



What is Air Pollution?

Air pollution is a mixture of hazardous substances emitted from natural and human sources, such as the burning of fossil fuels and industrial emissions. Common air pollutants include methane, carbon dioxide, carbon monoxide, nitrogen oxides (NO_x), sulfur oxides (SO₂), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), hazardous air pollutants (HAPs), particulate matter (PM), and ozone. Particulate matter (PM) and ozone account for most of the health effects from air pollution.

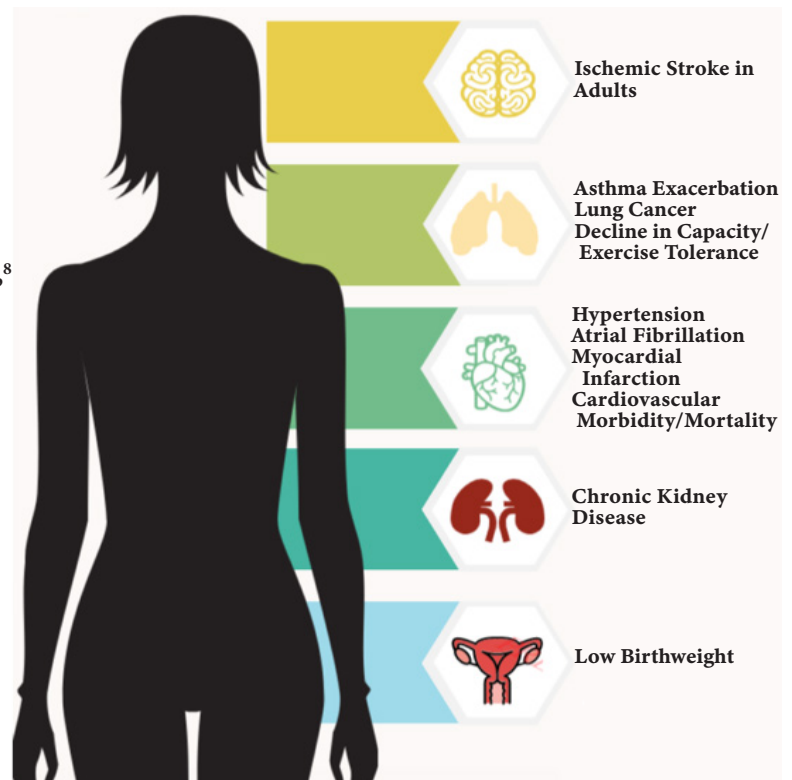
- Major sources of PM include fires, burning waste, exhaust, industrial processes, and windblown particles in dry environments, such as dust from agricultural fields.
- Fine particulate matter (PM_{2.5}, particles that are 2.5 microns or less in size) is a byproduct of fossil fuel combustion. Breathing in these tiny particles over time can damage the lungs and lead to serious health problems.
- Ozone is created when sunlight reacts with NO_x and VOCs. Ozone triggers asthma exacerbations, and ground-level ozone is associated with increases in emergency room visits.¹

In 2013, air pollution, specifically PM_{2.5} and ground level ozone, contributed to an estimated 2,000 to 4,000 deaths, 500 additional hospital stays, and 800 emergency room visits in Minnesota.²

Health Effects of Air Pollution

While most people associate exposure to air pollution with respiratory problems, exposure to air pollution is also associated with a number of chronic diseases.

- The American Heart Association has established a causal link between PM_{2.5} and heart and lung diseases.³
- The World Health Organization has classified air pollution as a human carcinogen.⁴
- Exposure to air pollution has been linked to hypertension,⁵ myocardial infarction,⁶ atrial fibrillation,⁷ asthma exacerbations,⁸ decreases in lung function,⁹ cerebrovascular ischemic stroke,¹⁰ chronic kidney disease,^{11,12} and reduced birth weight.¹³
- There is evidence that children¹⁴ and older adults¹⁵ are more likely to suffer from these effects than healthy adults.
- Combustion-related air pollution is associated with an array of adverse effects on children's brain development in areas including intelligence, memory, behavior, attention, and anxiety.¹⁶
- Prenatal exposure to traffic-related air pollutants¹⁷ and PM_{2.5} are also linked to an increased risk of autism spectrum disorder.¹⁸

