



# Community and Social Context: An Important Social Determinant of Cardiovascular Disease

## REVIEW ARTICLE

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## ABSTRACT

Disease prevention frameworks and clinical practice guidelines in the United States (US) have traditionally ignored upstream social determinants of health (SDOH), which are critical for reducing disparities in cardiovascular disease (CVD)—the leading cause of death in the US. Existing evidence demonstrates a protective effect of social support, social cohesion, and community engagement on overall health and wellbeing. Increasing community and social support is a major objective of the Healthy People 2030 initiative, with special provisions for vulnerable populations. However, to date, existing evidence of the association between community and social context (CSC)—an integral SDOH domain—and CVD has not been reviewed extensively. In particular, the individual and cumulative impact of CSC on CVD risk and the pathways linking CSC to cardiovascular outcomes are not well understood. In this review, we critically appraise current knowledge of the association between CSC and CVD, describe potential pathways linking CSC to CVD, and identify opportunities for evidence-based policy and practice interventions to improve CVD outcomes.

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## INTRODUCTION

Cardiovascular disease (CVD) affects more than 480 million people annually worldwide.<sup>1</sup> In the United States (US) alone, nearly 655,000 Americans die each year of CVD.<sup>2</sup> It is known that traditional clinical risk factors such as diabetes, hypertension, and obesity, and modifiable risk behaviors including insufficient physical activity, poor diet, smoking, and alcohol consumption, account for over 80% of all CVD.<sup>3</sup> Yet, most lifestyle CVD interventions focus on addressing downstream risk factors for disease, often failing to address the “causes of the causes.”<sup>4,5</sup> Disease prevention frameworks and clinical practice guidelines have historically ignored *upstream* social determinants of health (SDOH), which are critical toward achieving primary prevention and reducing health disparities in CVD.<sup>6,7</sup> In this context, a recent joint American College of Cardiology (ACC)/American Heart Association (AHA) clinical practice guideline emphasized the need to address SDOH to inform delivery of care and achieve primary prevention.<sup>6</sup>

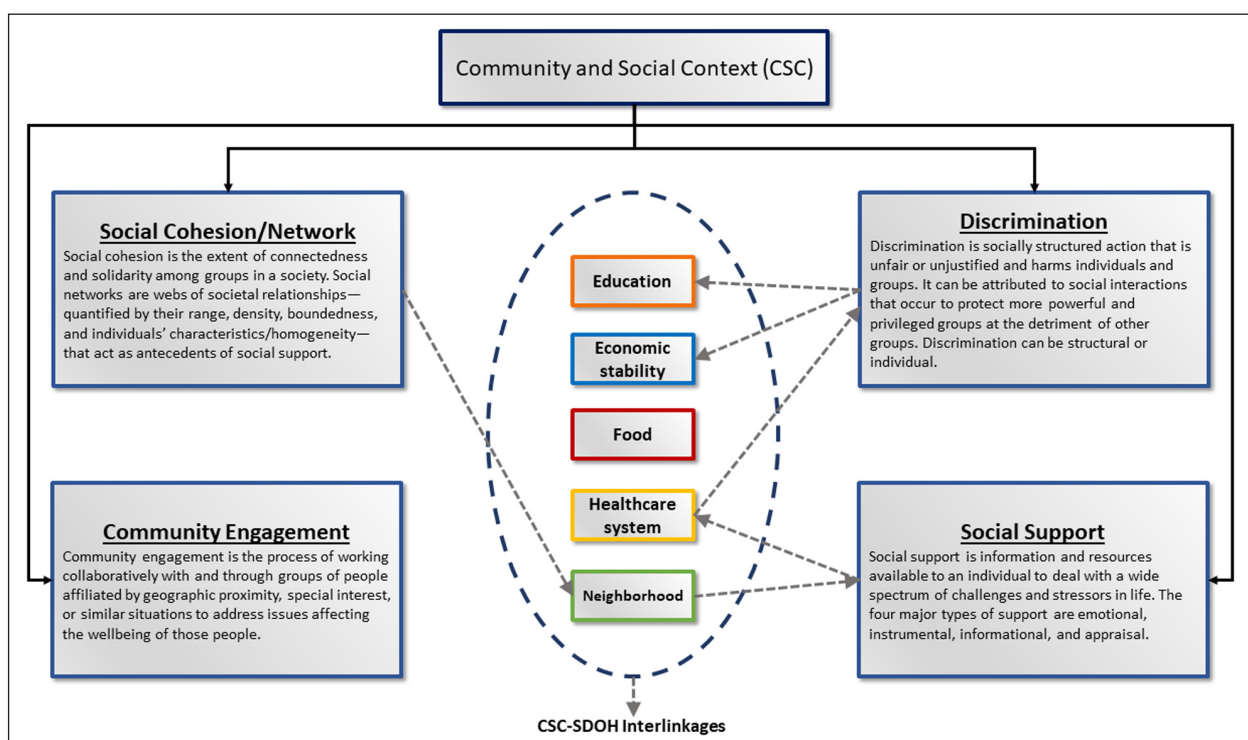
Healthy People 2030 is a key initiative of the US Department of Health and Human Services’ Office of Disease Prevention and Health Promotion. Designed to improve the nation’s health and wellbeing, Healthy People 2030 sets forth specific objectives to create social and physical environments that help achieve optimal population health.<sup>8</sup> Improved community and social support—a key SDOH—is a major objective, with special provisions for vulnerable populations including children/adolescents, racial/ethnic minorities and the lesbian, gay, bisexual, and transgender population.<sup>8</sup> Existing evidence suggests a protective effect of social support,

