



## Housing and Cardiovascular Health

### Introduction

Among the many social determinants of health, where someone lives is a strong predictor of how long and how well they live.<sup>1,2,3,4,5</sup> At their best, homes protect residents from hazards, toxins, and stressors; at their worst, homes may be the source of the exposure. As such, not all homes are healthy. In order to be healthy, homes must be both physically sound and located in a supportive neighborhood. The strong and direct health effects of having a safe, secure, and healthy home is well-supported.

The heart is not immune from the potential negative health effects of an unhealthy home. Many connections exist between the conditions in which one lives and cardiovascular health. Factors such as housing stability and access, indoor and outdoor environment, and a neighborhoods' socioeconomic status all have implications for health outcomes.

The American Heart Association (AHA) has long advocated for policies that promote healthy behaviors, and empower patients and consumers to live longer, healthier lives free of heart disease and stroke. As such, we support efforts that promote the equitable development and preservation of affordable housing in good condition, as it may also go a long way to promote population health and overall wellbeing.

### Access to Healthy Homes is Limited by Housing Costs and Poverty

Access to healthy homes has become increasingly limited by skyrocketing housing costs. While "affordable housing" generally defines housing that costs less than 30% of one's income, an estimated 12 million renter and homeowner households now pay more than 50% of their annual incomes for housing,<sup>6</sup> and a quarter of households below the Federal Poverty Limit (FPL) spend more than 70% of their income on rent and utility costs alone.<sup>7</sup> In fact, a family with one full-time worker earning the minimum wage cannot afford the local fair-market rent for a two-bedroom apartment anywhere in the United States.<sup>6</sup>

Living in a home that is unaffordable can cause substantial stress that negatively impacts one's heart and also siphons money away from necessary health care. For example, one study found that renters in high foreclosure risk areas had a higher prevalence of hypertension and hypercholesterolemia, which can increase one's risk of CVD.<sup>8</sup> In fact, unhealthy housing conditions are more common among low-income renters. Due to planning policies that allow pockets of poverty to exacerbate the issue, the most affordable homes are often located in unsupportive neighborhoods in which meaningful resource investment is often either nonexistent or gentrifying; either circumstance makes the environment unhealthy for its current residents.<sup>9</sup>

There is substantial evidence that neighborhoods' socioeconomic environments have important impacts on health.<sup>10</sup> For homes to be truly "healthy," they must also be located in supportive neighborhoods that provide easy access to jobs and schools, healthy food, healthcare, social services and amenities, green open spaces, and public transportation options.<sup>11</sup> Conversely, a neighborhood can also put up barriers to active lifestyles and create toxic stress.<sup>12</sup>

The negative effects of poverty on health are well understood; a robust body of literature documents higher rates of negative health outcomes among lower-income individuals. A similarly robust body of evidence demonstrates a relationship between wellbeing and the overall level of prosperity of a neighborhood—even independent of individual socioeconomic status.<sup>13,14,15,16</sup> These disparities are evident in a variety of outcomes, including a higher risk of chronic disease, including cardiovascular disease, and

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disease-related mortality among those living in low-income neighborhoods.<sup>17, 18, 19, 20, 21, 22, 23</sup> Low neighborhood prosperity is also associated with higher risk of hospitalization and worse recovery after treatment.<sup>24, 25, 26, 27</sup>

In studies of gentrification, whether increasing the prosperity of a neighborhood benefitted health depended on the nature of the change and the race and age of those studied.<sup>28, 29</sup> These findings suggest that the reason that less wealthy neighborhoods are associated with poorer health outcomes is likely complex, with deep political, sociological, and historical roots.

### Homelessness

Individuals who face homelessness and housing instability—defined as having no permanent place of residence, struggling to pay rent, living in overcrowded conditions, or moving frequently—are highly vulnerable, and at risk of poor health and quality of life.<sup>30, 31, 32</sup> Several health characteristics are common among the homeless population: rates of uncontrolled hypertension are higher than the general population; homeless adults experience a 40-50 % greater mortality risk from CVD than the general population; a third of homeless individuals at shelters report a disability; and many suffer from mental illness, substance use, domestic abuse, and prior incarceration.<sup>33, 34, 35, 36</sup> Although shelters for the homeless can mitigate increased risk of mortality, they do not shelter all homeless individuals. Nearly 190,000 individuals live on the streets and may be removed from healthcare, social and case management services that shelters generally provide.<sup>37</sup>

For many, the first point of entry into the healthcare system is through the Emergency Department (ED).<sup>38, 39</sup> Because many EDs simply stabilize and then discharge these individuals back to the streets, homeless individuals who visit EDs may not receive support recovery or follow up care.<sup>40</sup> Individuals who are referred to primary care often are forced to choose between paying for medication and treatment or food, rent, and other necessary expenditures.<sup>41</sup>

Several strategies to address homelessness and housing insecurity include health plans providing beneficiaries with shelter as a benefit,<sup>42, 43</sup> including social screening at EDs and other clinical settings,<sup>44</sup> providing long-term rent subsidies,<sup>45</sup> having hospitals direct a portion of investments towards affordable housing initiatives, and cities providing permanent supportive housing to its homeless citizens in need.<sup>46</sup>

