

# CARBON MONOXIDE POISONING

## HOW SAFE IS YOUR FAMILY?

Carbon monoxide poisoning is a very real threat. To help keep your family safe and secure, take our quiz and brush up on your CO IQ.

### **Question 1: What is carbon monoxide?**

**Answer:** Carbon monoxide, known by the chemical formula “CO,” is a poisonous gas that kills approximately 500 people in the United States alone every year. Of that number, about 200 people were killed by carbon monoxide emitted from a consumer product, like a stove or water heater. You can’t hear, taste, see or smell it. It’s nicknamed the “silent killer” because it sneaks up on its victims and can take lives without warning.

### **Question 2: What are the sources of CO?**

**Answer:** CO is a by-product of incomplete combustion. Sources of the gas can include malfunctioning appliances — including furnaces, stoves, ovens and water heaters — that operate by burning fossil fuels such as natural or liquefied petroleum (LP). When malfunctioning appliances aren’t adequately ventilated, the amount of CO in the air may rise to a level that can cause illness or even death. Other CO sources include wood fires, vehicle exhaust, blocked chimney flues, fuel-burning cooking appliances used for heating purposes, and charcoal grills used in the home, tent, camper, garage or other unventilated areas.

### **Question 3: How does CO affect the human body?**

**Answer:** When victims inhale CO, the toxic gas enters the bloodstream and replaces the oxygen molecules found in the critical blood component hemoglobin, depriving the heart and brain of the oxygen necessary to function. Many carbon monoxide poisonings occur in the winter months when furnaces, gas fireplaces, and portable heaters are being used and windows are closed. Make sure you have any heaters and gas-burning appliances regularly inspected to make sure they are safe to use.

### **Question 4: What are the symptoms of CO poisoning?**

**Answer:** Symptoms of carbon monoxide poisoning range from mild flu-like symptoms (such as a headache or stomachache without fever) to severe signs of heart and brain damage. Prolonged exposure to low levels of carbon monoxide over many days may result in death.

- People respond differently to the same level of carbon monoxide. Because of this, carbon monoxide poisoning can range from mild to severe in different people with the same level of exposure.
- A person who has mild symptoms usually does not even suspect carbon monoxide poisoning. Early symptoms can mimic the flu or a number of other conditions with similar symptoms, which can make it difficult for a doctor to diagnose. It is possible that a person with more severe poisoning may not even be aware of the seriousness of the condition because the exposure to carbon monoxide may cause fatigue and confusion. If a person has symptoms of carbon monoxide poisoning or if carbon monoxide poisoning is suspected, first get the person out of the polluted area, and then **call 911** .

- Symptoms of carbon monoxide poisoning change with different blood concentrations of carboxyhemoglobin (hemoglobin that has bonded with carbon monoxide instead of oxygen).
  - Some situations may provide clues to carbon monoxide exposure. For example, if a family or group of people who live or work in the same building complain of headaches or flu-like symptoms, these symptoms may be caused by high levels of carbon monoxide. Also, family pets living in the home may become sick, which can be another clue to diagnosing carbon monoxide poisoning. In the winter, unexplained headaches, nausea, or dizziness may be caused by heating systems that are not working correctly and are causing a buildup of carbon monoxide.
  - Delayed symptoms or long-term adverse effects of carbon monoxide poisoning can occur days or weeks after poisoning. The delayed symptoms or effects may include memory loss, changes in personality, disorientation, impaired reasoning ability, and behavioral or learning difficulties
  - Symptoms of carbon monoxide poisoning are often similar to symptoms of other illnesses. These symptoms include:
    - Headache.
    - Nausea, vomiting (often seen in children).
    - Dizziness.
    - Fatigue.
- More severe symptoms may include:
- Confusion, drowsiness.
  - Rapid breathing or pulse rate.
  - Vision problems.
  - Chest pain.
  - Convulsions, seizures.
  - Loss of consciousness.

The acute effects produced by carbon monoxide in relation to ambient concentration in parts per million are listed below:

<b>Concentration</b>	<b>Symptoms</b>
35 ppm (0.0035%)	Headache and dizziness within six to eight hours of constant exposure
100 ppm (0.01%)	Slight headache in two to three hours
200 ppm (0.02%)	Slight headache within two to three hours; loss of judgment
400 ppm (0.04%)	Frontal headache within one to two hours

800 ppm (0.08%)	Dizziness, nausea, and convulsions within 45 min; insensible within 2 hours
1,600 ppm (0.16%)	Headache, tachycardia, dizziness, and nausea within 20 min; death in less than 2 hours
3,200 ppm (0.32%)	Headache, dizziness and nausea in five to ten minutes. Death within 30 minutes.
6,400 ppm (0.64%)	Headache and dizziness in one to two minutes. Convulsions, respiratory arrest, and death in less than 20 minutes.
12,800 ppm (1.28%)	Unconsciousness after 2-3 breaths. Death in less than three minutes.

