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PERSPECTIVE ARTICLE

Perspectives: Recent advances in community-based interventions for cardiovascular disease disparities in the United States

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Abstract

Despite decades of progress in prevention and management, cardiovascular disease (CVD) remains the leading cause of mortality in the United States (US) and globally, with persistent and even widening disparities in outcomes across racial, ethnic, geographic, and socioeconomic groups. As a complement to clinical care, community-based interventions have emerged as vital tools in promoting cardiovascular health, particularly in underserved populations. This perspective focuses on recent advances in US-based community interventions for CVD, while acknowledging global relevance, and explores the historical evolution, current landscape, and future directions of community-driven CVD prevention strategies. We highlight foundational models such as the Healthy Heart Community Prevention Project in New Orleans, Louisiana, and examine recent major studies and innovations in the field from the US and across the world. Community-rooted programs demonstrate growing potential to address upstream determinants of cardiovascular health. Their continued success, however, will depend on sustained investment, robust evaluation frameworks, and alignment with clinical care pathways and health policy infrastructure.

Keywords: Community interventions; Cardiovascular disorders; Hypertension; Disparities

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1. Introduction

Cardiovascular disease (CVD), including coronary artery disease, myocardial infarction, heart failure, cerebrovascular disease, and other related disorders, is the primary cause of morbidity and mortality worldwide, including the United States (US). Despite significant advancements in prevention and treatment, recent data suggest that CVD rates continue to rise.[1,2] While age-adjusted mortality rates may have slightly declined, the total number of CVD-related deaths increased by over 10,000 in the US from 2021 to 2022, indicating the ongoing need to identify and implement more effective strategies for CVD prevention and control.[1] Traditional clinical care, including visits to physicians, nurse practitioners, and other clinicians, remains essential to control cardiometabolic risk factors such

as obesity, diabetes, hypertension, hyperlipidemia, and smoking; however, growing evidence suggests that community-based interventions, beyond simple screening, may be a strong pathway to optimize the control of these risk factors.[3-6] In the US, CVD-related healthcare costs including direct costs, related to disease management and indirect costs in the forms of lost productivity and early mortality, accounted for approximately US$ 400 billion dollars in 2019.[7] Based on 2022 US dollar value, annual inflation-adjusted CVD spending is projected to increase to US$1.8 trillion by 2050.[8] These alarming forecasts highlight the urgent need to prioritize and expand efforts in CVD prevention, focusing on community-based interventions, which have the potential to offer cost-effective measures that substantially reduce healthcare costs imposed by CVD. In this perspective piece, we explore recent advancements in community-based cardiovascular interventions, emphasizing recent US-based advancements, while drawing connections to select global initiatives where relevant. We examine strategies such as digital health programs, community-led behavioral interventions, and policy-driven approaches, with an emphasis on their impact on health equity. While this perspective focuses on marginalized and underserved communities, it is important to recognize that community-based interventions to promote a healthier lifestyle and minimize CVD risk factors can, and should, be implemented in all populations.

2. Methodology

For this perspective, we conducted a literature review using PubMed, focusing on studies published in English between 2023 and 2025, to capture recent advancements in community-based cardiovascular interventions. Our search strategy combined MeSH terms and title or abstract keywords related to CVDs, community health services, and implementation science. We prioritized original research, including randomized controlled trials (RCTs), community trials, and implementation studies, while excluding meta-analyses and systematic reviews. Although the systematic search included only studies from 2023 to 2025, we incorporated relevant older studies where appropriate to provide historical context and strengthen key discussions. The review encompassed lifestyle, digital health, policy-based, and culturally tailored interventions aimed at improving cardiovascular outcomes, particularly in underserved populations.

3. Brief history of the evolution of community-based CVD interventions

Community-based cardiovascular interventions have evolved significantly over the past several decades, shifting from broad public health campaigns to more targeted, culturally tailored approaches. Early large-scale initiatives, such as the Framingham Heart Study and the National Health and Nutrition Examination Survey, laid the groundwork for understanding cardiovascular risk factors at the population level.[9-11] However, these studies primarily informed clinical guidelines rather than directly engaging communities. The realization that traditional healthcare settings alone were insufficient in preventing CVD and addressing disparities led to the emergence of community-driven interventions, particularly for high-risk populations.