social cohesion, community engagement, and other community and social context (CSC) subdomains on overall health and wellbeing.<sup>8,9</sup> However, relatively few studies have examined the impact of CSC on CVD risk or the possible pathways linking CSC to CVD outcomes, both of which merit further research. This review is intended to (1) critically appraise current knowledge of the association between CSC and CVD, (2) elucidate potential pathways and mechanisms through which CSC may predict adverse CVD outcomes, and (3) identify opportunities for evidence-based interventions to improve CVD outcomes and reduce disparities.

## COMMUNITY AND SOCIAL CONTEXT: AN INTEGRAL PART OF SDOH

Widely used SDOH models, such as the Healthy People and Kaiser Family Foundation models, provide critical domain-based frameworks for greater understanding of SDOH and design of evidence-based interventions to address SDOH.<sup>8,10</sup> Community and social context is defined as “the context in which individual, societal, and cultural factors interact to impact health outcomes,”<sup>11</sup> and it is an integral part of SDOH. SDOH are broadly classified into six major domains: economic stability, education, food, CSC, neighborhood and physical environment, and healthcare system.<sup>8,10</sup> Each SDOH domain is linked to others via multiple pathways, with major CSC-SDOH interlinkages outlined in [Figure 1](#).

We identified four recurring themes in available literature on CSC and accordingly divided the domain into four distinct subdomains: social support, social



**Figure 1** Community and social context: interlinkages with other social determinants of health (SDOH) domains.

cohesion/social networks, discrimination, and community engagement and civic participation (Figure 1).<sup>10-13</sup> The following section discusses the impact of individual CSC subdomains on cardiovascular health using evidence from existing literature. Different measures used to define CSC subdomains, as reported in the literature and referenced herein, are listed in Table 1.<sup>14-38</sup>

## SOCIAL SUPPORT

### Context

Social support is a multifaceted construct that encompasses information and resources available to an individual to deal with a wide spectrum of life's

challenges and stressors.<sup>13</sup> It is often classified as emotional (empathy, love, trust), instrumental (tangible goods), informational (information provided to cope with stressful situations), and appraisal (affirmative support related to self-evaluation).<sup>10</sup> Social support is built around a bidirectional "positive emotional exchange" between an individual and his/her social networks, with positive effects on health outcomes.<sup>12</sup>

### Current Evidence

Social support is linked to physical and mental wellbeing, increased ability to cope with stress, and improved self-care and overall health-related quality of life in individuals