Many cases of reported carbon monoxide poisoning indicate that while victims are aware they are not well, they become so disoriented that they are unable to save themselves by either exiting the building or calling for assistance. Young children and household pets are typically the first affected.

### **Chronic poisoning**

Chronic exposure to relatively low levels of carbon monoxide may cause persistent headaches, lightheadedness, depression, confusion, memory loss, nausea and vomiting. It is unknown whether low-level chronic exposure may cause permanent neurological damage. Typically, upon removal from exposure to carbon monoxide, symptoms usually resolve themselves, unless there has been an episode of severe acute poisoning. However, one case noted permanent memory loss and learning problems after a 3-year exposure to relatively low levels of carbon monoxide from a faulty furnace. Chronic exposure may worsen cardiovascular symptoms in some people. Long term exposures to carbon monoxide present the greatest risk to persons with coronary heart disease and in people who are pregnant.

### **Poisoning during pregnancy**

Carbon monoxide poisoning in pregnant women may cause severe adverse fetal effects. Poisoning causes fetal tissue hypoxia by decreasing the release of maternal oxygen to the fetus. Carbon monoxide also crosses the placenta and combines with fetal hemoglobin, causing more direct fetal tissue hypoxia. Additionally, fetal hemoglobin has a 10 to 15% higher affinity for carbon monoxide than adult hemoglobin, causing more severe poisoning in the fetus than in the adult. Elimination of carbon monoxide is slower in the fetus, leading to an accumulation of the toxic chemical. The level of fetal morbidity and mortality in acute carbon monoxide poisoning is significant, so despite mild maternal poisoning or following maternal recovery, severe fetal poisoning or death may still occur.

## **First aid**

First aid for carbon monoxide poisoning is to immediately remove the victim from the exposure without endangering oneself and obtaining medical treatment then call 911. Patients who are unconscious may require CPR on site. The typical medical treatment for carbon monoxide poisoning is administering oxygen to the victim by a non-rebreather mask. Oxygen hastens the dissociation of carbon monoxide from carboxyhemoglobin, thus turning it into hemoglobin. Due to the possible severe effects in the fetus, pregnant patients are typically treated with oxygen for longer periods of time than non-pregnant patients.

## **Before Calling Emergency**

If possible, determine the following information:

- Patient's age, weight, and condition (for example, is the person awake or alert?)
- How long they may have been exposed to the carbon monoxide, if known

However, DO NOT delay calling for help if this information is not immediately available.

## **Poison Control**

The National Poison Control Center (1-800-222-1222) can be called from anywhere in the United States. This national hotline number will let you talk to experts in poisoning. They will give you further instructions.

This is a free and confidential service. All local poison control centers in the United States use this national number. You should call if you have any questions about poisoning or poison prevention. It does NOT need to be an emergency. You can call for any reason, 24 hours a day, 7 days a week.

## **Question 5: How can I tell if there is a risk of CO poisoning in my home?**

**Answer:** Have your fuel-burning appliances inspected by a qualified technician at least once a year. A qualified technician should have practical knowledge of the operation, installation and proper ventilation of fossil-fuel-burning devices; carry the applicable insurance; be bonded; and be licensed to perform heating, ventilation and air conditioning (HVAC) work in your area.

Be alert to these danger signs that signal a potential CO problem:

- Streaks of carbon or soot around the service door of your fuel-burning appliances.
- The absence of a draft in your chimney (indicating blockage).
- Excessive rusting on flue pipes or appliance jackets.
- Moisture collecting on windows and walls of furnace rooms.
- Fallen soot from the fireplace.
- Small amounts of water leaking from the base of the chimney, vent or flue pipe.
- Damaged or discolored bricks at the top of your chimney.
- Rust on the portion of the vent pipe visible from outside your home.

<b>Concentration</b>	<b>Source</b>
0.1 ppm	Natural atmosphere level (MOPITT)
0.5 to 5 ppm	Average level in homes
5 to 15 ppm	Near properly adjusted gas stoves in homes
5,000 ppm	Exhaust from a home wood fire
7,000 ppm	Undiluted warm car exhaust without a catalytic converter

Also, recognize that CO poisoning may be the cause when family members suffer from flu-like symptoms that don't disappear but improve when they leave home for extended periods of time.

