



Testing for exposure to CO from smoking or other sources

Inform the woman *Why the test is important, what the procedure is for taking the test and that you will provide solutions to reducing her exposure to CO, if levels are higher than expected*

Ask the woman *Approximately what time did you leave home?
Are you lactose intolerant? (if not already known)*

1

Woman breathes into analyser

Reading >5 ppm

Tell the woman her reading is higher than 5 ppm and she is exposed to sources of CO.

Reading is 5 ppm

Tell the woman her reading is 5 ppm and she could be exposed to sources of CO.

Reading <5 ppm

Tell the woman her reading is less than 5 ppm and she is unlikely to be exposed to smoke or other sources of CO.

2

Compare the reading with previous readings (*If none available, go to box 4*)

Reading is higher or the same as previous readings

The woman may not be compliant with her smoking cessation programme **OR** she could be exposed to other sources of CO.

Reading is lower than previous readings

She is compliant with her smoking cessation programme **OR** a previously identified environmental exposure has ceased. But if a previous smoker has stabilised at a level above 5 ppm (see notes) she could be exposed to other sources of CO.

3

You are suspicious: the woman could be exposed to environmental sources of CO

Ask the woman

Have you smoked or been exposed to smoke in the last 12 hours?

No

You are confident:

the woman is not exposed to other environmental sources of CO

- if the woman is an active smoker refer her to NHS stop smoking services
- if the woman's partner is an active smoker discuss ways to reduce her exposure and advice on quitting for her partner

Yes

4

Could this be a case of environmental CO poisoning? (*Positive responses raise suspicion*)

Ask the woman

Does your work involve possible exposure to smoke, fumes or motor vehicle exhaust?

Do you have gas, oil or solid fuel appliances in your home?

Do you ever use your gas stove or oven for heating purposes as well as cooking?

Has there been any change in ventilation in your home recently (eg fitting double glazing)?

Do you or any other occupants in your home suffer from headache, flu-like symptoms, drowsiness and/or nausea?

Is your home detached, semi-detached, terraced, flat, bedsit, hostel or mobile home?

5

You are suspicious: this could be a case of environmental CO poisoning

Action to take

Recommend that the woman:

- does not use any appliance she identifies as being a possible source of CO
- contacts an appropriately registered engineer to check all household gas, oil or solid fuelled appliances
- contacts her GP or attends a hospital emergency department, especially if she also has young children
- installs a CO alarm (EN 50291 compliant)

You should notify the local PHE health protection team (HPT)

6

See over for notes on boxes 1–6

Carbon monoxide, smoking and pregnancy

CO is produced when tobacco products are burnt. It is found in inhaled, exhaled and sidestream smoke. CO levels in the exhaled breath of smokers are higher than those in non-smokers. Those exposed to sidestream smoke may have higher levels of CO in their exhaled breath than non-smokers. Analysis of exhaled breath is a useful indicator of exposure to CO and to tobacco smoke. CO can also be emitted from malfunctioning or poorly ventilated fossil or wood fuelled heating and cooking appliances. Ruling out alternative sources of exposure is important – it could save the fetus and woman's life.

Box 1 Taking the test

Helping pregnant women to quit smoking is important. Some pregnant women find it difficult to say that they smoke. For pregnant women who do not smoke, they should be made aware of other sources of CO.

CO levels in blood decline with a half-life of about 6 hours. Asking the woman what time she left home might provide an indication as to whether domestic exposure to CO is likely to be identified. A lactose-intolerant woman can produce a higher reading than a non-smoker.

Box 2 Informing the woman of the breath test result and what this might mean

CO reading

>5 ppm If she is not a smoker, is the reading high enough to raise suspicion? Go to box 5 to ensure the woman is not being exposed to levels of CO from other sources.

5 ppm The woman is exposed to CO. You need to establish the source of CO exposure.

<5 ppm The woman is unlikely to be exposed to smoke or other sources of CO.

Note: For smoking cessation purposes, stabilisation at <5 ppm shows compliance with the programme. For women who stabilise at 5 ppm, it is recommended that the questions in box 5 are asked as a precautionary measure to eliminate the possibility of exposure to other sources of CO.

Box 3 Carbon monoxide reading not decreasing

Compare each reading with readings taken on any previous visits to the clinic. Establish why expected decreases in CO levels are not occurring. Is the woman complying with the smoking cessation programme? Is the woman exposed to other sources of CO?

Box 4 Exposure to tobacco smoke

Encourage the woman to quit smoking if she is an active smoker. Encouraging other members of the household to quit is important for the woman, and her fetus and its future health.

Box 5 There are many sources of carbon monoxide

The source of CO may be found in the home, car or workplace. Gas, oil, coal and wood heating appliances are the most common sources in the home other than tobacco smoke. More than one appliance may be causing the problem. Inappropriate appliance use and inappropriate use of generators and BBQs indoors can lead to a build up of potentially fatal CO.

It is also worth asking: *"Has an appliance been newly installed?"* or *"Have you recently started to re-use heating appliances/boilers after the summer break/during an unexpected cold spell?"*

Recent fitting of double glazing or blocking vents will suddenly reduce ventilation. If there is a problem appliance, CO will build up in the property.

CO is a mimic, simulating other more common conditions including flu-like illnesses, food poisoning, headache and depression. Headache is the most common symptom.

Poisoning can occur in all income groups and types of housing.

CO can leak into a semi-detached or terraced house/flat from neighbouring premises.

Box 6 Stopping further exposure is essential

Preventing further exposure is the most important thing you can do. Advise the woman on returning home to turn off all fossil fuelled appliances, open windows, make sure other occupants are safe and contact an appropriately registered engineer to check appliances. Any occupant experiencing any of the symptoms listed above should seek medical attention immediately.

Recommend the purchase of an audible CO alarm for installation in the home, but stress that an alarm is not a substitute for regular maintenance of appliances by an appropriately registered engineer.

It is essential that you contact your local HPT to notify them of your suspicions. The team will be able to coordinate services to help protect the woman if necessary.

Useful contact numbers

999	0800 111 999	0800 408 5500	0800 300 363
Ambulance/Police	Gas Emergency	Gas Safe Register	HSE Gas Safety Line
0844 892 0555	01684 278170	0845 658 5080	111
Local HPT	HETAS (solid fuel)	OFTEC (oil)	NHS 111

For queries or feedback on this card please email cofeedback@phe.gov.uk



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