Carbon Monoxide Awareness (CO)

The purpose of this session is to raise your awareness of the dangers associated with Carbon Monoxide (CO) poisoning

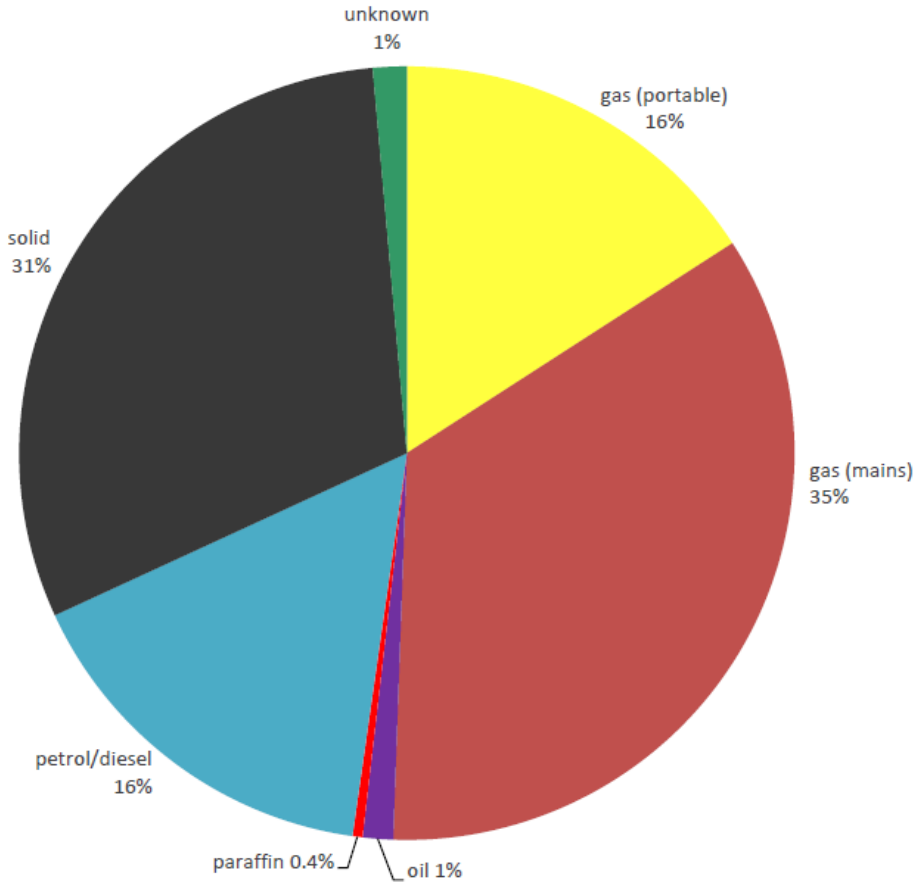
This presentation will cover:

- ✓ Deaths caused by CO
- ✓ What is CO
- ✓ Why is Carbon Monoxide called CO
- ✓ Burning carbon-based fuels
- ✓ Why CO is so toxic
- ✓ What equipment can produce CO
- ✓ How this equipment can produce CO
- ✓ How I can prevent CO from being produced
- ✓ What are the signs of CO from combustion
- ✓ Effects on the body
- ✓ Who is most at risk
- ✓ CO Alarms
- ✓ CO Poster Competition

On average, (since 1995) around 30 people per year in England & Wales are recorded as having died of Carbon Monoxide poisoning

Deaths caused by CO

FUEL TYPE relating to UK deaths from unintentional carbon monoxide poisoning from 01.09.1995 to 31.08.2019



CO-GAS SAFETY'S STATISTICS OF DEATHS AND INJURIES

Deaths caused by Unintentional Carbon Monoxide poisoning in UK

CO-Gas Safety comment

This chart shows that gas is responsible for the greatest percentage of the deaths included in our data, but our data so far also suggests that, per user, gas causes *less* deaths from carbon monoxide than solid fuel (since the number of users of solid fuel across the UK is far less than that of gas users).

In other words, considering the relatively small number of solid fuel users, there is a high incidence of deaths from solid fuel compared to that of gas.

What is CO

Carbon Monoxide (CO) is an odourless, tasteless, invisible, flammable and very toxic gas, which can be emitted from the burning of any carbon-based fuel.

