

# EXAMINING THE IMPACT OF AIR POLLUTION ON HUMAN HEALTH

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## Abstract

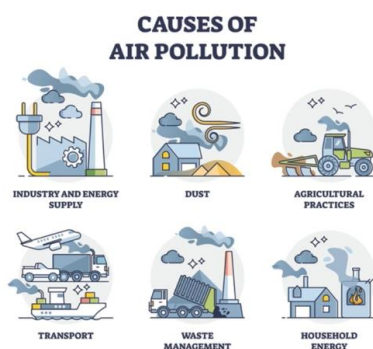
Air pollution is a major concern of the new civilized world, with serious toxicological effects on human health and the environment. It has several different emission sources, but the majority of air pollution comes from motor vehicles and industrial processes. According to the World Health Organization, the six main air pollutants are particulate emissions, ozone in the lower atmosphere, carbon monoxide, sulphur oxides, nitrogen oxides and lead. Long-term and short-term exposure to air toxics has a variety of toxicological effects on humans, including respiratory and cardiovascular diseases, neuropsychiatric complications, eye irritation, skin diseases and long-term chronic diseases such as cancer. Several reports have shown a direct association between exposure to poor air quality and increased morbidity and mortality, mainly from cardiovascular and respiratory diseases. Air pollution is considered the most important environmental risk factor for the onset and progression of a number of diseases such as asthma, lung cancer, ventricular hypertrophy, Alzheimer's and Parkinson's disease, psychological complications, autism, retinopathy, foetal growth and low birth weight.

**Keywords:** Air pollution, cardiovascular diseases, environment, human health, respiratory tract diseases.

## INTRODUCTION

Pollution prevention is a major global problem, because pollution is harmful to human health and the environment. Environmental pollution comes in various forms such as air pollution, water pollution, soil pollution etc. Air pollution can be defined as the presence of one or more pollutants such as dust, fog, smoke and colour in the atmosphere that are harmful to humans and plants and animals. There are many substances in the air that can harm the health of people, plants and animals and reduce visibility (lifespan). They arise from both natural processes and human activities. Substances that do not occur naturally in the air or occur in higher concentrations than usual in different places are called pollutants. Individual responses to air pollutants depend on the type of pollutant a person is exposed to, the degree of exposure, the person's health and genetics. Exposure to air pollutants increases on hot, smoky days. As the use of motorized traffic increases, this growth is expected to continue in the coming years as well, which may worsen the air quality. Poor air quality, on the other hand, has serious negative effects on public health.

## CAUSES OF AIR POLLUTION



Ref: [http://tnenvs.nic.in/Database/TN-ENVIS\\_793.aspx](http://tnenvs.nic.in/Database/TN-ENVIS_793.aspx)

- 1) **Ozone**, an atmospheric gas, is often called fog on Earth. It occurs when pollutants from cars, power plants, industrial boilers, refineries and other sources react chemically in sunlight.
- 2) **Harmful gases** such as carbon dioxide, carbon monoxide, nitrogen oxides (NO) and sulphur oxides (SO<sub>2</sub>) are components of motor vehicle exhaust and by products of industrial processes.

- 3) **Particulate matter (PM)** consists of chemicals such as sulfates, nitrates, carbon or mineral dust. Vehicle and industrial emissions from burning fossil fuels, cigarette smoke and burning organic matter (such as forest fires) contain particulate matter.
- 4) Particulate matter, a subset of fine particles (PM 2.5), is 30 times finer than a human hair. It can get deep into the lung tissue and cause serious health problems.
- 5) **Volatile organic compounds (VOCs)** evaporate at or near room temperature - hence the name volatile. They are called organic because they contain carbon. VOCs are released from paints, cleaning products, pesticides, some furniture, and even craft materials such as glue. Gasoline and natural gas are the main sources of VOCs released during combustion.
- 6) **Polycyclic aromatic hydrocarbons (PAHs)** are organic compounds that contain carbon and hydrogen. Of the more than 100 PAHs widely distributed in the environment, 15 are listed in the Report on Carcinogens. In addition to combustion, many industrial processes, such as the manufacture of iron, steel and rubber products and power generation, produce PAH compounds as a by-product. PAH compounds are also found in particles.
- 7) **Nitrogen oxides** are important air pollutants that can increase the risk of respiratory infections. They are mainly emitted by motor engines and are therefore traffic-related air pollutants. They are deep lung irritants that can cause pulmonary edema if large amounts are inhaled. They are generally less toxic than O<sub>3</sub>, but NO<sub>2</sub> can cause particular toxicological problems. Exposures at 2.0-5.0 ppm have been shown to affect T lymphocytes, particularly CD8+ cells and natural killer cells, which play an important role in host defence against viruses. Although these levels may be high, epidemiological studies show the effect of NO<sub>2</sub> on the incidence of respiratory infections in children. Cough and wheezing are the most common complications of nitric oxide toxicity, but eye, nose or throat irritation, headache, weakness, shortness of breath and chest pain. Pain, sweating, fever, bronchospasm, and pulmonary edema may also occur. Another report suggests that levels of nitric oxide between 0.2 and 0.6 ppm are safe for the human population.

