Carbon Monoxide

What is carbon monoxide?

Carbon monoxide (CO) is a non-irritating, odorless, colorless gas that is somewhat lighter than air. A by-product of incomplete burning of coal, wood, charcoal, natural gas, fuel oil, kerosene, gasoline, fabrics and plastics, it is the leading cause of poisoning deaths in the United States.

How does the new carbon monoxide law affect me?

Effective January 1, 2007, every Illinois home is required to have at least one carbon monoxide alarm in an operating condition within 15 feet of every room used for sleeping purposes. Homes that do not rely on the burning of fuel for heat, ventilation or hot water; are not connected to a garage; and are not near a source of carbon monoxide (as determined by the local building commissioner) are not required to install carbon monoxide detectors. (Public Act 94-741)

How are people exposed to CO?

Because the burning of fossil fuels and fossil fuel products is so widespread, CO is a common air pollutant, particularly in urban areas. Elevated levels in cities are caused by the concentration of traffic, industry and heating needs. Indoors, elevated CO levels can be traced to gas appliances, tobacco smoke, or poorly vented or unvented combustion sources.

There are four main sources of CO in the environment:

1. Automobile exhaust combined with inadequate ventilation is responsible for two-thirds of all accidental CO deaths. Lethal levels of the gas can occur in as little as 10 minutes in a closed garage.
2. Faulty heating equipment accounts for nearly one-third of accidental CO fatalities. Culprits can include your home heating system, but also improperly vented or unvented gas appliances, kerosene or propane space heaters.
3. Fires can raise CO levels in the blood of unprotected persons to 150 times normal in one minute; CO poisoning is the most frequent cause of immediate death associated with fire.
4. Methylene chloride, a solvent in some paints and varnish strippers, is absorbed by the body and changed to CO. Using products that contain methylene chloride for more than a few hours can raise CO levels in the blood seven to 25 times normal. People with pre-existing cardiac conditions who use these products in unventilated spaces risk heart attack and death.

Why is CO dangerous?

CO interferes with the blood's ability to carry oxygen. Blood carries oxygen to body tissues by combining the oxygen with hemoglobin, a substance found in red blood cells. CO, however, combines with hemoglobin 250 times better than oxygen does, thereby denying body tissues a sufficient supply of oxygen .

Infants in particular are more susceptible to CO poisoning because their hemoglobin binds with carbon monoxide better than adult hemoglobin does. This means that the unborn or newborns may suffer more serious effects than adults, even at the same levels of exposure.

What are the symptoms of CO poisoning?

At low levels, CO exposure causes no obvious symptoms, although people exposed to low CO levels may experience decreased exercise tolerance and shortness of breath during exertion. Tightness across the forehead, flushed skin and slightly impaired motor skills also may occur. The first and most obvious symptom is usually a headache with throbbing temples.

Symptoms of mild to moderate CO poisoning may resemble winter flu or gastroenteritis, particularly in children, and include nausea, lethargy and malaise. As the CO level or exposure time increases, symptoms become more severe and additional ones appear: irritability, chest pain, fatigue, diminished judgment, dizziness and dimness of vision. Higher levels cause fainting upon exertion, marked confusion and collapse. If exposure continues, coma, convulsion and death from respiratory arrest can result.

When unexplained symptoms persist and affect more than one person in a home or workplace where a source of combustion is present, CO poisoning should be considered. This is especially true during heating season.

Are there any long-term effects?

CO poisoning survivors may continue to suffer both severe and subtle neurological effects. Up to 40 percent of those who experience serious, nonfatal CO poisoning develop such symptoms as apathy, amnesia, loss of bladder control, headache, irritability, personality changes, confusion, memory loss, motor impairment and vision changes. These symptoms most often appear within two to four weeks after exposure, even after apparent recovery. Up to 75 percent of those with delayed effects recover within a year, but sometimes not fully. Some effects, such as memory loss and motor impairment, may be permanent.

How is CO poisoning treated?

The first rule in any CO exposure is to remove those exposed from the affected area and to eliminate the CO source. In mild cases, symptoms disappear on their own or with the use of supplied oxygen. More severe poisoning requires supportive care for the acute symptoms, including 100 percent oxygen, respiratory support, intravenous fluids and heart monitoring.

How can you tell if you are being exposed to CO?

The local gas company, fire department or health department may be able to help you have the air in your home or workplace tested. CO monitors also are now required for home use. Place detectors in areas where your family spends most of its time--family room, bedroom or kitchen--but far enough away from obvious and predictable sources of CO, such as a gas stove, to avoid false alarms. A hardware store, safety supply outlet, gas company, fire department or health department can provide more information about these devices.

How can I avoid CO poisoning in the home?

CO poisoning is entirely preventable, if you follow a few simple steps:

- Have your gas appliances checked periodically for proper operation and venting.
- Make sure flues, chimneys and vents are clear of debris and in good working order.
- Install CO monitors in the home.
- In the workplace, make sure there is sufficient ventilation when working around CO sources, such as propane-powered forklifts and space heaters.
- Check the exhaust system of your car regularly and keep it in good condition. Do not run the car or other gasoline-powered engines in a garage, even with the doors open. Crack car windows when driving.
- Use paint strippers that do not contain methylene chloride. If you do use solvents containing this substance, make sure the area is properly ventilated.

If you suspect CO exposure or poisoning, **call emergency personnel** and leave the area immediately. Affected individuals should be led to fresh air and provided with oxygen, if necessary.