| STUDY  | CITATION NUMBER | SUBDOMAIN DEFINITION/RELEVANT LINKS  |
|--|-----------------|--|
| <b>SOCIAL SUPPORT</b>                          |                 |  |
| Gallagher et al., 2011                         | 14              | Aspects of relationships with a partner that promote health or buffer stress including instrumental aid, emotional caring or concern, and information; final measure created using a survey questionnaire with multiple items<br><a href="https://pubmed.ncbi.nlm.nih.gov/21372734/">https://pubmed.ncbi.nlm.nih.gov/21372734/</a>   |
| Wu et al., 2013                                | 15              | Perceived social support, using Multidimensional Perceived Social Support Scale<br><a href="https://pubmed.ncbi.nlm.nih.gov/22746258/">https://pubmed.ncbi.nlm.nih.gov/22746258/</a>   |
| Kawachi et al., 1996                           | 16              | Berkman-Syme Social Networks Index: a composite measure of social connections. Major domains include marital status, sociability, church group membership, other community organization membership.<br><a href="https://pubmed.ncbi.nlm.nih.gov/8935453/">https://pubmed.ncbi.nlm.nih.gov/8935453/</a>   |
| Berkman et al., 1992                           | 17              | Emotional support, measured using social ties (eg, can you count on anyone to provide you with emotional support?) and social networks (eg, marital status, contact with friends/relatives, membership in religious organization, activities in voluntary groups)<br><a href="https://pubmed.ncbi.nlm.nih.gov/1443968/">https://pubmed.ncbi.nlm.nih.gov/1443968/</a>   |
| Williams et al., 1992                          | 18              | Perceived social support using structural (eg, marital status) and functional (eg, satisfaction with social relationships, feeling of loneliness) aspects<br><a href="https://pubmed.ncbi.nlm.nih.gov/1729574/">https://pubmed.ncbi.nlm.nih.gov/1729574/</a>   |
| Berkman et al., 2003                           | 19              | Low perceived social support determined using the Enhancing Recovery in Coronary Heart Disease Patients (ENRICHED) Social Support Instrument (ESSI)<br><a href="https://pubmed.ncbi.nlm.nih.gov/12813116/">https://pubmed.ncbi.nlm.nih.gov/12813116/</a>   |
| <b>SOCIAL COHESION</b>                         |                 |  |
| Kim et al., 2014                               | 20              | Perceived neighborhood social cohesion quantified using a four-item scale: (1) I really feel part of this area; (2) If I were in trouble, there are lots of people in this area who would help me; (3) Most people in this area can be trusted; (4) Most people in this area are friendly.<br><a href="https://pubmed.ncbi.nlm.nih.gov/25135074/">https://pubmed.ncbi.nlm.nih.gov/25135074/</a>  |
| Lagisetty et al., 2016                         | 21              | Perceived neighborhood social cohesion using five-item Likert scale: (1) People around here are willing to help their neighbors; (2) People in this neighborhood generally don't get along with each other; (3) People in this neighborhood can be trusted; (4) People in this neighborhood do not share the same values; (5) Most people in this neighborhood know each other.<br><a href="https://pubmed.ncbi.nlm.nih.gov/26527589/">https://pubmed.ncbi.nlm.nih.gov/26527589/</a> |
| Quinn et al., 2017                             | 22              | Neighborhood social cohesion quantified using four questions modified from the Project on Human Development in Chicago Neighborhoods Community Survey<br><a href="https://www.cdc.gov/pcd/issues/2019/19_0085.htm">https://www.cdc.gov/pcd/issues/2019/19_0085.htm</a>   |
| Buckner, 1988                                  | 23              | Neighborhood Cohesion Instrument<br><a href="https://onlinelibrary.wiley.com/doi/abs/10.1007/BF00930892">https://onlinelibrary.wiley.com/doi/abs/10.1007/BF00930892</a>  |
| Sampson et al., 1997                           | 24              | Social Cohesion Scale<br><a href="https://science.sciencemag.org/content/277/5328/918">https://science.sciencemag.org/content/277/5328/918</a>   |
| Smith et al., 2017<br>Health Retirement Survey | 25              | Multiple items/subdomains<br><a href="https://hrs.isr.umich.edu/sites/default/files/biblio/HRS%202006-2016%20SAQ%20Documentation_07.06.17_0.pdf">https://hrs.isr.umich.edu/sites/default/files/biblio/HRS%202006-2016%20SAQ%20Documentation_07.06.17_0.pdf</a>   |

| STUDY   | CITATION NUMBER | SUBDOMAIN DEFINITION/RELEVANT LINKS  |
|---|-----------------|--|
| <b>DISCRIMINATION</b>                               |                 |  |
| Everson-Rose et al., 2015                           | 26              | Discrimination measured using (1) lifetime discrimination with the Lifetime Discrimination Scale and (2) everyday discrimination with the Everyday Discrimination Scale<br><a href="https://pubmed.ncbi.nlm.nih.gov/26085044">https://pubmed.ncbi.nlm.nih.gov/26085044</a>   |
| Forde et al., 2020                                  | 27              | Discrimination measured using (1) lifetime discrimination with the Lifetime Discrimination Scale and (2) everyday discrimination using the Everyday Discrimination Scale<br><a href="https://pubmed.ncbi.nlm.nih.gov/32605388/">https://pubmed.ncbi.nlm.nih.gov/32605388/</a>  |
| Schulman et al., 1999                               | 28              | Discrimination measured as differences in management of chest pain based on race and sex of patient in scripted interviews<br><a href="https://pubmed.ncbi.nlm.nih.gov/10029647/">https://pubmed.ncbi.nlm.nih.gov/10029647/</a>  |
| Popescu et al., 2011                                | 29              | Discrimination measured as differences in acute myocardial infarction admissions to revascularization hospitals and high-quality hospitals based on race<br><a href="https://pubmed.ncbi.nlm.nih.gov/21632492/">https://pubmed.ncbi.nlm.nih.gov/21632492/</a>  |
| Wang et al., 2009                                   | 30              | Discrimination measured as difference in incident hypertension, left ventricular hypertrophy, and barriers to healthcare in patients with a history of incarceration vs those without a history of incarceration<br><a href="https://pubmed.ncbi.nlm.nih.gov/19364998/">https://pubmed.ncbi.nlm.nih.gov/19364998/</a>  |
| <b>COMMUNITY ENGAGEMENT AND CIVIC PARTICIPATION</b> |                 |  |
| Victor et al., 2018<br>Resnicow et al., 2005        | 31,32           | Effects of community engagement on CVD risk factors assessed via engagement in barbershops, local churches<br><a href="https://www.nejm.org/doi/full/10.1056/NEJMoa1717250">https://www.nejm.org/doi/full/10.1056/NEJMoa1717250</a><br><a href="https://content.apa.org/record/2005-07929-001">https://content.apa.org/record/2005-07929-001</a>   |
| Benson et al., 2019                                 | 33              | Various community engagement practices, including heart-health screenings, community weight-loss interventions, community health challenges, and phone counseling program<br><a href="https://pubmed.ncbi.nlm.nih.gov/30792949/">https://pubmed.ncbi.nlm.nih.gov/30792949/</a>   |
| Sidebottom et al., 2018                             | 34              | Community engagement using multiple interventions in a single town to assess for improvement in CVD risk factors<br><a href="https://pubmed.ncbi.nlm.nih.gov/29634974/">https://pubmed.ncbi.nlm.nih.gov/29634974/</a>  |
| Burr et al., 2011                                   | 35              | Volunteer work assessed as a community engagement activity<br><a href="https://journals.sagepub.com/doi/abs/10.1177/0898264310388272">https://journals.sagepub.com/doi/abs/10.1177/0898264310388272</a>  |
| <b>ADDITIONAL RESOURCES</b>                         |                 |  |
| Driscoll A., 2010                                   | 36              | "The collaboration between institutions of higher education and their larger communities (local, regional/state, national, global) for the mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity"<br><a href="https://naspa.tandfonline.com/doi/pdf/10.3200/CHNG.40.1.38-41">https://naspa.tandfonline.com/doi/pdf/10.3200/CHNG.40.1.38-41</a>   |
| CDC 2011  | 37              | "The process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest, or similar situations to address issues affecting the wellbeing of those people"<br><a href="https://www.atsdr.cdc.gov/communityengagement/index.html">https://www.atsdr.cdc.gov/communityengagement/index.html</a>  |
| Ahmad et al., 2010                                  | 38              | "Community Engagement in Research is a core element of any research effort involving communities which requires academic members to become part of the community and community members to become part of the research team, thereby creating a unique working and learning environment before, during, and after the research."<br><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2901283/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2901283/</a> |

