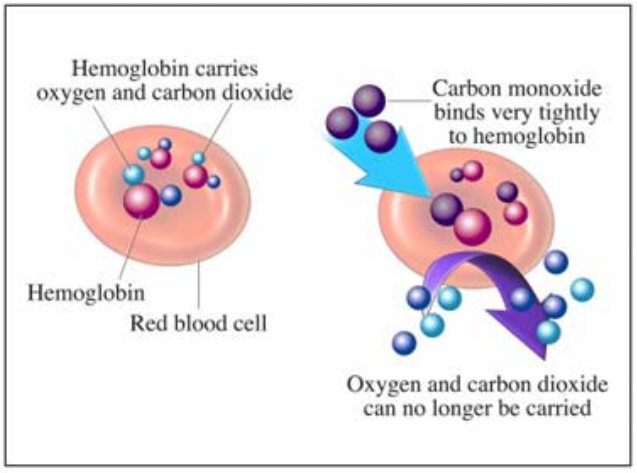
Breath Carbon Monoxide Monitor – the Stethoscope of Smoking Cessation[1]

Do you know why you would use a breath CO monitor? This document will help you understand its value as a diagnostic tool in tobacco treatment and tobacco prevention education.

What is carbon monoxide (CO)?

Carbon monoxide (CO) is a poisonous gas that you can't smell or see. It is formed through combustion and is produced in car exhaust, fumes, faulty gas boilers and from tobacco smoke. CO, tar and nicotine are the main components of tobacco smoke. All represent some risk to health.

- Carbon monoxide mainly affects the lungs, heart, and blood vessels, and in pregnant women passes into the blood of the fetus, reducing its oxygen supply
- When smoke from a cigarette is inhaled, CO is absorbed into the blood through the lining of the lungs
- Oxygen is carried around the body by red blood cells. CO binds with hemoglobin in the red blood cells to form carboxyhemoglobin (COHb), preventing red blood cells from carrying oxygen
- CO binds with hemoglobin 200 times more readily than oxygen



What CO does to your body

Heart:
To compensate for the shortage of oxygen, the heart has to work harder (beat faster) to get enough oxygen to all parts of the body. The heart itself gets less oxygen, increasing the risk of heart damage.

Circulation:
The COHb causes the blood to thicken and the arteries to get coated with a thick fatty substance. This causes circulation problems and high blood pressure, with increased risk of heart attack and stroke. Hands and feet can become colder as less blood circulates to the extremities.

Breathing:
The reduced supply of oxygen means you can easily get out of breath with increased physical activity as there is little extra oxygen available for the increased demand. The lack of oxygen can also cause tiredness and lack of concentration.

Pregnancy:
The supply of oxygen required by the baby for health growth is reduced when the pregnant mother smokes. This can increase the risk of the baby being born underweight or with defects and even the danger of Sudden Infant Death Syndrome.

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What does a carbon monoxide breath test show?

Key Terms:

PPM (Parts Per Million) – Unit of measure. As it relates to this test, the reading means one part CO in one million parts of air (breath).

%COHB (Carboxyhemoglobin) – COHB reading shows the percentage of vital oxygen that has been replaced in the bloodstream by CO.

- A CO breath test shows the amount of carbon monoxide in the breath (**ppm**), which is an indirect, non-invasive measure of blood Carboxyhemoglobin (**%COHb**), which is the level of CO in the blood. [1]
- The percentage of COHb is the proportion of red blood cells carrying CO instead of oxygen. So if your CO reading is 5% (about 30 ppm) it means 5% of your red blood cells are carrying CO instead of oxygen. This creates a shortage of oxygen, and the body needs oxygen to live.
- The CO reading is going to be highest later in the day, when the smoker has smoked most or all of their daily ration of cigarettes and have built up a high CO level. CO leaves the body rapidly and the half-life is about 5 hours. Within 24 to 48 hours of not smoking, smokers will be at non-smoker levels – which means under 6 ppm. [1,3]
- Breath CO also acts as an *indicator* of the levels of some *4000* toxic substances present in cigarette smoke, some *60* of which are known carcinogens. [1,9]
- The CO reading doesn't tell you exactly how many cigarettes have been smoked; rather it is an indicator of how much smoke a smoker is inhaling and how much of the cigarette they are smoking, which is why experts believe that the CO breath test is a good indicator of a smoker's dependence to nicotine. [1,3]
- The breath CO monitor can demonstrate how effectively a smoker can regulate or tailor the delivery of nicotine. For example, a smoker may cut back on cigarettes, but they may still require the same amount of nicotine. Thus, they may smoke those fewer number of cigarettes more aggressively to get the same amount of nicotine that they are accustomed to – the result – along with maintaining a particular level of nicotine; their CO intake remains constant as they smoke those fewer number of cigarettes more aggressively. [1, 3]

Why monitor CO?

- CO is easily measured through the breath - the test is quick to carry out, non-invasive and provides a cost-effective means of validating the smoking status of a significant number of clients. [1] After the initial outlay of funds for the monitor and accessories, the cost per test per patient per year is very minimal. i.e. The cost for 500 tests is approximately $0.33 per patient.
- Breath carbon monoxide monitors offer the treatment specialist an independent clinical tool that provides valuable evidence in identifying, educating, assessing and treating tobacco dependent patients. [1]
- The breath CO test is non-invasive and is easily administered by non-technical staff and breath testing is not regulated by C.L.I.A.

