

## FACTS ABOUT

# Reducing Your Exposure to Particle Pollution

## What are particle pollutants?

Particle pollutants, also called particulate matter, or PM, are a complex mixture of small solid particles and liquid droplets found in the air. Particulate pollutants differ greatly in chemical composition, shape and size. Particles that are 10 micrometers<sup>1</sup> in diameter or smaller, called PM<sub>10</sub>, are a concern because they can pass through the throat and nose and enter the lungs. Particles that are 2.5 micrometers in diameter or smaller are called PM<sub>2.5</sub>, or fine particles. Fine particles can penetrate deeper into the lungs than PM<sub>10</sub>. The picture on the right shows that PM<sub>10</sub> and PM<sub>2.5</sub> are much smaller than fine beach sand or human hair.

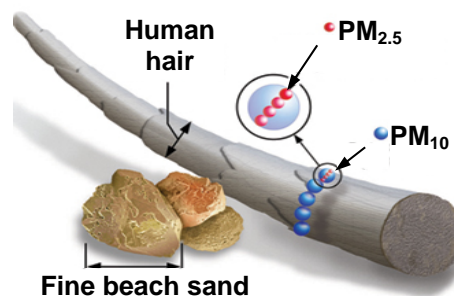


Image courtesy of the U.S. EPA

## Where do particulate pollutants come from?

Particulate pollutants are produced naturally from wild fires, dust storms, volcanic eruptions and sea spray. Naturally generated particles also include components from biological sources, many of which are known allergens, such as pollens, mold spores, dust mites and cockroaches. Human activities generate particles, as well. The burning of gas and oil in motor vehicle engines, industrial processes and power generators emit large amounts of particles. Activities such as smoking tobacco, cooking and burning wood, candles and incense can emit many particles indoors. Particles also can form from complex reactions of gaseous pollutants emitted from motor vehicles and industrial plants.

## Why should I be concerned about particulate pollutants?

Inhalation of particulate pollutants, especially PM<sub>2.5</sub>, has been linked to increased risk for a number of adverse health effects. Long-term exposure to elevated levels of PM<sub>2.5</sub> is associated with premature death in older adults with heart or lung diseases, and with reduced lung growth in children. Short-term exposures to elevated levels of PM<sub>2.5</sub> also have been linked to premature death, primarily in people who already have heart or lung disease, as well as hospitalization for cardiovascular causes, including stroke, heart attacks and congestive heart failure, and chronic obstructive disease and asthma. PM<sub>2.5</sub> exposure also has been associated with emergency room visits for asthma and increased asthma symptoms. PM<sub>10</sub> exposure has been associated with premature death and hospitalization for respiratory causes in people who have chronic lung disease. Children, the elderly and people with heart or lung diseases are more likely to be affected than healthy adults.

## What can I do to reduce my exposure to particulate pollutants?

The California Air Resources Board has active programs to reduce particle emissions from sources such as cars, buses, trucks and industrial plants. There also are many actions you can take to reduce your and your family's exposures to particulate pollutants in different environments. These are listed below.

### **Reduce exposure to particulate pollutants in vehicles**

The combustion of gasoline and diesel fuel in motor vehicles contributes the majority of particulate pollutants in the air in California, especially in urban environments. Due to the close proximity to the emission sources (vehicles), the highest exposure to particles outdoors usually occurs when driving on the road. You can take the following actions to reduce your exposure to particles in vehicles:

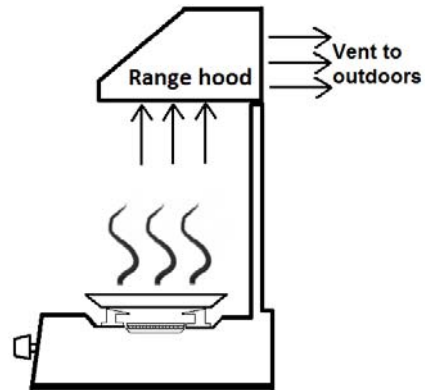
- Reduce traveling during rush hour, and stay away from smoking vehicles when on the road.

<sup>1</sup> One micrometer is one millionth of a meter.

