

Using an expired carbon monoxide monitor

Monitoring carbon monoxide (CO) levels is a great way to engage women in a conversation about the harms of smoking and the benefits of quitting.

How does CO harm the mother and the developing baby?

CO is a toxic gas that is formed when a cigarette burns. When the mother breathes in cigarette smoke, the CO out-competes oxygen to bind with haemoglobin (Hb) and form carboxyhaemoglobin (COHb). This has negative health effects for the mother and the fetus.

Effects on the mother

In the short term, the reduced oxygen in the mother's blood can lead to shortness of breath, tiredness and reduced ability to cope with the demands of pregnancy and birth. In the long term, it thickens the blood which increases risk of clotting and cardiovascular disease.

Effects on the fetus

The COHb passes through the umbilical cord reducing the amount of oxygen reaching the fetus. This can have devastating effects on growth and development increasing the risk of pre-term birth, low birth weight, cot death and respiratory problems to name just a few.



What does the expired CO monitor measure?

The CO monitor measures the level of expired CO in the breath which is an indirect measure of percent COHb in the bloodstream. The piCO^{baby}™ measures the mother's expired breath CO level and also indicates the percent fetal COHb.

Note: Cutting back on the number of cigarettes smoked per day does not automatically result in a lower CO ppm reading. If a woman inhales more deeply on those fewer cigarettes her CO reading can be as high or higher than her previous reading.

How does a CO reading help engage a woman in smoking cessation?

- By alerting the mother to the dangers of smoking and encouraging and motivating her to make a quit attempt.
- By providing visible evidence that something is not right, much like a high blood pressure or high sugar level reading does.

Be mindful:

- The CO reading is a tool to support a mother to quit, not to judge her behaviour.
- Always ask about smoking in the home and do a CO test on all women exposed to second-hand smoke even if the woman herself is a non-smoker.



Step by step instructions for use of the expired CO monitor

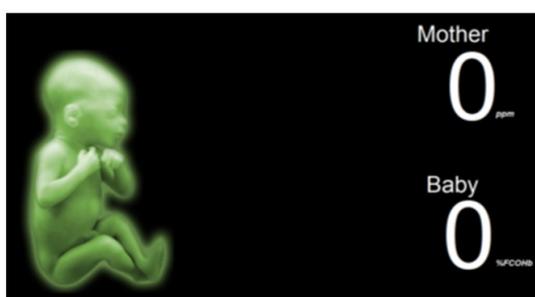
1. Explain to the mother what the monitor measures and that this is a routine test for all pregnant women who smoke and those exposed to second-hand smoke.
2. Attach a D-piece to the meter and a steri-breath disposable tube.
3. Press the female symbol, ask the mother to breathe in and hold when she sees the clock come up on the screen.
4. Ask the mother to keep holding her breath for the 15 second countdown. Two short beeps will sound during last three seconds of the countdown.
5. At the commencement of a long beep, ask the mother to blow slowly into the mouth piece aiming to empty her lungs completely (at least 5 seconds).
6. The CO ppm and equivalent % COHb levels appear on the screen. The coloured LED will light accordingly - see table below for interpretation of the reading.

LED colour	How to explain to a woman what the reading means	Adult (ppm)	Adolescent or Pregnant (ppm)
Green	Great place to be. You have little or no CO in your bloodstream and that means your baby is getting plenty of oxygen through the placenta. This will promote normal growth and development for baby.	Low 0 - 6	Low 0 - 3
Amber	You have a moderate /high /very high* amount of CO in your bloodstream which is going through the placenta to the baby. This reduces the amount of oxygen the baby is getting and that can be harmful for baby's growth and development.	Moderate 7 - 10	Moderate 4 - 6
Red	The CO is a gas that's produced when you inhale cigarette smoke. So to get that level back into the green / safe zone we need to reduce your exposure to cigarette smoke.	High 11 - 25	High 7 - 15
Darker red	Using NRT over a few weeks while you cut down to quit can reduce your CO level. How about I organise for you to have a chat with our smoking cessation advisor or to a Quitline counsellor?	Very high 26+	Very high 16+

* Select the word that matches the reading

Notes:

- It takes 12-24 hours for CO levels in breath to reduce to that of a non-smoker but three months before it leaves the blood. If a woman smokes just prior to testing her reading will be higher than usual.
- The CO monitor can be attached to a PC using the connection lead. This allows the mother to view the reading and the image on the computer screen (see below) and also allows data to be uploaded from the monitor.
- Refer to the monitor's operating manual for information on correct use, calibration, maintenance and troubleshooting.



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