**Table 1** Community and social context subdomain measures.<sup>14-38</sup>

with CVD.<sup>13,39</sup> Gallagher and colleagues<sup>14</sup> found that older adults with high levels of social support were more likely to consult with a health professional for weight gain, adhere to medication, and exercise regularly compared with those with medium or low levels of social support; these pathways improve overall cardiovascular health and survival.

Through multiple pathways, social support has been shown to improve self-care in patients with heart failure.<sup>15</sup> For example, findings from a study of social support and survival in patients with heart failure found that patients experiencing both lack of social support and

medication nonadherence had a 3.5-times increased risk of adverse cardiac events relative to patients with medication adherence and higher social support.<sup>15</sup> In the same study, the authors reported a mediation effect of medication adherence, highlighting a possible mechanism through which social support may impact cardiovascular health. Similarly, lack of emotional support has been associated with a significantly increased risk of mortality after hospitalization for myocardial infarction (MI).<sup>17</sup>

In a unique 19-year retrospective cohort study of more than 3,000 men and women, Thurston et

al.<sup>40</sup> found nearly twice the increased risk of incident coronary artery disease associated with experiences of loneliness. Further, it has been reported that individuals without a spouse or close confidant have lower survival rates compared with those who were married, have a confidant, or both.<sup>18</sup>

Despite the evidence documenting a protective effect of social support on cardiovascular health, relatively few studies have evaluated the effectiveness of social support interventions in the context of CVD. In the Enhancing Recovery in Coronary Heart Disease (ENRICH) trial—the largest study of social support interventions in CVD patients to date—Lett and colleagues<sup>41</sup> demonstrated that higher levels of perceived social support with cognitive behavioral therapy were associated with improved cardiac outcomes (time to death and reinfarction), but only in patients without elevated depression, suggesting the relevance of psychological wellbeing to the CSC-CVD association. Greater evidence is needed to improve current understanding of the effectiveness of existing interventions and inform future interventions on a population level.

## SOCIAL COHESION

### Context

Social cohesion is an important measure of the strength of an individual's ties to his/her community and is defined by Kawachi and Berkman<sup>42</sup> as “the extent of connectedness and solidarity among groups in a society.” A cohesive society allows mutual sharing of the community's collective energy and support system via availability of social capital, which is in turn made available through social networks. Social networks are webs of societal relationships—quantified by their range, density, boundedness, and individuals' characteristics/homogeneity—that act as antecedents of social support.<sup>43,44</sup> Social cohesion may protect cardiovascular health through multiple pathways, including improved health behaviors, positive psychological and physical health effects, and improved coping ability.<sup>13,45,46</sup>

### Current Evidence

Findings from a large, prospective study of > 5,000 participants suggest that neighborhood social cohesion may predict 22% lower risk of MI, independent of sociodemographic and clinical predictors.<sup>20</sup> These results are corroborated by findings from the Mediators of Atherosclerosis in South Asians Living in America (MASALA) Study, which showed nearly 50% lower odds of hypertension associated with high neighborhood cohesion.<sup>21</sup>

Berkman and colleagues<sup>44</sup> posit that social networks influence health behaviors and, ultimately, health outcomes by providing social support, influencing social engagement/attachment, and increasing access to material goods and resources. In their study of > 2,700 participants from the Framingham Heart Study, Strully

et al.<sup>47</sup> demonstrated that men had nearly 50% higher odds of taking aspirin if a male friend had also been recently taking aspirin; furthermore, women were nearly three times as likely to take aspirin if a female friend recently experienced a cardiovascular event. Similarly, using data for > 23,000 adults from the National Health Interview Survey, Quinn and colleagues<sup>22</sup> reported that higher social cohesion was associated with 22%, 13% and 14% increased odds of meeting aerobic guidelines, strength guidelines, and combined aerobic and strength guidelines, respectively.

