

# Carbon Monoxide

## The Silent Killer

### Facts

- According to the Centers for Disease Control (CDC), over 400 unintentional deaths related to carbon monoxide (CO) poisoning occur each year in the United States. CO is the leading cause of accidental poisoning deaths. (CDC 2013)
- An estimated 20,000 people nationwide are treated annually for CO poisoning, but it is believed that many more are misdiagnosed or never seek medical care. (CDC 2013)
- California law requires new and existing homes to have carbon monoxide alarms. (California Building Code Section 420, 2013)

### Symptoms

- Early exposure to CO mimics flu-like symptoms; headache, nausea, vomiting, fatigue, dizziness, confusion, shortness of breath and fast heart rate.

### Sources

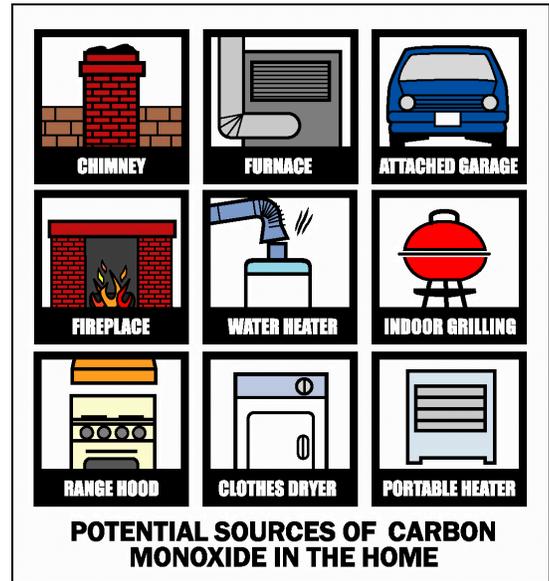
- CO is a toxic gas that is odorless, tasteless and invisible. CO is produced when fossil fuels burn incompletely due to insufficient oxygen. Fuels include natural gas, propane, kerosene, gasoline, coal, wood and charcoal.

- Sources of CO include the furnace, water heater, gas kitchen range or cooktop, gas clothes dryer, fireplace, space heater, portable generator, charcoal grill, wood-burning stove or an idling vehicle in an attached garage.

### Causes

- Improper installation or poor maintenance of appliances. Automobile exhaust.
- Inadequate ventilation of appliances, including fuel burning space heaters and portable generators.
- Energy efficient homes that have added insulation, sealed windows and other weatherproofing can become 'airtight' and trap CO inside.

If CO poisoning is suspected, open windows and doors for fresh air. Leave the house and call **9-1-1**.



### Santa Clara County Fire Department

408.378.4010 or 1.800.800.1793

Serving Campbell, Cupertino, Los Altos, Los Altos Hills,  
Los Gatos, Monte Sereno, Saratoga and unincorporated communities.

[www.sccfd.org](http://www.sccfd.org)

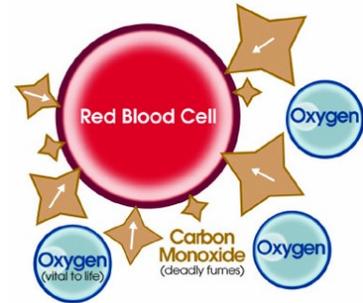
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## CO Exposure

Age, overall health, length of exposure and the concentration of the exposure (measured in parts per million) all determine the degree to which CO affects a person.

- Install carbon monoxide alarms outside each sleeping area and on every level of the home. Test monthly. ([www.nfpa.org](http://www.nfpa.org))

A source of carbon monoxide poisoning, such as a faulty furnace, kitchen range or water heater can produce up to 1,600 ppm. A charcoal grill 3,200 ppm and tailpipe exhaust can produce in excess of 70,000 ppm. The table below shows typical symptoms based on concentration and time of exposure.



## Concentration & Time of Exposure — parts per million (ppm)

9 ppm	EPA residential standard - not to exceed 9 ppm in 8 hours
35 ppm	EPA residential standard - not to exceed 35 ppm in 1 hour
50 ppm	OSHA workplace standard - not to exceed 50 ppm in an 8 hour period
200 ppm	Slight headache, fatigue, dizziness, and nausea after 2-3 hours.
400 ppm	Frontal headaches within 1-2 hours. Life threatening after 3 hours.
800 ppm	Dizziness, nausea and convulsions within 45 minutes. Unconsciousness within 2 hours. Death within 2-3 hours.
1,600 ppm	Headache, dizziness and nausea within 20 minutes. Death within 1 hour.
12,800 ppm	Death within 1-3 minutes.



Carbon monoxide alarms are designed to activate before potentially life-threatening levels of CO are reached. To reduce nuisance alarms, there are also requirements that each alarm must meet before it activates. (UL standard 2034)

## Underwriters Laboratories Standards for CO Alarms @ 85 decibels

30 ppm present	Alarm will sound when present for more than 30 days (Alarm required to ignore low levels of CO unless present long-term)
70 ppm present	Alarm will sound within 1-4 hours (Alarm required to ignore levels of 70 ppm for at least 1 hour before sounding)
150 ppm present	Alarm will sound within 10-50 minutes
400 ppm present	Alarm will sound within 4-15 minutes

## For more information about carbon monoxide poisoning and prevention tips:

Centers for Disease Control (Fact Sheets available in multi-languages) - [www.cdc.gov](http://www.cdc.gov)

CO Poisoning Prevention Guidelines (available in multi-languages) - <http://www.cdc.gov/co/guidelines.htm>

Consumer Product Safety Commission - [www.cpsc.gov](http://www.cpsc.gov)

Environmental Protection Agency - [www.epa.gov](http://www.epa.gov)

Federal Emergency Management Agency - [www.fema.gov](http://www.fema.gov)

National Fire Protection Association – [www.nfpa.org](http://www.nfpa.org)