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The benefits of the breath CO monitor as a diagnostic and educational tool

The breath CO monitor is, at its most basic, a tool that allows you to observe and measure – like the stethoscope, the blood pressure cuff, the cholesterol test, and even the scale.

1. **Breath CO establishes the link between smoking and the body**

   It's well established that expired breath CO correlates well with the percentage of CO in the blood.[1,10] That's essentially like establishing a link between smoking and almost every organ in the body.

2. **Powerful biomarker feedback allows you to connect the dots with health risks**

   The CO result comes from the smoker's body, it's their biofeedback – they own it. This allows you to make this very real connection between their smoking and their body which ultimately gives the causal relationship between smoking and stroke, smoking and heart disease, smoking and respiratory diseases - a much bigger impact. So now, the dangers of smoking aren't just some abstract health risk – it really personalizes it, making it a very powerful educational tool.[1,6,10,11]

3. **Bio-chemical validation for your smoking cessation program**

   Breath CO monitoring provides a way of bio-chemically verifying self-reported claims of abstinence, thereby providing those who manage smoking cessation services with a way of assessing the effectiveness of those services. [1,5,8,10]

4. **Treating "tobacco use" as you would any other disease**

   A person being treated for high blood pressure would be monitored regularly to check their progress - the same should be true when treating smokers, especially given that, according to the CDC, tobacco is the leading cause of death and disease in the U.S. [12] One of the hidden benefits of breath CO monitoring is the conversation that it allows the treatment professional/counselor to have with the smoker, that wouldn't otherwise be possible without this type of personal biofeedback – it keeps the smoker interested and connected to treatment. Research indicates that multiple CO assessments made throughout the entire treatment process are likely to have more of a behavioral impact than a single CO assessment. [6] So beyond the initial baseline CO assessment, testing every time you see the smoker including after they have stopped smoking, can have a motivational benefit. [4]

5. **CO levels correlate well with tobacco dependence**

   Baseline expired CO measurements are a valuable clinical tool in judging severity of dependence and likelihood of cravings during abstinence. [1]

   There is some evidence that expired CO measurements correlate with levels of plasma nicotine and the severity of tobacco dependence. [1]

6. **Positive reinforcement**

   When a smoker stops smoking, the level of carbon monoxide in their blood falls quickly. It will be the same as a non-smoker's within 24 to 48 hours. CO assessments made after the smoker has stopped smoking are extremely valuable as it allows the counselor to demonstrate an almost immediate benefit to stopping smoking. This immediate and positive result can have a profound impact on the smoker and counselors can use this as a way of encouraging smokers – accentuating the positives over the difficulties associated with kicking the smoking habit. [1,2,3]

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What is a Smokerlyzer®?

A Smokerlyzer® is a brand of breath CO monitors manufactured by Bedfont Scientific, Ltd. Smokerlyzers® have been used throughout the world in clinical research, tobacco treatment and tobacco prevention education since the early 1980's.

Contact coVita For More Information

- coVita can help with:
  - Additional questions you may have regarding the use of a breath CO monitor
  - Training on the use of your breath CO monitor including interpretation of readings
  - Reimbursement CPT Codes
  - Purchasing a Smokerlyzer® including discounts

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References

1/ Bittoun, R. (2008). Carbon monoxide meter: The essential clinical tool-the 'stethoscope"-of smoking cessation. *Journal of Smoking Cessation*, 3(2), 69-70. DOI 10.1375/jsc.3.3.69

2/ Jamrozik K, Vessey M, Fowler G, Nicholas W, Parker G, Van Vunakis H. Controlled trial of three different antismoking interventions in general practice. *British Medical Journal 1984 288: 1499-1503*

3/ Fagerstrom KO. Assessment of the smoker who wants to quit. *Monaldi Archives Chest Disease 2001; 56: 2, 124-127*

4/ Irving J. Martin, Clark Elizabeth C., Crombie, Iain K., Smith Carins S. Evaluation of a Portable Measure of Expired-Air Carbon Monoxide , Preventive Medicine 17, 109-115 (1988)

5/ Wald Nicolas J, Idle Marianne, Boreham Jillian, Bailey Alan. Carbon monoxide in breath in relation to smoking and carboxyhaemoglobin levels. *Thorax 1981, 36: 366-369*

6/ McClure Jennifer B. Are Biomarkers Useful Treatment Aids for Promoting Health Behavior Change? *American Journal of Preventive Medicine 2002; 22 (3), 200-207*

7/ Jarvis Martin J., Tunstall-Pedoe Hugh, Feyerabend Colin, Vessey Cyril, Saloojee Yussuf. Comparison of Tests Used to Distinguish Smokers from Nonsmokers. *American Journal of Public Health 1987, Vol. 77, No. 11, 1435-1438*

8/ WHO European strategy for smoking cessation policy, 7 June, 2004 (Revised)

9/ American Cancer Society. Cigarette Smoking. Accessed at http://www.cancer.org/Cancer/CancerCauses/TobaccoCancer/CigaretteSmoking/cigarette-smoking-tobacco.

10/ Jarvis MJ, Belcher M, C Vesey, DCS Hutchinson. Low cost carbon monoxide monitors in smoking assessment. *Thorax 1986; 41: 886-887.*

11/ U.S. Department of Health and Human Services. The Health Consequences of Smoking: What it means to you. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health, 2004.

12/ U.S. Department of Health and Human Services. The Health Consequences of Smoking: What it means to you. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health, 2004.