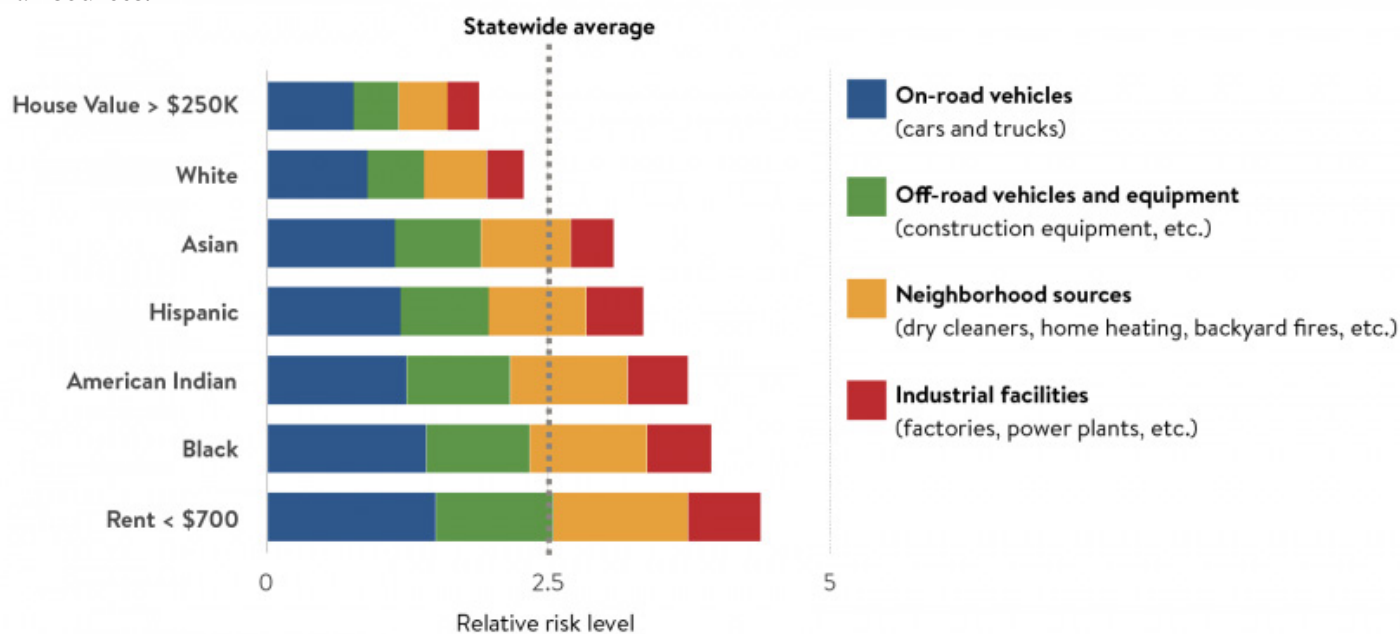


Climate change is increasing our exposure to air pollution.

Our summers are getting hotter, which means higher ozone levels. On hot days air stagnates, giving pollutants from vehicle exhaust time to react with each other and form ground level ozone, which triggers asthma attacks. Wildfires are more frequent and intense. Wildfire smoke exposure was associated with decreased numbers and altered gene expression of immune cells in children,¹⁹ and is associated with exacerbation of asthma and COPD symptoms, as well as increased risk of respiratory infections and deaths from all causes.²⁰

Unequal Exposure to Air Pollution

People who are non-white,²² and those with lower socioeconomic status²³ are exposed to higher levels of air pollution and are more susceptible to adverse effects. An alarming 91% of communities of color and Indigenous communities are exposed to levels of air pollution above health guidelines.²⁴ Black mothers exposed to air pollution and extreme heat during pregnancy are at higher risk than white mothers for stillbirth, premature birth, and underweight babies.²⁵ Minnesota communities with higher percentages of lower income people, people of color, and Indigenous people have higher levels of air pollution from all sources.²⁶



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Reducing air pollution improves health.

Use of cleaner energy results in decreased particulate matter exposure, which translates into better health and increased life expectancy.²⁷ Two studies of children in California demonstrated that decreasing NOx and ozone pollution improves lung function and decreases bronchitis episodes in children.^{28, 29} The financial benefits of improved child health in California due to reducing air pollutants over a 20 year period are estimated at \$1.6 to \$2.6 billion due to reduced post-neonatal mortality, asthma hospitalizations, ER visits, school absences, and low birth weight infants.³⁰

Learn more at hpforhc.org

Check out our YouTube Video at <https://bit.ly/3nfhQ2T>

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References cited available at <https://bit.ly/2YRqgW1>