

Prioritizing Cultural Relevance and Co-Production in Cardiovascular Technologies

A Call for Action

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Inequities in Cardiovascular Disease Care

Cardiovascular disease (CVD) continues to be the foremost cause of mortality worldwide, with disproportionate impacts on racialized populations.¹ Individuals identifying as Black, Indigenous, Hispanic, South Asian, and other marginalized groups experience higher rates of CVD-related illness and death, often at younger ages and with greater severity than those individuals from White populations.² These inequities stem from complex interactions between genetics, systemic racism, socioeconomic barriers, and exclusionary health practices.^{3,4} Addressing these disparities demands more than standardized interventions; it requires the deliberate design and implementation of technologies that reflect the lived realities of marginalized communities.

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Cultural Relevance in the Design and Implementation of Cardiovascular Disease Technologies

Digital health technologies, including wearable devices, mobile apps, and algorithm-driven diagnostics, are increasingly being utilized to enhance CVD prevention and management.⁵ However, these tools often fail to serve populations most burdened by the disease, primarily because they are developed without input from those communities.⁶ As a result, they may amplify existing inequities by embedding biases, excluding relevant cultural contexts, or assuming homogeneous levels of digital access and health literacy.^{7–9} For example, artificial intelligence models trained predominantly on data from individuals from White populations may yield less accurate predictions for individuals who are of other races and ethnicities, while interfaces that ignore language preferences or sociocultural norms can deter use altogether.⁶ In contrast, culturally adapted technologies intentionally incorporate users' cultural frameworks, languages, and values into both the design processes and user experiences.^{10,11} This means ensuring that data inputs are representative, interfaces are linguistically and visually inclusive, and health information resonates with community beliefs. Crucially, it also involves collaborating directly with the populations these technologies aim to support, not just as end-users, but as co-creators.

Rationale and Relevance of Co-Production for Equitable Digital Health Tools

Co-production, where communities, clinicians, and developers collaborate equitably to co-design, implement, and evaluate CVD technologies, offers a clear pathway forward to ensure cultural relevance.¹² By embedding co-production as a guiding principle to develop culturally relevant tools, it can be ensured that innovations in cardiovascular care are not only technologically sophisticated but also socially just, culturally safe, and truly responsive to those most affected by cardiovascular disease.^{13,14} Evidence for the effectiveness of this approach is growing. The FAITH! mobile app, co-designed with African American communities, successfully improved composite cardiovascular health outcomes among its users.¹⁵ Similarly, a culturally tailored tablet intervention enhanced medication adherence and health beliefs among Black adults managing hypertension and diabetes.¹⁶ For Hispanic populations, the SMASH platform integrated culturally meaningful messaging with real-time medication monitoring, resulting in significantly higher adherence and blood pressure control rates.¹⁷ In Aotearoa New Zealand, the OL@-OR@ app was co-developed with Māori and Pasifika

communities, blending lifestyle guidance with culturally resonant content and design.¹⁸ Indigenous communities in Northern Ontario have also emphasized the importance of culturally respectful, technology-enabled cardiac care. Their feedback pointed to the need for continuity of care that integrated traditional values and local health knowledge into virtual platforms.¹⁹ Longstanding initiatives such as the Strong Heart Study highlight the critical role of community-based, culturally aligned research through co-production in addressing cardiovascular risk in American Indian populations.²⁰ Global reviews of digital health equity underscore the importance of diverse development teams, algorithmic transparency, and Indigenous data sovereignty.²¹ Such authentic collaboration enhances usability and sustained engagement, ultimately leading to digital health tools that are culturally relevant and more effective in improving cardiovascular outcomes.

Recommendations to Embed Cultural Relevance in Digital Health Tools

Embedding cultural relevance in digital health tools extends far beyond surface-level adaptations such as language translation or only including diverse images.^{22,23} While translating content into a user's primary language is important, it represents only a small piece of the puzzle.^{22,23} Deeper cultural tailoring requires aligning the content, design, and delivery modes of the tool with the specific values, beliefs, and communication preferences of the target group. For example, in HF or CVD management apps, culturally relevant health-promotion messages should reflect the dietary practices, health beliefs, and social contexts of the intended community.^{24,25} Interface design should also resonate visually and experientially.^{15,26} For instance, using avatars and imagery that reflect the group's identity or simplifying navigation to accommodate varying digital literacy levels.²⁶ Likewise, choosing communication modes that match user preferences, such as video-based guidance for populations less comfortable with text messages, can improve engagement and comprehension.^{15,26} Evidence from culturally adapted interventions, such as SMS-based CVD prevention programs tailored for South Asian and Black populations, demonstrates greater user satisfaction and sustained behavior change.^{15,26} Achieving cultural relevance demands an intentional, multistage process that incorporates community insight, cultural humility (a lifelong process of active self-reflection involving continuous exploration of our own and others' cultural identities and beliefs), and iterative design.²⁷

