CEHC FACT SHEET: Carbon Monoxide

What is carbon monoxide?
Carbon monoxide (CO) is a colorless, nonirritating, odorless, tasteless gas that is highly poisonous. Because it is impossible to see, taste, or smell, carbon monoxide can be lethal before its presence is detected. It is a product of incomplete burning of natural gas, gasoline, liquefied petroleum gas, oil, kerosene, coal, charcoal, or wood. When there is not enough oxygen to produce carbon dioxide (CO2), carbon monoxide is produced.

Carbon monoxide exposures occur indoors due to poor ventilation of appliances (kerosene heaters, space heaters, stoves, and furnaces), fireplaces, and tobacco smoke. Another common exposure to carbon monoxide occurs when car exhausts are not properly vented. Automobile exhausts with high carbon dioxide exposure can be fatal.

How can carbon monoxide exposure occur?
There are many ways that an individual can be exposed to carbon monoxide. Exposure to carbon monoxide occurs in semi-closed spaces, i.e., garages, homes, warehouses. The most common source of carbon monoxide exposure is motor vehicle exhaust. Thus, breathing air that contains automobile exhaust can cause toxic exposure.

In the home, appliances that are not working properly are common sources of exposure, as appliances that are not vented properly can allow for carbon monoxide to build up in the air. Cigarette smoke also produces carbon monoxide, and exposure can occur through second hand smoke. Additional exposure can result if charcoal is burned or portable fuel-burning camping equipment is used inside the house.

People who work in industries that burn gas and coal or in places where there are high amounts of vehicular exhaust can suffer from carbon monoxide poisoning. Also, firefighters, traffic police officers, coal miners, toll booth operators, or transportation mechanics who work in smoke-filled places can be exposed.

Children who are exposed to carbon monoxide have a greater risk of severe exposure than adults, as they have faster respiration rates than adults. When a child breathes carbon monoxide it can harm the blood's ability to transport oxygen. This can damage major organs and lead to death if the exposure was severe. Keeping all items that can omit carbon monoxide away from children is highly recommended.

How can carbon monoxide affect health?
The effects of carbon monoxide exposure can vary greatly from person to person, depending on age, overall health, and length of exposure. According to the Agency for Toxic Substances and Disease Registry (ATSDR), carbon monoxide poisoning is the leading cause of death due to poisoning in the United States.
Exposure to high concentrations of carbon monoxide can cause the following symptoms:

- Headache
- Impaired vision and coordination
- Nausea
- Vomiting
- Dizziness
- Can trigger asthma
- Confusion
- Chest pain
- Weakness
- Heart failure
- Seizure
- Breathing difficulties
- Coma

People who have heart or lung disease are more vulnerable to the toxic effects of carbon monoxide. Adverse effects are due to the formation of carboxyhemoglobin (HbCO) in the blood, which inhibits oxygen intake.

Low levels of carbon monoxide exposure cause mild effects that are often mistaken for the flu. These symptoms include dizziness, nausea, fatigue, and disorientation. In the long term, exposure to low levels of carbon monoxide can cause heart disease and damage to the nervous system.

Breathing high levels of carbon monoxide during pregnancy can cause miscarriage or increase the risk of damage to a developing fetus. Carbon monoxide crosses the placenta and the fetus is exposed to it. Breathing lower levels of carbon monoxide can lead to slower than normal mental development of a child. It may result in low birth weights and nervous system damage. Infants, children, the elderly and those with respiratory diseases are at a higher risk if exposed to carbon monoxide.

**How can carbon monoxide exposure be diagnosed?**
Medical devices called carbon monoxide-oximeters that are found in clinical laboratories or hospitals determine levels of carboxyhemoglobin, which is produced when carbon monoxide combines with hemoglobin. Some infrared radiation adsorption and electrochemical instruments can also diagnose carbon monoxide exposure.

**How can carbon monoxide exposure be prevented?**
Carbon monoxide exposure can be prevented. To reduce risk of exposure, take the following precautions:

1. Do not run an automobile in any closed or semi-enclosed spaces near the home, including the garage. Children have a severe risk of carbon monoxide from this type of exposure.
2. Have all appliances and home equipment, especially gas powered mowers, checked for any leaks. Regular maintenance is recommended.
3. Install carbon monoxide and smoke detectors in the home. Install them on every floor and especially near bedrooms or the furnace.
4. Keep children away from car exhausts, gas powered tools, paint strippers, and unvented heaters, including wood stoves. These items should always be placed in a well vented area.
5. Avoid smoking and second hand smoke.
References


