

## VIEWPOINT

# Health Equity

## A Call to Action for Innovators, Clinical Leaders, and Policymakers



Amber E. Johnson, MD, MS, MBA,<sup>a</sup> Jelani K. Grant, MD,<sup>b</sup> Johanna P. Contreras, MD, MSc,<sup>c</sup> Aubrey J. Grant, MD,<sup>d</sup> Karen Joynt Maddox, MD,<sup>e</sup> Partho P. Sengupta, MD,<sup>f</sup> Adedapo Ilyomade, MD,<sup>g</sup> Modele O. Ogunniyi, MD, MPH<sup>h,i</sup>

Access to high-quality, patient-centered health care is a fundamental right, but one that too often in U.S. society goes unrealized. Physical access to health care, including transportation, as well as financial access, including insurance coverage, are inequitably distributed along racial and ethnic lines as well as socioeconomic ones. Further, while advances in digital health and innovation continue to improve the management of cardiovascular disease, especially as health care incorporates more telemedicine and remote monitoring capabilities,<sup>1</sup> the most disproportionately affected and disadvantaged populations lack access to the appropriate technology to keep pace with the rapid virtualization of health care.<sup>2</sup> Restricted access to technology in resource-limited settings can potentially exacerbate disparities endemic to health care in the United States.<sup>3</sup> In this viewpoint, we start with an illustrative clinical case of a patient with a history of peripartum cardiomyopathy and chronic left ventricular systolic dysfunction. The case facilitates discussion of systemic barriers to health care. We then discuss the role of technology in improving access

to health care and conclude with suggestions to change policy.

The patient was a 34-year-old Black woman with a history of peripartum cardiomyopathy, hypothyroidism, and cannabis use disorder who presented to the hospital with progressive dyspnea and was found to be in cardiogenic shock. Her past medical history included a diagnosis of Grave's disease at age 8 years, for which she underwent radioactive iodine ablation. Unfortunately, the patient was unaware that she consequently developed hypothyroidism that would require levothyroxine supplementation. At age 18, she was prescribed levothyroxine but was unable to afford the medication. Her first pregnancy occurred at age 21 years and was complicated by pre-eclampsia and peripartum cardiomyopathy. Notably, at the time of delivery, her thyroid stimulating hormone was 850 mU/L (upper limit of normal = 4.1). At this index admission, she presents with heart failure (HF) and is evaluated for either an orthotopic heart transplant or a left ventricular assist device. Unfortunately, she was deemed an unsuitable candidate for advanced therapies due to uncontrolled hypothyroidism, ongoing cannabis use, and a "lack of social support." The patient was discharged after initiating the 4 pillars of guideline-directed medical therapy for HF. She followed up with her primary care physician but missed her HF clinic appointment as she could not afford the transportation. She subsequently required a series of readmissions for acute decompensated HF. This case highlights multiple systemic issues in health care, including social determinants of health (SDOH) in cardiovascular care, access to subspecialty care, and potential bias in health care delivery.

This case exemplifies how inaccessible health care can be, especially for historically marginalized patients. Health care access involves the ability for a

From the <sup>a</sup>Section of Cardiology, Pritzker School of Medicine, University of Chicago, Chicago, Illinois, USA; <sup>b</sup>Johns Hopkins Hospital, Baltimore, Maryland, USA; <sup>c</sup>Icahn School of Medicine at Mount Sinai, New York, New York, USA; <sup>d</sup>MedStar Heart and Vascular Institute, Washington, DC, USA; <sup>e</sup>Cardiovascular Division, Department of Medicine, Washington University School of Medicine, St Louis, Missouri, USA; <sup>f</sup>Robert Wood Johnson Medical School and University Hospital, New Brunswick, New Jersey, USA; <sup>g</sup>Baptist Health South Florida, Miami, Florida, USA; <sup>h</sup>Division of Cardiology, Department of Medicine, Emory University School of Medicine, Atlanta, Georgia, USA; and the <sup>i</sup>Grady Health System, Atlanta, Georgia, USA.

