

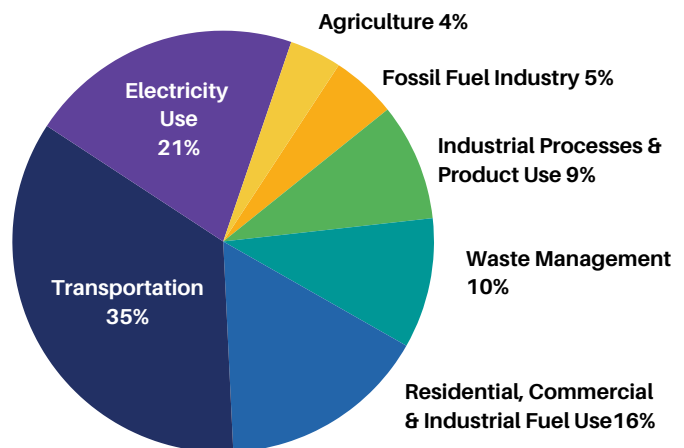


Transit and Health: An Intersectional Issue

The ways we commute, travel, and transport goods have interweaving impacts on our environment and on the health of individuals and communities through their effects on the air, water, land, and climate. After World War II, the United States [prioritized](#) cars when building the roads, parking lots, and highways that make up our transportation infrastructure.

The transportation sector is the largest contributor of both Maryland's and the United States' total greenhouse gas emissions. Evaluating our transportation system, not only through its direct emissions, but also through its overlapping effects on other aspects of the built environment is necessary to recognize and reverse these trends that harm our health.

Maryland's 2020 GHG Emissions Sector Contributions ¹



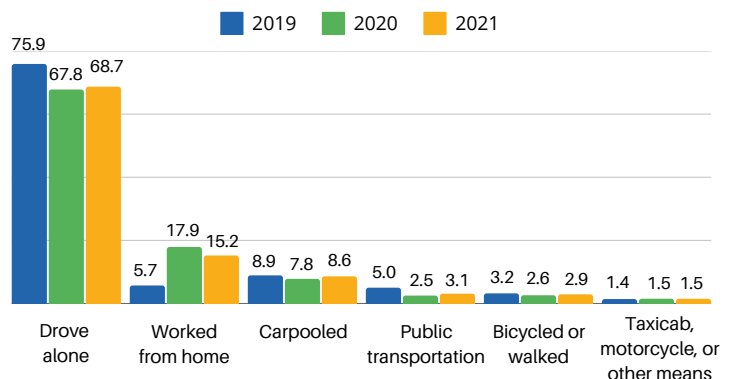
INFRASTRUCTURE AND THE ENVIRONMENT

The prioritization of car-focused infrastructure creates a cycle of car dependency and continued incentivization of more car infrastructure at the cost of our environment and health. In the United States, 91.7% of all households own [at least one car](#), 68.7% of work commutes are done [solo](#), and 97% of all [daily traveling](#) is done via personal vehicle or ride share service.

To accommodate this mode of travel, land must be dedicated to roadways and parking surfaces. Around [50-60%](#) of space in downtown business districts is dedicated towards car infrastructure. Vehicle emissions pollute the air, and runoff from paved surfaces contaminates water and soil.

Means of Transportation to Work in the U.S.:
2019, 2021, and 2022 ²

(In percent. Workers aged 16 and older living in the U.S., excluding Puerto Rico)

