

Backgrounder: What is Particulate Matter?



What is particulate matter?

Particle pollution, called particulate matter or PM, is a combination of fine solids and aerosols that are suspended in the air we breathe.

- Particles are made up of different things. “A mixture of mixtures” is how EPA describes them. PM can be solids, like dust, ash, or soot. PM can also be completely liquid aerosols or solids suspended in liquid mixtures.
- Particles are different sizes. The ones of most concern are small enough to lodge deep in the lungs where they can do serious damage. They are measured in microns. The largest of concern are 10 microns in diameter (PM₁₀). The group of most concern is 2.5 microns in diameter or smaller (PM_{2.5}). Some of these are small enough to pass from the lung into the bloodstream just like oxygen molecules. By comparison, the diameter of a human hair is huge—it’s 70 microns.
- Particles come from different sources. Combustion sources ranging from diesel trucks and buses to coal-fired power plants are the major source of PM_{2.5} pollution.

What are the health effects of particulate matter?

Short-term increases (over hours to days) in particle pollution have been linked to:

- death from respiratory and cardiovascular causes, including strokes;^{i,ii,iii}
- increased numbers of heart attacks, especially among the elderly and in people with heart conditions;^{iv}
- inflammation of lung tissue in young, healthy adults;^v
- increased hospitalization for cardiovascular disease, including strokes;^{vi,vii}
- increased emergency room visits for patients suffering from acute respiratory ailments;^{viii}
- increased hospitalization for asthma among children; and^{ix, x, xi}
- increased severity of asthma attacks in children.^{xii}

Year-round exposure to particle pollution has also been linked to:

- increased hospitalization for asthma attacks for children living within 200 meters (218 yards) of roads with heavy truck or trailer traffic;^{xiii}
- slowed lung function growth in children and teenagers;^{xiv, xv}
- significant damage to the small airways of the lungs;^{xvi}
- increased risk of dying from lung cancer; and^{xvii}
- increased risk of death from cardiovascular disease.^{xviii}

How serious is the impact?

Here’s one example: EPA scientists estimated in the draft Staff Paper that at the level of the current PM_{2.5} standard, over **4,700 premature deaths occur each year in just nine cities** analyzed (Detroit, Los Angeles, Philadelphia, Pittsburgh, St. Louis, Boston, Phoenix, Seattle, and San Jose). Extrapolating these data would mean many thousands of more deaths avoided nation-wide, but EPA has not calculated the number. Other studies have estimated the death toll to be tens of thousands annually.

Who is at risk?

Anyone may be affected by particle pollution, but several groups are most at risk:

- Children under 18
- Adults 65 and older
- Anyone with chronic lung diseases, such as asthma, chronic bronchitis, or emphysema
- Anyone with a cardiovascular disease
- Anyone with diabetes

Background: What is Particulate Matter?

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