

The drivers of health, sometimes called the social determinants of health, are the social, economic, and environmental conditions in which people are born, live, work, and age. Although they significantly contribute to the risk of premature death, the drivers of health are often overlooked when it comes to preventive health measures, with most efforts targeted towards medical services.¹ The following is a brief overview of how some drivers of health affect health outcomes.

Poverty

In the United States, individuals and families are considered to live in poverty when their income does not reach a federally-determined threshold to adequately afford minimum necessities such as food, clothing, transportation, and shelter.² According to the United States Department of Health and Human Services, the poverty threshold for an individual is an annual income of \$12,140 or less, and for a family of four, an annual household income of \$25,000 or less.³ Around 12.7 percent of the United States population lives in poverty.⁴ In North Carolina, 14.7 percent of the population lives in poverty, giving the state the thirteenth highest poverty rate in the country.^{5,6} Those who live at or near the federal poverty line are at significant risk of poor health. Evidence shows that individuals who live in poverty have higher rates of HIV and other sexually transmitted infections, chronic disease, obesity, tobacco use, and community violence.^{7,8} Studies have found positive associations between life expectancy and income, with men in the highest income bracket living an average of 87.3 years compared to men in the lowest income bracket living an average of 72.7 years.⁹ Income level is also related to other drivers of health. Individuals who live in poverty also face food insecurity, limited access to transportation, challenges affording health insurance and medical care, and are often unable to live in communities that present opportunities to be healthy because of the cost burden of quality housing options or the lack of affordable housing options in safe areas.^{2,10,11}

Education

Academic achievement and education are strongly correlated with health across the lifespan. In general, those with less education have more chronic health problems and shorter life expectancies. In contrast, people with more years of education are likely to live longer, healthier lives. Further, these health disparities based on years of education are seen in every ethnic group.¹² Adults who have not finished high school are more likely to be in poor or fair health than college graduates. The age-adjusted mortality rate of high school dropouts ages 25-64 is twice as large as the rate of those with some college education. They are also more likely to suffer from the most acute and chronic health conditions, including heart disease, hypertension, stroke, elevated cholesterol, emphysema, diabetes, asthma attacks, and ulcers. College graduates live, on average, five years longer than those who do not complete high school. In addition, people with more education are less likely to report functional limitations and are also less likely to miss work due to disease.¹² Level of education is also positively correlated with health literacy. Health literacy is the capacity to which people can gather, process, and comprehend health information

and services to make health decisions. Individuals with higher levels of education are more likely to have adequate-to-high health literacy than individuals with lower levels of education. Low health literacy is associated with poor health outcomes and exacerbates health disparities.¹³⁻¹⁶ Low health literacy contributes to poor health outcomes because those with low health literacy are less able to understand health information, to engage with health care providers, and to understand how certain health-risk behaviors can be detrimental to their health.¹⁵

Access to Health Care

Accessing quality health care is necessary to promote and maintain good health, to prevent and manage diseases, and to achieve health equity.¹⁷ Although genetics play a strong role in risk factors for chronic conditions like cardiovascular disease, diabetes, and cancer,¹⁸ the quality of care received can mitigate or increase the risk of these diseases. Those who lack access to health care services because of lack of insurance coverage are more likely to have poor health status, be diagnosed with a disease or condition at a late stage, and die prematurely.¹⁷

Within the United States, there are disparities in access to care. People of color, low-income Americans, and those who reside in rural areas are less likely to have insurance coverage, utilize less care, and face numerous barriers to accessing health care.¹⁹⁻²¹ People of color are more likely to forego or delay care and less likely to have a regular source of care or checkups. Individuals with low incomes are frequently unable to afford private insurance and often forego regular care appointments to avoid costs. Americans who reside in rural areas can have limited access to coverage compared to those who reside in urban areas. These barriers and lack of routine preventive care contribute to higher rates of many health conditions in these populations.

Built Environment

Built environment encompasses our homes and neighborhoods, open spaces, streets, and community infrastructure.²² Communities having few or no sidewalks, bicycle lanes, walking paths, parks, or recreational facilities contribute to sedentary lifestyles by not providing ample opportunities for physical activity. With fewer opportunities for physical activity, the risk of obesity, diabetes, cardiovascular disease, and other diseases increases.²²⁻²⁴ A systematic review of 28 interventions that examined the relationship between built environment features and physical activity and/or travel infrastructure found that built environment interventions can have a positive effect on physical activity.²⁵ In addition to physical activity, access to healthy foods, health care, and other services can be limited by the ability of individuals to navigate their neighborhood without a car.