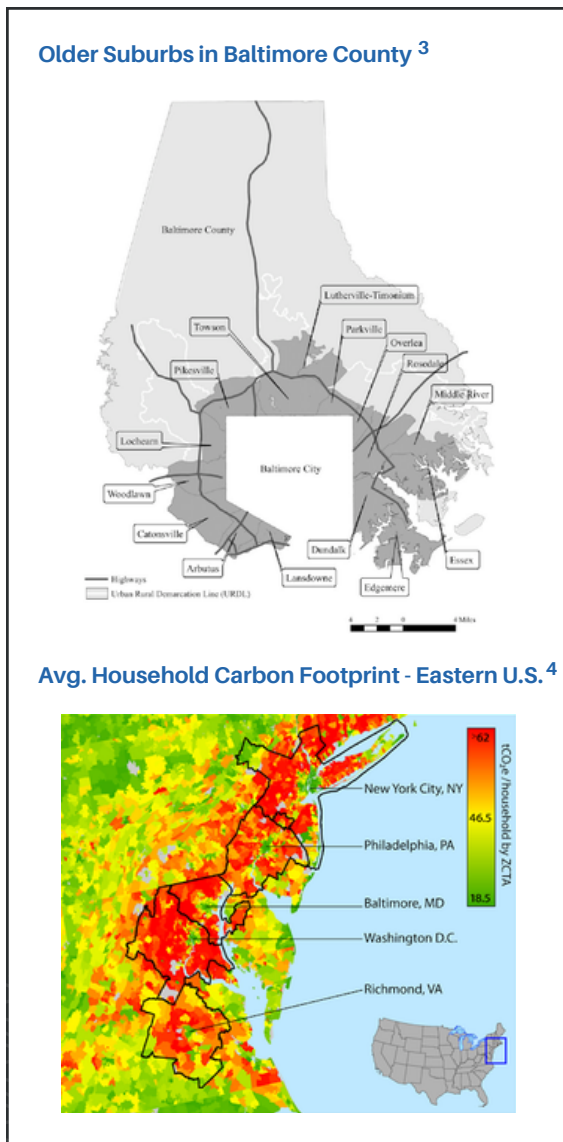


Air-Water-Soil

Fossil fuel combustion and tire and brake wear produce a variety of pollutants referred to as Transit-Related Air Pollution (TRAP). These include Carbon Dioxide, Nitrogen Oxides, Volatile Organic Compounds (VOCs), and Particulate Matter 2.5 microns or less (PM_{2.5}), which contribute to environmental and health problems. These TRAP pollutants are associated with various respiratory diseases such as asthma and chronic obstructive pulmonary disease (COPD), heart disease, and cancer. An estimated [7,100 premature deaths](#) have been attributed to traffic emissions in the northeast United States alone. [See detailed outcomes table.](#) Billions of dollars are spent yearly in healthcare costs from illnesses caused or exacerbated by TRAP. It is estimated that Maryland incurred [\\$6 billion dollars](#) in excess health care costs from illnesses related to TRAP in 2016 alone.

Vehicle pollution contaminates land and water. Runoff from impermeable paved surfaces washes pollutants into adjacent soils and nearby bodies of water. A [study](#) conducted at the University of Toronto found that pollution levels were much higher in waterways located near heavier trafficked roadways, implicating traffic-related pollution as a major cause of this contamination. Contamination also poses a problem for our supply of drinkable water and safe food supplies, as crops produced in contaminated soil can cause illness.

Urban Sprawl



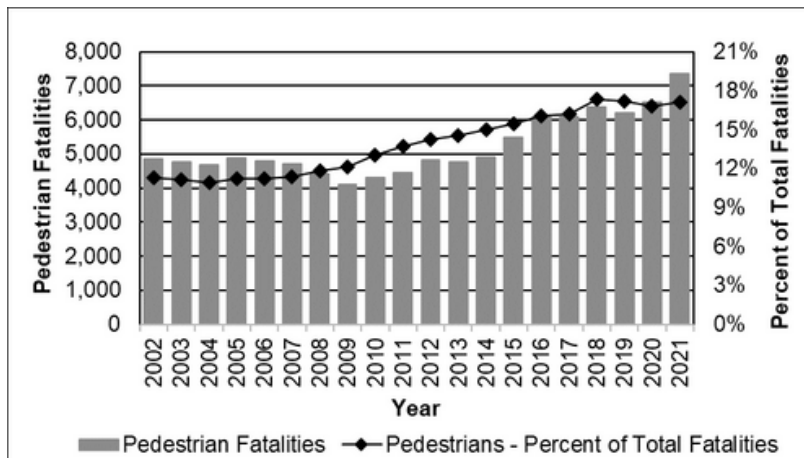
The United States' suburban development proliferated with the mass production of [personal vehicles](#). Land farther away from downtown was less expensive for development. This allowed those who owned cars and could afford these newer homes to move. Many were unable to afford this or were unable to move because of [segregation](#). [Typical characteristics](#) of urban sprawl are low-density single-family houses, road patterns necessitating personal vehicles for even short-distance trips, radial growth patterns surrounding city centers (development surrounding Baltimore is an example of this), and "strip development," an outward extension of major roadways lined with commercial/residential buildings.



