Facts about
Fine Particle Air Pollution

AMERICAN LUNG ASSOCIATION®

In 1997, the U.S. Environmental Protection Agency (EPA) set new National Ambient Air Quality Standards (NAAQS) for a form of air pollution known as "fine particles," or $PM_{2.5}$ – particulate matter less than 2.5 microns in diameter.[i] Fine particles can cause serious health effects at relatively low concentrations. Tens of thousands of premature deaths each year are attributed to fine particle air pollution.[ii]

The Clean Air Act requires EPA to review and update the National Ambient Air Quality Standards every five years in light of new scientific and medical studies.[iii] Today's settlement puts EPA on an enforceable schedule to complete the review of the fine particle standard by December 2005.

- Fine particles in the air are made up of a variety of microscopic substances: acid aerosols such as sulfates and nitrates, organic chemicals, metals, and carbon soot.[iv]

- Combustion of fossil fuels is the major source of fine particle emissions into the atmosphere. Fine particles can be emitted directly into the air as smoke from wood stoves or agricultural burning or as soot from the exhaust of diesel trucks, buses and heavy equipment. Fine particles can also be formed from gaseous emissions of sulfur and nitrogen oxides and organic compounds that are transformed in the atmosphere into sulfate, nitrate, and carbonaceous aerosols. The major sources of these emissions are coal-fired power plants, factories, and cars.[v] Prevailing winds can transport fine particles hundreds of miles in the atmosphere.

- Fine particles are easily inhaled deep into the lungs where they can remain embedded for long periods of time.[vi]

- Hundreds of community health studies have linked daily increases in fine particle pollution to reduced lung function, greater use of asthma medications, and increased rates of school absenteeism, emergency room visits, hospital admissions, and premature death.[vii]

- In people with heart disease, very short-term exposures of one hour to elevated fine particle concentrations have been linked to irregular heart beats and heart attacks.[viii]

- Long-term epidemiological studies have repeatedly demonstrated that people living in areas with high fine particle concentrations have an increased risk of premature death compared to those in cleaner cities.[ix] The risk of dying early from cardio-respiratory diseases and lung cancer is higher in more polluted areas.[x] Lives might be shortened by one to two years on average.[xi]

- Fine particle pollution is especially harmful to people with lung diseases such as asthma and chronic obstructive pulmonary disease (COPD), which includes chronic bronchitis and emphysema, because particles can aggravate these diseases.[xii] Exposure to fine particle air pollution can trigger asthma flare-ups and cause wheezing, coughing, and respiratory irritation in individuals with sensitive airways.[xiii] People with heart disease such as coronary artery disease and congestive heart failure and people with diabetes are at risk of serious cardiac effects.[xiv]

- The elderly are at increased risk from fine particle air pollution. Numerous community health studies have shown that when particle levels are high, senior citizens are more likely to be hospitalized for heart and lung problems, and some may die prematurely.[xv]

- Infants and children may be especially susceptible to the health effects of fine particle pollution, because their lungs are still developing. Children have greater exposure to air pollution because of their faster breathing rates and the increased amount of time spent playing outdoors.[xvi] In addition to aggravated wheezing and coughing and reduction in lung function, over the long term, particle air pollution could stunt lung function growth in children.[xvii]

- Some studies suggest that pregnant women may be another sensitive group. A limited number of studies report that high particle concentrations are associated with low birth weight in infants, pre-term delivery, and increased risk of infant mortality.[xviii]

- The current federal standard for $PM_{2.5}$ is 65 $\mu g/m^3$ measured over a 24-hour period, and 15 $\mu g/m^3$ on an annual average basis. California has established a more stringent annual average standard of 12 $\mu g/m^3$. Many areas of the United States have unhealthy concentrations of fine particle pollution.

- Areas where fine particle concentrations exceed the National Ambient Air Quality Standards must be designated as "nonattainment areas" under the Clean Air Act. States must develop "State Implementation Plans" with enforceable strategies to reduce air pollution in order to attain the health standards.

- To limit exposure to fine particle air pollution, the American Lung Association offers the following tips:

    - Avoid exercising near high-traffic areas
    - Do not exercise outdoors when particle levels are high, or substitute an activity that requires less exertion
    - Eliminate indoor smoking
    - Reduce use of fireplaces and wood-burning stoves

The American Lung Association has been fighting lung disease for more than 90 years. With the generous support of the public and the help of volunteers, they have seen many advances against lung disease. However, the work is not finished. As they look forward to their second century, the Lung Association will continue to strive to make breathing easier for everyone. Along with their medical section, the American Thoracic Society, they provide programs of education, community service, advocacy, and research. The American Lung Association's activities are supported by donations to Christmas Seals® and other voluntary contributions. You may obtain additional information via their America Online site, keyword: ALA, or Web site at http://www.lungusa.org. The American Lung Association does not endorse products.

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[i] U.S. EPA. 40 CFR Part 50 National Ambient Air Quality Standards for Particulate Matter; Final Rule; Federal Register Vol. 62, No. 138, pp. 38651-38701, July 18, 1997.

[ii] Abt Associates. Death, Disease and Dirty Power: Mortality and Health Damage Due to Air Pollution from Power Plants. Report prepared for the Clean Air Task Force, October 2000; and Shprentz, DS, Bryner, GC, and Shprentz JS. Breath-Taking: Premature Mortality Due to Particulate Air Pollution in 239 American Cities. Natural Resources Defense Council Report, May 1996.

[iii] Section 109(d)(1) of the Clean Air Act.

[iv] U.S. EPA, Office of Air Quality Planning and Standards. Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information; OAQPS Staff Paper, EPA-452\R-96-013, July 1996.

[v] U.S. EPA, Office of Air Quality Planning and Standards. Latest Findings on National Air Quality: 2001 Status and Trends. EPA 454/K-02-001, September 2002.

[vi] U.S. EPA, Office of Research and Development. Air Quality Criteria for Particulate Matter. Chapter 10: Dosimetry of Inhaled Particles in the Respiratory Tract. EPA/600/P-95/001bF, April 1996.

[vii] California Air Resources Board and the Office of Environmental Health Hazard Assessment. Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates. May 3, 2002.

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