

CO can come from common unburned hydrocarbon fuels (referenced by the chemical symbols C & H; C for carbon & H for hydrogen). These fuels include gasoline, natural gas, heating oil, coal, propane, wood, diesel, charcoal and similarly familiar products.

Scratch and Sniff Carbon Monoxide

Carbon monoxide is often referenced as “**The Silent Killer**” in that CO is odorless, tasteless and invisible. It is very important to know that some common odors also contain harmful or deadly levels of carbon monoxide. These odors may be around us everyday and because of their commonality might be why they are often overlooked as hazardous or as the contributing factor to some everyday illness symptoms.

It is of primary importance that the health symptoms and the effects of CO poisoning are clearly understood, recognized, tested for, and remediated. Carbon monoxide at a high concentration is a deadly poison and in lesser concentrations can cause or compound illness symptoms for all people especially those who have vulnerable or pre-existing health conditions. Pregnancy is critical to protect from CO exposure, especially for the fetus. The traditional method to test for CO in people is a blood test, followed by the blood sample sent to a lab for analysis.

Many emergency rooms have been equipped with blood gas testing systems for years and have been able to establish CO poisoning rather quickly. General practitioners on the other hand have not had blood gas testing systems at their facilities and to some extent have ignored many of the symptoms of carbon monoxide that are now associated with low level & chronic CO poisoning.

Even people of good health may be experiencing CO poisoning if symptoms include headaches, sinus & head pressure, constant stuffiness, flu-like, dizziness or even chronic tiredness. With the variety of health symptoms presented, a variety of treatments have been tried, many of them self prescribed. How often do you or your health care provider think of CO poisoning when you have one or more of the common symptoms?



DON'T CONFUSE CO WITH CO2

It is not just carbon monoxide that can trigger some of these symptoms. It may be too high of a concentration of another everyday gas most people don't think much about, **carbon dioxide** or CO₂. This is the “air” we breathe out. It is in our atmosphere and compared to nitrogen and oxygen, is merely a small percentage of the total atmospheric content, less than .004 %. (393 PPM in April 2011 compared to 373 PPM 10 years earlier in April 2001; Reference NOAA Mauna Loa CO₂ Data.) — **Complaints of stuffiness** and indoor odors can begin to occur for some people however, when the inside levels are over 600 PPM and the temperature is noticeably warm. **Compounded health issues** can begin at chronic exposure levels of 2500 PPM and exceeding levels. Ventilation should be addressed and air should be monitored. ASHRAE recommends no more than a 1000 PPM level. It is your air in your home.

It is recommended to have your living and working spaces measured periodically for the CO₂ concentration levels. It may be an indicator of poor ventilation or combustion exhaust gas intrusion. This is an easy measurement.

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Breathe fresh air often, and away from combustion system exhaust if possible.

How much CO is too much? This is important, please measure the air in your home for CO!

The health effects can vary significantly due to age, sex, weight and overall state of health. CO is measured in Parts per Million or PPM; out of a million molecules of air, how many are carbon monoxide. The time given respective to the levels referenced in this chart, are for healthy people unless otherwise stated.

What are the symptoms of CO poisoning? Consult with your physician!

CO poisoning mimics many common illnesses, such as food poisoning. It is most frequently misdiagnosed as a flu-like syndrome. The following is a list of common symptoms.

- headaches · loss of hearing · dizziness · depression · blurry vision · cardiac arrest
- disorientation · respiratory failure · weakness · vomiting · coma · painful discomfort
- loss of consciousness · muscle aches & soreness · memory disorders · seizures
- nausea · rapid heartbeat · chronic tiredness · slurry speech · additional symptoms of illnesses

This list is not meant to serve as a diagnosis of carbon monoxide poisoning. It is meant to provide general information on poisoning symptoms. Oxidative stress causes a chain reaction in the body due to the interruption of oxygen intake. Get out and stay out of CO atmosphere's.