These patterns exacerbate many of our air, soil, and water issues due to the large surface areas paved for driving and parking. In addition, as development grows farther from city centers, [vehicle-miles traveled](#) rises resulting in increased traffic congestion. Concurrently, the carbon footprint increases noticeably as distance increases from city centers. There is an increased demand for fuel, resulting in increased carbon emissions, especially for the [transportation sector](#).

Additionally, road safety is an issue, especially with the growth in vehicle miles traveled. Pedestrian injuries and fatalities have [risen](#) over the last decade.

Pedestrian Fatalities in Motor Vehicle Crashes, 2002 to 2021⁵



7,522 people were struck and killed while walking in 2022, an average of more than 20 per day. Black and Native Americans, older adults, and people walking in low-income communities die at higher rates and face higher levels of risk.

Destination Access and Urban Heat Islands

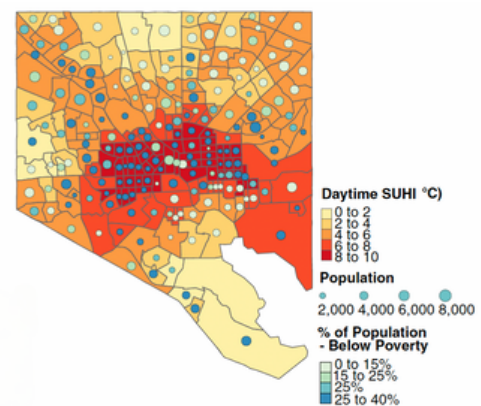
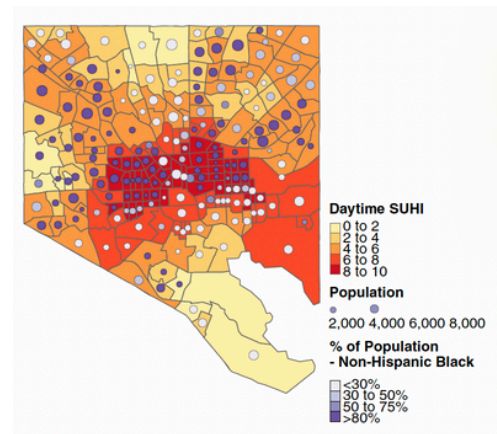
A side effect of urban sprawl and car-centric urban planning is that many people in the United States cannot reach necessary locations without a personal vehicle. It is estimated that [5.8 million](#) people in America have missed medical appointments or have rescheduled due to lacking adequate transportation. Similar [scenarios](#) exist for access to grocery stores, education, and employment.

The large amount of surface area paved for vehicles contributes to another environmental hazard known as the Urban Heat Island effect. This occurs when the surface and air temperature is measurably hotter within a city than the surrounding area. Concrete and asphalt absorb heat, raising the temperature and exacerbating health-related impacts such as heat illnesses. In a heat wave, mortality rates [increase](#) by 6% for every 1.8-degree Fahrenheit increase in temperature. When neighborhoods have more impervious surfaces that retain heat, road orientations that obstruct wind flows, and a lack of urban canopy, residents are at increased risk for adverse health outcomes.

