

# Carbon Monoxide The “Invisible Killer”

Northern New England  
Poison Center

# Objectives

- Define carbon monoxide
- Describe possible sources
- Identify carbon monoxide poisoning signs and symptoms
- Understand who is at risk for poisoning
- Describe key prevention tips and available resources
- Recognize Northern New England Poison Center Services

# What is Carbon Monoxide Poisoning?



CO is a colorless, tasteless, odorless nonirritating gas produced when sources of carbon, such as fuels or wood are burned

[Click here for more information from the Vermont Health Department](#)

Source: NNEPC and the Center for Disease Control

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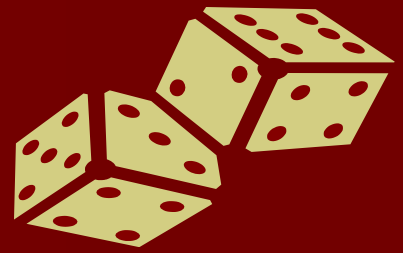
# Carbon Monoxide (CO)

VS.

# Carbon Dioxide (CO<sub>2</sub>)

<b>Carbon Monoxide</b>	<b>Carbon Dioxide</b>
A byproduct of burning fuels	Gas exhaled with normal breathing
A poison even at low doses	An asphyxiant and poisonous at high doses

# Who is at Risk?



- **EVERYONE, especially:**

- People using alternate heat sources during power outages
- Elderly
- Unborn babies, infants,
- Individuals with chronic heart disease, anemia or respiratory problems

Source: Center for Disease Control and  
[www.emedicinehealth.com](http://www.emedicinehealth.com)

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# Who is at risk? Cont.....

- Personnel at fire scenes (fire-fighters/rescue workers)
- Individuals working with combustion engines or combustible gases indoors
- Industrial workers at pulp mills, steel foundries and plants producing formaldehyde and coke
- Pets



# Is CO Poisoning Common?

- Is the third leading cause of unintentional/accidental poisoning deaths in the United States
- Poisonings occur more often in the fall/winter months
- Accounts for more than 40,000 emergency department visits each year in the U.S.

For information on the CDC study “Unintentional non-fire related CO Exposures in the U.S. in 2001-2003 visit

<http://www.cdc.gov/od/oc/media/pressrel/fs050120.htm>

Source: Olson: Poisoning and Drug  
Overdose

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# Sources



- Burning fuels such as: wood, oil, natural gas, gasoline, kerosene, propane, coal and diesel
  - Electrical appliances do not produce CO
- Common sources of human exposure include:
  - Smoke inhalation from fires
  - Automobile exhaust
  - Faulty or poorly vented charcoal, kerosene or gas stoves
  - To a lesser extent, cigarette smoke and methylene chloride (industrial uses)

Source: NNEPC, Vermont Department  
of Health, the Environmental Protection  
Agency and Olson: Poisoning and Drug  
Overdose



# Cold Weather Hazards



## ■ Insufficient ventilation

- Generators used inside during a power outage
- Gas or kerosene heater in room without proper ventilation
- Stoves or fireplaces that are improperly vented or blocked
- Exhaust flues or appliance ducts that are blocked or sealed shut
- Cars or trucks idling in a garage
  - Opening the door is not sufficient

Source: Environmental Protection  
Agency, Center for Disease Control and  
the Vermont Department of Health

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# Cold Weather Hazards cont....

## ■ **Poor function or worn parts**

- Appliances and equipment
- Heating systems

## ■ **Improper use**

- Using charcoal grills indoors
- Heating homes with gas ovens

# Warm Weather Hazards



- **Enclosed area (poor ventilation)**
  - Gas, kerosene, charcoal, propane or hibachi grills
  - Gasoline-powered equipment (lawnmower, chainsaw, generator), used in a home, garage or under a tarp
  - Gas-fueled lanterns and stoves burned inside a tent, trailer, boat cabin without proper ventilation

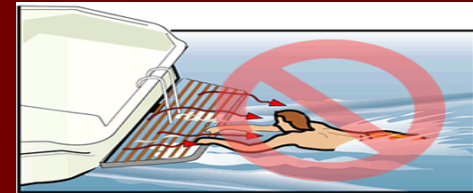
Source: Environmental Protection  
Agency

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# Warm Weather Hazards cont...