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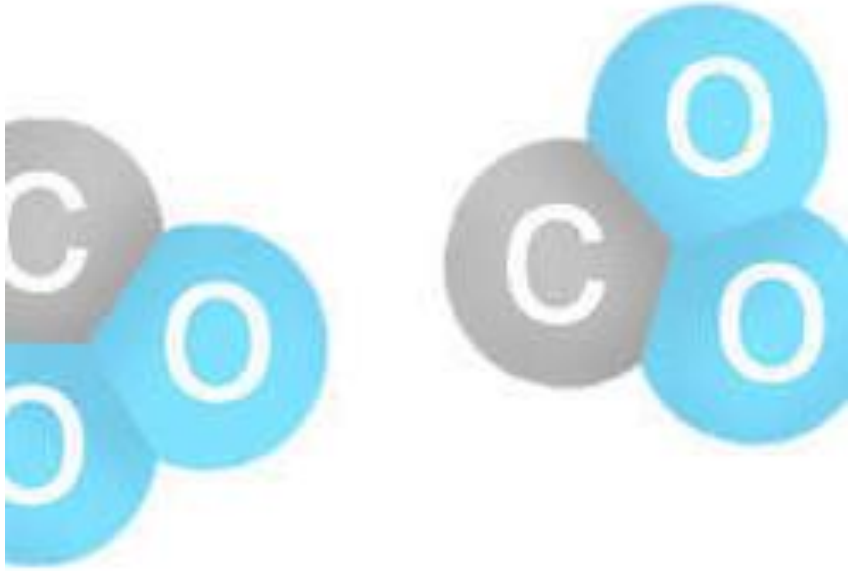
Why is Carbon Monoxide called CO

The fuels that we use on a daily basis **all contain carbon**

Sources of carbon include **wood, charcoal, LPG, oil, natural gas** and **petrol**

When we burn these fuels, the carbon combines with oxygen in the air

If there is enough oxygen, carbon dioxide is produced. Carbon dioxide, or CO2, is formed from **one** atom of carbon and **two** atoms of oxygen

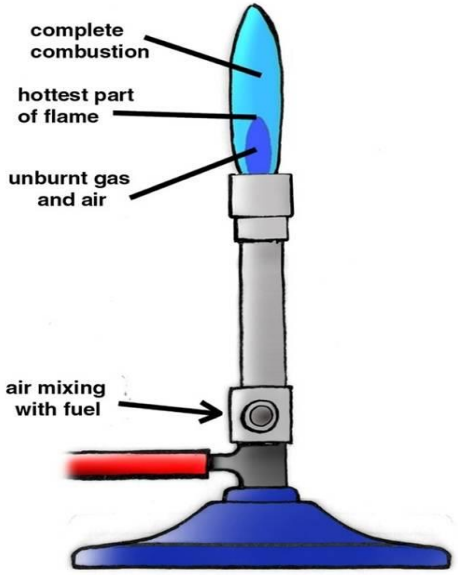


The **less oxygen there is at the flame**, the **more likely it is that carbon monoxide will be formed**

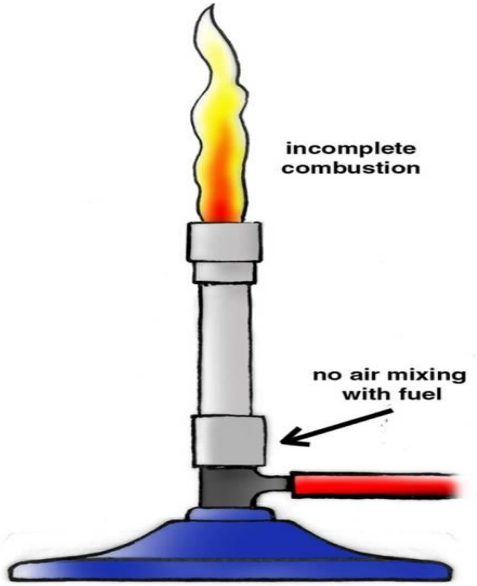
This is why it is so important to **burn fuels in a well-ventilated area**

Burning carbon-based fuels

It is important to remember that burning carbon-based fuels is safe
It only becomes unsafe when the fuel is not burnt correctly, then an excess of CO is produced, which may escape into a living or working area



Complete combustion will produce Carbon Dioxide and Water Vapour



Incomplete combustion will produce **Carbon Monoxide** and Water Vapour

N.B. In some rare cases CO can be produced from a blue flame

Why CO is so toxic

Carbon Monoxide (CO) can bind to the haemoglobin (part of the red cells) however, it doesn't break away again

CO blocks the haemoglobin making it useless for carrying oxygen. This explains why CO can poison in tiny amounts

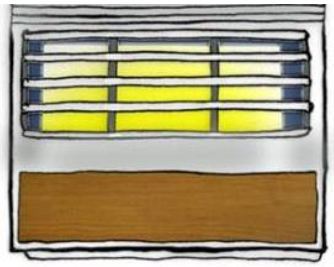
When CO is in the blood, less oxygen will be absorbed, tissues and cells will be deprived of energy

Under 2% of CO in the air can kill in 1-3 minutes

ref: hse.gov.uk

What equipment can produce CO

Mains gas heating and cooking appliances
Bottled gas heating and cooking appliances
Solid fuel heating and cooking appliances
Oil heating appliances
LPG
Barbecues
Petrol / Diesel vehicles and boats
Generators
Gas appliances in caravans/boats/allotments
Bottled gas lighting, camping cookers
Paraffin burning appliances
Cigarettes



So what causes CO to be produced?