One of the earliest and most influential models was the Church/Community Health Awareness and Monitoring Program in Baltimore, Maryland, during the late 1970s.[12-14] This initiative mobilized church volunteers from roughly 100 local churches to conduct blood pressure screenings and referrals in predominantly Black communities. This approach laid the foundation for later barbershop-based hypertension programs, where trusted community figures facilitated engagement in cardiovascular care. In the 1990s, the Healthy Heart Community Prevention Project (HHCPP), led by New Orleans locals Daphne Ferdinand, PhD RN, and Keith Ferdinand, MD, in New Orleans, Louisiana, expanded on this model, integrating faith-based health messaging and barbershop and hair salon hypertension screening programs to improve cardiovascular awareness in African American populations.[15,16]

The early 2000s saw the rise of policy-driven cardiovascular interventions, including the Million Hearts initiative, a national program launched in 2012 by the Centers for Disease Control and Prevention and the Centers for Medicare & Medicaid Services to prevent one million heart attacks and strokes within 5 years.[17] The initiative focuses on system-wide improvements in cardiovascular care and collaborates with community organizations, pharmacies, local health departments, faith-based groups, and employers to promote hypertension control, smoking cessation, and heart-healthy behaviors beyond traditional clinical settings. In addition, studies such as the Los Angeles Black Barbershop Blood Pressure Study demonstrated the power of pharmacist-barber collaborations, achieving significant blood pressure reductions through community-based medication management.[18]

Internationally, the North Karelia Project in Finland, launched in 1972, remains one of the most successful large-scale community interventions.[19] By targeting dietary changes, smoking cessation, and blood pressure control through community and government collaboration, North Karelia achieved remarkable reductions in CVD mortality

over several decades. These historical efforts have paved the way for modern interventions which will be discussed in the following sections.

4. Health equity and community-based cardiovascular interventions

Disparities in cardiovascular health across racial, ethnic, and socioeconomic lines remain a major public health crisis in America. Black, non-black Hispanic, indigenous, and rural communities in America experience significant health disparities and are at a notably higher risk for CVD. Compared to White Americans, Black Americans are nearly twice as likely to have major CVD risk factors such as obesity, type 2 diabetes, and hypertension, and to experience major CVD including ischemic heart disease, heart failure, and stroke.[20] In addition, non-Hispanic Black individuals are 33% more likely to die of CVD than non-Hispanic white individuals.[21] Recent data from 43,000 persons also confirmed that Black women and men have the highest long-term cardiovascular mortality of any racial or ethnic group, even after adjusting for atherosclerotic CVD risk scores and coronary artery calcium.[22] These disparities can be attributed to social determinants of health, including healthcare access, low socioeconomic status, food deserts, racism-related stress, and lack of trust in the healthcare system.[23]

For Hispanic communities, language barriers provide their own complications. Furthermore, a lack of Hispanic clinicians, lower socioeconomic markers among Hispanic immigrant communities, and food deserts caused by geographic disparities add to the challenges to reduce CVD burden in this population.[24] Large meta-analyses have found that Hispanic Americans have similar levels of minor CVD as White Americans but much higher incidence of type 2 diabetes.[20] However, a unique challenge in studying Hispanic populations in America is their incredible diversity, both genetically and socio-culturally. The term "Hispanic" is an umbrella classification that includes individuals of varying national origins, racial backgrounds, migration histories, and socioeconomic statuses. This heterogeneity poses methodological challenges in cardiovascular research, as findings from one subgroup (*e.g.*, Mexican Americans) may not be applicable to another (*e.g.*, Puerto Ricans, Cubans, or Central Americans). Consequently, broad generalizations may undermine the credibility of study findings. As a result, some studies may find substantial CVD disparities, while others find none.[24,25]

Indigenous US communities also suffer from higher rates of CVD than their non-Hispanic White counterparts. Indigenous men and women have, respectively, 30% and 70% higher mortality rates from CVD compared to the general population. The unique culture, history, and legal status of indigenous communities provide unique challenges and opportunities for community-based health interventions.[26]

In addition, rural communities face their own unique challenges in managing cardiovascular risk. Lack of both specialized and primary care physicians and other clinicians, lack of medical supplies, long travel distances to hospitals, and high incidence of food deserts contribute to a stark urban/rural divide in markers of cardiovascular health. Although poverty level is a strong moderating variable, rural areas have higher CVD death rates than their urban counterparts across the board. These disparities are the most pronounced in the southern US, where rural populations experience over double the rate of CVD mortality.[27] Community-based health interventions are critical pieces in boosting healthcare within underserved communities and bridging gaps in health equity. Crucially, these interventions must consider the differences in specific patient populations to be effective. In African–American communities, involving non-medical community members such as hairdressers and pastors has been shown to increase medication adherence as well as primary and secondary health outcomes.[16] Medication adherence, notably reduced in Black communities, is a major risk factor that can be attributed to lower education levels, lack of social support and culturally competent care, and high costs. Many of these factors can be directly addressed with a community-based intervention involving other persons in addition to physicians. A notable successful example of combining health professionals with community leaders is the Los Angeles Barbershop Blood Pressure Study, where pharmacist-led interventions in Black-owned barber shops drastically reduced blood pressure.[18] On the other hand, one shortcoming of not involving physicians in community-based initiatives is a lack of integration between different types of healthcare workers and actual clinical care.[28]