Social isolation has been shown to be a strong risk factor for CVD. A meta-analysis of 16 longitudinal studies found that poor social relationships were associated with 29% increased risk of coronary heart disease and 32% increased risk of stroke.<sup>48</sup> Prior evidence suggests that socially isolated individuals may experience higher rates of smoking and obesity and are less likely to be physically active relative to those with stronger social bonds.<sup>48,49</sup> In addition, social isolation and loneliness may lead to chronic stress, which in turn contributes to CVD.<sup>50</sup> In one of the largest reported prospective studies of social network in CVD, Kawachi and colleagues<sup>16</sup> followed 32,624 male health professionals over a 4-year period and found that those who were socially isolated had a 90% increased risk for cardiovascular mortality and 121% increased risk of incident stroke compared with those with the highest level of social networks.

Poor social networks/lack of social cohesion may have disproportionate effects on disadvantaged populations, including racial/ethnic minorities. For example, findings from a diverse prospective study of > 5,000 adults suggest that the effects of neighborhood segregation were more prominent in non-Hispanic Blacks (NHBs) than non-Hispanic Whites (NHWs), while no effects were observed in Hispanics.<sup>51</sup> Conversely, increasing neighborhood social cohesion is associated with a corresponding decrease in interleukin-6 (IL-6) levels, with the strongest association reported in the NHB population (15-point decrease per unit increase in social cohesion).<sup>3,52</sup> While there is considerable variation in the measurement and operationalization of social cohesion, widely used and validated scales such as the Neighborhood Cohesion Instrument,<sup>23</sup> Social Cohesion Scale,<sup>24</sup> and the psychosocial and lifestyle questionnaire from the Health Retirement Survey<sup>25</sup> assess various aspects of trust, type/strength of social bonds (eg, friendships, exchange of resources), perceived helpfulness/practical help, common values, loyalty, and tolerance (*Table 1*).

## DISCRIMINATION

### Context

The Institute of Medicine defined discrimination as “differences in care that result from biases, prejudices, stereotyping, and uncertainty in clinical communication and decision making.”<sup>53</sup> While there are multiple forms of discrimination related to race, gender, weight, national



origin, religion, and other sociodemographic factors, this review focuses on racial/ethnic discrimination. Most population-level racial/ethnic disparities are linked to structural or institutional racism, which manifests as disparities in employment opportunities, residential segregation, and access to material resources, among others.<sup>54</sup> In turn, such differential treatment<sup>55</sup> restricts access to health care and affects quality of care for disadvantaged populations.

Major mechanisms of the discrimination-CVD association include internalized racism and adverse psychological effects, unhealthy coping behaviors, and cumulative psychological and physiological effects of acute and chronic stress.<sup>13,56</sup> In addition, insufficient cultural competence training and implicit provider bias toward racial/ethnic minorities increases the risk of bias in clinical decision making and affects the quality of the physician-patient relationship, with implications for patients' trust in the healthcare system.<sup>57,58</sup>

### Current Evidence

A large population-based study of > 6,000 adults (The Multi-Ethnic Study of Atherosclerosis) found that during a median follow-up of over 10 years, lifetime discrimination experience in two or more domains predicted a 6% to 28% increased risk of CVD.<sup>26</sup> Similarly, during a 13-year follow-up of participants from the Jackson Heart Study, Forde and colleagues<sup>27</sup> found that lifetime discrimination was associated with a 50% increased risk of hypertension.

Institutional racism contributes to disparities in both healthcare access and quality.<sup>56</sup> Existing evidence suggests that racial/ethnic minorities receive lower quality of care compared to NHWs.<sup>59</sup> For example, it has been previously documented that NHBs with hypertension are less likely to receive psychosocial support and rapport-building statements from physicians and more likely to experience shorter clinic visits compared with their NHW counterparts with similar CVD risk profiles.<sup>60</sup> In turn, such differential treatment can create gaps in physician-patient communication and compromise the overall quality of care.<sup>56</sup>

Provider-level disparities in adherence to clinical guidelines, medication prescribing, and use of invasive therapies based on patients' race/ethnicity have been noted in prior studies.<sup>59</sup> A survey-based study of > 700 physicians found that providers were less likely to refer NHB patients to the cardiac catheterization laboratory compared with NHW patients.<sup>28</sup> Similarly, NHB patients with MI are less likely to be admitted to facilities with resources for revascularization procedures.<sup>29</sup> In addition, NHBs who are taken to the catheterization lab have lower odds of door-to-balloon time < 90 minutes and longer revascularization times compared with NHWs.<sup>61</sup>

