

Environmental Health Fact Sheets

Carbon Monoxide

What is carbon monoxide?

Carbon monoxide is a colorless, odorless, tasteless, poisonous gas that can cause sudden illness and death if inhaled at sufficient concentrations. It is produced by incomplete combustion of carbon containing materials.

How can I be exposed to carbon monoxide?

Any person in an area with a fuel-burning device that is able to produce carbon monoxide is potentially at risk of being exposed if there is not proper venting. Common sources of carbon monoxide include the following:

- Generators
- Charcoal Grills
- Gas cooking ranges
- Kerosene room heaters
- Wood and gas fireplaces
- Wood, coal, or gas burning stoves
- Gas furnaces, water heaters, and clothes dryers
- Diesel, natural gas, propane, and gasoline powered trucks, cars, boats, machinery, equipment, and tools.

What are the symptoms of carbon monoxide exposure?

You cannot smell, taste, or feel carbon monoxide. Therefore, its presence may not be evident until symptoms develop. Symptoms of carbon monoxide poisoning include:

- Fatigue
- Dizziness
- Headache
- Rapid heart rate
- Irregular breathing
- Nausea and/or vomiting
- Thought impairment or disorientation
- Wheezing/bronchial constriction/persistent cough
- Chest pain in persons with coronary artery disease

Death can occur in the absence of some or all of these symptoms. In this case the victim simply “falls asleep” and never regains consciousness.

Because these symptoms mimic other illnesses, persons with carbon monoxide poisoning often overlook the significance of the body’s response to the gas.

How can carbon monoxide affect my health?

When hemoglobin in the blood comes in contact with carbon monoxide it is converted to carboxyhemoglobin (COHb). COHb hinders the delivery of oxygen to the body. The amount of COHb in the blood determines whether the toxic health effects or symptoms occur.

In general, persistent exposure to carbon monoxide at 50 parts per million (ppm) would result in a concentration of less than 10% COHb in the blood. This amount of COHb is not expected to produce symptoms in normal individuals. However, a person with heart disease might be affected by a COHb level below 10%.

Are some people at greater risk of carbon monoxide poisoning?

- Carbon monoxide is especially harmful to unborn babies, infants, the elderly, and people with anemia, a history of respiratory illness or heart disease.
- Each year approximately 500 Americans die from unintentional CO poisoning, more than 20,000 visit the emergency room and more than 4000 are hospitalized due to CO poisoning. Fatalities are most common among those 65 years and older.

Is there a medical test to show whether I've been exposed to carbon monoxide?

A test is available to measure the amount (percentage) of carboxyhemoglobin (COHb) in the blood.

- COHb percentages of 2% for non-smokers or > 9% for smokers strongly supports carbon monoxide poisoning; although COHb levels of 0 to 10% may be without symptoms.
- COHb levels of 10 to 20% may cause headache, dilation of surface blood vessels and difficulty breathing.
- COHb levels of 20 to 30% may cause throbbing headache, nausea, vomiting, fatigue and irritability.
- COHb levels of 30 to 40% may cause dizziness, confusion, and increased heart rate and breathing rate.
- Between 50 to 60%, one might lose consciousness, and over 70% may result in coma and death.

How can families reduce the risk of being exposed to carbon monoxide?

Individuals potentially exposed to carbon monoxide should consider installing a detector that meets the requirements of Underwriters Laboratory (UL) Standard 2034 to warn them of its presence in the indoor environment. However, no detector is 100% reliable, and sensitive individuals may experience health issues at levels of carbon monoxide below the detection limit of the detector.

In addition to installing carbon monoxide detectors, people should:

Do:

- Have heating systems, water heaters, and any other gas, oil, or coal-burning appliances serviced by a qualified technician every year.
- Have chimneys cleaned each year.
- Have cars exhaust system checked every year.
- Install battery-operated carbon monoxide detectors in homes, and check or replace batteries when changing the time on clocks in the spring and fall of each year.
- Seek medical attention promptly if carbon monoxide poisoning is suspected and if feeling dizzy, light headed, or nauseous.

Do not:

- Heat a house with a gas oven.
- Run a car or truck inside a garage attached to a house, even if the door is left open.
- Burn any substance in a stove or fireplace that is not vented.
- Enter confined spaces, such as traffic tunnel, that are not vented and/or shown to be free of carbon monoxide.
- Use a generator, charcoal grill, camp stove, or other gas or charcoal burning device inside the home, basement, garage, or outside the home near a window.

What should I do if I think myself or someone else has been exposed to carbon monoxide?

If you suspect you or someone else has been exposed to carbon monoxide, especially if you are experiencing symptoms, you should leave the area immediately, get fresh air, and seek emergency medical care. Most hospitals can test the blood for the presence of carbon monoxide.

Can illness due to carbon monoxide be treated?

Yes. The treatment for carbon monoxide poisoning is high-dose oxygen, usually using a facemask attached to an oxygen reserve bag.

Carbon monoxide levels in the blood may be periodically checked until they are low enough to safely send you home.

In severe cases of carbon monoxide poisoning, a hyperbaric pressure chamber, when available, may be used to give even higher doses of oxygen.

Has the federal or state government made recommendations to protect human health?

- The U.S. Occupational Safety and Health Administration has set a Permissible Exposure Limit (PEL) for carbon monoxide in workplace settings of a time-weighted-average (TWA) of 50 ppm (55 mg/m³). The TWA PEL must not be exceeded during any 8-hour workshift of a 40-hour workweek.

- The Pennsylvania Department of Health recommends that carbon monoxide in indoor air not exceed 9 ppm (10.31 mg/m³).

Where can I get more information?

For more information, contact:

Pennsylvania Department of Health, Division of Environmental Health Epidemiology, P.O. Box 90, Harrisburg, Pennsylvania, 17108. Telephone number 717-787-1708.

References

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