## ■ Excessive inhalation of exhaust fumes

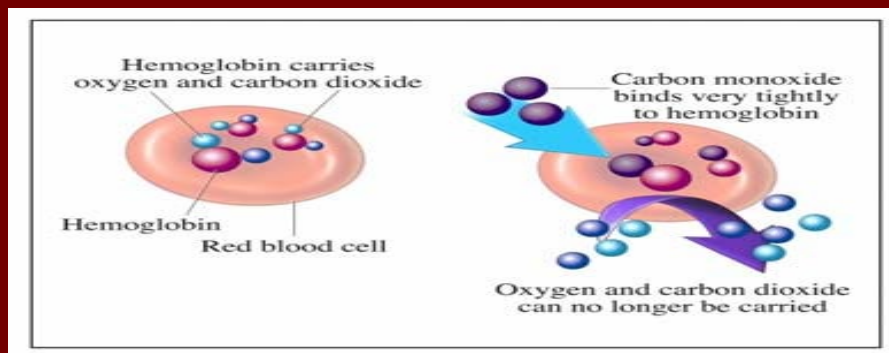
- Teak surfing or pulling a skier from a boat's diving platform
- Diving from or swimming near a houseboat platform
- Riding in the back of a pickup truck with a camper shell



# How does Carbon Monoxide Poisoning Work?

Enters the body through the lungs and is delivered to the blood

- Red blood cells pick up CO instead of oxygen
  - Hemoglobin likes CO 250 times more than oxygen
- CO prevents the oxygen that is present from being readily released to and used properly by tissues



Source: Olson: Poisoning and Drug  
Overdose

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# Why Do We Need Oxygen?

- Brain damage
  - Can only live a few minutes without oxygen.
- Organ damage
  - Vital organs such as brain and heart need oxygen
- Possibly death

# Toxic effects = Concentration X Exposure

Long-term  
exposure to low  
levels of CO

May  
=

Short-term  
exposure to high  
levels of CO

Source: Vermont Department of Health,  
Consumer Product Safety Commission,  
Environmental Protection Agency

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# Signs and Symptoms

- Flu-like symptoms (without fever or runny nose) including:
  - Headache
  - Fatigue/sleepiness
  - Shortness of breath
  - Nausea
  - Dizziness
  - Confusion or disorientation
- Young children, elderly and household pets are usually effected first



Source: Vermont Department of  
Health, Environmental Protection  
Agency





# Failure to Detect Danger

- Often mistaken for the flu, food poisoning or other illnesses
- Those sleeping or intoxicated can die before experiencing any symptoms
- Prolonged exposure can lead to brain damage and death
- Victims may become disoriented and unable to save themselves

Source: Center for Disease Control ,  
Environmental Protection Agency,  
Medlineplus

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# Prognosis



- Difficult to predict the long-term effects of CO poisoning/exposure.
  - Even with proper medical treatment a few people can develop long-term brain damage.
  - Some individuals appear to have no long-term affects.
- If pregnant, fetal complications or death may result.

Source: EMedicineHealth and Olson:  
Poisoning and Drug Overdose

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# Carbon Monoxide Detector

*Your best protection!*

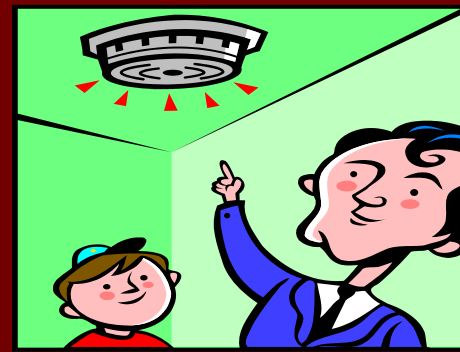


- Install a carbon monoxide detector close to sleeping areas. For more protection:
  - Install one in every bedroom
  - Install one on every level of your home
- Never ignore a carbon monoxide detector, IT COULD SAVE YOUR LIFE!
- Visit or click here for more information:  
<http://www.cpsc.gov/cpsc/pub/pubs/466.html>

Source: NNEPC and the Vermont  
Department of Health

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# Buying a Detector



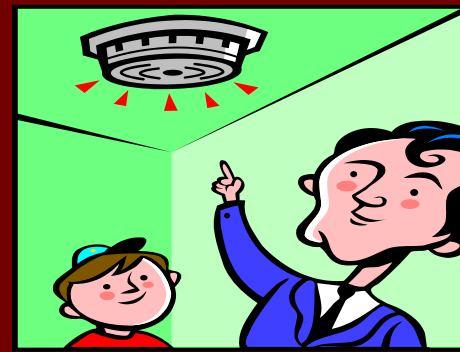
- Do not buy based on price.
- Purchase with Underwriters Laboratories (UL 2034) label.
- Contact Consumer Product Safety Commission (CPSC) for assistance.
- Follow manufacturers instructions for placement, use and maintenance.

[Click here for information on Carbon Monoxide detectors](#)

Source: Consumer Product Safety  
Commission, Vermont Department of  
Health

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# Maintaining Detectors



- If battery powered
  - Check monthly
  - Replace batteries every year or when batteries are low
- If electric, make sure there is battery backup in case of power outages.

Source: Center for Disease Control and  
the Vermont Department of Health,  
Underwriters Laboratories Inc.

