Health Effects of Air Pollution





Past EDGE Center air quality research has focused on the Duwamish River Valley

Every year air pollution kills more people than car accidents

The World Health Organization estimates that, globally, 4.2 million people die each year from causes directly related to air pollution. Air pollution causes or worsens the heart and lung diseases that are the number one cause of death around the world, including in the U.S. Because of tighter emissions standards, most forms of air pollution have been declining in the U.S. over the past decades, however climate change is reversing that trend. Some things we can do to reduce air pollution include supporting policies to further cut emissions and planting neighborhood trees and greenwalls.

What is air pollution?

Air pollution is a mix of suspended particles and gasses including carbon monoxide, volatile organic compounds (VOCs), nitrous oxides from vehicle emissions, sulfur dioxide, metals, and ozone. While ozone in the outer layers of the atmosphere protects the Earth from most of the sun's UV radiation, ground level ozone is a powerful pollutant created by a mix of emissions from traffic, industry, and other sources, reacting chemically in the presence of sunlight. Airborne particles are called particulate matter (PM) and may be made up of acids, organic chemicals, metals, ash, and dust. PM is measured by size. The smallest particles are the most dangerous because they can penetrate most deeply into the lungs.

What causes air pollution?

The largest sources of air pollution in Puget Sound are vehicles and wood smoke. Generally, air pollution can come from natural sources such as forest fires, volcanoes, pollen, and dust. It can also come from human sources such as industry, power plants, and vehicles, including cars, trucks, trains, planes, and boats. Major worldwide sources of particulate matter come from the burning of wood, land clearing, transportation, and industrial sources, particularly power plants.

How do we study air pollution?

There are three ways to study air pollution. Exposure assessments measure the amount of pollution in a place of interest. Toxicology studies measure how poisonous a single pollutant or mix of pollutants is to humans and animals in a controlled laboratory setting. Epidemiological studies investigate the association of a pollutant with human disease across a population and ask whether the pollutant causes that disease. Dr. Joel Kaufman's lab uses all three approaches.

What are the health effects of air pollution?

- Exposure to fine particulate matter for even a few hours causes constriction of blood vessels and increases in blood pressure. These short-term effects pose higher risks for the elderly, those with heart disease, asthma, diabetes, or obesity and for women.
- Longer-term exposure to air pollution worsens asthma and is closely associated with the development of heart and lung diseases like strokes, emphysema, and lung cancer. In fact, increased exposure to some types of air pollution has been associated with an increase in risk of emphysema equivalent to smoking a pack of cigarettes a day.
- Exposure to fine particulate matter, a major component of urban air pollution, is associated with risk of disease and death even at levels lower than regulatory standards.



What can we do to protect ourselves?

- To promote community health we can support policies that limit emissions from vehicles and industrial sources and that reroute traffic away from schools, playgrounds, nursing homes, and other community spaces. We can also limit drive times, turn vehicles off when waiting, buy lower emission vehicles and help create neighborhood greenspaces.
- To protect our own health and the health of our families we can spend less time in and around traffic; drive with the windows closed and ventilation set to recycle air; use air filters at home; wear masks as appropriate; and alter walking routes to avoid major roads and industrial areas. It's also important to look for guidance from EPA on up to date local air quality.

Volunteers from UW help maintain a greenwall in Georgetown during a recent Duwamish Alive! event. Greenwalls help improve neighborhood air quality.

ABOUT THE KAUFMAN LAB

The University of Washington Interdisciplinary Center for Exposures, Diseases, Genomics and Environment (EDGE) is committed to conducting and communicating science that reduces the burden of environmentally-related diseases through science translation into policy and practice. EDGE's Deputy Director Dr. Joel Kaufman studies the links between traffic-related air pollution and human health. He led a community-based study of diesel exhaust exposures in Georgetown and South Park in 2013 (https://bit.ly2JvBB2R) and, recently, led a study in several U.S. cities on lung effects from air pollutants worsening with climate change (https://bit.ly/2PqvLUd).

LEARN MORE

EDGE website: https://deohs.washington.edu/edge/

Kaufman website: https://deohs.washington.edu/faculty/kaufman_joel



CONNECT

contactLisa Hayward Wattsphone206.685.8244e-mailIhayward@uw.edu

contactBJ Cummingsphone206.685.5379e-mailbjcumngs@uw.edu

twitter @ecogenetix