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HEALTH ADVOCATES FOR CLEAN AIR

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Air Pollution Fact-Sheet

Air pollution is the biggest environmental health risk in the world, responsible for more than 6 million deaths in 2016. This disease burden falls disproportionately on vulnerable populations, especially people living in low- and middle-income countries where development and urbanization have brought increased emissions from many sources, including heavy industry and motorized transport, outpacing air pollution control measures. Women and children living without access to clean household energy are also disproportionately affected by air pollution.

What is Air Pollution?

Air pollution is a complex mixture of gases and aerosols (suspended solid and liquid particles).

PARTICLE POLLUTION (PM): The most measured and important pollutant of concern is particle pollution or particulate matter (PM), which manifests as dust, soot, smog or smoke. Chemical components of particle pollution vary, depending on the source. Sources of PM include: household fuel combustion (especially solid fuels); tobacco smoke; power generation (especially from coal); open burning of trash, agricultural waste and forests; and motor vehicles, especially diesel engines. PM is emitted directly from fuel combustion and formed from reactions in the atmosphere. Health risks from particle pollution depend on particle size. Particles below 2.5 microns ($PM_{2.5}$) are most harmful because they penetrate deep into the small airways and air sacs of the lungs; the smallest particles can even pass into the bloodstream. Larger particles, between 2.5 and 10 microns in diameter, are deposited in the larger airways. WHO air quality guidelines for $PM_{2.5}$ and PM_{10} are measured in micrograms per square meter of air (µg/m3); the guidelines call for an annual mean of 10 $\mu g/m^3$ for $PM_{2.5}$ and 20 $\mu g/m^3$ for and PM_{10}.

OTHER COMMON AIR POLLUTANTS INCLUDE:

NITROGEN DIOXIDE (NO_2)	Formed by fuel combustion for heating, power generation, and in vehicle and ship engines
SULFUR DIOXIDE (SO_2)	Formed by combustion of sulfur-containing fossil fuels for domestic heating, power generation, ships and motor vehicles
GROUND-LEVEL OZONE (O_3)	Formed by photochemical reactions (reactions in the sunlight) between emissions from vehicles and industry (e.g. nitrogen oxides, volatile organic compounds)

Outdoor Air Pollution

Outdoor or ambient air pollution refers to the air pollution existing outside of homes and buildings. In 2016, outdoor air pollution caused about 4.2 million deaths, and 91 percent of the world population was living in areas with air pollution above the WHO guideline levels. Outdoor air pollution comes from a variety of man-made and natural sources:

Traffic-related air pollution results from a mixture of tailpipe emissions from the combustion engines of motor vehicles, with diesel engines being among the most polluting. Particles from brake, tire, and road wear also contribute to traffic-related air pollution.

Power generation and industry that rely on solid fuel or diesel generators to meet energy needs introduce significant levels of particulate matter and black carbon into the atmosphere.

Municipal and agricultural waste incineration in open fires or in outdated incineration facilities contribute significantly to outdoor air pollution.

Natural sources include windblown desert dust, salt from sea spray, volcanic eruptions, and forest and grassland fires. Forest fires and resulting haze in Southeast Asia have been occurring since the 1980s, with significant episodes in 1997, 2002, 2006 and 2013. The most recent severe haze episode occurred in 2015 and is estimated to have caused more than 100,000 deaths in the region. While the impacts are most dramatic during the major haze "episodes," these fires make a substantial contribution to air quality throughout the year.

Household Air Pollution

About 3 billion people, many of whom are poor and living in low- or middle-income countries, rely on poor quality fuels such as biomass (e.g. wood, animal dung, crop waste), charcoal, coal, or kerosene for cooking, heating and lighting in their homes. These polluting fuels combined with open fires, simple stoves and poor ventilation are largely responsible for the elevated levels of air pollution inside homes, reaching up to 100 times higher than the acceptable levels for particulate matter. This results in about 2.6 million deaths and contributes to 25 percent or more of outdoor air pollution in parts of Africa and Asia.

