequities in clinical trial representation currently exist. The lack of diversity in clinical trial representation has the potential to negatively impact CVH and social justice. According to a recent literature review of the major cardiovascular trials published between 1986 and 2018, only half of the landmark cardiovascular trials reported information on race.⁶⁹ However, it is estimated that only 2.9% of participants in clinical trials leading to US Food and Drug Administration approval of cardiovascular drugs in the United States were non-Hispanic Black.⁷⁰ Women and minoritized population participation in pivotal cardiometabolic trials is also disproportionately low, with no improvement in representation between 2008 and 2017.^{69,71}

The inclusion of people of diverse backgrounds in clinical trials enhances the scientific rigor of the trial. Clinical trials are designed to evaluate the effects of drugs, devices, procedures, diets, and behavioral approaches on health-related outcomes. Health-related outcomes are often related to the lived experiences and the exposures faced by the individual.⁷² A person’s lived experience may be shaped by age, biological sex, sexual orientation, environmental conditions, genetic variation, or underlying comorbidities.⁷² Participant diversity in clinical trials is needed to account for the diversity of lived experiences and exposures and to enhance the generalizability of trial results.⁷³

Successful recruitment of diverse populations in clinical trials requires (1) intentionality to address this challenge in the design and conduct of the trial and (2) strategies to address structural and system-level barriers that result in low trial participation or distance patients from wanting to participate. To address barriers at the patient, investigator, institutional, and system levels, targeted strategies that expand the pool of participants are needed. Efforts begin with intentional enrollment and optimized retention strategies.⁷³

Researchers across many medical disciplines have identified strategies and best practices to improve enrollment and optimize the retention of diverse clinical trial participants over the past few decades. Strategies have focused on site selection, screening procedures, community engagement, and communication strategies. Solutions are not 1 dimensional and can be implemented with iterative checks across multiple levels to optimize results. Examples of tools designed to overcome the multilevel barriers to diversifying the clinical trial population include the following: (1) the National Institutes of Health Trial Innovation Network, which has developed tools to increase recruitment using decentralized trial methods; (2) the resource *Faster Together, Enhancing the Recruitment of Minorities in Clinical Trials* (available on Coursera)⁷⁴ trains research teams on identifying and addressing individual and site-specific barriers and facilitators around minority recruitment; (3) the National Initiative for Minority Involvement in Neurological Clinical Trials has identified investigator-level barriers and has created and tested a series of evidence-based practices that address minority recruitment and retention challenges in neurologic clinical trials⁷⁵; (4) online toolkits offer investigators and research coordinators interactive and responsive resources for identifying recruitment barriers and supporting the adoption of best practices; and (5) additional resources include information on best practices for recruitment and retention of research coordinators, guidelines for better screening, research staff training materials, as well as videos showing clinical research concepts for lay audiences.⁷⁵

In addition, the AHA has developed the Strategically-Focused Research Network on the Science of Diversity in Clinical Trials and, through various funded projects, has provided head-to-head comparisons of inclusion strategies in trials as well as decentralized trial approaches for improving the diversity of participants in trials. Importantly, journals, including the *New England Journal of Medicine*, have required mandatory reporting of information on subgroup baseline demographics to receive approval for publication, incentivizing investigators to include more diverse subjects in clinical trials.

Clinical trials lack diversity not only among participants but also among the research team, including primary investigators who lead the trials.⁷⁶ Diversity among research teams fosters community engagement and

the participation of disparate communities in research planning. One study found that studies led by female principal investigators are significantly more likely to successfully enroll women than studies led by men.⁷⁷ Racial concordance between the clinical trial principal investigator and patient participant trust may also lead to greater trial participant diversity. In a randomized clinical trial of 2904 US adults designed to assess trust in the information presented via online video about prostate cancer, Black adult participants were significantly more likely to trust a Black versus White presenter. However, the same preference was not held among White adult participants who expressed no difference in trust according to the race of the presenter.⁷⁸

Key session take-aways: Diversity in clinical representation is lacking both in terms of the trial participants and trial primary investigators. The inclusion of diverse communities in clinical trials is critical and enhances the rigor of studies.

AHA Session proposed solutions:

1. Acknowledge that the inclusion of minorities in clinical trials and inclusion success is the responsibility of the many and not the few
2. Improve inclusion and representation in multi-center trials. This requires preparing and training for inclusion and representation.
3. Seek meaningful engagement of participants of diverse backgrounds to foster inclusion and address participant needs and preferences
4. Tips for diversity retention:
 - a. Proactively assess recruitment and retention barriers and develop mitigation strategies
 - b. Prioritize the participant journey; minimize burden and return value, data-driven site selection (choose sites with the availability, capacity, and feasibility to recruit the study target population), engage stakeholders at every step; decentralize components of trials to ease participation/burden, use digital tools and real work data