Unfortunately, knowledge of discrimination in health care and its resulting disparities is still low among cardiologists. Findings from a web-based survey of nearly 350 cardiologists found that only one-third of providers

agreed that racial disparities existed in cardiac care, merely 12% felt that it was present in their institution, and just 5% felt that their patients were affected by it. Interestingly, physicians caring for NHB and Hispanic patients had an even lower perception of the existence of healthcare disparities.<sup>62</sup> Feelings of implicit bias and provider discrimination among the NHB population have been documented to lower their trust in the healthcare system, leading to missed doctor appointments.<sup>63</sup>

Discrimination is a strong correlate of health and wellness among those who are incarcerated. CVD is the second-leading cause of death in the incarcerated<sup>64</sup> population, with a disproportionate impact on racial/ethnic minority populations. Prior evidence suggests worse CVD outcomes in the incarcerated population relative to the nonincarcerated and higher CVD risk in NHBs compared with NHWs.<sup>30</sup> However, current knowledge of the long-term impact of incarceration on the cardiovascular health of racial/ethnic minorities is limited and mandates further study.

## COMMUNITY ENGAGEMENT AND CIVIC PARTICIPATION

### Context

Community engagement encourages community members to plan, design, and implement public health interventions and is an established tool to reduce disparities and inequities in health and health care.<sup>65</sup> The concept of civic participation means participating in a variety of community-level activities that foster societal relationships, strengthen social bonds and networks, and improve health and wellbeing—both on individual and community levels.<sup>66</sup> Both community engagement and civic participation have beneficial effects on cardiovascular health.

### Current Evidence

In the Community Outreach and Cardiovascular Health (COACH) trial, patients with CVD, type 2 diabetes, or hypercholesterolemia were randomized to either enhanced usual care (control arm) or to the intervention arm, which included CVD risk factor management with a nurse practitioner/community health worker.<sup>67</sup> The intervention group had significantly higher improvements in total cholesterol, LDL cholesterol, triglycerides, systolic and diastolic blood pressures, and hemoglobin A1c.

The HONU (Heart of New Ulm) is a population-level CVD prevention project that engages a variety of community stakeholders to reduce CVD risk in the community through heart-health screenings, community weight-loss interventions, community health challenges, and a phone counseling program for high-risk residents. The project's multipronged approach to community engagement over the course of 5 years yielded a significant improvement in a variety of CVD risk factors, including physical activity and daily fruit and vegetable intake.<sup>33</sup> Compared with matched controls from a similar community over the

span of 7 years, the community at New Ulm had higher rates of blood pressure control, lower triglyceride levels, higher medication compliance (lipid medication and aspirin), and smaller increases in atherosclerotic CVD risk scores.<sup>31</sup>

Health advocacy by barbers, coupled with medication management by pharmacists, has been shown to be helpful in improving health behaviors in the NHB community.<sup>31</sup> In a cohort of 319 NHB males with systolic blood pressure (SBP)  $\geq 140$  mm Hg, 139 barbershop patrons were assigned to an intervention involving medication management by a pharmacist in the shop (cases) and 180 patrons received lifestyle modification tips and encouragement to set up doctor appointments (controls). At the end of 6 months, mean SBP dropped by 27 mm Hg in cases compared with 9.3 mm Hg in the control group.<sup>31,34</sup>

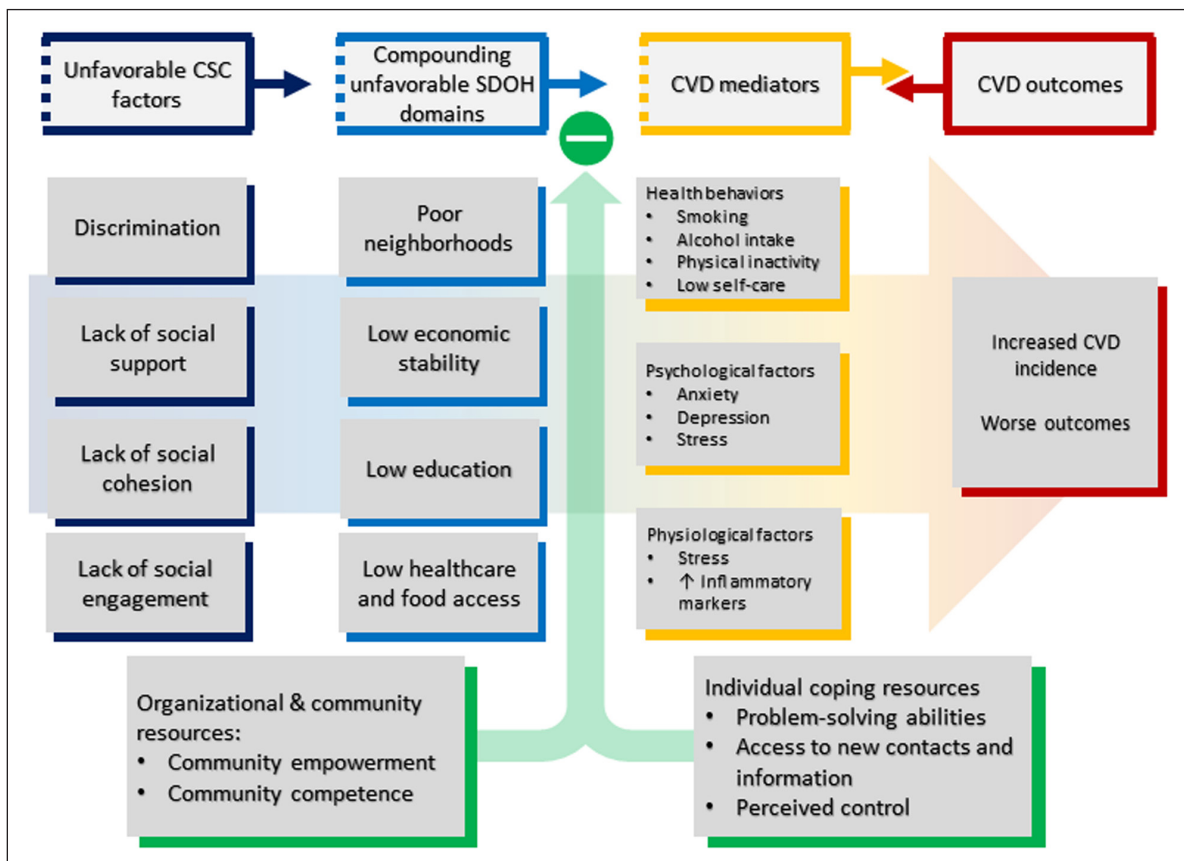
Local churches have also been successful in improving community health behaviors. Findings from the Healthy Body Healthy Spirit trial of > 1,000 individuals recruited across 16 churches showed that a combination of standard educational materials, nutritional/physical activity resources, and motivational interviewing (via telephone counseling calls) significantly increased both fruit and vegetable consumption and physical activity.<sup>32</sup>