A lack of air (ventilation) to ensure efficient combustion
and …
A poor or no escape route to atmosphere for the products of combustion (fumes)

Some examples:

Portable Generators. It is vitally important to ensure adequate ventilation when using portable generators that burn carbon-based fuels. Recent fatal CO poisonings were caused using such generators in buildings or near tents. These generators should only be run in the outside air. Do not use this equipment in buildings / garages etc. Further guidance can be found on www.hse.gov.uk

Barbeques. Recent fatal CO poisonings were caused by the use of barbeques in or near tents. Never use or place a barbecue, gas or charcoal, inside a tent or confined space even if you think it has gone out and it's cold to touch

Cookers. Fatal CO poisonings have been caused by the use of gas cookers as heating appliances. Never use cookers as heating appliances, especially gas grills! Ensure correct ventilation whilst using gas cookers

Wood pellets. Wood pellets in store can emit CO, even if not burning!

http://www.hse.gov.uk/safetybulletins/co-wood-pellets.htm

How can I prevent CO being produced?

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Use competent, qualified persons to carry out:

- ✓ Installation of equipment
- ✓ Regular maintenance to manufacturer's instructions

Always:

- ✓ Use the equipment to manufacturer's instructions
- ✓ Ensure adequate ventilation and keep ventilators clear
- ✓ Be aware of the danger signs, but prevention is best!
- ✓ Ensure your chimney is swept at least once a year by a qualified sweep

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What are the signs of CO from combustion?

CO is colour-less, invisible, odour-less and tasteless

There are however, numerous signs to watch out for that can indicate CO is present:

- Sooty marks around gas appliances, walls, ceiling, condensation inside of windows and on walls when an appliance is on
- Yellow flames at appliance burner. Signs of scorching on and around appliances
- Pilot lights go out and slow burning solid fuel fires
- Unexplained illness, headaches, nausea etc.
- You may be able to smell some of the other products of combustion, which may have escaped into the room rather than gone up a chimney, (because it is partly blocked for example)

- Sometimes people describe this smell as 'gassy' or ‘sooty’ and think there has been an escape from a gas supply pipe supplying natural gas to the house or appliance
- You may find that pets pick up on the presence of CO – cats may leave the house and dogs can develop nausea and a sore throat!

Effects of CO on the body

Depending on the amount and length of exposure, the symptoms of Carbon Monoxide poisoning are:

Headaches, tiredness, nausea, dizziness, convulsions, Collapse, death.

The following table shows the effects of CO on adults.

Effects of Carbon Monoxide on Humans			
%CO	Parts per million	Effects on adults	% Saturation of CO in bloodstream
0.01	100	Slight headache in 2 to 3 hrs	13%
0.02	200	Mild headache, dizziness, nausea and tiredness after 2 to 3 hrs	20-30%
0.04	400	Frontal headache and nausea after 1 to 2 hours, risk to life if over 3 hrs exposure	36%
0.08	800	Severe headaches, dizziness, convulsions within 45 mins, unconsciousness and death possible after 2 to 3 hrs	50%
0.16	1600	Headaches, dizziness and nausea within 20 mins, collapse unconsciousness and death possible within 1 to 2 hrs	68%
0.32	3200	Headaches, dizziness and nausea within 5 to 10 mins, death possible after 15 mins	70-75%
0.64	6400	Severe symptoms within 1 to 2 mins, death within 15 mins	80%
1.28	12800	Immediate symptoms, death within 1 to 3 mins	85-90%

As the effects are similar to flu like symptoms CO poisoning can be misdiagnosed. Different members of the family can suffer different symptoms

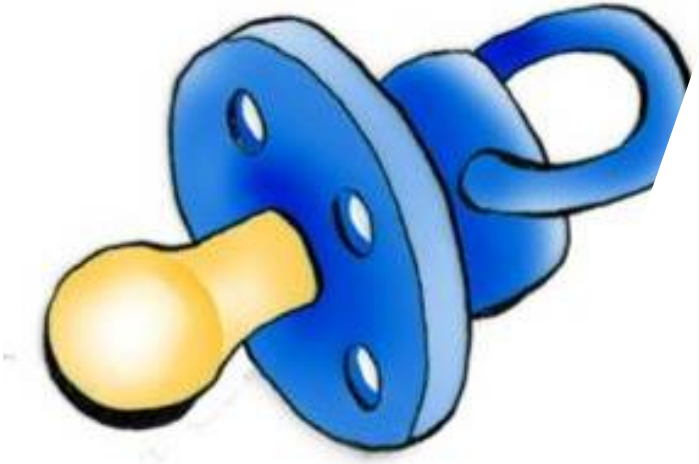
The difference is that there is no fever and when in fresh air the symptoms disappear