Targeted Intervention Strategies and Big-Data Research Informing Health Equity

Addressing CVH disparities also necessitates a commitment to research and innovation.^{79,80} Fostering research that specifically addresses the unique needs and challenges of populations affected by CVD disparities is crucial. Encouraging research that expands on the existing literature on how SDoH affects cardiovascular health is vital to developing new tools and models for understanding SDoH.⁶ Primordial prevention, the prevention of risk factors of CVD, is essential.⁸¹ Fostering research that addresses the unique needs and challenges affected by CVD disparities includes

investing in studies exploring the root causes of these disparities, testing potential solutions, determining ways to implement evidence-based care to address CVH disparities, and population-level data analyses to address the overall impact of implemented solutions.³³ Research efforts that drive innovation in CVD prevention and treatment that explore emerging technologies, precision medicine, and personalized health care approaches to address the specific needs of diverse populations are needed. Research strategies must incorporate SDoH-based frameworks and variables, including social and environmental factors. One study used the social vulnerability index to show how disadvantaged geographic areas can negatively impact the ecosystem of the human microbiome, emphasizing the importance of environmental factors and their potential impact on CVH.⁸² Another study found an association between social vulnerability index and risk factors for CVD, including hypertension and diabetes, which underscores the significance of a multidimensional approach that considers SDoH to improve CVH.⁸³ Bridging the gap between research and practice is also essential, as is ensuring findings from CVH research are translated into practical, community-based, and evidence-based interventions/practices readily implementable to reduce disparities. This involves training and educating community partners, including health care professionals and community health workers, in the latest advancements in CVH research and treatment to ensure that innovations effectively reach the communities that need them most. Research efforts should be “supplemented by additional research on the dissemination and implementation of effective interventions to modify health behaviors and to mitigate CVD risk.”²¹ Big-data and publicly available SDoH indexes may be used to better understand disparities in CVD risk and outcome according to geocoded regions within the United States as well as to inform public health planning.⁸⁴

Targeted Intervention Strategies and Institutional Support

Addressing the SDoH is costly, and institutional support, local and national, is needed. Research dollars to support innovative ideas that address the SDoH may be needed. This includes fostering community-based partnerships to obtain community feedback and implementing SDoH-based tools that predict CVD risk in the local community.⁶ Projects that craft initiatives (whether small scale or large) that rigorously test the feasibility, effectiveness, and acceptability of proposed strategies within populations marked by significant health disparities are also needed.⁶⁷ Using methods in implementation science to tailor and evaluate the effectiveness of EBIs for specific target populations is

crucial, considering the unique needs of the communities being served.⁸⁵ Piloting EBI function as a testing ground to refine approaches before broader implementation through evaluation and assessment has been proposed.⁸⁶ By meticulously designing, measuring, and adapting EBIs, researchers and institutions can ensure that efforts to address CVH disparities are effective and responsive to the evolving needs of diverse communities.

Editorial Board Representation, Grant Funding, and Research Skills for Improving Health Equity

Intervention strategies to address disparities in medical publishing may further positively influence efforts to achieve greater health equity and social justice.³ Lack of diversity on the editorial board has been associated with gaps in the review process, perpetuation of negative stereotypes, and harm to members of the cardiology profession from “equity-deserving” groups.³ Other suggestions include training editorial boards around SDoH issues as well as the intentional allocation of an editor focused on social justice. Aside from expanding the diversity of the editorial board, the release of annual themed issues addressing health equity, as featured by a variety of journals, is key.⁸⁷

Greater emphasis on supporting research grant support for women and minoritized faculty is also critical to health equity and social justice. Unfortunately, US women in academia hold fewer grants, submit fewer applications, and are less successful in receiving funding renewal.³ The Ginther 2011 report examined the relationship between race, priority score, and probability of obtaining National Institutes of Health R01 funding. According to this report, there were significant differences in funding by race and ethnicity.⁸⁸ Potential sources of disparities in funding included topic selection, where research topics at the community and population level tended to garner lower award rates than fundamental and mechanistic investigations.⁸⁹ More recent estimates reveal, however, that National Institutes of Health R01 funding rates have most dramatically increased among Black applications since 2019.⁹⁰ Efforts such as the Robert A. Winn Diversity in Clinical Trials Award Program expand the number of female and minoritized faculty who attain research funding.⁹¹

CONCLUSIONS

Social justice is paramount in achieving equitable CVH. It is critical to address the significant disparities in CVD outcomes across diverse populations and to recognize the influence of SDoH. Effectively addressing health disparities in CVD demands a comprehensive and multifaceted approach that prioritizes social

justice, addresses SDoH, confronts bias, involves community, and promotes cultural competency. Several clinical recommendations should be followed to help achieve health equity, implementing changes that encompass improved health care access, implementing evidenced-based care, enhancing clinical trial inclusion, and optimizing workforce training and diversity. Key strategies for advancing social justice in research include enhancing clinical trial inclusion, fostering CVD disparity-focused research, integrating multilevel interventions, cultivating institutional support, diversifying editorial boards, and establishing organizational justice. Prioritizing sustainability, research excellence, and strategic scaling are pivotal elements that hold the potential to instigate lasting change, ultimately leading to a substantial reduction in disparities within CVH outcomes.

