

Arterial Blood Gas (ABG)



Does this test have other names?

ABG, systemic arterial blood gas analysis, PaO₂, PaCO₂, pH, or oxygen saturation test

What is this test?

An arterial blood gas analysis (ABG) measures the balance of oxygen and carbon dioxide in your blood to see how well your lungs are working. It also measures the acid-base balance in the blood. Your kidneys and lungs work to keep your acid-base levels in balance. You need this for the enzyme systems in your body to work at their best. When there is an imbalance, your blood has too much acid (acidosis) or too much base (alkalosis). Untreated, the imbalance can be harmful and even life-threatening.

Why do I need this test?

You may need this test if you have trouble getting oxygen into your system because you have a lung disease such as pneumonia or emphysema. But low oxygen levels and impaired gas exchange may be a sign of another disease or condition that has nothing to do with your lungs. Your healthcare provider needs to know what's causing your breathing problems to prescribe the right treatment. If you are using supplemental oxygen to help you breathe, this test shows if you are getting enough extra oxygen.

People on a breathing machine or who have kidney disease, kidney failure, diabetes, shock, chronic vomiting, or other conditions may have problems with the acid-base balance in their blood. Here are some of the more common reasons an ABG is ordered:

- You're often short of breath.
- You're unusually tired.
- You feel confused or disoriented.
- You have chronic vomiting or nausea.
- You are in shock.
- You have a smoke-inhalation injury.
- You have carbon monoxide poisoning.
- You have burns in your airways.
- You're being treated for a near-drowning accident or for decompression sickness.
- You're being treated for a lung condition that affects how your body absorbs oxygen or gets rid of carbon dioxide.
- You're a smoker, and the healthcare provider needs to find out whether you have a disease such as congestive heart failure.
- You've had a drug overdose.
- You've had a head or neck injury and now have trouble breathing.
- You have a condition that can affect breathing, such as asthma, chronic obstructive pulmonary disease, myasthenia gravis, or Guillain-Barré syndrome.
- A newborn is having trouble breathing.

What other tests might I have along with this test?

An ABG is often done at the same time as the tests listed below:

- **Electrolytes**, including the levels of sodium, potassium, and bicarbonate in your blood
- **Glucose**, or the amount of sugar in your blood
- **Other blood tests**, including blood count; magnesium; calcium; amylase; blood urea nitrogen, or BUN; creatinine and phosphorus; ketones; and lactate level tests. These tests show how well your kidneys are working.
- **Urine tests** may also be done to find out how well your kidneys are working and to check overall health.
- **Chest X-ray** to look at your lungs, or other radiology studies

If your healthcare provider suspects you have a lung disease or heart condition, you may need other tests to see how well your lungs work. These may include:

- **Spirometry**. This test measures the amount of air you can breathe in and out and how forcefully you can exhale.
- **Lung volume measurements**. These tests find out how much you can inhale, how much you can exhale, and how much air is left in your lungs after you exhale.
- **Lung diffusion capacity**. This test measures the amount of oxygen that passes from your lungs to your bloodstream.

What do my test results mean?

Test results may vary depending on your age, gender, health history, and other things. Your test results may be different depending on the lab used. They may not mean you have a problem. Ask your healthcare provider what your test results mean for you.

The results of your ABG will show several numbers. Here are two important ones:

- **Partial pressure of oxygen, or PaO₂**. This measurement shows the pressure of oxygen in your blood. Healthy adults will generally have a resting PaO₂ greater than 80 millimeters of mercury (mmHg).
- **Acid-base balance (pH)**. When carbon dioxide builds up in your blood, it dissolves and creates an acid. If your blood acid level is out of balance, it can mean your body isn't able to get rid carbon dioxide efficiently. This may happen because your lungs aren't working well or your kidneys can't get rid of the acid. A normal result is between 7.35 and 7.45.

How is this test done?

The test is done with a blood sample. A needle is used to draw blood from an artery, usually in your arm or wrist.

Does this test pose any risks?

Having a blood test with a needle carries some risks. These include bleeding, infection, bruising, and feeling lightheaded. When the needle pricks your arm or hand, you may feel a slight sting or pain. Afterward, the site may be sore.

What might affect my test results?

How far you live above sea level can affect your results. Your blood oxygen goes down as your elevation goes up. Smoking, inhaling secondhand smoke, having a fever, or breathing quickly can also affect the test results.

How do I get ready for this test?

You don't need to do anything to prepare for the test. Be sure your healthcare provider knows about all medicines, herbs, vitamins, and supplements you are taking. This includes medicines that don't need a prescription and any illicit drugs you may use.

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