- Close windows and use the air recirculation setting (close vents) if in heavy traffic, but air out the vehicle periodically to avoid drowsiness from build-up of exhaled carbon dioxide. Most vehicles now have a pleated air filter in the outside-air intake for the vehicle's passenger compartment. Follow the manufacturer's instructions to change the cabin filter regularly. Install a high efficiency particle filter if available. Avoid using portable electronic air cleaners in vehicles because some produce ozone, which also can harm your health.
- Avoid long warm-ups (especially in an enclosed space, e.g., garage) and unnecessary idling.
- Avoid smoking in motor vehicles, especially when the windows are closed.
- Consider purchasing an electric, hybrid (gasoline-electric) or other low-emitting vehicle when you buy your next vehicle. See [www.driveclean.ca.gov](http://www.driveclean.ca.gov) for a buying guide.
- Keep your vehicle properly tuned and maintained.

**Reduce exposure to particulate pollutants indoors**

Indoor particulate pollutants may originate indoors or outdoors. You can take the following actions to eliminate particulate pollutants that are generated indoors:



- The highest exposure to particles indoors usually occurs during cooking. Use exhaust fans that vent to the outdoors when cooking. If an exhaust fan is not present or it does not vent outdoors, use a high-efficiency portable air cleaner to remove particles. For advice on how to select a safe indoor air cleaner, see [www.arb.ca.gov/research/indoor/aircleaners/consumers.htm](http://www.arb.ca.gov/research/indoor/aircleaners/consumers.htm).

- Do not allow smoking in your home.
- Use an electric or gas stove and heater instead of a wood stove or fireplace. If you do burn wood, use "seasoned" (dry) wood, and make sure that your fireplace or woodstove drafts properly. For more information on wood burning, see [www.arb.ca.gov/research/indoor/wood\\_burning\\_handbook.pdf](http://www.arb.ca.gov/research/indoor/wood_burning_handbook.pdf).



- Have gas heaters and stoves checked annually by a professional before the heating season to assure that they are functioning properly and vented to the outdoors.
- Never use hibachis, charcoal grills or unvented space heaters indoors.
- Limit burning of candles and incense indoors, and use them only with good outdoor air ventilation.
- Avoid use of air fresheners, cleaning products and fragrances that have a pine or citrus scent because they can react with ozone to form particles and formaldehyde. For more information on cleaning products, see [www.arb.ca.gov/research/indoor/cleaning\\_products\\_fact\\_sheet-10-2008.pdf](http://www.arb.ca.gov/research/indoor/cleaning_products_fact_sheet-10-2008.pdf).

- Assure adequate ventilation during activities that generate moisture indoors, such as showering, cooking and dishwashing. Moisture encourages the growth of molds and dust mites, which can trigger asthma and allergies in people who are sensitive to these allergens.

To reduce the entry of outdoor particles into your home, take the following actions:

- Use door mats and remove shoes at the doorway.
- Close windows and doors when the outdoor particle level is high. Check the current and forecasted air quality levels for your city at [www.airnow.gov](http://www.airnow.gov).
- Keep your house clean to avoid re-suspension of particles from carpets and floors such as soil, pollens, cockroach allergens and animal dander. Use a high-efficiency vacuum cleaner or a central (whole-house) vacuum cleaner, and damp mop hard floors often.



- Use a medium- or high-efficiency filter in your central forced air system to remove airborne particles that infiltrate your home, if your system can accept such a filter. If your home does not have a central system, use high-efficiency portable air cleaners that don't emit ozone. Follow the manufacturer's instructions to change filters. For more information on filters and air cleaning devices, see [www.arb.ca.gov/research/indoor/acdsumm.pdf](http://www.arb.ca.gov/research/indoor/acdsumm.pdf).



### **Reduce exposure to particulate pollutants when outdoors**

- Avoid activity outdoors when outdoor pollution levels are high. Check the current and forecasted air quality levels for your city at [www.airnow.gov](http://www.airnow.gov).
- When walking, jogging, biking and doing other outdoor activities, avoid areas close to sources of harmful particle pollution such as busy roads or freeways.
- Use electric instead of gas-powered lawn and garden equipment.

### **For more information**

Contact the ARB Public Information Office at (916) 322-2990, or ARB's Indoor Air Quality Program staff at (916) 445-0753 or (916) 322-8282 (message line). For more information about particulate pollutants, visit [www.arb.ca.gov/research/aaqs/caaqs/pm/pm.htm](http://www.arb.ca.gov/research/aaqs/caaqs/pm/pm.htm), and for indoor air quality, visit [www.arb.ca.gov/research/indoor/indoor.htm](http://www.arb.ca.gov/research/indoor/indoor.htm).

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