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REFERENCES

- Lopez KN, Morris SA, Krishnan A, Jacobs MB, Bhat AH, Chelliah A, Chiu JS, Cuneo BF, Freire G, Hornberger LK, et al. Associations between maternal sociodemographics and hospital mortality in newborns with prenatally diagnosed hypoplastic left heart syndrome. *Circulation*. 2023;148:283–285. doi: [10.1161/CIRCULATIONAHA.123.064476](https://doi.org/10.1161/CIRCULATIONAHA.123.064476)
- Quality AfHRA. CAHPS Cultural Competence Item. <https://cahps.ahrq.gov/surveys-guidance/item-sets/cultural/index.html>.
- Keir M, McFadden C, Ruzyczki S, Weeks S, Slawnych M, Scott McClure R, Kuriachan V, Fedak P, Morillo C. Lack of equity in the cardiology physician workforce: a narrative review and analysis of the literature. *CJC Open*. 2021;3:S180–s186. doi: [10.1016/j.cjco.2021.09.019](https://doi.org/10.1016/j.cjco.2021.09.019)
- Healthy People 2030. <https://health.gov/healthypeople/priority-areas/social-determinants-health>.
- Hicken MT, Lee H, Morenoff J, House JS, Williams DR. Racial/ethnic disparities in hypertension prevalence: reconsidering the role of chronic stress. *Am J Public Health*. 2014;104:117–123. doi: [10.2105/AJPH.2013.301395](https://doi.org/10.2105/AJPH.2013.301395)
- Powell-Wiley TM, Baumer Y, Baah FO, Baez AS, Farmer N, Mahlobo CT, Pita MA, Potharaju KA, Tamura K, Wallen GR. Social determinants of cardiovascular disease. *Circ Res*. 2022;130:782–799. doi: [10.1161/CIRCRESAHA.121.319811](https://doi.org/10.1161/CIRCRESAHA.121.319811)
- Martin SS, Aday AW, Almarzooq ZI, Anderson CAM, Arora P, Avery CL, Baker-Smith CM, Barone Gibbs B, Beaton AZ, Boehme AK, et al. 2024 heart disease and stroke statistics: a report of US and global data from the American Heart Association. *Circulation*. 2024;149:e347–e913. doi: [10.1161/CIR.0000000000001209](https://doi.org/10.1161/CIR.0000000000001209)
- Lee K, Pellowski JA, Brayboy LM, Thompson KD, Dunsiger S. The Association of Racism and Discrimination in disparities of hypertensive disorders of pregnancy in the United States: an analysis of PRAMS data. *Matern Child Health J*. 2024;28:969–978. doi: [10.1007/s10995-023-03885-0](https://doi.org/10.1007/s10995-023-03885-0)
- Maternal mortality rates in the United States, 2020. 2022.
- Cameron NA, Everitt IK, Lee KA, Yee LM, Khan SS. Chronic hypertension in pregnancy: a lens into cardiovascular disease risk and prevention. *Hypertension*. 2023;80:1162–1170. doi: [10.1161/HYPERTENSIONAHA.122.19317](https://doi.org/10.1161/HYPERTENSIONAHA.122.19317)
- Svigkou A, Katsi V, Kordalis VG, Tsioufis K. The molecular basis of the augmented cardiovascular risk in offspring of mothers with hypertensive disorders of pregnancy. *Int J Mol Sci*. 2024;25:5455–5477. doi: [10.3390/ijms25105455](https://doi.org/10.3390/ijms25105455)
- Meyerovitz CV, Juraschek SP, Ayturk D, Moore Simas TA, Person SD, Lemon SC, McManus DD, Kovell LC. Social determinants, blood pressure control, and racial inequities in childbearing age women with hypertension, 2001 to 2018. *J Am Heart Assoc*. 2023;12:e027169. doi: [10.1161/JAHA.122.027169](https://doi.org/10.1161/JAHA.122.027169)