The muscle relaxing effect can impair movement to rectify any suspected problem or to summon help

Who is most at risk

Everyone is at risk but;

The elderly and young are at higher risk than healthy adults. Possibly this is because they spend more time indoors, they are small (if children), or already ill (if elderly)



If you are suffering any of the symptoms, especially if more than one person in the house is suffering, you may be at risk of CO poisoning

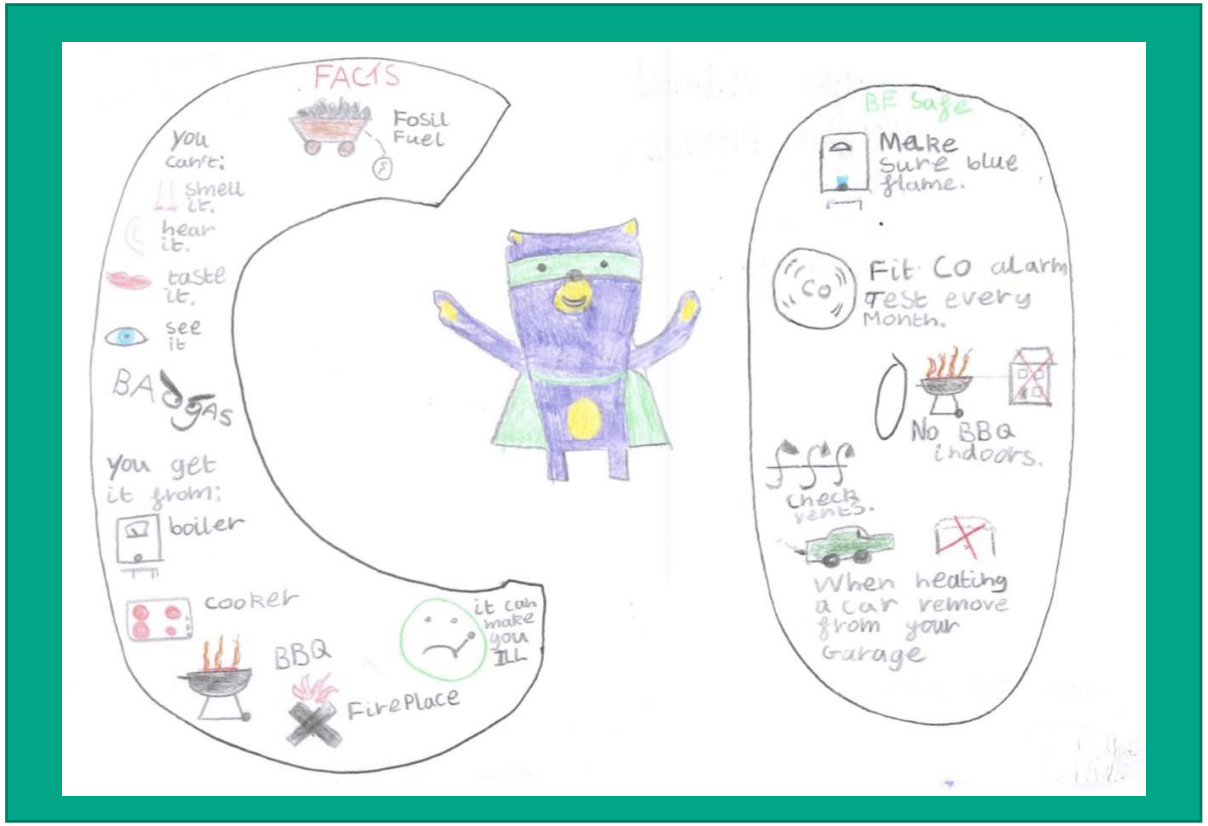
CO alarms

Install an approved (EN 50291) carbon monoxide alarm in the home gives an added safeguard

Do not use the 'Black Spot' detector as they give no audible alarm, i.e. it will not warn you when sleeping or when slipping into a CO induced coma

Don't let this be your alarm!

GDN poster competition



Each year the Gas Distribution Networks (GDNs) run a competition to raise awareness of the dangers of CO for primary aged pupils. This is free to enter. You can find more info on the Safety Seymour website below:

https://safetyseymour.co.uk/

If you suspect Carbon Monoxide (CO) or a gas escape…

GET OUT!

- ✓ Turn off appliances
- ✓ Ventilate
- ✓ Evacuate if necessary
- ✓ Call the Gas Emergency Service

0800 111 999