**Question 6: How can I avoid CO poisoning?**

**Answer:** The most important steps are preventive. Have a qualified service professional inspect your fuel-burning appliances at least once a year. Install UL certified CO alarms outside of sleeping areas and near all fuel-burning appliances.

Other precautions include:

- Avoid using charcoal grills inside the home, tent or camper, or in an unventilated garage.
- Don't allow vehicle exhaust fumes to enter the home.
- Ensure all fuel-burning appliances are properly ventilated.

**Question 7: What should I look for when I buy a CO alarm?**

**Answer:** Rather than searching for specific features, look for the UL Mark with the adjacent phrase "Single Station Carbon Monoxide Alarm."

UL certified CO alarms are designed to detect elevated levels of CO and sound an alarm to alert you and your family to a potential poisoning risk. Although CO indicator cards and other devices on the market are also intended to detect elevated levels of CO, most aren't designed with an audible alarm. The presence of an audible alarm may be significant — especially while you and your loved ones sleep.

UL certified CO alarms are required to have manually operated alarm reset/silence button that will allow you to silence the alarm signal. If elevated levels of CO continue to exist, the alarm will sound again in six minutes.

**Question 8: How can I protect my family when we're traveling? When we're working in the garage?**

**Answer:** UL evaluates and certifies CO alarms intended for use in recreational vehicles (RVs) and areas such as garages or attics where dampness, humidity and temperatures isn't as controlled as in the living space of the home. CO alarms used in these areas comply with additional requirements designed to address the special conditions often present in these environments. UL also evaluates CO travel alarms. These devices are equipped with a mounting bracket for temporary mounting only. UL certified CO alarms intended for use in these environments are marked accordingly near the UL Mark.

**Question 9: Do CO alarms operate differently than smoke alarms?**

**Answer:** Although they may look and sound similar, CO alarms and smoke alarms are designed and intended to detect two separate, distinct hazards. Therefore, to help protect your family from both hazards, it's important to install both UL Listed CO alarms and UL Listed smoke detectors. Remember: Find Peace of Mind. Look for UL.

**Question 10: How do I install my CO alarm?**

**Answer:** Follow the installation instructions found in the manufacturer's use and care booklet that accompanies the product. Proper installation is an important factor in receiving optimum performance. It's important to follow these instructions exactly.

**Question 11: How do I take care of my CO alarm?**

**Answer:** Like smoke detectors, CO alarms need to be tested regularly and cleaned as indicated in the manufacturer's use and care booklet. If the unit is battery-operated, test the detector weekly and replace the battery at least once a year. Never allow anyone to "borrow" the battery. Like any appliance or power tool, a CO alarm can't work unless it has a functioning power source.

**Question 12: Will exposure to other household gases or vapors cause the CO alarm to sound a false alarm?**

**Answer:** When UL evaluates samples of residential CO alarms, consideration is made that your home may contain moderate levels of cleaning chemicals and other substances. UL 2034, the Standard UL engineers and technicians use to test residential carbon monoxide alarms, includes exposure tests to normal concentrations of methane, butane, heptane, ethyl acetate (nail polish remover), isopropyl alcohol (rubbing alcohol), carbon dioxide and propane — all gases that would typically be found in a home.

You should, however, keep these chemicals away from your CO alarms. Low exposure over an extended period of time could damage the sensing device and cause false alarms.

**Question 13: What do I do if my CO alarm sounds?**

**Answer:** Immediately operate the reset/silence button and call the City of Garden Plain at 531-2321, or 911 for verification of elevated levels of Carbon Monoxide.

Move to fresh air – either go outside or move to an open door or window. Check to make sure that everyone in your household is accounted for. Do not re-enter the premises nor move away from the open door or window until the emergency services have arrived, the premises have been sufficiently aired out, and your CO alarm remains in its normal condition.

If your CO alarm reactivates within a 24-hour period, operate the reset button, call your emergency services and move to fresh air. Call a qualified technician to examine and/or turn off your fuel-burning appliances or other sources of combustion. If your RV, car or truck is idling in an attached garage, turn off the engine. Although your problem may appear to be temporarily solved, it's crucial that the source of the CO is determined and appropriate repairs are made.

Remember that an alarm indicates elevated levels of CO in your home. CO is called the “silent killer” because it cannot be seen or smelled. Some people can be exposed to dangerous levels of CO and not feel any symptoms. Regardless of whether you feel symptoms, never ignore the alarm.



UL Certified Home CO Monitor