

The Health Perspective on Planning: **Built Environments as Determinants of Health**

An emerging body of research points to various connections between community design and health issues. This fact sheet – developed to provide rationale for land use policy change – presents a brief summary of existing research, categorized by public health topic. It is intended to help public health practitioners work with planners toward land use policy solutions that improve community health.

Increasing Physical Activity

Recent statistics indicate that 53 percent of Californians fail to meet recommended guidelines for physical activity, putting them at high risk for illness and premature death.¹ Limited physical activity is a primary risk factor for heart disease, cancer, stroke, diabetes, and Alzheimer’s disease – five of the top ten causes of death in California. It is also a primary risk factor for obesity and diabetes, the fastest-growing diseases in the state.²

The residents of many California neighborhoods have no option but to drive everywhere: it is likely too far or dangerous to walk or bike to work, the nearest transit stop, a grocery store, or a public park. If communities were designed so that people could walk or bicycle to these destinations, residents would have many more opportunities to incorporate physical activity into their daily lives.



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- ▶ People living in highly walkable, mixed-use communities (where residential, commercial, and office land uses are located near each other) are more than twice as likely to get 30 or more minutes of daily exercise as those living in auto-oriented, single-use areas.³
- ▶ Almost one-third of Americans who commute to work via public transit meet their daily requirements for physical activity (30 or more minutes per day) by walking as part of their daily life, including to and from the transit stop.⁴
- ▶ People who live within walking distance (1/4 mile) of a park are 25 percent more likely to meet their minimum weekly exercise recommendation.⁵

Access to Healthy Food Retail



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Unhealthy eating habits are a primary risk factor for five of the top ten causes of death in California. Meanwhile, the state has four times as many “unhealthy” food outlets (e.g., fast food chains, restaurants, and convenience stores) as “healthy” food outlets (supermarkets, produce vendors, and farmers’ markets).⁶ The result is what’s known as *food deserts*, neighborhoods that lack places where residents can buy fresh fruits and vegetables and other healthy foods.

Convenience stores, gas stations, and fast food outlets are often the only food retailers available in low-income neighborhoods, where there may be high concentrations of households eligible for food stamps.⁷ Residents who

can’t drive are left to either take a bus or taxi to the nearest grocery store – a time-consuming inconvenience that many can’t afford – or rely on “fringe” food outlets such as gas stations or liquor stores. Transportation, land use, and economic development decisions shape neighborhood food access and the food retail environment.

- ▶ In low-income neighborhoods, each additional supermarket has been found to increase residents’ likelihood of meeting nutritional guidelines by one-third.⁸
- ▶ Residents in communities with a more “imbalanced food environment” (where fast food and corner stores are more convenient and prevalent than grocery stores) have more health problems and higher mortality than residents of areas with a higher proportion of grocery stores, when other factors are held constant.⁹
- ▶ The presence of a supermarket in a neighborhood is linked to higher fruit and vegetable consumption and a reduced prevalence of overweight and obesity.^{10,11}

Environmental Health

Polluted air is a primary trigger for asthma attacks and a major cause of asthma, bronchitis, lung cancer, leukemia, and other illnesses. Between 2001 and 2005, the adult asthma rate increased by 12 percent in California, and the childhood asthma rate increased by 15 percent.¹² Motor vehicles are often the principal contributors of particulate matter and other pollutants that contribute to the formation of ozone; diesel trucks in particular emit particulate matter air pollutants that have the potential to cause cancer, premature death, and other health effects.^{13, 14} Meanwhile, hundreds of Californians suffer acute bacterial infections and overexposure to chemical contaminants from polluted drinking water each year.¹⁵ Decisions about the location of certain land uses, land use mix and intensity, transportation investments, and design and building guidelines play a role in environmental health.

Outdoor Air Quality

- ▶ In general, the more vehicle miles traveled (VMT) in a community, the worse the air pollution.¹⁶
- ▶ Children living near heavily trafficked roads experience decreased lung function, greater rates of hospitalization for asthma attacks,¹⁷ and greater risk for all kinds of cancer.¹⁸
- ▶ Living near heavily trafficked roads greatly increases asthma severity, a burden borne disproportionately by asthma sufferers who are ethnic/racial minorities or from low-income households.¹⁹
- ▶ Exposure to traffic is related to early death. A study in the Netherlands found that elderly adults living near busy roads had almost twice the risk of dying from cardiopulmonary disease.²⁰
- ▶ Places with more pavement and less greenery are more susceptible to the “heat island effect,” which accelerates the formation of ozone and increases the risk of heat stroke.²¹

Indoor Air Quality

- ▶ Californians spend almost 90 percent of their time indoors,²² yet indoor air is often more polluted than outdoor air.²³ This is due to a combination of second-hand smoke, mold growth, allergens from pets and pests, dust, radon, and off-gassing of volatile organic compounds (VOCs) from materials such as carpeting and paints – all coupled with the lack of ventilation that traps unhealthy air inside buildings.²⁴
- ▶ Conditions that promote exposure to irritants and allergens such as secondhand smoke, house-dust mites, cockroach antigens, and mold spores are common in low-income housing. Old carpeting acts as a reservoir for allergens, while kitchens and baths (particularly in older housing) often lack adequate ventilation, increasing the problems associated with moisture and mold.²⁵ All of these irritants and allergens can cause or aggravate diseases such as asthma.

- ▶ Green building practices – for example, the use of low-VOC materials, natural ventilation, and windows instead of artificial lights – can improve indoor air quality.