Civic participation, such as volunteering, voting, and a variety of group recreational and sporting activities (eg, hockey, soccer, gardening, cleaning, etc.), strengthens existing social networks, increases social cohesion,

creates a common sense of goals and purpose, and improves overall health and wellbeing.<sup>68</sup> A study of > 7,000 middle-aged and older adults found that greater participation in volunteering activities was associated with 22% lower odds of central adiposity and 26% lower odds of lipid dysregulation. Similarly, another study of > 5,600 middle-aged and older men and women documented a 20% lower risk of hypertension and lower blood pressure levels overall among individuals who reported volunteering.<sup>35</sup> Civic participation may also improve overall CVD risk profile by improving physical activity and expanding/strengthening social networks, as documented in a study of Hispanic individuals that found that increased civic participation promoted physical activity, regardless of the size of social networks and awareness of physical activity resources.<sup>69</sup>

### PATHWAYS FROM CSC TO CVD

The theoretical foundations of social support and all four subconstructs are grounded in the social comparison, social exchange, and social competence theories.<sup>70</sup> The positive impact of each type of support is facilitated by social networks, social cohesion/community engagement, and the overall psychosocial climate of an individual's environment.<sup>70</sup> These pathways are summarized in *Figure 2*.



**Figure 2** Pathways from community and social context (CSC) to cardiovascular disease (CVD). SDOH: social determinants of health.

It is posited that a positive psychosocial climate, including attributes of helpfulness and protection, helps develop social competence, which in turn positively reinforces self-esteem, psychological wellbeing, and the ability to cope with stress.<sup>70,71</sup> Social competence further enhances the positive, bidirectional, mutually rewarding association between an individual and the networks that provide social support, ensuring overall “social health”—an important determinant of psychological wellbeing.<sup>70,72</sup>

Social support and associated constructs influence health outcomes via both physiological and psychological stress response as well as health behaviors.<sup>44</sup> Lack of social cohesion and trust have been associated with poor mental health outcomes, and limited social support or weak/small social networks—largely prevalent among disadvantaged groups—are associated with negative emotional states.<sup>73</sup> Similarly, the effects of poor social support and/or community engagement might be mediated by poor health behaviors, such as smoking, excessive alcohol consumption, and low physical activity levels.<sup>74</sup>

The psychological and behavioral responses to unfavorable community/social exposures potentiate harmful physiological responses, such as activated hypothalamic-pituitary-adrenal (HPA) axis and raised levels of inflammatory markers.<sup>75,76</sup> For example, acute

stress is documented to be associated with raised IL-6 levels in women with low self-reported social support.<sup>76</sup> Social isolation and low social support are linked to increased heart rate, blood pressure, and cortisol levels in preclinical studies.<sup>77,78</sup> Similarly, poor social support is linked to increased HPA axis reactivity and associated effects, such as increased heart rate and blood pressure.<sup>79</sup>

Major mechanisms of the discrimination-CVD association include internalized racism and adverse psychological effects (negative emotional state, heightened anticipatory vigilance, psychological distress, etc.), unhealthy coping behaviors, and cumulative psychological and physiological effects of acute and chronic stress.<sup>13,54,56</sup> These contribute to elevated blood pressure, decreased insulin sensitivity, and increased coronary artery calcium.<sup>80,81</sup> Additional factors at the healthcare level include lack of cultural competence training and implicit provider bias toward racial/ethnic minorities and other disadvantaged population subgroups, with implications for quality of care for marginalized populations and patient trust in the healthcare system.<sup>57,58</sup>