Recent innovations include the use of geographic information system mapping to determine the optimal locations of so-called "trusted spaces" – community centers such as barber shops and nail salons where staff can provide evidence-based care to maximize the positive impacts.[29] In Hispanic communities, programs targeting language and cultural barriers have been particularly effective. Thirteen weeks of behavioral classes on healthy habits taught in Spanish to patients with type 2 diabetes decreased hemoglobin A1c (HbA1c) from an average of 7 – 6.3% after 1 year.[30] This is especially significant considering diabetes is the main cardiovascular disparity that is consistently

identified in Hispanic populations. Similar positive results are seen in North American indigenous populations. A meta-analysis of 1986 studies on CVD in indigenous communities suggested that adapting a model of heart health that incorporates traditional indigenous notions of heart health and integrating community members into care vastly improved health outcomes. Patient education programs incorporating modern medicine with traditional indigenous storytelling and ceremony were especially valuable in improving outcomes or older indigenous persons.[26] Trials conducted in rural settings, both in the US and internationally, have also demonstrated significant benefits. A recent intervention conducted in rural China, where patients with uncontrolled hypertension were assigned to a non-physician community-based provider, was associated with a reduction in systolic blood pressure by 23 mmHg compared with usual care.[31] Studies in rural Kentucky examining the effect of community health workers on patients with type 2 diabetes found that the workers markedly improved patient confidence and self-worth but lagged in improving heart-healthy behavior or HbA1c levels. This underscores the need to develop new strategies that are molded to specific populations.[28] Community health interventions could define a new standard of care for CVD prevention, but it is imperative that these programs are adjusted based on individual communities and that their planning involves the voices of those communities. Much more work needs to be done to establish how community interventions can be employed in different geographic and demographic areas. However, navigating a dynamic political climate to ensure a consistent stream of funding is a critical factor for all researchers.

5. Key innovations in community-based cardiovascular interventions

The HHCPP emerged during the 1990s as a pioneering community-based initiative to reduce cardiovascular risk in African–American populations.[15,16] It focused on building strong partnerships within the backbone of the community including with barbershops, beauty salons, churches, and healthcare professionals to promote healthy lifestyle changes in a culturally relevant fashion that resonated with the community. Major outreach activities included blood pressure screenings during barbershop visits, health messages delivered during church worship services, clinical symposia for local healthcare professionals aimed at improving hypertension and lipid guideline adherence, and efforts to reduce vaccination hesitancy. Today, HHCPP remains active through various community outreach programs such as health fairs, healthy cooking classes, health education and faith-based programs, as well as expanded academic collaborations to generate scientific evidence from its community initiatives.

One of these relevant local initiatives, the Church-based Health Intervention to Eliminate Racial Inequalities in Cardiovascular Health (CHERISH) Study, uses the potential of faith-based community interventions in addressing cardiovascular disparities.[32] Funded by the National Institutes of Health (NIH), CHERISH is a 7-year RCT partnering with over 40 predominantly African–American churches across New Orleans. The intervention trains community health workers to deliver cardiovascular prevention strategies aligned with the 2019 American College of Cardiology/American Heart Association guidelines.[33] By embedding health promotion into trusted church environments, CHERISH aims to reduce disparities in blood pressure, cholesterol, and overall cardiovascular risk through education, coaching, and sustained behavioral support.

Another HHCPP effort, the Text My BP Meds NOLA study, was an innovative digital health initiative designed to improve hypertension control in Black adults residing in New Orleans.[34] The program utilized simple cell phone text message-based technology to deliver regular messages to participants regarding medication adherence and blood pressure self-monitoring. The study showed significant improvements in medication adherence and blood pressure.