Water Quality

- ▶ Pavement and other impermeable surfaces that do not absorb water accelerate its flow into rivers, preventing the natural filtration and cleaning provided by plants, rocks, and soil. This runoff increases the risk for microbial and chemical contamination of drinking water supplies, especially after heavy rainstorms.²⁶
- ▶ By preventing the natural recharge of underwater aquifers, pavement also accelerates the depletion of underground freshwater supplies.²⁷
- ▶ Asphalt and cement can be replaced with more permeable surfaces and water filtration buffers to improve water quality.

Injury Prevention

Motor vehicle collisions are the leading cause of accidental death in California, and being hit by a car while walking is the third leading cause of death for children under 12.²⁸ For every mile traveled, a pedestrian’s risk of dying is more than 15 times that of drivers, providing a legitimate disincentive for walking.²⁹ Many of these injuries and fatalities could be prevented by designing roadways to protect pedestrians and bicyclists.



Photo courtesy of New York Bicycling Coalition

- ▶ Roads designed to maximize car traffic – high-speed, unobstructed, and wide multilane roads – are dangerous to pedestrians and bicyclists. Increased traffic collision rates are correlated with increases in total vehicle miles traveled (VMT).³⁰
- ▶ Crash rates increase exponentially with street width, especially since drivers move faster on wider roads.³¹ Pedestrian injuries can be reduced more than sevenfold by slowing traffic down from 30 to 20 miles per hour.³² Slowing traffic from 40 to 20 miles per hour can reduce a pedestrian’s chance of being killed, if hit, from 85 percent to just 5 percent.³³
- ▶ Pedestrian accidents are 2.5 times less likely on streets with sidewalks than on otherwise similar streets.³⁴

Elder and Child Health



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Since neither the youngest nor oldest members of society can drive, car-dependent neighborhoods can hinder children’s development and impede seniors’ ability to maintain social connections and access needed services. Vulnerable populations like children and the elderly may also be even more affected by planning decisions that fail to take health into account, such as locating residential developments near freeways, the persistence of neighborhood “food deserts,” and the creation of urban “heat islands.”

- ▶ Children with attention deficit disorder have been found to function better than usual after activities in green settings; the “greener” a child’s play area,

the less severe his or her attention deficit symptoms. This research suggests that contact with nature may support attentional functioning in a population of children who desperately need attentional support.³⁵

- ▶ Planning for diverse transportation options will only grow in importance as America grays. There are currently about 4.5 million nondrivers over age 75, and projections indicate this figure is likely to grow to about 6 million by 2020.³⁶
- ▶ Safe, walkable streets and paths are especially important to the elderly. Individuals age 50 and older make three-quarters of all trips not taken by private automobile on foot.³⁷
- ▶ Older nondrivers take 65 percent fewer social, family, and religious trips than older people who still drive. On a given day, those in lower-density neighborhoods are 50 percent more likely to stay home than those living in denser neighborhoods.³⁸

Mental Health and Substance Abuse

Stress and high blood pressure are associated with increased risk of cardiovascular disease, stroke, obesity and diabetes, and osteoarthritis. Anxiety is also associated with increased risk of aggression, depression,³⁹ and substance abuse.⁴⁰ Attributes of the built environment contribute to both anxiety and calm.

- ▶ Drivers who commute longer distances tend to have higher blood pressure and report more feelings of being “tense” or “nervous.”^{41, 42}
- ▶ Studies have associated higher rates of depression with abundant graffiti and fewer private gardens.⁴³
- ▶ “Everyday” interactions with nature – such as viewing natural scenes and being in natural environments (including urban park settings) – help reduce anxiety and hasten recovery from illness.⁴⁴

Violence Prevention



Homicide is the leading cause of death among young men in some parts of California, and fear of assault is a leading cause of anxiety. Fear of assault is a major reason people choose not to walk, use recreational facilities, or allow their children to play outside. While many variables influence violence and crime in communities, aspects of the physical environment can both encourage and discourage street crime.

- ▶ Research suggests that the physical features, layout, and design of many aspects of neighborhoods can influence crime prevention and other crime-related outcomes, such as neighborhood deterioration and residents' fear of crime. Relevant features of the built environment include housing design, block layout, land use and circulation patterns, resident-generated territorial features (like street closures or community gardens), and physical deterioration.⁴⁵
- ▶ Street crime along particular streets can decline or vanish after implementing building patterns that provide “defensible space” (an area that residents feel they control), “natural surveillance” (the ability to see what’s happening around an area) and “sense of order” (places that are well tended and lack visible signs of deterioration). Equally important, such design features help residents *feel safe*.^{46, 47, 48}
- ▶ A study of more than 500 zip codes in California over time found that an increase in the number of bars and take-out alcohol retailers (liquor, convenience, and grocery stores) corresponded with an increase in the rate of violence.⁴⁹

- ▶ Residents living in “greener” surroundings report lower levels of fear, fewer incivilities, and less aggressive and violent behavior (controlling for the number of apartments per building, building height, vacancy rate, and number of occupied units per building).⁵⁰

Chronic Health Disparities/Poverty

Concentrations of health problems develop in certain neighborhoods, where residents experience substandard housing and violence, and where grocery stores and parks are rare.

- ▶ Evidence from some California communities shows that life expectancy is 20 years greater in the wealthiest census tracts than in the most impoverished.⁵¹
- ▶ A study of more than 300 cities in the United States found that those with the greatest income inequality also had the greatest rates of mortality.⁵²
- ▶ Relocating residents from public housing projects into neighborhoods with lower concentrations of poverty has been associated with weight loss and a decline in reported stress levels among adults, and reduced rates of injury among male youths.^{53, 54} (However, research suggests that relocating vulnerable public housing residents to higher-quality housing or safer neighborhoods may not improve their health status without substantial relocation assistance, partly due to poorer initial health status of public housing residents and the stress of forced relocation.⁵⁵ This may have implications for residents of affordable housing who are displaced due to gentrification or redevelopment.)



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