Recommendations to Embed Co-Production in Digital Health Tools

To embed co-production in digital health tools for CVD management and prevention, it is essential to engage patient and community partners from the earliest stages of research through to knowledge translation.²⁸ Too often, patients are involved only at the dissemination phase, after the tool is already developed, serving a tokenistic feedback role rather than as equal partners.²⁸ True co-production involves shared decision-making across all phases: identifying research questions, co-designing features, testing usability, and co-developing dissemination strategies with all patient and community partners.²⁹ Frameworks such as the Saskatchewan Centre for Patient-Oriented Research Tool and the Research Quality Plus for Co-Production (RQ+4CoPro) provide structured guidance for enabling and logistically planning co-production in research, while also assessing the depth and quality of engagement.^{30,31} For instance, in adapting heart failure self-management apps, patients and equity-denied groups should be engaged to shape the tool's goals, interface, and feedback mechanisms based on lived and living experiences.³² Similarly, community-based participatory approaches in developing interventions for hypertension management (a risk factor

for CVD) have shown that co-produced content, which are created and tested with knowledge users, enhances acceptability, adherence, and trust.³³ Thus, embedding co-production in digital health tools for CVD not only strengthens methodological rigor but also ensures that digital health tools align with the cultural, social, and contextual realities of the populations they aim to serve.

The Role of Cardiovascular Nurses

Cardiovascular nurses can play a crucial role in making digital health tools for heart disease more culturally appropriate and effective. They act as intermediaries between patients and technology, helping to ensure that digital platforms align with patients' cultural beliefs, language preferences, and health literacy levels. By participating in the design and evaluation of these tools, nurses can help tailor features, such as dietary guidance, medication reminders, and exercise plans, to reflect the diverse needs of the populations they serve. They can also provide culturally sensitive education, guiding patients in how to use these technologies in ways that feel familiar and respectful. Importantly, cardiovascular nurses can identify and address barriers to access, such as limited internet connectivity or a lack of digital skills, especially in underserved communities. Their ongoing feedback from patients can help developers refine digital tools to be more inclusive and responsive. Ultimately, nurses can ensure that digital innovations in cardiac care are not only clinically sound but also socially and culturally relevant.

Conclusions

To advance cardiovascular equity, the digital health technology sector must shift from universalist models to ones that are structurally inclusive and culturally grounded. Achieving this will require sustained investment in transdisciplinary partnerships among developers, public health experts, and communities. This calls for new metrics that assess not only clinical efficacy but also cultural resonance, trustworthiness, and accessibility. In essence, technologies indifferent to cultural differences are likely to exacerbate disparities, coined in the literature as the "digital divide." Culturally tailored tools that are co-produced are foundational components of equitable, person-centered cardiovascular care, making them a scientific and moral imperative.

REFERENCES

1. World Health Organization. Cardiovascular Diseases (CVDs). World Health Organization; 2024. Accessed November 1, 2025. <https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-cvds>
2. Carnethon MR, Pu J, Howard G, et al; American Heart Association Council on Epidemiology and Prevention; Council on Cardiovascular Disease in the Young; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; Council on Functional Genomics and Translational Biology; and Stroke Council. Cardiovascular health in African Americans: a scientific statement from the American Heart Association. *Circulation*. 2017;136(21):e393–e423.
3. Allana S, Thompson DR, Ski CF, Clark AM. Intersectionality in heart failure self-care: ignorance is not an option. *J Cardiovasc Nurs*. 2020;35(3):231–233.
4. Allana S, Ski CF, Thompson DR, Clark AM. Intersectionality and heart failure: what clinicians and researchers should know and do. *Curr Opin Support Palliat Care*. 2021;15(2):141–146.
5. Kvedar JC, Fogel AL, Elenko E, Zohar D. Digital medicine's march on chronic disease. *Nat Biotechnol*. 2019;34(3):239–246.
6. Obermeyer Z, Powers B, Vogeli C, Mullainathan S. Dissecting racial bias in an algorithm used to manage the health of populations. *Science*. 2019;366(6464):447–453.
7. Vyas DA, Eisenstein LG, Jones DS. Hidden in plain sight—reconsidering the use of race correction in clinical algorithms. *N Engl J Med*. 2020;383(9):874–882.