The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

patient to see a qualified health care professional within a reasonable period. Individual- and neighborhood-level social risk factors influence the access to care essential for HF management.<sup>4</sup> In this case, our patient had no medical insurance coverage. She was unemployed, and her fiancé worked in construction. She lived 45 minutes from the nearest tertiary care hospital by car and had no access to public transportation. This hospital was in an urban location, whereas she lived in a rural area. The median household income in her neighborhood was \$25,000. Each of these SDOH posed as negative factors in this patient's cardiovascular outcomes. Lack of insurance and the cost of medical treatment precluded her from receiving care for her thyroid disease throughout her childhood and adolescence. However, data suggest that affording and accessing care are important to achieving better health outcomes and controlling long-term health costs. Disparities in health care access may vary by patient location due to barriers such as state-based insurance coverage, distance to care, and rurality.<sup>4</sup>

Poor health care utilization led to this patient being labeled as an unsuitable candidate for advanced therapies.<sup>5</sup> Systemic barriers may contribute to a patient's limited access to preventive care, thus increasing the use of emergency care and repeated hospitalizations. Moreover, race-based biases and preferences can adversely affect the medical care patients receive.<sup>6</sup> For example, data have shown that clinicians caring for patients with HF expressed a preference for patients of higher socioeconomic status and education level.<sup>7</sup> Researchers found a correlation between clinician bias for higher patient wealth and higher education ( $r = 0.48$ ;  $P < 0.001$ ). Meaning that people with more wealth bias also reported more education bias.<sup>7</sup>

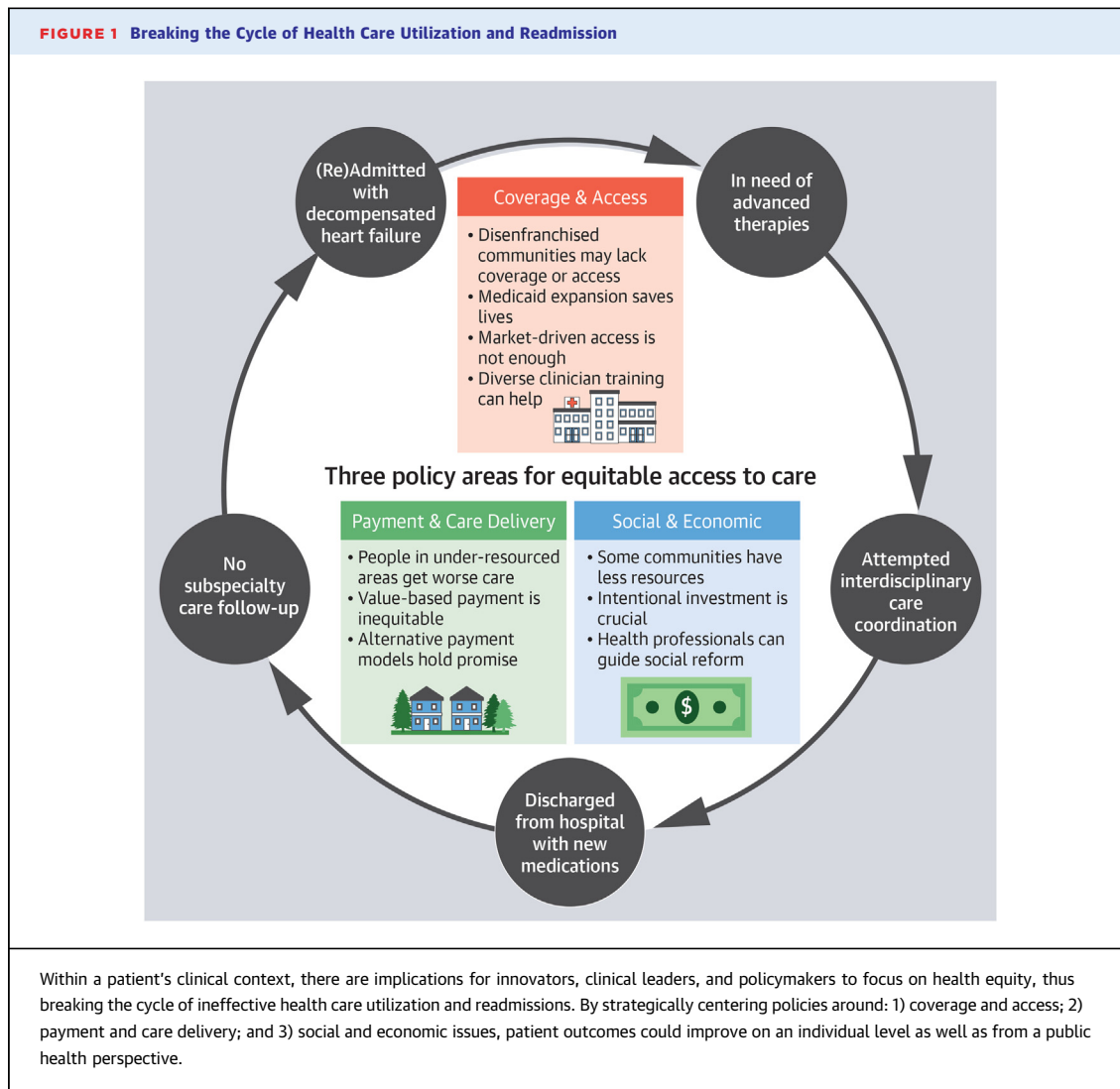
Technological interventions are emerging to help address barriers to care, including improving access and eliminating implicit bias. For example, novel digital health solutions and mobile health platforms can potentially enhance cardiovascular care, even among at-risk groups. However, the divide in health care access across race/ethnicity, wealth, geography, and education remains.<sup>8</sup> Recent technological advances for cardiovascular disease management include advanced telemedicine and remote monitoring capabilities.<sup>1</sup> Further, artificial intelligence (AI) has the potential to mitigate bias by facilitating patient autonomy, promoting patient well-being, human safety, and public interest. By ensuring transparency, AI technologies can foster responsibility and accountability. Technology should be developed by equity-minded engineers who will

