

# CARBON MONOXIDE POISONING

Carbon monoxide poisoning typically occurs from breathing in carbon monoxide (CO) at excessive levels. Symptoms are often described as "flu-like" and commonly include headache, dizziness, weakness, vomiting, chest pain, and confusion. Large exposures can result in loss of consciousness, arrhythmias, seizures, or death. The classically described "cherry red skin" rarely occurs. Long term complications may include feeling tired, trouble with memory, and movement problems. In those exposed to smoke, cyanide toxicity should also be considered.

Carbon monoxide poisoning can occur accidentally, as an attempt to end one's own life, or as an attempt to end another's life. CO is a colourless and odorless gas which is initially non-irritating. It is produced during incomplete burning of organic matter. This can occur from motor vehicles, heaters, or cooking equipment that run on carbon-based fuels. It can also occur from exposure to methylene chloride.

Carbon monoxide primarily causes adverse effects by combining with hemoglobin to form carboxyhemoglobin (HbCO) preventing the blood from carrying oxygen. Additionally, myoglobin and mitochondrial cytochrome oxidase are affected. Diagnosis is based on a HbCO level of more than 3% among nonsmokers and more than 10% among smokers.

Efforts to prevent poisoning include carbon monoxide detectors, proper venting of gas appliances, keeping chimneys clean, and keeping exhaust systems of vehicles in good repair. Treatment of poisoning generally consists of giving 100% oxygen along with supportive care. This should generally be carried out until symptoms are no longer present and the HbCO level is less than 10%. While hyperbaric oxygen therapy is used for severe poisonings, the benefit over standard oxygen delivery is unclear. The risk of death among those affected is between 1 and 30%.

Carbon monoxide poisoning is relatively common, resulting in more than 20,000 emergency room visits a year in the United States. It is the most common type of fatal poisoning in many countries. In the United States, non-fire related cases result in more than 400 deaths a year. Poisonings occur more often in the winter, particularly from the use of portable generators during power outages. The toxic effects of CO have been known since ancient history. The discovery that hemoglobin is affected by CO was made in 1857.

## Signs and symptoms

Carbon monoxide is not toxic to all forms of life. Its harmful effects are due to binding with hemoglobin so its danger to organisms that do not use this compound is doubtful. It thus has no effect on photosynthesising plants. It is easily absorbed through the lungs. Inhaling the gas can lead to hypoxic injury, nervous system damage, and even death. Different people and populations may have different carbon monoxide tolerance levels.

Concentration	Symptoms
35 ppm (0.0035%), (0.035‰)	Headache and dizziness within six to eight hours of constant exposure
100 ppm (0.01%), (0.1‰)	Slight headache in two to three hours
200 ppm (0.02%), (0.2‰)	Slight headache within two to three hours; loss of judgment
400 ppm (0.04%), (0.4‰)	Frontal headache within one to two hours
800 ppm (0.08%), (0.8‰)	Dizziness, nausea, and convulsions within 45 min; insensible within 2 hours
1,600 ppm (0.16%), (1.6‰)	Headache, <a href="#">increased heart rate</a> , dizziness, and nausea within 20 min; death in less than 2 hours
3,200 ppm (0.32%), (3.2‰)	Headache, dizziness and nausea in five to ten minutes. Death within 30 minutes.
6,400 ppm (0.64%), (6.4‰)	Headache and dizziness in one to two minutes. Convulsions, respiratory arrest, and death in less than 20 minutes.
12,800 ppm (1.28%), (12.8‰)	Unconsciousness after 2–3 breaths. Death in less than three minutes.