- Mussa J, Rahme E, Dahhou M, Nakhla M, Dasgupta K. Considering gestational diabetes and gestational hypertension history across two pregnancies in relationship to cardiovascular disease development: a retrospective cohort study. *Diabetes Res Clin Pract*. 2023;206:110998. doi: [10.1016/j.diabres.2023.110998](https://doi.org/10.1016/j.diabres.2023.110998)
- Palatnik A, McGee P, Bailit JL, Wapner RJ, Varner MW, Thorp JM Jr, Caritis SN, Prasad M, Tita ATN, Saade GR, et al. The Association of Race and Ethnicity with severe maternal morbidity among individuals diagnosed with hypertensive disorders of pregnancy. *Am J Perinatol*. 2023;40:453–460. doi: [10.1055/a-1886-5404](https://doi.org/10.1055/a-1886-5404)
- Howell EA. Reducing disparities in severe maternal morbidity and mortality. *Clin Obstet Gynecol*. 2018;61:387–399. doi: [10.1097/GRF.0000000000000349](https://doi.org/10.1097/GRF.0000000000000349)
- Venkatesh KK, Perak AM, Wu J, Catalano P, Josefon JL, Costantine MM, Landon MB, Lancki N, Scholtens D, Lowe W, et al. Impact of hypertensive disorders of pregnancy and gestational diabetes mellitus on offspring cardiovascular health in early adolescence. *Am J Obstet Gynecol*. 2024. doi: [10.1016/j.ajog.2024.04.037](https://doi.org/10.1016/j.ajog.2024.04.037)
- Ikomi C, Baker-Smith CM. Where a child lives matters: neighborhood deprivation and pediatric obesity. *Curr Opin Pediatr*. 2023;36:3–9. doi: [10.1097/MOP.0000000000001317](https://doi.org/10.1097/MOP.0000000000001317)
- Baker-Smith CM, Yang W, McDuffie MJ, Nescott EP, Wolf BJ, Wu CH, Zhang Z, Akins RE. Association of area deprivation with primary hypertension diagnosis among youth medicaid recipients in Delaware. *JAMA Netw Open*. 2023;6:e233012. doi: [10.1001/jamanetworkopen.2023.3012](https://doi.org/10.1001/jamanetworkopen.2023.3012)
- Motairek I, Lee EK, Janus S, Farkouh M, Freedman D, Wright J, Nasir K, Rajagopalan S, Al-Kindi S. Historical neighborhood redlining and contemporary cardiometabolic risk. *J Am Coll Cardiol*. 2022;80:171–175. doi: [10.1016/j.jacc.2022.05.010](https://doi.org/10.1016/j.jacc.2022.05.010)
- Wadhwa RK, Secemsky EA, Xu J, Yeh RW, Song Y, Goldhaber SZ. Community socioeconomic status, acute cardiovascular hospitalizations, and mortality in Medicare, 2003 to 2019. *Circ Cardiovasc Qual Outcomes*. 2024;17:e010090. doi: [10.1161/CIRCOUTCOMES.123.010090](https://doi.org/10.1161/CIRCOUTCOMES.123.010090)
- Carnethon MR, Pu J, Howard G, Albert MA, Anderson CAM, Bertoni AG, Mujahid MS, Palaniappan L, Taylor HA Jr, Willis M, et al. Cardiovascular health in African Americans: a scientific statement from the American Heart Association. *Circulation*. 2017;136:e393–e423. doi: [10.1161/CIR.0000000000000534](https://doi.org/10.1161/CIR.0000000000000534)
- Perera S, Zheng Z, Wadhwa RK. Cardiovascular health, lifestyle factors, and social determinants in Asian subpopulations in the United States. *Am J Cardiol*. 2024;216:77–86. doi: [10.1016/j.amjcard.2024.01.029](https://doi.org/10.1016/j.amjcard.2024.01.029)
- Breathett K, Sims M, Gross M, Jackson EA, Jones EJ, Navas-Acien A, Taylor H, Thomas KL, Howard BV. Cardiovascular health in American Indians and Alaska natives: a scientific statement from the American Heart Association. *Circulation*. 2020;141:e948–e959. doi: [10.1161/CIR.0000000000000773](https://doi.org/10.1161/CIR.0000000000000773)
- Howard BV, Lee ET, Cowan LD, Devreux RB, Galloway JM, Go OT, Howard WJ, Rhoades ER, Robbins DC, Sievers ML, et al. Rising tide of

