

Frequently Asked Questions: Soot and Particles

What is soot or particle matter?

Tiny particle matter or soot is increasingly seen by scientists and regulators as a particularly dangerous form of air pollution. Small particles can pass through the defenses in the nose and throat and lodge deep into lungs or pass into the bloodstream.

Where does it come from?

Most particle pollution is a by-product of combustion, such as auto and diesel exhaust, power plant emissions and wood smoke. Dust, metals, nitrates, bits of tire rubber and industrial emissions are other contributors. It may be visible as smoky haze, but is often invisible.

What kinds of particles are there in soot pollution?

There are currently two kinds of particles regulated by the federal and state governments. 'Fine' particles (PM 2.5) are 2.5 micrometers in diameter or smaller. Larger or "coarse" particles (PM 10) are between 2.5 and 10 micrometers in diameter. Both are smaller than the width of a human hair.

Leading-edge research suggests the existence of even smaller, more-damaging "ultrafine" particles. Because science is still emerging, these particles are not regulated by federal or state air agencies.

How does it harm us?

Particle pollution is linked to the following health problems:

- Lung irritation and decreased lung function – including shortness of breath, coughing, difficulty breathing and chest tightness – even in otherwise healthy adults and children

- Aggravation of asthma and other preexisting lung problems, especially in children and the elderly
- Development of chronic bronchitis or chronic obstructive lung disease
- Permanent lung damage
- Aggravation of heart problems, irregular heartbeat and increased risk of heart attack
- Increased risk of dying from lung cancer
- Incomplete lung development in children

Statewide, premature deaths linked to small or 'fine' particles like diesel soot are now at levels comparable to deaths from traffic accidents and tobacco smoke, according to 2004 California Air Resources Board estimates. These premature deaths reportedly shorten lives by an average of 14 years.

Who is at greatest risk from soot pollution?

Everyone is at risk, but children are at greater risk because they spent lots of time outdoors playing and their lungs are still developing and sensitive. People most susceptible to harm from air pollution include:

- Individuals with heart disease – such as coronary artery disease or congestive heart failure
- Individuals with lung disease – such as asthma, emphysema or chronic obstructive pulmonary disease (COPD)
- Pregnant women
- Outdoor workers
- Children under age 14, whose lungs are still developing
- Athletes who exercise vigorously outdoors

What's the situation here?

Soot and particles are currently measured in two ways: by measuring average levels over a 24-hour period and by measuring average levels

over the course of a year. Parts of our region are not expected to meet new federal standards for the smaller or “fine” particles. The American Lung Association estimates 24-hour-averaged soot pollution in metropolitan Sacramento is among the [ten worst](#) in the nation’s big cities.

When is soot pollution of most concern?

Particle pollution is usually at its worst in the winter, when stagnant, cold air traps particles close to the ground and wood burning is more popular. Unfortunately, that comforting smoky smell or haze around your neighborhood on cold winter days can be the sign of a health hazard.

To help battle particle pollution, our local regulators will begin declaring “Spare the Air” days in the wintertime this year for the first time. On Spare the Air days, a ratio of weather and pollution conditions called the Air Quality Index is forecast to reach or exceed 127, a level that is unhealthy for sensitive groups. The system is the same as the summer system for ozone: AQI readings above 150 are unhealthy for everyone and over 200 are very unhealthy.