In a more recent academic partnership with Tulane University, and in response to the increasing rates of obesity and use of glucagon like peptide-1 agonists (GLP-1a) for cardiometabolic disease management, HCCP is working on a pilot community-based intervention that will integrate culinary classes, cardiovascular health education, and personalized digital meal-planning tools, to enhance the effects of GLP-1a, preserve muscle mass, and promote sustainable lifestyle changes. Currently submitted for NIH funding through the Louisiana Clinical and Translational Science Center, the program seeks to equip participants with skills and resources that persist even when access to GLP-1a medications is lost due to any reason including insurance coverage issues which frequently occurs.[35]

Recent evidence from large-scale trials further supports the strategies embedded within programs such as the HHCPP. A 2024 meta-analysis of digital health interventions for management of hypertension in the US populations experiencing health disparities showed that most of the 28 included studies examined multicomponent digital health interventions incorporating digital health (remote blood pressure monitoring in this case), community health workers or nurses, and/or cultural modifications, components critical to community-based

interventions and incorporated into the studies by the HHCPP.[36] This analysis also revealed that community interventions led to significant reductions in blood pressure compared with the standard treatment groups. While not a community-based intervention per se, the 2024 RICH LIFE trial demonstrated that multilevel, equity-focused strategies within primary care settings such as incorporating social needs screening and team-based management can significantly improve blood pressure control in high-risk populations, particularly in rural areas and among patients with coronary heart disease.[37] The SAHELI, an RCT performed in Chicago, Illinois, among the US South Asian adults, investigated a 16-week culturally adapted group lifestyle intervention versus written health education materials to reduce CVD risk factors including blood pressure, cholesterol, and HbA1c. Although the study did not meet its primary outcome of improving the CVD risk factors, the intervention was at least associated with minor improvements in self-reported health behaviors, which can be a stepping stone in the long-term management.[38]

In addition to efforts within the US, several recent community-based RCTs conducted globally have yielded overwhelmingly positive results. A large 2023 RCT studying a geographically diverse population of 33,995 participants in China showed that participants receiving a blood pressure intervention led by non-physician community healthcare professionals had significantly lower rates of major cardiovascular events including a composite of myocardial infarction, stroke, heart failure requiring hospitalization, and CVD-related death after 36 months compared with the standard care group (hazard ratio [HR]: 0.67, 95% confidence interval: 0.61 – 0.73). They also found a significant reduction in blood pressure in the intervention group.[30] Another Chinese RCT evaluated a digital health behavioral intervention for older adults with hypertension.[39] The intervention utilized a social media-based messaging platform and health education, incorporating personalized exercise prescriptions, dietary guidance based on the Dietary Approaches to Stop Hypertension diet, medication adherence strategies, and regular blood pressure monitoring. Over a 12-week period, participants in the intervention group experienced significant improvements compared to the control group, including a reduction in systolic blood pressure by 7.36 mm Hg (p=0.002), increased exercise time, enhanced medication adherence, and more frequent blood pressure monitoring. Several other community-based intervention studies performed across the world including India, Mexico, Nepal, Brazil, and Kenya have addressed hypertension and/or other major CVD risk factors, including obesity, diabetes, and even depression.[40-45] The core strategies including utilization of community resources, cultural adaptations, and incorporation of innovative approaches such as faith-based engagement and digital health technologies are broadly applicable across these conditions and have been implemented.

It is worth mentioning that many community-based cardiovascular efforts originate organically within communities and operate independently of research protocols. For instance, since 2016, Linda Peterson, MD, a cardiologist at Washington University in St. Louis, has led a unique early prevention school-based cardiovascular outreach initiative targeting both grade school and high school students across the St. Louis region.[46] The program introduces young students – many from underserved communities – to the basics of heart function, the importance of cardiovascular health, and the role of cardiologists. Over the years, the program has expanded from a single-classroom effort to a multi-team initiative, reaching an estimated 1,300 students across several public schools. While not originally designed as a research study, this model demonstrates potential in academic-community partnerships aimed at improving cardiovascular health literacy from an early age. Such programs present valuable opportunities for systematic research, and efforts should be made to remove barriers and facilitate funding mechanisms that support their integration into formal study designs. If proven effective through research, these programs could be implemented either as a standalone intervention or integrated into broader, multimodal community-based strategies to improve cardiovascular health across diverse communities in the US and globally.

6. Future directions: 2025 and beyond

CVD community-based interventions are emerging as essential tools for reducing population-level risk, improving equity, and fostering sustainable health behavior change. Moving forward, the continued success and scalability of these interventions will depend not only on innovation and research but also on their thoughtful integration into healthcare systems and policy frameworks (Figure 1).