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# Emergency *Detector Alarms!*



- Get fresh air right away
- Call 911 or your local fire department
- Call the Northern New England Poison Center (NNEPC) at 1-800-222-1222
- Do not re-enter an affected home until CO is gone
  - Fire department can determine when it is safe to re-enter a building

[Click here for more information from the  
Vermont Health Department](#)

# Fire Department/EMS's role?

- Rescue victims
- Special detectors that monitor parts per million (PPM) of the atmosphere at any given location.
  - Find source of CO
  - Can detect small amounts of CO
- If CO is detected:
  - The source will be investigated and identified
  - Next steps will be recommend
  - The area will be ventilated until CO levels are safe

# Prevention Tips: Do's...



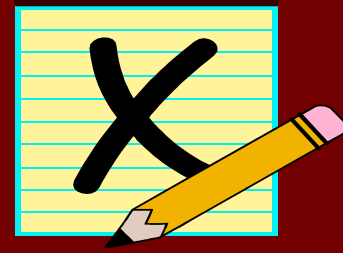
- Purchase CO detectors.
  - **Install and maintain according to manufacture's instructions.**
- If CO detector goes off, evacuate home immediately and call 911.
- Know signs and symptoms of CO poisoning.
- Professionally install & annually inspect appliances & heating systems.
- Open flue when using fire place.
- Make sure stove pipes and other vents are joined tightly without cracks or rust

Source: Center for Disease Control and  
the Consumer Product Safety  
Commission

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# Prevention Tips: Don't...



- Never run a portable generator, gasoline-powered engines (such as mowers, snow-blowers, chainsaws) or burn charcoal in:
  - Crawlspace
  - Indoors
  - Garages
  - Basements
  - Closed in porch
  - Vehicle
  - Tent
  - Under windows
- Never leave a car, mower or other vehicle running in a garage, even with the door open
- Do not heat home with gas oven.

Source: Center for Disease Control and  
the Environmental Protection Agency

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# Visual Warning Signs



- Streaks of carbon or soot around door of your fuel-burning appliance.
- No draft in your chimney.
- A large amount of rusting on flue pipes or appliance jackets or vent pipes.
- Moisture on windows/walls of furnace doors.

Source: Consumer Product Safety  
Commission, Underwriters Laboratories  
Inc.

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# Visual Warning Signs Cont....



- Discolored or damage bricks at top of chimney.
- Soot falling from fire place.
- Flu-like symptoms that go away when you leave home and come back when you re-enter.

# Northern New England Poison Center (NNEPC)



- 1-800-222-1222
- [www.nnepc.org](http://www.nnepc.org)
- Free CO brochures



# NNEPC Mission

- Prevent Poisonings
- Minimize the effects of poisonings that have occurred

# NNEPC

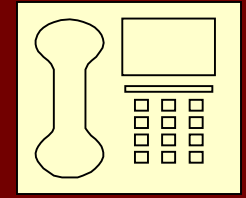
## What We DO?



- Call center
- Regional (Vermont, New Hampshire and Maine)
- Certified
- 24/7 hour help line
- Free
- Confidential
- Trained staff (including nurses and pharmacists)
- TTY and translation services available

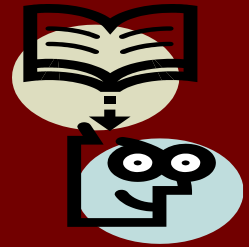
# NNEPC

## Types of Calls



- Human and animal
- Poison emergencies/exposures
- Poison related questions and information
- Medication identification
- Substance abuse and medication information
- Health care professional treatment consultation

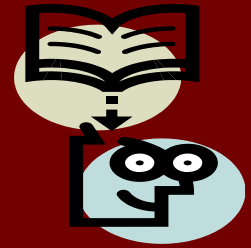
# Additional Resources



- Environmental Protection Agency Information Clearinghouse (EPA)
  - Information on indoor air quality
  - 1-800-438-4318
  - [www.epa.gov/iaq/iaqinfo.html](http://www.epa.gov/iaq/iaqinfo.html)
- Consumer Product Safety Commission (CPSC)
  - Information on CO poisoning prevention, purchasing a CO detector & report products or product-related injuries
  - 1-800-638-2772 (TTY 1-800-638-8270)
  - [info@cpcs.gov](mailto:info@cpcs.gov)



# Resources Cont.....



- Centers for Disease Control (CDC)
  - How to prevent poisoning from home appliances
  - [www.cdc.gov/co/faqs.htm](http://www.cdc.gov/co/faqs.htm)
- National Institute for Occupational Safety Health (NIOSH)
  - Information about small engine hazards
  - [www.cdc.gov/niosh/homepage.html](http://www.cdc.gov/niosh/homepage.html)
- National Institute of Health and Library of Medicine (NLM)
  - General Information
  - [nlm.nih.gov/medlineplus/print/carbonmonoxidepoisoning.html](http://nlm.nih.gov/medlineplus/print/carbonmonoxidepoisoning.html)