#### EFFECTS OF AIR POLLUTION ON HUMAN HEALTH:

- 1) Some gases can have serious and harmful effects on human health and the relevant authority should be alerted. The gases mentioned below are primarily outdoor air pollutants, but some can and do occur indoors depending on source conditions.
- 2) **Cigarette smoke:** Cigarette smoke is a major contributor to the development of cancerous health conditions, which are not only observed in smokers but also in passive smoker populations. It contains numerous harmful chemicals. Smoking is known to affect passive smokers. Exposure to this gas increases the risk of lung cancer.
- 3) **Ozone:** Our eyes become itchy, burning, and prone to respiratory illnesses like asthma when we are exposed to this gas. It reduces our resistance to colds and pneumonia.
- 4) **Nitrogen oxides:** This gas can make children vulnerable to respiratory illnesses in winter.
- 5) **Carbon monoxide:** CO (carbon monoxide) together with haemoglobin reduces the amount of oxygen entering the blood through our lungs. Binding to other haemoproteins causes changes in the function of affected organs, such as the brain and cardiovascular system, as well as in the developing fetus. It can impair our ability to concentrate, slow our reflexes and make us confused and sleepy.
- 6) **Sulfur dioxide:** SO<sub>2</sub> (sulfur dioxide) in the air is caused by increased burning of fossil fuels. It has the potential to oxidize and create sulfuric acid mist. SO<sub>2</sub> in the air causes lung diseases and other lung conditions such as wheezing and shortness of breath. Long-term effects are more difficult to determine because SO<sub>2</sub> exposure is often combined with exposure to SPM.
- 7) **SPM (suspended particulate matter):** Particulate matter consists of dust, smoke, fog and smoke. The main SPM chemical component of major concern is lead, others are nickel, arsenic and diesel exhaust components. These particles attach to our lung tissues when inhaled and cause lung damage and difficulty breathing.

The importance of SPM as a major pollutant deserves special attention because  
a) It continues to affect more people worldwide than any other pollutant.

- b) More monitoring data are available for it than for any other pollutant.  
c) More epidemiological evidence on exposure has been collected than for any other pollutant.

Air Pollution		
Causes	Effects	Solutions
<ul style="list-style-type: none"> <li>▪ Dust</li> <li>▪ Animals</li> <li>▪ Radioactive decay</li> <li>▪ Wildfires</li> <li>▪ Vegetation</li> <li>▪ Volcanoes</li> <li>▪ Aircraft</li> <li>▪ Vehicles</li> <li>▪ Marine vessels</li> <li>▪ Waste deposition in landfills</li> <li>▪ Military sources</li> <li>▪ Fossil fuels</li> <li>▪ Mining</li> <li>▪ Agriculture</li> <li>▪ Industry</li> <li>▪ Private households</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mortality</li> <li>▪ Cardiovascular diseases</li> <li>▪ Lung diseases</li> <li>▪ Cancer</li> <li>▪ Effects on the central nervous system</li> <li>▪ Acid rain</li> <li>▪ Global warming</li> <li>▪ Depletion of the ozone layer</li> <li>▪ Effects on animals</li> <li>▪ Effects on agriculture</li> <li>▪ Economic effects</li> </ul>	<ul style="list-style-type: none"> <li>▪ Change in energy consumption behavior</li> <li>▪ Reduce material consumption</li> <li>▪ Avoid the use of cars</li> <li>▪ Reuse and recycle</li> <li>▪ Biodigesters</li> <li>▪ Use of energy efficient devices</li> <li>▪ Convince others</li> </ul>

Ref: <https://cdn-0.environmental-conscience.com/wp-content/uploads/2020/05/air-pollution-2.png>

## CONCLUSION

Human health is greatly affected by air pollution, which can trigger and result in numerous diseases that are fatal and causing high levels of mortality. Controlling air pollution is therefore essential and should be at the top of governments' priority lists. Politicians and legislators in these countries must update all laws and regulations related to air pollution. Coordination between the various departments involved in air pollution must be managed through a strong environmental protection organization. An effective environmental protection organization must have adequate budgets for the management, research, development, monitoring and overall control of the environment, including air pollution.

## REFERENCES

- [1] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5122104/>
- [2] <https://eea.europa.eu/en/topics/in-depth/air-pollution/eow-it-affects-our-health#:~:text=Both%20short-%20and%20long-term,asthma%20and%20lower%20respiratory%20infections.>
- [3] <https://www.who.int/news/item/15-11-2019-what-are-health-consequences-of-air-pollution-on-populations>
- [4] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7044178/>
- [5] <https://www.sciencedirect.com/topics/engineering/air-pollution>
- [6] [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health)
- [7] <https://cdn-0.environmental-conscience.com/wp-content/uploads/2020/05/air-pollution-2.png>
- [8] [http://tnenvis.nic.in/Database/TN-ENVIS\\_793.aspx](http://tnenvis.nic.in/Database/TN-ENVIS_793.aspx)