Carbon Monoxide
Backgrounder

What is carbon monoxide?

Carbon Monoxide (CO) is an **invisible, odourless and tasteless gas** that is a common by-product of incomplete combustion. Carbon monoxide is produced when fossil fuels like natural gas, propane, oil, gasoline, kerosene, wood, charcoal or coal burn.

Why is carbon monoxide dangerous?

Once inhaled, CO attaches to the hemoglobin in the red blood cells. Hemoglobin normally carries oxygen throughout the body. When CO attaches to the hemoglobin, it blocks the oxygen the body must have, creating immediate health risks.

Depending on the degree and length of exposure, serious carbon monoxide poisoning can cause:

Permanent brain damage

Damage to the heart, possibly leading to life-threatening cardiac complications

Fetal death or miscarriage

Death

Exposure to carbon monoxide may be particularly dangerous for:

- **Unborn babies.** Fetal blood cells take up carbon monoxide more readily than adult blood cells do. This makes unborn babies more susceptible to harm from carbon monoxide poisoning.
- **Children.** Young children take breaths more frequently than adults do, which may make them more susceptible to carbon monoxide poisoning.
- **Older adults.** Older people who experience carbon monoxide poisoning may be more likely to develop brain damage.
- **People who have chronic heart disease.** People with a history of anemia and breathing problems also are more likely to get sick from exposure to carbon monoxide.

What are the signs and effects of carbon monoxide exposure?

Mild Exposure	Medium Exposure	Extreme Exposure
Slight headache, nausea, vomiting, fatigue, flu-like symptoms without a fever.	Throbbing headache, drowsiness, confusion, fast heart rate.	Convulsions, unconsciousness, brain damage, heart and lung failure followed by death.

What are some sources of carbon monoxide?

Common sources of carbon monoxide production are **gas, oil or propane appliances** like these and others **that are not working properly**:

Furnaces | Fireplaces | Clothes Dryers | Ovens | Water Heaters | Space/Patio Heaters | Portable Gas Heater

When appliances are installed and maintained properly, any CO that is produced is vented outside and does not enter the home. Appliances designed for outdoor use like portable generators and patio heaters also produce CO and should therefore only be used outside.

What is the extent of financial and health impacts associated with Carbon Monoxide poisoning?

Unintentional poisoning, of which carbon monoxide is a leading source, is a common cause of injury and injury outcomes in Canada. The total costs of unintentional poisoning in 2018 were **$2.6 billion**.[1]

The health impacts associated with unintentional poisoning are also substantial. The table below provides information related to injury and injury outcomes associated with unintentional poisoning for Canada.

Annual Cause of Injury 2018 [2]

Cause of Injury	Deaths	Hospitalizations	Emergency Dept. Visits	Disability
Unintentional Poisoning	3,477	10,772	79,231	2,591

1. *Potential Lost, Potential for Change – The Cost of Injury in Canada 2021* Parachute Canada, BC Injury Research and Prevention Unit, Public Health Agency of Canada
2. Ibid

How do carbon monoxide incidents occur?

Some common conditions that can cause CO levels to rise quickly:

Appliance malfunction and or lack of regular maintenance.

e.g. the heat exchanger on your furnace cracks, damaged venting systems.

Vent, flue, or chimney is blocked by debris or even snow.

Fireplace, wood burning stove, BBQ or other source of burning material is not properly vented.

Vehicle is left running in an attached garage and carbon monoxide seeps into the house.

Appliances improperly used.

e.g. using patio heaters, BBQs or portable generators indoors, in enclosed spaces or near open windows, doors or outside vents.

Where do carbon monoxide incidents occur?

On average approximately **65%** of all carbon monoxide incidents occur in **private residences**.

Why do carbon monoxide incidents occur?

The primary causes of carbon monoxide residential incidents are **the lack of proper and regular maintenance of fuel burning appliances** followed by inappropriate use of fuel burning appliances.

How can residents reduce the risks of residential carbon monoxide incidents?

There are two key steps Ontarians should take to reduce carbon monoxide incidents in their homes:

1. **Have all fuel burning appliances in homes inspected and maintained** on a yearly basis through the services of a **TSSA-registered contractor** who must employ **certified technicians**.

2. **Have working, certified, carbon monoxide or smoke/carbon monoxide alarms installed in your home.*** Test the alarms, replace batteries regularly and replace the alarms when they have expired and as per manufacturer's instructions.

* Effective January 1, 2026 updates to the Ontario Fire Code will require CO alarms near sleeping areas and on every floor in all homes and residential units that have a fuel-burning appliance, fireplace, or attached garage.

Additional safety tips include:

- Ensure that all vents are clear of debris including snow during the winter months
- Do not use outdoor fuel-burning appliances (e.g. patio heaters, BBQs, portable generators) in your home or other enclosed spaces
- Do not leave cars, lawn mowers, ATV or other vehicles running in attached garages
- Have any new or replacement fuel-burning appliances installed through the services of a TSSA-registered fuels contractor
- Have any repairs to fuel-burning appliances conducted through the services of a TSSA-registered fuels contractor
- Do not operate gasoline powered engines in confined spaces such as garages, workshops, boathouses or basements

For more information visit COsafety.ca or contact TSSA at safetyinfo.org