### *Supportive Housing*

Supportive housing policies, including permanent supportive housing, have improved housing stability and other social determinants of health for the homeless and housing insecure population.<sup>47, 48</sup> Research supports the effectiveness of Housing First approaches that do not condition receipt of a home on engaging in certain prerequisites, such as entering substance use disorder (SUD) treatment or gaining employment, but instead provide homes first then social, medical, and other supports.<sup>49, 50, 51, 52, 53</sup>

Challenges facing these programs include reduction of funds to support low-income housing programs,<sup>54</sup> and early disengagement from programs.<sup>55</sup> Proposed improvements to assist these programs include increased reimbursement for housing as a medical service under Medicaid, Medicare, and private insurance.<sup>56</sup>

### Indoor Housing Conditions

Healthy homes are structurally sound: dry, clean, hazard-free, well-ventilated and properly heated and/or cooled, free of pests, free of contaminants, and well-maintained.<sup>57, 58</sup> Absent these features, unhealthy housing conditions can expose residents to toxins, allergens, and hazards, and can lead to poor health

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outcomes.<sup>59,60,61,62</sup> Because dilapidated homes are likely to be more affordable, low-income and rural communities as well as certain racial/ethnic-minority residents are disproportionately affected.<sup>63,64,65,66,67,68,69</sup>

Poor indoor air quality can result from poor ventilation and substandard home remodeling practices that introduce harmful toxins such as particulate matter (PM 2.5).<sup>70,71,72,73,74,75,76,77</sup> Second-hand smoke (SHS) exposure has also historically been a problem, especially for the millions of low-income residents living in multi-unit housing.<sup>78,79</sup> Tobacco smoke can migrate through shared ventilation systems, unsealed cracks, and door spaces, leading to adverse health outcomes.<sup>80</sup> Nearly half of US middle and high-school students and nearly 70% of black children ages 3-11 report exposure to SHS.<sup>81,82</sup> The federal Smoke-Free Housing regulation, which banned smoking in public housing beginning in July 2018, should provide protection to some tenants.<sup>83,84</sup> While there is not yet research demonstrating the impact of this policy, prior research has demonstrated the potential for smoke-free housing policies to reduce exposure to indoor SHS, particularly in conjunction with additional smoking cessation programs.<sup>85,86,87,88,89,90,91</sup>

Additionally, unfiltered, contaminated water is also an increasing concern in communities nationwide.<sup>92,93</sup> Residents affected by these conditions may consequently suffer from illnesses ranging from lower respiratory tract infections to heart disease and cancer.<sup>94,95,96,97,98,99,100</sup>

Interventions include healthy home education, condition monitoring, and home remediation programs which update features that may be failing to protect against or emitting toxins, such as furnaces that need new filters, and providing healthy supplies, such as green cleaning products.<sup>101,102,103,104,105</sup> Green home policies, including tax credits for LEED certification, and programs have been shown to successfully reduce exposure to home health hazards.<sup>106,107,108,109</sup>

### Environmental Health Hazards

Healthy homes should protect residents from environmental health hazards such as pollution, contaminated soil and/or water, and extreme weather. Living in close proximity to pollution (which is more common among residents of less wealthy neighborhoods) can impact heart health, leading to a measurable association between living nearby an industrial area and developing CVD.<sup>110</sup>

Studies have identified numerous health effects of neighborhood sources of air pollution, which disproportionately affect people of certain neighborhoods and geographic areas.<sup>111,112,113</sup> For example, proximity to an industrial facility has been found to increase risk of cognitive disability, preterm birth, asthma, stroke, and all-cause hospitalizations.<sup>114,115,116,117,118,119</sup>

Deteriorating environments can also increase the risk of ground and water contamination. Elevated blood lead levels and other heavy metal toxicity has been traced to residential remodeling, lead pipes, and superfund sites.<sup>120,121,122</sup> The disparate presence of environmental toxins in certain areas warrants concern.<sup>123,124</sup> Areas with environmental exposures tend to be less prosperous and home to a greater proportion of ethnic minorities.<sup>125,126,127,128,129</sup> These effects and disparities persist regardless of the source of pollution, and communities tend to be concerned about this pollution.<sup>130</sup>

Environmental hazards are not always the result of contamination or pollution—extreme weather events can also pose serious health risks and will worsen as a result of climate change. Low-income people and minorities are particularly at risk.<sup>131</sup> Where temperature-controlled spaces are less available, cold- and heat-related mortalities tend to be higher.<sup>132,133</sup>

Healthy built environments include refuge from extreme cold and heat, which may not be available to residents of certain neighborhoods, particularly in impoverished and non-white communities.<sup>134,135,136</sup> Tree

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canopy and vegetation may also help negate heat and protect against heat-related illness.<sup>137</sup> However, increasing vegetation may not benefit all communities equally, potentially due to other factors of the built environment that limit the overall level of heat reduction that can be achieved.<sup>138</sup>

In short, significant disparities in exposure and associated health outcomes are the result of homes that fail to protect people from environmental hazards and increased risk factors clustered in and around certain neighborhoods.

## Conclusion

There is a significant opportunity to improve the health of our communities by promoting policies and initiatives that bring healthy housing within reach for everyone, including and especially the most vulnerable among us. Addressing disparities in housing access, affordability, and quality will require multi-sectoral collaboration, which AHA supports wholeheartedly. We encourage policymakers and stakeholders to work with communities to ensure that equitable investments are made to promote safe and socially supportive neighborhoods and mitigate unhealthy housing conditions for current residents so they may achieve and maintain good health.

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