

Airborne particles absorb and adsorb toxic substances and can be inhaled and lodge in the lungs. Once in the lungs, the toxic substances can be adsorbed into the bloodstream and carried throughout the body.

PM₁₀ concentrations tend to be lower during the winter months because meteorology greatly affects PM₁₀ concentrations. During rain, concentrations are relatively low, and on windy days, PM₁₀ levels can be high. Photochemical aerosols, formed by chemical reactions with manmade emissions, may also influence PM₁₀ concentrations.

Effects: Elevated ambient particulate levels are associated with premature death, an increased number of asthma attacks, reduced lung function, aggravation of bronchitis, respiratory disease, cancer, and other serious health effects.

Short-term exposure to particulates can lead to coughing, minor throat irritation, and a reduction in lung function. Long-term exposure can be more harmful. The U.S. EPA estimates that eight percent of urban non-smoker lung cancer risk is due to PM₁₀ in soot from diesel trucks, buses, and cars. Additional studies by the U.S. EPA and the Harvard School of Public Health estimate that 50,000 to 60,000 deaths per year in the United States are caused by particulates. PM₁₀ particles collect in the upper portion of the respiratory system, affecting the bronchial tubes, nose, and throat. They contribute to aggravation of asthma, premature death, increased number of asthma attacks, bronchitis, reduced lung function, respiratory disease, aggravation of respiratory and cardiovascular disease, alteration of lung tissue and structure, changes in respiratory defense mechanisms, and cancer.

Particulate Matter 2.5 Microns or Smaller in Diameter (PM_{2.5})

PM_{2.5} is a mixture of particulate matter (fine dusts and aerosols) 2.5 microns or smaller in aerodynamic diameter. 2.5 micrometers is approximately 1/30 the size of a human hair; so small that several thousand of them could fit on the period at the end of this sentence. Particles 2.5 microns or smaller get down into the deepest portions of the lungs where gas exchange occurs between the air and the blood stream. These are the most dangerous particles because the deepest portions of the lungs have no efficient mechanisms for removing them. If these particles are soluble in water, they pass directly into the blood stream within minutes. If they are not soluble in water, they are retained deep in the lungs and can remain there permanently.

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