challenge bias in the tools they help create.<sup>9</sup> Thus, the health care industry must promote AI that is responsive to bias mitigation and can sustain equitable algorithms.<sup>10</sup>

The utilization of virtual reality (VR) technologies is emerging as a potent adjunct to conventional methodologies in implicit bias training, augmenting the depth and efficacy of traditional educational experiences. The American College of Cardiology, recognizing the transformative potential of this modality, has engaged in a synergistic partnership with Equity Commons, an innovative VR implicit bias firm. This collaboration is focused on the development of immersive virtual scenarios that simulate clinical environments, enabling participants to directly confront and understand implicit bias and SDOH. These virtual experiences are designed not only to augment awareness but also to foster a comprehensive understanding of health equity dynamics. Preliminary data from this partnership reveals that participants have reported a heightened awareness of personal biases and an increased propensity to engage in proactive measures to mitigate these biases. These data underscore the potential of VR as a transformative tool in the training and education of health care professionals, particularly for cultivating a deeper understanding and mitigating biases within clinical settings.

Equity is urgently needed to understand and address the rapidly growing technological field to prevent further perpetuation of health care disparities.<sup>3,11</sup> Community-based approaches are essential to tailoring technological interventions to meet the needs of marginalized populations.<sup>12</sup> Areas for policy change must consider better access to technological intervention via improved insurance coverage. Minoritized low-income and rural communities lack coverage and access to advanced care and technological innovations. Medicaid expansion will continue to save lives, whereas market-driven insurance is associated with continued health care disparity.<sup>13</sup> Observational data suggest that the value-based payment policy has been inequitable and ineffective.<sup>14</sup> Alternative payment models hold more promise for incentivizing equity, but, like AI created for equity, policy tools need to be designed intentionally with parity in mind.

In addition to strategies for insurance coverage and pay structure, policy change is needed to address health care inequities, as detailed in [Figure 1](#). For example, Medicaid expansion has been highly effective at improving access to care and improving health outcomes, particularly among people from racial or ethnic minority communities or rural areas. Policy



changes to incentivize Medicaid expansion among the remaining states that have not done so, as well as support for permanently expanded subsidies for individual market-based coverage, are needed to improve health equity. Ensuring adequate payment from Medicaid health care professionals could also improve access to care among marginalized groups.<sup>14</sup> In terms of workforce, policies should prioritize training health care professionals who have been historically excluded from medical education, including physicians, nurses, therapists, pharmacists, and other team members.<sup>6</sup> Intentional investment in resource-limited communities is also crucial. Examples include improved infrastructure for broadband internet for disinvested urban and rural communities.<sup>15</sup> Such improvements are estimated to improve access to telehealth, education, and other critical

resources for millions of Americans. Further, access to economic opportunity, criminal justice, and housing all require policy change via cross-sectoral partnerships with health care professionals and organizations to optimally support positive changes in population health equity.

