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# AIR POLLUTION AROUND THE GLOBE

**Nurmuhammedov Javohir**

**Maxmudov Husan**

**Raxmonkulov Sardor**

**Abbasi Guliza**

**Ramazonova Anora**

**Annonation:** we want you to know why air pollution is detrimental for human health, what causes air pollution and how to help reduce air pollution.

**Keywords:** Clean Air Act, seven million deaths, smog and soot, hazardous air pollutants, greenhouse gases, mercury, hydrofluorocarbons (HFCs), electric car, local food, Kigally agreement

Air pollution refers to the release of pollutants into the air—pollutants that are detrimental to human health and the planet as a whole. According to the World Health Organization (WHO), each year, indoor and outdoor air pollution is responsible for nearly **seven million deaths** around the globe. Ninety-nine percent of human beings currently breathe air that exceeds the WHO's guideline limits for pollutants, with those living in low- and middle-income countries suffering the most. In the United States, the **Clean Air Act**, established in 1970, authorizes the U.S. Environmental Protection Agency (EPA) to safeguard public health by regulating the emissions of these harmful air pollutants.

Most air pollution comes from energy use and production. Driving a car on gasoline, heating a home with oil, running a power plant on fracked gas: In each case, a fossil fuel is burned and harmful chemicals and gases are released into the air.

Air pollution is now the world's fourth-largest risk factor for early death. According to the 2020 State of **Global Air report**—which summarizes the latest scientific understanding of air pollution around the world—4.5 million deaths were linked to outdoor air pollution exposures in 2019, and another 2.2 million deaths were caused by indoor air pollution. The world's most populous countries, China and India, continue to bear the highest burdens of disease. The effects of air pollution on the human body vary, depending on the type of pollutant, the length and level of exposure, and other factors, including a person's individual health risks and the cumulative impacts of multiple pollutants or stressors.

These are the two most prevalent types of air pollution. **Smog** (sometimes referred to as ground-level ozone) occurs when emissions from combusting fossil fuels react with sunlight. Soot—a type of particulate matter—is made up of tiny particles of chemicals, soil, smoke, dust, or allergens that are carried in the air. The sources of smog and soot are similar. Both come from cars and trucks, factories, power plants, incinerators, engines, generally anything that combusts fossil fuels such as coal, gasoline, or natural gas.

Smog can irritate the eyes and throat and also damage the lungs, especially those of children, senior citizens, and people who work or exercise outdoors. It's even worse for people who have asthma or allergies; these extra pollutants can intensify their symptoms and trigger asthma attacks. The tiniest airborne particles in **soot** are especially dangerous because they can penetrate the lungs and bloodstream

and worsen bronchitis, lead to heart attacks, and even hasten death. In 2020, a report from Harvard's T.H. Chan School of Public Health showed that COVID-19 mortality rates were higher in areas with more particulate matter pollution than in areas with even slightly less, showing a correlation between the virus's deadliness and long-term exposure to air pollution.

These findings also illuminate an important environmental justice issue. Because highways and polluting facilities have historically been sited in or next to low-income neighborhoods and communities of color, the negative effects of this pollution have been disproportionately experienced by the people who live in these communities.

A number of **hazardous air pollutants** pose severe health risks and can sometimes be fatal, even in small amounts. Almost 200 of them are regulated by law; some of the most common are mercury, lead, dioxins, and benzene. These are also most often emitted during gas or coal combustion, incineration, or—in the case of benzene—found in gasoline. Benzene, classified as a carcinogen by the EPA, can cause eye, skin, and lung irritation in the short term and blood disorders in the long term. Dioxins, more typically found in food but also present in small amounts in the air, is another carcinogen that can affect the liver in the short term and harm the immune, nervous, and endocrine systems, as well as reproductive functions. **Mercury** attacks the central nervous system. In large amounts, lead can damage children's brains and kidneys, and even minimal exposure can affect children's IQ and ability to learn. Another category of toxic compounds, polycyclic aromatic hydrocarbons (PAHs), are by-products of traffic exhaust and wildfire smoke. In large amounts, they have been linked to eye and lung irritation, blood and liver issues, and even cancer. In one study, the children of mothers exposed to PAHs during pregnancy showed slower brain-processing speeds and more pronounced symptoms of ADHD.

While these climate pollutants don't have the direct or immediate impacts on the human body associated with other air pollutants, like smog or hazardous chemicals, they are still harmful to our health. By trapping the earth's heat in the atmosphere, **greenhouse gases** lead to warmer temperatures, which in turn lead to the hallmarks of climate change: rising sea levels, more extreme weather, heat-related deaths, and the increased transmission of infectious diseases. In 2021, carbon dioxide accounted for roughly 79 percent of the country's total greenhouse gas emissions, and methane made up more than 11 percent. Carbon dioxide comes from combusting fossil fuels, and methane comes from natural and industrial sources, including large amounts that are released during oil and gas drilling,. We emit far larger amounts of carbon dioxide, but methane is significantly more potent, so it's also very destructive.

Another class of greenhouse gases, **hydrofluorocarbons (HFCs),** are thousands of times more powerful than carbon dioxide in their ability to trap heat. In October 2016, more than 140 countries signed the **Kigali Agreement** to reduce the use of these chemicals—which are found in air conditioners and refrigerators—and develop greener alternatives over time.

The less gasoline we burn, the better we're doing to reduce air pollution and the harmful effects of climate change.Make good choices about transportation. When you can, ride a bike, walk, or take public transportation. For driving, choose a car that gets better miles per gallon of gas or buy an **electric car.** You can also investigate your power provider options—you may be able to request that your electricity be supplied by wind or solar. **Buying your food locally** cuts down on the fossil fuels burned in trucking or flying food in from across the world. And most important: "Support leaders who push for clean air and water and responsible steps on climate change,"

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