- cardiovascular disease in American Indians. *The Strong Heart Study. Circulation.* 1999;99:2389–2395. doi: [10.1161/01.CIR.99.18.2389](https://doi.org/10.1161/01.CIR.99.18.2389)
25. Haider AH, Schneider EB, Sriram N, Dossick DS, Scott VK, Swoboda SM, Losonczy L, Haut ER, Efron DT, Pronovost PJ, et al. Unconscious race and social class bias among acute care surgical clinicians and clinical treatment decisions. *JAMA Surg.* 2015;150:457–464. doi: [10.1001/jamasurg.2014.4038](https://doi.org/10.1001/jamasurg.2014.4038)
 26. Chae DH, Nuru-Jeter AM, Adler NE. Implicit racial bias as a moderator of the association between racial discrimination and hypertension: a study of midlife African American men. *Psychosom Med.* 2012;74:961–964. doi: [10.1097/PSY.0b013e3182733665](https://doi.org/10.1097/PSY.0b013e3182733665)
 27. Banerjee S, Aaysha Cader F, Gulati M, Capers QT. Racism and cardiology: a global call to action. *CJC Open.* 2021;3:S165–S173. doi: [10.1016/j.cjco.2021.09.014](https://doi.org/10.1016/j.cjco.2021.09.014)
 28. What is health equity? 2022;2024. <https://www.cdc.gov/healthequity/whatis/index.html>.
 29. Sara JD, Prasad M, Eleid MF, Zhang M, Widmer RJ, Lerman A. Association between work-related stress and coronary heart disease: a review of prospective studies through the job strain, effort-reward balance, and organizational justice models. *J Am Heart Assoc.* 2018;7:1–15.
 30. Balinda IG, Reza N. Diversity, equity, inclusion, and belonging in cardiovascular disease fellowship training. *Methodist Debaque Cardiovasc J.* 2022;18:67–77. doi: [10.14797/mdcvj.1080](https://doi.org/10.14797/mdcvj.1080)
 31. Rosales CB, Coe K, Ortiz S, Gámez G, Stroupe N. Social justice, health, and human rights education: challenges and opportunities in schools of public health. *Public Health Rep.* 2012;127:126–130. doi: [10.1177/003335491212700117](https://doi.org/10.1177/003335491212700117)
 32. Agarwala A, Bekele N, Deych E, Rich MW, Hussain A, Jones LK, Sturm AC, Aspry K, Nowak E, Ahmad Z, et al. Racial disparities in modifiable risk factors and statin usage in Black patients with familial hypercholesterolemia. *J Am Heart Assoc.* 2021;10:e020890. doi: [10.1161/JAHA.121.020890](https://doi.org/10.1161/JAHA.121.020890)
 33. Brown AF, Ma GX, Miranda J, Eng E, Castille D, Brockie T, Jones P, Airhihenbuwa CO, Farhat T, Zhu L, et al. Structural interventions to reduce and eliminate health disparities. *Am J Public Health.* 2019;109:S72–S78. doi: [10.2105/AJPH.2018.304844](https://doi.org/10.2105/AJPH.2018.304844)
 34. Paskett E, Thompson B, Ammerman AS, Ortega AN, Marsteller J, Richardson D. Multilevel interventions to address health disparities show promise in improving population health. *Health Aff (Millwood).* 2016;35:1429–1434. doi: [10.1377/hlthaff.2015.1360](https://doi.org/10.1377/hlthaff.2015.1360)
 35. Ndejio R, Hassen HY, Wanyenze RK, Musoke D, Nuwaha F, Abrams S, Bastiaens H, Musinguzi G. Community-based interventions for cardiovascular disease prevention in low-and middle-income countries: a systematic review. *Public Health Rev.* 2021;42:1604018. doi: [10.3389/phrs.2021.1604018](https://doi.org/10.3389/phrs.2021.1604018)
 36. Jongen CS, McCalman J, Bainbridge RG. The implementation and evaluation of health promotion services and programs to improve cultural competency: a systematic scoping review. *Front Public Health.* 2017;5:24.
 37. Butler M, McCreedy E, Schwer N, Burgess D, Call K, Przedworski J, Rosser S, Larson S, Allen M, Fu S, et al. *Improving Cultural Competence to Reduce Health Disparities [Internet]*. Agency for Healthcare Research and Quality (US); 2016.
 38. Analysis NCIHW. HRSA health workforce: state of the U.S. health care workforce, 2023. 2024.
 39. Eshtehardi P, Bullock-Palmer RP, Bravo-Jaimes K, Bozkurt B, Dorbala S, Gillam LD, Grines CL, Mehran R, Mieres JH, Singh T, et al. Women leaders: transforming the culture in cardiology. *Open Heart.* 2022;9:1–3. doi: [10.1136/openhrt-2022-001967](https://doi.org/10.1136/openhrt-2022-001967)
 40. Blumenthal DM, Olenki AR, Yeh RW, DeFaria YD, Sarma A, Stefanescu Schmidt AC, Wood MJ, Jena AB. Sex differences in faculty rank among academic cardiologists in the United States. *Circulation.* 2017;135:506–517. doi: [10.1161/CIRCULATIONAHA.116.023520](https://doi.org/10.1161/CIRCULATIONAHA.116.023520)
 41. Kalra A, Reed GW, Puri R, Majmudar M, Kumar A, Foley JD, Zala H, Nasir K, Kapadia SR, Bhatt DL. Trend of demographics of cardiovascular disease fellows and association between fellows and program director race. *JACC: Adv.* 2022;1:100032. doi: [10.1016/j.jacadv.2022.100032](https://doi.org/10.1016/j.jacadv.2022.100032)
 42. Balasubramanian S, Pasquali SK, Cousino MK, Lowery RE, Les AS, Yu S, McCormick AD, West CL, Fifer CG, Goldberg CS, et al. Representation of women and minority faculty and fellows in academic pediatric cardiology training programs. *J Am Coll Cardiol.* 2023;81:1181–1188. doi: [10.1016/j.jacc.2023.01.022](https://doi.org/10.1016/j.jacc.2023.01.022)
 43. Schnabel RB, Benjamin EJ. Diversity 4.0 in the cardiovascular health-care workforce. *Nat Rev Cardiol.* 2020;17:751–753. doi: [10.1038/s41569-020-00462-8](https://doi.org/10.1038/s41569-020-00462-8)