Housing is another component of the built environment that is a major driver of health. Housing can be detrimental to health through two pathways: cost burden of paying for housing and quality of housing. A household is considered cost-burdened if they spend more than 30

percent of their income on housing and severely cost-burdened if they spend more than 50 percent of their income on housing. Cost-burdened households are associated with worse self-reported health and a higher likelihood of postponing health care services. This relationship is particularly strong among severely cost-burdened households and low-income renters.²⁶

Housing quality greatly influences health and factors into acute episodes of illness.²⁷ Overcrowding and poor ventilation in a home can be a breeding ground for pests (mites and roaches), mold, and respiratory viruses.²⁸ Poor housing conditions, such as loose carpets, poor lighting, unsafe stairways, and bathtubs without handles, can also result in falls and hospitalizations, particularly among elderly individuals.^{29,30} The link between chronic diseases, particularly asthma, and housing quality has been studied extensively. Studies have shown that damp, cold, moldy housing can increase the likelihood of developing asthma.^{13–15} Exposure to lead through lead-based paint can cause lead poisoning and can lead to developmental delays and neurological changes in children.³⁵ Early interventions and investments to address these housing quality issues significantly improve health outcomes and yield considerable returns. Under conservative estimates, each dollar invested in lead paint hazard control yields a return between \$17 and \$221 in savings for health care, lost earnings, tax revenue, special education, and direct costs of crime.³⁶ Other housing quality issues that affect health include accessibility for older adults or individuals with disabilities. Hazards such as uneven flooring and stairs can lead to falls or make homes inaccessible. Interventions, such as ramps, grab bars, and single-floor housing units, can make independent living safer and more accessible for these populations.

Transportation

Access to transportation is another important driver of health outcomes. For example, having a driver's license influences the likelihood that an individual will seek health services such as chronic care management and regular checkups.³⁷ Adults who miss health care appointments due to transportation problems are 1.9 times more likely to have arthritis and heart disease, 2.5 times more likely to have diabetes, and 3.3 times more likely to have depression or chronic obstructive pulmonary disease when compared to adults who do not miss health care appointments due to transportation problems.³⁸ This is particularly true for lower-income and under/uninsured people and is further exacerbated for rural residents who often have to travel outside of town for specialty care.³⁹

Children, older adults, individuals with low socio-economic status, and racial and ethnic minority populations are often cited as populations that have difficulty accessing health services due to transportation barriers. One study found that 21 percent of older adults cited transportation problems as a barrier to accessing care.⁴⁰ A study that surveyed more than 600 low-income immigrants in Nassau County, New York found that many participants had to miss or reschedule clinic appointments because of issues related to transportation, such as unreliable rides, issues with

public transportation, and transportation-related costs.⁴¹ Transportation barriers also affect other drivers of health. Poor transportation or lack of access to transportation can cut off access to many food outlets that offer healthy foods, such as supermarkets and farmers' markets.⁴²

Food

When an individual or family does not have access to enough food, they are considered food insecure. Food insecurity is defined as the disruption of food intake or eating patterns because of a lack of money and other resources.⁴³ Being food insecure has many consequences that often result in negative health outcomes, directly and indirectly. Those who are living in food-insecure households are more at risk for diabetes and obesity⁴⁴ and food insecurity can also have adverse effects on child and adolescent mental health. A study conducted within the United States found a positive association between mental disorders and a household's food security status.⁴⁵ Other studies focusing on children and adolescents have found that food insecurity negatively affects a child's academic performance, weight gain, and social skills, which subsequently leads to specific nutritional and non-nutritional consequences for children.³² In the older adult population, those who are malnourished use more health care services, including more and longer hospital admissions.⁴⁶ Malnourishment can result from food insecurity or the inability to properly store or cook foods (e.g., broken or inaccessible appliances or disabled utilities making refrigerators and freezers unusable).

Interpersonal Violence

Interpersonal violence includes intimate partner violence, sexual violence, and childhood sexual and physical abuse.⁴⁷ According to the Centers for Disease Control, 37 percent of women and 31 percent of men in the United States have experienced some form of interpersonal violence. One in 4 children have faced some form of childhood abuse, with more than a 1,000 children dying from physical abuse in 2016.¹⁵ Interpersonal violence victimization is associated with a range of physical, psychological, and social consequences.

Physically, interpersonal violence can result in bruises, broken bones, traumatic brain injury, pain, and other issues.⁴⁸ Victims of violence can also experience cardiovascular, gastrointestinal, endocrine, and immune system health conditions as a result of chronic stress from the trauma of abuse.⁴⁸ While one may only see the physical effects of interpersonal violence, there are also many psychological and social effects. People who are victims and survivors often also experience anxiety, post-traumatic stress disorder, sleep disturbances, and suicidal behaviors.⁴⁸ Numerous health-risk behaviors have been associated with interpersonal violence, including the use and abuse of tobacco, alcohol, and illicit substances, unsafe sexual behaviors, and eating disorders.⁴⁹ Socially, people who are victims and survivors may face restricted access to various social services and may feel isolated from social networks.⁴⁸

People who are victims of sexual violence face other long-term consequences. Major physical health consequences may include unwanted pregnancies, gynecological complications, sexually transmitted infections, cervical cancer, genital injuries, gastrointestinal disorders, and chronic pain. Psychologically, these individuals often suffer from anxiety, shame or guilt, social withdrawal, post-traumatic stress disorder, depression, low self-esteem, and high risk of suicide.⁵⁰

Abuse suffered during childhood, either physical or sexual in nature, has long-term physical and mental health impacts that last throughout the lifespan. Children who experience abuse are at increased risk for several diseases and conditions as an adult, including cardiovascular disease, cancer, obesity, chronic lung disease, and liver disease. These individuals are also at an increased risk for developing depression and other psychiatric disorders before the age of 21.⁵¹

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