Digital health technologies offer immense potential for expanding the reach and efficacy of community-based interventions.[47] Incorporating mobile platforms, wearable devices, and app-based peer support has shown promise in improving blood pressure control, medication adherence, and patient engagement. Furthermore, the integration of artificial intelligence into community-based research offers a unique opportunity to leverage big data, particularly data on social determinants of health to design interventions, identify at-risk populations, and optimize resource allocation.[48] However, barriers such as digital literacy

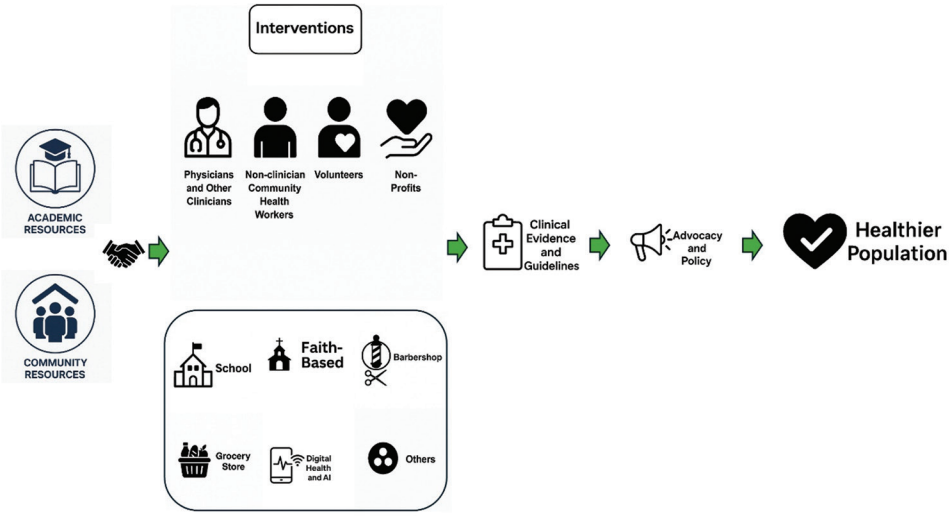

Figure 1. Pathway from academic and community resources to evidence, policy, and population health

gaps, inconsistent internet access, and device affordability continue to limit reach among those most at risk. Moreover, many digital interventions lack cultural considerations or real-world usability testing.

Future programs should prioritize inclusive design, multilingual interfaces, and user-centered development involving the target populations from the outset. They should also integrate community programming with standard pharmacologic and clinical care. While community-based CVD interventions have shown promise, many are limited by significant heterogeneity in methodology and a lack of integration with comprehensive clinical management. Few studies evaluate the impact of community-based interventions alongside a robust clinical care plan. To enhance effectiveness and real-world applicability, future research should prioritize clinical-community partnerships and design care pathways that span pre-treatment, concurrent treatment, and post-treatment phases, ensuring sustained lifestyle support across the continuum of care. The absence of standardized outcome measures, core implementation frameworks, and uniform reporting practices limits the ability to compare results across studies or conduct robust meta-analyses. Many promising programs remain unpublished or unevaluated due to resource constraints, limited research infrastructure, and challenges navigating institutional review board processes. Future efforts should prioritize the development of flexible yet rigorous evaluation models such as hybrid effectiveness-implementation designs[49] and the establishment of core outcome sets for community-based CVD research.

Furthermore, many community-rooted strategies remain disconnected from guidelines and the broader healthcare system. Successful integration requires robust evidence on the efficacy of the intervention, clear referral pathways, inclusion of community health workers in care teams, and bidirectional communication between clinical and community settings. Barriers such as limited reimbursement for non-clinical roles, poor electronic medical record data interoperability, and lack of institutional support continue to hinder progress. Addressing these challenges will require aligning community efforts with population health goals and value-based care metrics recognized by payers and accrediting bodies. Health policy will be essential in supporting this integration. Federal and state agencies can drive change through reimbursement models, workforce incentives, and investments in infrastructure. Policies that promote community health worker certification and fund grassroots innovation through research-practice partnerships will be key.

7. Conclusion

Community-based interventions have become essential in addressing the persistent burden and disparities of CVD. Programs grounded in cultural relevance, trust, and local infrastructure offer scalable solutions that extend beyond clinical settings. A growing body of evidence supports the effectiveness of these interventions across diverse populations and delivery models. As this evidence base grows, it is now imperative to integrate these approaches into mainstream healthcare, supported by sustainable funding, robust research infrastructure, and policy reform.

This conceptual framework illustrates how a partnership between academic institutions and community entities can contribute distinct but complementary resources that feed

into the design and delivery of effective community-based cardiovascular interventions. When rigorously studied, these interventions can generate evidence that informs clinical guidelines, shapes policy, and ultimately drives improvements in cardiovascular health at a population level.

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Conflict of interest

The authors declare that they have no competing interests.

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