 44. McGregor B, Belton A, Henry TL, Wrenn G, Holden KB. Improving behavioral health equity through cultural competence training of health care providers. *Ethn Dis.* 2019;29:359–364. doi: [10.18865/ed.29.S2.359](https://doi.org/10.18865/ed.29.S2.359)
 45. Takeshita J, Wang S, Loren AW, Mitra N, Shults J, Shin DB, Sawinski DL. Association of Racial/ethnic and gender concordance between patients and physicians with patient experience ratings. *JAMA Netw Open.* 2020;3:e2024583. doi: [10.1001/jamanetworkopen.2020.24583](https://doi.org/10.1001/jamanetworkopen.2020.24583)
 46. Han JK, Belardo D, Ibrahim NE, Qt C, Grines CL, Smith SC Jr, Walsh MN, Gulati M. A look back, a path forward: moving toward diversity and inclusion in cardiovascular society presidents. *JACC Case Rep.* 2022;4:247–253. doi: [10.1016/j.jaccas.2021.12.022](https://doi.org/10.1016/j.jaccas.2021.12.022)
 47. Beattie JM, Castiello T, Jaarsma T. The importance of cultural awareness in the management of heart failure: a narrative review. *Vasc Health Risk Manag.* 2024;20:109–123. doi: [10.2147/VHRM.S392636](https://doi.org/10.2147/VHRM.S392636)
 48. Mazimba S, Peterson PN. JAHA spotlight on racial and ethnic disparities in cardiovascular disease. *J Am Heart Assoc.* 2021;10:e023650. doi: [10.1161/JAHA.121.023650](https://doi.org/10.1161/JAHA.121.023650)
 49. Mensah GA, Mokdad AH, Ford ES, Greenlund KJ, Croft JB. State of disparities in cardiovascular health in the United States. *Circulation.* 2005;111:1233–1241. doi: [10.1161/01.CIR.0000158136.76824.04](https://doi.org/10.1161/01.CIR.0000158136.76824.04)
 50. Brandt EJ, Tobb K, Cambron JC, Ferdinand K, Douglass P, Nguyen PK, Vijayaraghavan K, Islam S, Thamman R, Rahman S, et al. Assessing and addressing social determinants of cardiovascular health: JACC state-of-the-art review. *J Am Coll Cardiol.* 2023;81:1368–1385. doi: [10.1016/j.jacc.2023.01.042](https://doi.org/10.1016/j.jacc.2023.01.042)
 51. Adedinsowo D, Eberly L, Sokumbi O, Rodriguez JA, Patten CA, Brewer LC. Health disparities, clinical trials, and the digital divide. *Mayo Clin Proc.* 2023;98:1875–1887. doi: [10.1016/j.mayocp.2023.05.003](https://doi.org/10.1016/j.mayocp.2023.05.003)
 52. Cuadros DF, Moreno CM, Miller FD, Omori R, MacKinnon NJ. Assessing access to digital services in health care—underserved communities in the United States: a cross-sectional study. *Mayo Clinic Proceedings: Digital Health.* 2023;1:217–225.
 53. Brunner W, Pullyblank K, Scribani M, Krupa N, Fink A, Kern M. Determinants of telehealth technologies in a rural population. *Telemed J E Health.* 2023;29:1530–1539. doi: [10.1089/tmj.2022.0490](https://doi.org/10.1089/tmj.2022.0490)
 54. Baker-Smith CM, Sood E, Prospero C, Zadokar V, Srivastava S. Impact of social determinants and digital literacy on telehealth acceptance for pediatric cardiology care delivery during the early phase of the COVID-19 pandemic. *J Pediatr.* 2021;237:115–124.e2. doi: [10.1016/j.jpeds.2021.06.036](https://doi.org/10.1016/j.jpeds.2021.06.036)
 55. Kuan PX, Chan WK, Fern Ying DK, Rahman MAA, Peariasamy KM, Lai NM, Mills NL, Anand A. Efficacy of telemedicine for the management of cardiovascular disease: a systematic review and meta-analysis. *Lancet Digit Health.* 2022;4:e676–e691. doi: [10.1016/S2589-7500\(22\)00124-8](https://doi.org/10.1016/S2589-7500(22)00124-8)
 56. Flodgren G, Rachas A, Farmer AJ, Inzitari M, Shepperd S. Interactive telemedicine: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev.* 2015;2015:CD002098.
 57. Takahashi EA, Schwamm LH, Adeyoye OM, Alabi O, Jahangir E, Misra S, Still CH. An overview of telehealth in the management of cardiovascular disease: a scientific statement from the American Heart Association. *Circulation.* 2022;146:e558–e568. doi: [10.1161/CIR.0000000000001107](https://doi.org/10.1161/CIR.0000000000001107)
 58. Spruill TM, Muntner P, Popp CJ, Shimbo D, Cooper LA, Moran AE, Penko J, Bibbins-Domingo K, Ibe C, Nnodim Opara I, et al. AddREssing social determinants TO pRevent hypErtension (the RESTORE network): overview of the health equity research network to prevent hypertension. *Am J Hypertens.* 2023;36:232–239. doi: [10.1093/ajh/hpad010](https://doi.org/10.1093/ajh/hpad010)
 59. Singh H, Jt F, Mirzazada S, Saragosa M, Uleryk EM, Nelson MLA. Community-based culturally tailored education programs for Black communities with cardiovascular disease, diabetes, hypertension, and stroke: systematic review findings. *J Racial Ethn Health Disparities.* 2023;10:2986–3006. doi: [10.1007/s40615-022-01474-5](https://doi.org/10.1007/s40615-022-01474-5)
 60. Belanger MJ, Kovell LC, Turkson-Ocran RA, Mukamal KJ, Liu X, Appel LJ, Miller ER 3rd, Sacks FM, Christenson RH, Rebuck H, et al. Effects of the dietary approaches to stop hypertension diet on change in cardiac biomarkers over time: results from the DASH-sodium trial. *J Am Heart Assoc.* 2023;12:e026684. doi: [10.1161/JAHA.122.026684](https://doi.org/10.1161/JAHA.122.026684)
 61. Lichtenstein AH, Appel LJ, Vadiveloo M, Hu FB, Kris-Etherton PM, Rebholz CM, Sacks FM, Thorndike AN, Van Horn L, Wylie-Rosett J. 2021 dietary guidance to improve cardiovascular health: a