Green Spaces

When more surface area is dedicated to roads and parking areas, there is less space available for parks and vegetation. A lack of green space not only contributes to an increased Urban Heat Island Effect, but also misses the opportunity to filter air pollution and reduce urban noise levels. Urban green spaces can improve health by providing a public open space for physical activity, recreation, and increased social connectivity. Added vegetation also absorbs more carbon dioxide, one of the main drivers of climate change.

Distribution of Surface Urban Heat Island Intensity (SUHI) by Race and Income in Baltimore, MD⁶



PHYSICAL/MENTAL HEALTH

Physical Activity

Designating space that invites physical activity will incentivize its use. Commuting in personal vehicles leads to physical inactivity, which is highly associated with heart disease and high blood pressure. The prioritization of urban space for personal vehicles creates a less [inviting, less safe environment](#) for pedestrians and bikers. More infrastructure dedicated to travel via walking, bicycle, and public transit, or a mix of these, leads to more active transportation with the added benefit of lower carbon emissions from a reduced number of cars on the road.



Stress

Driving is stressful, particularly when traffic is heavy, and the stress of daily commuting can have adverse effects on physical and [mental health](#). [Researchers](#) have found evidence of mental health impacts from the time and expense of commuting to and from work. In the United States, the amount of money spent on personal vehicles averages approximately [\\$1000 a month](#). More sprawl and congestion contribute to more vehicle miles and time spent commuting, exacerbating stress.

Inequitable Conditions

All of these issues are not experienced equally across populations. [Numerous studies have found](#) that lower income, Black, and Brown neighborhoods are disproportionately exposed to many unhealthy environmental conditions, such as living near [high-traffic](#) roadways, leading to heavier exposure to pollutants. These communities are also located in urban areas with less green space, contributing to [worse air quality](#) and [higher ambient temperatures](#). These populations are more likely to have lower economic status, making car ownership less likely. Furthermore, the cost of car ownership for lower income households is a higher percentage of household budget, causing more economic [strain](#).

CLIMATE CHANGE

Addressing climate change includes addressing the environmental inequities it exacerbates. The transportation sector is the largest contributor to greenhouse gas emissions, and there is a tremendous opportunity to reduce these impacts. Increased use of electric vehicles is a positive effort toward reducing the overall carbon load, while an extensive reexamination of our transportation system is also needed. Increasing support for cleaner, low-carbon modes of transportation, including public transit and pedestrian access, is necessary to slow the effects of climate change on our health and environment.

1 Maryland Department of the Environment. (2022). *Reducing greenhouse gas emissions in Maryland: A progress report*. mde.maryland.gov/programs/air/ClimateChange/Documents/GGRA%20PROGRESS%20REPORT%202022.pdf

2 Burrows, M. & Burd, C. (2024). *Community in the United States: 2022. American Community Survey briefs*. U.S. Census Bureau, U.S. Department of Commerce. www2.census.gov/library/publications/2024/demo/acsbr-018.pdf

3 Hanlon, B., & Airgood-Obrycki, W. (2018). *Suburban revalorization: Residential infill and rehabilitation in Baltimore County's older suburbs*. Environment and Planning A: Economy and Space. doi.org/10.1177/0308518X18763607

4 Jones, C. & Kammen, D. (2013). *Spatial distribution of U.S. household carbon footprints reveals suburbanization undermines greenhouse gas benefits of urban population density*. Environmental Science & Technology Journal. coolclimate.berkeley.edu/maps

5 National Highway Traffic Safety Administration, U.S. Department of Transportation. (2021). *Pedestrian safety*. www.nhtsa.gov/book/countermeasures-that-work/pedestrian-safety

6 Hsu, A., Sheriff, G., Chakraborty, T., & Manya, D. (2021). *Disproportionate exposure to urban heat island intensity across major U.S. cities*. www.nature.com/articles/s41467-021-22799-5



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