8. Mitchell UA, Chebli PGT, Ruggiero L, Muramatsu N. The digital divide in health-related technology use: the significance of race/ethnicity. *Gerontologist*. 2019;59(1):6–14.
9. Veinot TC, Mitchell H, Ancker JS. Good intentions are not enough: how informatics interventions can worsen inequality. *J Am Med Inform Assoc*. 2018;25(8):1080–1088.
10. 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.
11. Mason C, Lazenby S, Stuhldreher R, Kimball M, Bartlein R. Lessons learned from implementing digital health tools to address COVID-19 in LMICs. *Front Public Health*. 2022;10:859941.
12. Albert A, Islam S, Haklay M, McEachan RRC. Nothing about us without us: a co-production strategy for communities, researchers and stakeholders to identify ways of improving health and reducing inequalities. *Health Expect*. 2023;26(2):836–846.
13. Brotherdale R, Berry K, Branitsky A, Bucci S. Co-producing digital mental health interventions: a systematic review. *Digit Health*. 2024;10:20552076241239172.
14. Mimoso I, Figueiredo T, Midão L, et al. Co-creation in the development of digital therapeutics: a narrative review. *Int J Environ Res Public Health*. 2024;21(12):1589.
15. Chrane R, Brewer LC, Balls-Berry JE, et al. The FAITH! App: describing a culturally tailored cardiovascular mobile health intervention for African Americans. *JMIR Mhealth Uhealth*. 2020;8(9):e14550.
16. Smith T, Ravenell J, Thomas T, Hankerson S, Hargreaves M, Ogedegbe G. A culturally tailored mHealth intervention to improve medication adherence among Black patients with hypertension and diabetes: a pilot RCT. *J Gen Intern Med*. 2021;36(3):742–749.
17. Martinez M, Gonzalez M, Martinez C, et al. SMASH: a smart medication adherence platform tailored for Hispanic adults with uncontrolled hypertension. *Ann Fam Med*. 2018;16(4):307–315.
18. Mhurchú CN, Eyles H, Titoo W, et al. Co-design of the OL@-OR@ app: a mobile health intervention for Māori and Pasifika communities. *Aust N Z J Public Health*. 2024;48(2):163–170.
19. Brown A, Villeda N, Lafrenière D, Restoule J, Hackett C. Culturally safe virtual cardiac care for indigenous populations in Northern Ontario: a qualitative needs assessment. *Can J Cardiol*. 2025;41(1):112–120.
20. Howard BV, Lee ET, Cowan L, et al. The Strong Heart Study: a longitudinal study of cardiovascular disease in American Indians. *Am J Epidemiol*. 1995;142(3):548–556.
21. Johnson T, Edmonds T, Penehira M, Carter K, Kukutai T. Reimagining digital health for Indigenous communities: principles for culturally safe AI and health technology. *Lancet Digit Health*. 2024;6(3):e120–e128.
22. Sit HF, Ling R, Lam AIF, Chen W, Latkin CA, Hall BJ. The cultural adaptation of step-by-step: an intervention to address depression among Chinese young adults. *Front Psychiatry*. 2020;11:650.
23. Nittas V, Daniore P, Chavez SJ, Wray TB. Challenges in implementing cultural adaptations of digital health interventions. *Commun Med (Lond)*. 2024;4(1):7.
24. Vincze L, Barnes K, Somerville M, et al. Cultural adaptation of health interventions including a nutrition component in Indigenous peoples: a systematic scoping review. *Int J Equity Health*. 2021;20(1):125.
25. Brewer LC, Hayes SN, Caron AR, et al. Promoting cardiovascular health and wellness among African-Americans: community participatory approach to design an innovative mobile-health intervention. *PLoS One*. 2019;14(8):e0218724.
26. Goswami A, Poole L, Thorlu-Bangura Z, et al. The use of digital health interventions for cardiometabolic diseases among South Asian and Black minority ethnic groups: realist review. *J Med Internet Res*. 2023;25:e40630.
27. Yeager KA, Bauer-Wu S. Cultural humility: essential foundation for clinical researchers. *Appl Nurs Res*. 2013;26(4):251–256. doi:10.1016/j.apnr.2013.06.008.
28. Parry M, Owadally T, O'Hara A, Nickerson N, Hart D. Community- and patient-partner engagement in women's cardiovascular disease research: a rapid review of the evidence. *CJC Open*. 2023;6(2 Pt B):485–502.
29. Jull J, Smith M, Carley M, Stacey D, Graham ID; Cochrane Decision Coaching Review Team. Co-production of a systematic review on decision coaching: a mixed methods case study within a review. *Syst Rev*. 2024;13(1):149.
30. Saskatchewan Centre for Patient-Oriented Research. SCPOR Patient-Oriented Research Level of Engagement Tool; 2018. Accessed November 1, 2025. Available at: www.scpor.ca
31. McLean RKD, Carden F, Aiken AB, et al. Evaluating the quality of research co-production: Research Quality Plus for Co-Production (RQ + 4 Co-Pro). *Health Res Policy Syst*. 2023;21(1):51.
32. Barbaric A, Munteanu C, Ross H, Cafazzo JA. Design of a patient voice app experience for heart failure management: usability study. *JMIR Form Res*. 2022;6(12):e41628.
33. Chimberengwa PT, Naidoo M. Using community-based participatory research in improving the management of hypertension in communities: a scoping review. *S Afr Fam Pract (2004)*. 2020;62(1):e1–e14.