- scientific statement from the American Heart Association. *Circulation*. 2021;144:e472–e487. doi: [10.1161/CIR.0000000000001031](https://doi.org/10.1161/CIR.0000000000001031)
62. Graham GN, Yancy CW, Boehm AK, Wendt MH. Cardiovascular care in an increasingly diverse community. *Circulation*. 2012;125:1037–1042. doi: [10.1161/CIRCULATIONAHA.109.898734](https://doi.org/10.1161/CIRCULATIONAHA.109.898734)
 63. Braveman P, Gottlieb L. The social determinants of health: it's time to consider the causes of the causes. *Public Health Rep*. 2014;129(Suppl 2):19–31. doi: [10.1177/00333549141291S206](https://doi.org/10.1177/00333549141291S206)
 64. Braveman PA, Kumanyika S, Fielding J, Laveist T, Borrell LN, Manderscheid R, Troutman A. Health disparities and health equity: the issue is justice. *Am J Public Health*. 2011;101(Suppl 1):S149–S155. doi: [10.2105/AJPH.2010.300062](https://doi.org/10.2105/AJPH.2010.300062)
 65. Mensah GA, Cooper RS, Siega-Riz AM, Cooper LA, Smith JD, Brown CH, Westfall JM, Ofili EO, Price LN, Arteaga S, et al. Reducing cardiovascular disparities through community-engaged implementation research: a National Heart, Lung, and Blood Institute workshop report. *Circ Res*. 2018;122:213–230. doi: [10.1161/CIRCRESAHA.117.312243](https://doi.org/10.1161/CIRCRESAHA.117.312243)
 66. Association AH. EmPOWERED to serve. 2024;2024. <https://www.empoweredtoserve.org/en/business-accelerator-program>.
 67. Moise N, Cené CW, Tabak RG, Young DR, Mills KT, Essien UR, Anderson CAM, Lopez-Jimenez F. Leveraging implementation science for cardiovascular health equity: a scientific statement from the American Heart Association. *Circulation*. 2022;146:e260–e278. doi: [10.1161/CIR.0000000000001096](https://doi.org/10.1161/CIR.0000000000001096)
 68. Lloyd-Jones DM, Allen NB, Anderson CAM, Black T, Brewer LC, Foraker RE, Grandner MA, Lavretsky H, Perak AM, Sharma G, et al. Life's essential 8: updating and enhancing the American Heart Association's construct of cardiovascular health: a presidential advisory from the American Heart Association. *Circulation*. 2022;146:e18–e43. doi: [10.1161/CIR.0000000000001078](https://doi.org/10.1161/CIR.0000000000001078)
 69. Vilcant V, Ceron C, Verma G, Zeltser R, Makaryus AN. Inclusion of under-represented racial and ethnic groups in cardiovascular clinical trials. *Heart Lung Circ*. 2022;31:1263–1268. doi: [10.1016/j.hlc.2022.06.668](https://doi.org/10.1016/j.hlc.2022.06.668)
 70. Chen S, Li J. Participation of Black US residents in clinical trials of 24 cardiovascular drugs granted FDA approval, 2006-2020. *JAMA Netw Open*. 2021;4:e212640. doi: [10.1001/jamanetworkopen.2021.2640](https://doi.org/10.1001/jamanetworkopen.2021.2640)
 71. Khan MS, Shahid I, Siddiqi TJ, Khan SU, Warraich HJ, Greene SJ, Butler J, Michos ED. Ten-year trends in enrollment of women and minorities in pivotal trials supporting recent US Food and Drug Administration approval of novel cardiometabolic drugs. *J Am Heart Assoc*. 2020;9:e015594. doi: [10.1161/JAHA.119.015594](https://doi.org/10.1161/JAHA.119.015594)
 72. Disparities NIoMHaH. Diversity and Inclusion in Clinical Trials. 2024.
 73. Boden-Albala B. Confronting legacies of underrepresentation in clinical trials: the case for greater diversity in research. *Neuron*. 2022;110:746–748. doi: [10.1016/j.neuron.2021.12.008](https://doi.org/10.1016/j.neuron.2021.12.008)
 74. Kusnoor SV, Villalta-Gil V, Michaels M, Joosten Y, Israel TL, Epelbaum MI, Lee P, Frakes ET, Cunningham-Erves J, Mayers SA, et al. Design and implementation of a massive open online course on enhancing the recruitment of minorities in clinical trials - faster together. *BMC Med Res Methodol*. 2021;21:44. doi: [10.1186/s12874-021-01240-x](https://doi.org/10.1186/s12874-021-01240-x)