Additional evidence is needed to understand potential intersectionality among different CSC subdomains. Future studies should also assess how CSC effects are potentially modified via socioeconomic and demographic pathways.

| CSC SUBDOMAINS                                      | RECOMMENDATIONS FOR FUTURE WORK   |
|---|---|
| <b>SOCIAL SUPPORT</b>                               | <ul style="list-style-type: none"> <li>• Conduct large-scale population-based studies to further elucidate pathways from CSC to CVD.</li> <li>• Inform community-level social support interventions using evidence from both observational and experimental studies.</li> <li>• Increase focus on social support-CVD link in disadvantaged populations, including racial/ethnic minorities.</li> <li>• Develop validated, generalizable measures of social support.</li> </ul>  |
| <b>SOCIAL COHESION</b>                              | <ul style="list-style-type: none"> <li>• Future study should focus on increasing understanding of potential moderating effects of race/ethnicity on the social cohesion-CVD relationship.</li> <li>• Future research should improve understanding of pathways linking social cohesion/networks and CVD, including the role of health behaviors and psychological wellbeing.</li> <li>• Investigate possible intersectional effects of race/ethnicity and other SDOH, on CVD outcomes.</li> </ul>  |
| <b>DISCRIMINATION</b>                               | <ul style="list-style-type: none"> <li>• Define and develop tools to measure/analyze discrimination and bias in health care.</li> <li>• Elucidate major physiologic, psychological, and behavioral pathways from perceived discrimination to CVD.</li> <li>• Improve current understanding of the effects of internalized racism and health behaviors in marginalized populations.</li> <li>• Develop evidence-based interventions to address health system factors contributing to racial/ethnic disparities in CVD, such as implicit bias and lack of cultural competence.</li> </ul> |
| <b>COMMUNITY ENGAGEMENT AND CIVIC PARTICIPATION</b> | <ul style="list-style-type: none"> <li>• Design and implement community-level CVD prevention interventions: identify community leaders and engage relevant stakeholders.</li> <li>• Document potential variation in civic participation by different sociodemographic factors, including sex and race/ethnicity.</li> <li>• Describe pathways linking civic participation to improved CVD outcomes.</li> <li>• Increase representation and participation of underserved communities in community-based CVD prevention programs.</li> </ul>  |

**Table 2** Subdomain-specific research and policy recommendations. CSC: community and social context; CVD: cardiovascular disease; SDOH: social determinants of health.



## CONCLUSIONS

Community and social context affect cardiovascular health via multiple subdomains and diverse pathways. Social support, social cohesion, discrimination, and community engagement and civic participation uniquely determine social networks and social capital, ability to seek and/or provide help, ability to cope with stress, neighborhood trust and strength of social bonds, bias and prejudice, and overall sense of goals and common purpose. In turn, these and related CSC factors shape one's susceptibility to illness and access to helpful resources, thereby determining individual-, community-, and population-level health outcomes.

The effects of individual CSC subdomains manifest via both upstream (eg, material resources, access/quality of care) and downstream (eg, unhealthy coping behaviors) factors. These constructs impact CVD risk via multiple physiologic, psychosocial, and emotional pathways, including the role of stress as a mediator of increased CVD risk and poor disease outcomes.

The findings of this review are intended to increase awareness of the impact of social and environmental conditions on cardiovascular health and serve as a resource for healthcare providers and health equity champions, both on practice and policy levels. Given the country's current social and political climate, we are confident that the evidence presented herein will stimulate future discussion on addressing CSC-related inequities in CVD morbidity and mortality, with particular implications for socially disadvantaged communities.

Key recommendations to address major knowledge gaps in the field and advance current understanding of the pathways, mechanisms, and overall effects of CSC were presented in [Table 2](#). Future efforts should focus on developing strategies to incorporate CSC into clinical risk-prediction algorithms and informing CVD prevention and management guidelines and practices.

## KEY POINTS

- Individual and societal relationships are key determinants of health and wellbeing, and high social cohesion is documented to have a strong protective effect on cardiovascular health. Conversely, poor social bonds and weak social networks predict poor cardiovascular health, with a disproportionate impact on vulnerable communities.
- Evidence for a positive effect of social support on cardiovascular disease (CVD) outcomes—including the long-term impact of social support interventions—is lacking and merits greater research, as does evidence to develop a standardized social support measurement tool.
- Racial/ethnic discrimination is linked to both cardiovascular risk factors and adverse CVD outcomes, including hypertension, stroke, and coronary heart disease. Although various pathways explain the link between discrimination and CVD, existing understanding is limited and merits further study.
- Current evidence suggests that community engagement and civic participation promote positive behavioral changes, strengthen social bonds/networks, and exert a protective effect on cardiovascular health.
- Greater civic engagement and representation of marginalized populations in community engagement initiatives is essential to maximizing the benefits of such interventions and improving health outcomes on a population level.
- Medical training must acknowledge and address issues such as cultural competence with the aim of reducing implicit provider bias in clinical decision making.

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## COMPETING INTERESTS

The authors have no competing interests to declare.

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