WHAT ARE THE HEALTH EFFECTS?

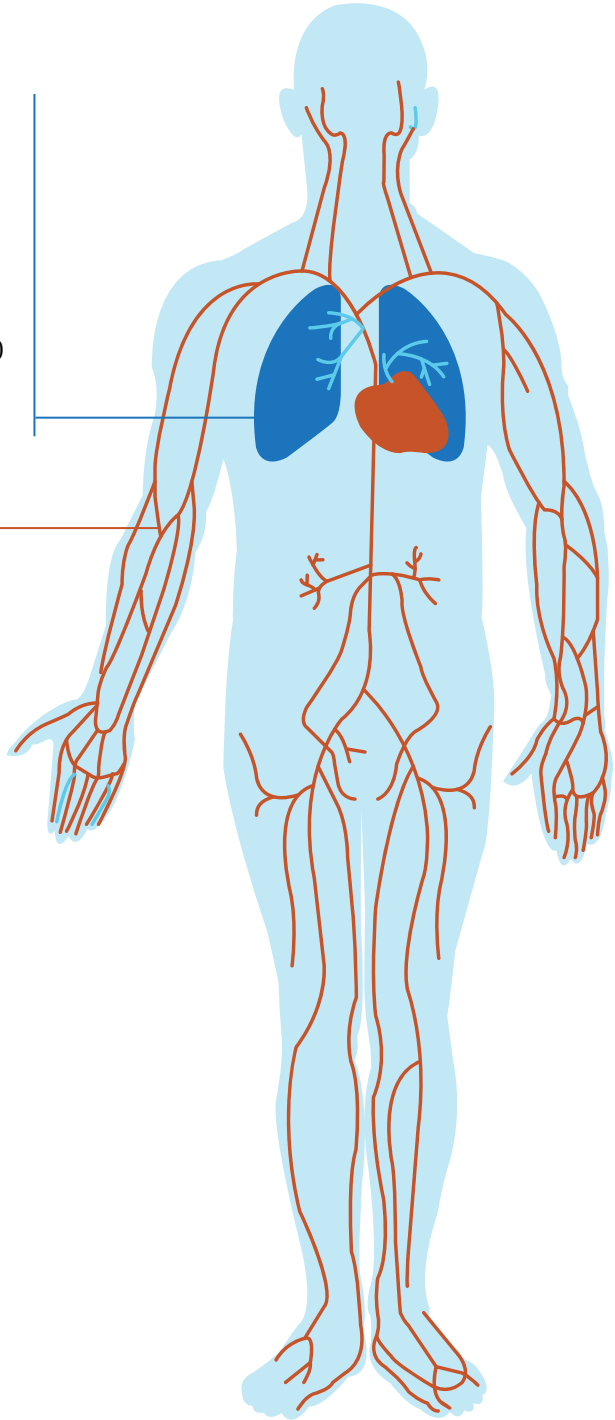
Regardless of the source, air pollution has a clear and devastating impact on human health. Exposure to elevated levels of particulate matter, both daily and over longer periods of time, has a strong relationship with increased death and disease. In addition, particle pollution at very low concentrations has been shown to have adverse health effects; there exists no pollution threshold under which no negative health effects occur. The major health effects of air pollution include:

1 RESPIRATORY ILLNESS

- Respiratory irritation (coughing, wheezing), airway inflammation
- Decreased lung function and lung growth
- Lower respiratory infection (pneumonia)
- Asthma
- Chronic obstructive pulmonary disease (COPD)
- Lung cancer

2 CARDIOVASCULAR ILLNESS

- Stroke
- Heart disease
- Hypertension



OTHER HEALTH RISKS

- Low birth weight
- Tuberculosis
- Cataract
- Nasopharyngeal cancer
- Laryngeal cancer
- Decreased cognitive ability