Carbon monoxide poisoning is best treated with supplemental oxygen or pressurized oxygen in a hyperbaric chamber where CO is forced out of the hemoglobin of the blood. The longer CO stays in the body, especially for those who often respire in chronic, under 30 PPM concentrations of CO in the air, the more disruptions in body functions and the reoccurrence of symptoms are likely.

What can I do if I or someone I know has been CO poisoned?

This answer may have several responses and would depend upon the severity of the symptoms. Call 911 and get out of the contaminated space if possible. **The responding emergency technicians may be equipped with a pulse CO-oxymeter or breath analysis modules for immediate, non-invasive carboxyhemoglobin % measurements with the victims.** The standard therapy requires supplemental oxygen, ventilatory support and monitoring the heart rate. Traditional testing requires intravenous blood gas sampling. High exposures require hyperbaric systems to force the CO to unload from the blood cells and replace with oxygen.

Since we know the symptoms and we know the sources and how to measure CO in air, in blood and in combustion systems how is it so easily missed?

This may be an easy question to answer with other questions. **How many of us test for CO everywhere we go? Who is testing when you go to work, visit a store or restaurant, stay at a motel, go to church?** Is there someone else testing for CO everywhere I go and will they alert me to hazardous concentrations? Am I connecting the symptoms I may have to the source or the cause? **Am I a health professional who knows the symptoms but do not test patients when they are presented?**

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| 12,000 PPM | Death within 1 – 3 minutes |
| 1,600 PPM | Nausea within 20 minutes, death within 1 hour |
| 800 PPM | Nausea and convulsions – death within 2 hours |
| 400 PPM | Frontal headaches within 1-2 hours; life threat within 3 hours; UL 2034 alarms should sound within 4 & 15 minutes. |
| 200 PPM | NIOSH (National Institute for Occupational Safety & Health) A worker shall not be exposed to more than this amount. |
| 150 PPM | UL Listed 2034 CO alarms must respond within range of 10 to 60 minutes this or higher. |
| 70 PPM | If CO at this level for at least one hour and no more than 4 hours, UL 2034 alarm should be sounding. |
| 50 PPM | Maximum average level for continuous exposure in an 8 hour workday per U.S. federal law. |
| 36-99 PPM | Evacuation & air pack levels with foreseeable health hazards. <u>Medical Alert:</u> Suggest a health consultation when levels displayed are chronic . Advise use of air packs. Ventilation required & source discovery testing recommended. |
| 25 PPM | <u>A common level for the use of self contained breathing apparatus by emergency responders.</u> Also an 8 hour time weighted exposure limit prescribed by ACGIH (American Conference of Governmental Industrial Hygienists) |
| 25-35 PPM | Levels where fire department personnel wear breathing apparatus & begin evacuations. |
| 10-35 PPM | Increased health consequences during pregnancy, for small children, elderly, and those suffering respiratory or heart problems. You are cautioned if these are chronic exposure concentrations. May increase heart stresses. Other causal attempts at diagnosis often overlook carbon monoxide exposure or patient testing. COSA (Carbon Monoxide Safety Association) recommend alarms & monitors begin alarming no later than within these concentration levels. |
| 9 PPM | This concentration or higher is often measured around busy city streets & intersections. ASHRAE (American Society of Heating, refrigeration and Air Conditioning Engineers) presents 9 PPM as the maximum allowable concentration for continuous (24 hr) exposure. The ventilation air shall meet the out door air standard is referenced to EPA at 9 PPM or lower as an ambient outdoor air quality goal as averaged over 8 hours. (A 9 PPM increase over an outside measurement is a common action level if this difference is coming from an inside source. Some jurisdictions require a fuel shut off.) COSA recommends digital CO alarms & monitors that begin displaying CO at levels below 9 PPM. |
| 1-9 PPM | It may be difficult to avoid those often occurring spikes in transient or chronic CO levels without life-style changes. |

Get a low level carbon monoxide alarm for your home, building or a friend to be sure.