A patient-centered framework that incorporates multipronged solutions to address SDOH is necessary to improve health care outcomes, especially for historically marginalized patients. This requires partnerships between clinicians, health care systems, professional societies, and government agencies.<sup>13</sup>

#### FUNDING SUPPORT AND AUTHOR DISCLOSURES

Dr Johnson has received research support from the National Heart, Lung, and Blood Institute (K23HL165110); and has received honoraria from Sanofi and Edwards Lifesciences. Dr Aubrey Grant is a

co-founder and chief equity officer for Equity Commons. Dr Maddox receives research support from the National Heart, Lung, and Blood Institute (R01HL143421 and R01HL164561), the National Institute of Nursing Research (U01NR020555), the National Institute on Aging (R01AG060935, R01AG063759, and R21AG065526), and the National Center for Advancing Translational Sciences (UL1TR002345); serves as an associate editor for the Journal of the American Medical Association (JAMA); previously served on the Health Policy Advisory Council for the Centene Corporation (St. Louis, MO); has received research funding from Humana. Dr Ogunniyi has received institutional research grant support from AstraZeneca, Boehringer

Ingelheim, Cardurion Pharmaceuticals, and Pfizer; and serves on the V-INCLUSION trial steering committee. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

---

**ADDRESS FOR CORRESPONDENCE:** Dr Amber E. Johnson, University of Chicago Medical Center, 5841 South Maryland Avenue, Chicago, Illinois 60637, USA. E-mail: [amberj@uchicago.edu](mailto:amberj@uchicago.edu).

---

## REFERENCES

- Sharma A, Harrington RA, McClellan MB, et al. Using digital health technology to better Generate Evidence and deliver Evidence-based care. *J Am Coll Cardiol*. 2018;71(23):2680-2690.
- Brewer LC, Fortuna KL, Jones C, et al. Back to the Future: achieving health equity through health Informatics and digital health. *JMIR Mhealth Uhealth*. 2020;8(1):e14512.
- Sim I. Mobile devices and health. *N Engl J Med*. 2019;381(10):956-968.
- Powell-Wiley TM, Baumer Y, Baah FO, et al. Social determinants of cardiovascular disease. *Circ Res*. 2022;130(5):782-799.
- Breathett K, Yee E, Pool N, et al. Does race influence decision making for advanced heart failure therapies? *J Am Heart Assoc*. 2019;8(22):e013592.
- Johnson AE, Talabi MB, Bonifacino E, et al. Racial Diversity among American Cardiologists: implications for the past, present, and Future. *Circulation*. 2021;143(24):2395-2405.
- Amdani S, Conway J, Kleinmahon J, et al. Race and socioeconomic bias in pediatric cardiac transplantation. *JACC Heart Fail*. 2023;11(1):19-26.
- Merid B, Robles MC, Nallamothu BK. Digital Redlining and cardiovascular innovation. *Circulation*. 2021;144(12):913-915.
- Johnson AE, Brewer LC, Echols MR, Mazimba S, Shah RU, Breathett K. Utilizing artificial intelligence to enhance health equity among patients with heart failure. *Heart Fail Clin*. 2022;18(2):259-273.
- Bates DW, Levine D, Syrowatka A, et al. The potential of artificial intelligence to improve patient safety: a scoping review. *NPJ Digit Med*. 2021;4(1):54.
- Burke LE, Ma J, Azar KM, et al. Current Science on Consumer Use of mobile health for cardiovascular disease prevention: a Scientific Statement from the American heart association. *Circulation*. 2015;132(12):1157-1213.
- Johnson A, Broughton S, Aponte-Soto L, et al. Participatory Genomic Testing can effectively Disseminate cardiovascular Pharmacogenomics Concepts within Federally qualified health Centers: a Feasibility Study. *Ethn Dis*. 2020;30(Suppl 1):167-176.
- Ogunniyi MO, Mahmoud Z, Commodore-Mensah Y, et al. Eliminating disparities in cardiovascular disease for Black women: JACC review Topic of the Week. *J Am Coll Cardiol*. 2022;80(18):1762-1771.
- Shashikumar SA, Zheng J, Orav EJ, Epstein AM, Joynt Maddox KE. Changes in cardiovascular Spending, care utilization, and clinical outcomes associated with Participation in Bundled payments for care improvement - advanced. *Circulation*. 2023;148(14):1074-1083.
- Moorhead JB Jr, Herbert BM, Abebe KZ, et al. Internet access and cardiovascular death in the United States. *Am Heart J Plus*. 2022;21:100200.

---

**KEY WORDS** technological innovation, health equity, health policy