

# HEALTH EFFECTS OF AIR POLLUTION

Exposure to air pollution is linked to mortality and shortening of life expectancy. In the short-term (i.e., a few days to weeks), exposure to air pollution (represented in the daily [air pollution concentrations](#) or [air quality index](#) values) can impact an individual's health. During certain high-pollution days (i.e., *episodes*), the effects can be more severe. However, the biggest impact comes from long-term exposure (i.e., weeks to months) to air pollutants, which increases a person's chances of dying from heart disease, chronic respiratory diseases, lung infections, lung cancer, diabetes, and other health problems. Not surprisingly, exposure to air pollution also reduces the numbers of years that a person is expected to live. Among the air pollutants, fine particulate matter (PM<sub>2.5</sub>) is the most consistent and robust predictor of mortality in studies of long-term exposure.

Some groups of people, including children, pregnant women, the elderly, and people with heart and lung diseases, are more affected by exposure to air pollution.

## Short-Term Health Effects

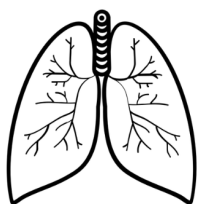
Exposures over a few hours to a few days can contribute to ear, nose, and throat irritation. The irritation usually disappears with the removal of the pollutant(s).

Short-term exposure may also cause and aggravate lower-respiratory and chronic conditions such as allergies, asthma, and bronchitis. In people with heart disease, short-term exposure to PM<sub>2.5</sub> can lead to heart attacks, arrhythmias, and even death.

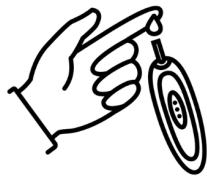
## Long-Term Health Effects

The Global Burden of Disease ([GBD](#)) analysis estimates the impacts on health from long-term exposure to air pollution, which includes five noncommunicable diseases — diabetes, stroke, COPD, lung cancer, and ischemic heart disease — and one communicable disease — lower-respiratory infection (see table next page). There is broad scientific agreement that exposure to PM<sub>2.5</sub> increases the risk of dying from these diseases. Exposure to air pollution is also associated with other conditions and diseases including metabolic dysfunction, disorders of the central nervous system (including neurological and psychiatric diseases), and adverse pregnancy and developmental outcomes (e.g., preterm birth, low birth weight, or growth restriction). Globally, air pollution is linked to the following noncommunicable diseases:

*Percentage of deaths by cause attributed to air pollution in 2017.*



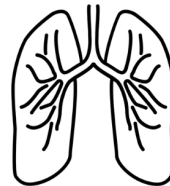
**41 percent**  
of COPD deaths



**20 percent**  
of diabetes  
deaths



**16 percent**  
of ischemic heart  
disease deaths



**19 percent**  
of lung cancer  
deaths



**11 percent**  
of stroke deaths

*(Continued on page 2)*



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The State of Global Air website is a collaboration between the Health Effects Institute and the Institute for Health Metrics and Evaluation, with expert input from the University of British Columbia



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## HEALTH EFFECTS OF AIR POLLUTION *(Continued from page 1)*

### Description of Diseases Included in the Global Burden of Disease Analysis Linked to Air Pollution



**ISCHEMIC HEART DISEASE:** Ischemic heart diseases refer to heart problems caused by narrowed heart arteries. When arteries are narrowed, less blood and oxygen reaches the heart muscle. Also called coronary artery disease and coronary heart disease, ischemic heart diseases can ultimately lead to heart attack. [MORE](#)

*In 2017, 8.93 million global deaths were attributed to ischemic heart diseases, 16% of which were linked to air pollution.*



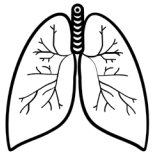
**STROKE:** A stroke occurs when the blood supply to part of the brain is suddenly interrupted or when a blood vessel in the brain bursts, spilling blood into the spaces surrounding brain cells. Brain cells die when they no longer receive oxygen and nutrients from the blood or there is sudden bleeding into or around the brain. [MORE](#)

*In 2017, 6.17 million global deaths were attributed to stroke, 11% of which were linked to air pollution.*



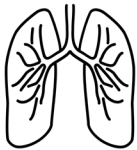
**DIABETES:** Diabetes is a chronic disease caused by the inherited and/or acquired deficiency in production of insulin by the pancreas or by the ineffectiveness of the insulin produced. Such a deficiency results in increased concentrations of glucose in the blood, which in turn damage many of the body's systems, in particular the blood vessels and nerves. The most common types of diabetes are type 1, type 2, and gestational diabetes. Air pollution burden is estimated for type 2 diabetes. [MORE](#)

*In 2017, 1.37 million global deaths were attributed to diabetes, 20% of which were linked to air pollution.*



**COPD:** Chronic obstructive pulmonary disease (COPD), including chronic bronchitis and emphysema, is a lung disease characterized by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible. [MORE](#)

*In 2017, 3.2 million global deaths were attributed to COPD, 41% of which were linked to air pollution.*



**LUNG CANCER:** Cancer is a disease in which cells in the body grow out of control. When cancer starts in the lungs, it is called lung cancer. Unlike normal cells, cancer cells grow without order or control, destroying the healthy lung tissue around them. [MORE](#)

*In 2017, 1.88 million global deaths were attributed to lung cancer, 19% of which were linked to air pollution.*



**ACUTE RESPIRATORY LUNG INFECTIONS:** Acute lower-respiratory infections include pneumonia (infection of the lung alveoli), as well as infections affecting the airways such as acute bronchitis and bronchiolitis, influenza, and whooping cough. Such infections are a leading cause of illness and death in children and adults across the world. [MORE](#)

*In 2017, 2.56 million global deaths were attributed to lower-respiratory infections, 35% of which were linked to air pollution.*

#### FOR MORE INFORMATION:

To learn more about the local air quality in your neighborhood or city on a daily basis, please visit [www.aqicn.org](http://www.aqicn.org).

To access data on real-time air quality from around the world, please visit [www.openaq.org](http://www.openaq.org).

To learn more about long-term trends in air pollution and the associated health burden, please visit [www.stateofglobalair.org](http://www.stateofglobalair.org).

#### ADDITIONAL RESOURCE:

Thurston GD, Kipen H, Annesi-Maesano I, Balmes J, Brook RD, Cromar K, et al. 2017. A joint ERS/ATS policy statement: What constitutes an adverse health effect of air pollution? An analytical framework. *Eur Respir J* 49:1600419; <https://doi.org/10.1183/13993003.00419-2016>.

[American Heart Association](#) | [National Institute of Neurological Disorders and Stroke](#) | [World Health Organization](#) | [American Lung Association](#) | [Centers for Disease Control and Prevention](#) | [European Lung Foundation](#)



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