 75. Boden-Albala B, Carman H, Southwick L, Parikh NS, Roberts E, Waddy S, Edwards D. Examining barriers and practices to recruitment and retention in stroke clinical trials. *Stroke*. 2015;46:2232–2237. doi: [10.1161/STROKEAHA.114.008564](https://doi.org/10.1161/STROKEAHA.114.008564)
 76. Schwartz AL, Alsan M, Morris AA, Halpern SD. Why diverse clinical trial participation matters. *N Engl J Med*. 2023;388:1252–1254. doi: [10.1056/NEJMp2215609](https://doi.org/10.1056/NEJMp2215609)
 77. Yong C, Suvarna A, Harrington R, Gummidipundi S, Krumholz HM, Mehran R, Heidenreich P. Temporal trends in gender of principal investigators and patients in cardiovascular clinical trials. *J Am Coll Cardiol*. 2023;81:428–430. doi: [10.1016/j.jacc.2022.10.038](https://doi.org/10.1016/j.jacc.2022.10.038)
 78. Loeb S, Ravenell JE, Gomez SL, Borno HT, Siu K, Sanchez Nolasco T, Byrne N, Wilson G, Griffith DM, Crocker R, et al. The effect of racial concordance on patient Trust in Online Videos about Prostate Cancer: a randomized clinical trial. *JAMA Netw Open*. 2023;6:e2324395. doi: [10.1001/jamanetworkopen.2023.24395](https://doi.org/10.1001/jamanetworkopen.2023.24395)
 79. Santo K, Redfern J. Digital health innovations to improve cardiovascular disease care. *Curr Atheroscler Rep*. 2020;22:71. doi: [10.1007/s11883-020-00889-x](https://doi.org/10.1007/s11883-020-00889-x)
 80. Hernandez MF, Rodriguez F. Health Techequity: opportunities for digital health innovations to improve equity and diversity in cardiovascular care. *Curr Cardiovasc Risk Rep*. 2023;17:1–20. doi: [10.1007/s12170-022-00711-0](https://doi.org/10.1007/s12170-022-00711-0)
 81. Lloyd-Jones DM, Albert MA, Elkind M. The American Heart Association's focus on primordial prevention. *Circulation*. 2021;144:e233–e235. doi: [10.1161/CIRCULATIONAHA.121.057125](https://doi.org/10.1161/CIRCULATIONAHA.121.057125)
 82. Farmer N, Maki KA, Barb JJ, Jones KK, Yang L, Baumer Y, Powell-Wiley TM, Wallen GR. Geographic social vulnerability is associated with the alpha diversity of the human microbiome. *mSystems*. 2023;8:e0130822. doi: [10.1128/mSystems.01308-22](https://doi.org/10.1128/mSystems.01308-22)
 83. Jain V, Al Rifai M, Khan SU, Kalra A, Rodriguez F, Samad Z, Pokharel Y, Misra A, Sperling LS, Rana JS, et al. Association between social vulnerability index and cardiovascular disease: a behavioral risk factor surveillance system study. *J Am Heart Assoc*. 2022;11:e024414. doi: [10.1161/JAHA.121.024414](https://doi.org/10.1161/JAHA.121.024414)
 84. Prevention CfDca. Social Determinants of Health (SDOH) and PLACES Data. 2023;2024.
 85. Peters DH, Adam T, Alonge O, Agyepong IA, Tran N. Implementation research: what it is and how to do it. *Br Med J*. 2013;347:f6753.
 86. Smith JD, Li DH, Rafferty MR. The implementation research logic model: a method for planning, executing, reporting, and synthesizing implementation projects. *Implement Sci*. 2020;15:84. doi: [10.1186/s13012-020-01041-8](https://doi.org/10.1186/s13012-020-01041-8)
 87. Wadhwa RK, Watson KE, Carnethon MR. Advancing cardiovascular health equity in the United States: now that we know, where do we Go next? *Circulation*. 2023;148:197–198. doi: [10.1161/CIRCULATIONAHA.123.065971](https://doi.org/10.1161/CIRCULATIONAHA.123.065971)
 88. 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](https://doi.org/10.1126/science.1196783)
 89. Hoppe TA, Litovitz A, Willis KA, Meseroll RA, Perkins MJ, Hutchins BI, Davis AF, Lauer MS, Valentine HA, Anderson JM, et al. Topic choice contributes to the lower rate of NIH awards to African-American/black scientists. *Sci Adv*. 2019;5:eaaw7238. doi: [10.1126/sciadv.aaw7238](https://doi.org/10.1126/sciadv.aaw7238)
 90. Lauer M, Bernard MA. Research project Grant funding rates and principal investigator race and ethnicity. 2022;2024. <https://nexus.od.nih.gov/all/2022/06/14/research-project-grant-funding-rates-and-principal-investigator-race-and-ethnicity/>
 91. Robert A. Winn diversity in clinical trials award program. 2024.