

Types of Lung Function Tests

Breathing Tests

Spirometry

Spirometry measures how much air you breathe in and out and how fast you blow it out. This is measured in two ways: peak expiratory flow rate (PEFR) and forced expiratory volume in 1 second (FEV₁). PEFR refers to the amount of air you can blow out as quickly as possible. FEV₁ refers to the amount of air you can blow out in 1 second.

During the test, a technician will ask you to take a deep breath in and then blow as hard as you can into a tube connected to a small machine. Your doctor may have you inhale a medicine (bronchodilator) that helps open your airways. He or she will want to see whether the medicine improves the test results.

Spirometry is done to look for diseases and conditions that affect how much air you can breathe in. It's also done to look for diseases that affect how fast you can breathe air out such as **Asthma** and COPD (chronic obstructive pulmonary disease).

Peak Flow Meter

A peak flow meter is a small, hand-held device that you blow into. It shows how well air moves out of your lungs. People who have asthma sometimes use this device. It helps them (and their doctors) check their breathing. Depending on the individual's age, height, and personal "best", the meter will show an improvement or a decline in breathing ability. The ranges for each individual and treatment indications for each level should be listed on their **Asthma Action Plan**, a plan to manage their asthma symptoms developed by the individual, and/or the parent, and the physician or other healthcare provider.

A peak flow meter is recommended for all people with asthma except those who are physically unable, too young to or unable to understand the concept of performing this device. Most individuals should use a peak flow meter twice daily (morning and evening) or as indicated by their physician and record the results daily for better managing of their asthma symptoms.

Lung Volume Measurement

This test measures the size of your lungs and how much air you can breathe in and out. During the test, you sit inside a glass booth (with some machines) and breathe into a small mouthpiece (tube) that's hooked to a computer.

Sometimes you breathe in nitrogen or helium gas and then blow it out. The gas you breathe out is then measured to test how much air your lungs can hold.

The test can help diagnose lung tissue scarring or a stiff and/or weak chest wall.

Lung Diffusion Capacity

This test measures how well oxygen passes from your lungs to your bloodstream. During this test, you breathe in a gas through a tube. You hold your breath for a brief moment and then blow the gas out.

Abnormal test results may suggest loss of lung tissue, emphysema (a type of COPD), very bad scarring, or problems with blood flow through the body's arteries.

Tests To Measure Oxygen Level

Pulse oximetry and arterial blood gas tests show how much oxygen is in your blood. During pulse oximetry, a flexible clip with a small internal light is placed over your fingertip, earlobe, or toe to measure the oxygen. This test is painless and no needles are used.

During an arterial blood gas test, your doctor, respiratory therapist, or nurse inserts a small needle into an artery, usually in your wrist. He or she takes a sample of blood. The oxygen level of the blood and other sensitive levels relating to breathing function are checked in a lab.

Testing in Infants and Young Children

Spirometry and other measures of lung function usually can be done in children older than 6 years, if they can follow directions well. Spirometry may be tried in children as young as 5 years. However, technicians who have special training with young children may need to do the testing.

Instead of spirometry, a growing number of medical centers measure respiratory system resistance. This is another way to test lung function in young children.

The child wears nose clips and has his or her cheeks supported with an adult's hands. The child breathes in and out quietly on a mouthpiece, while the technician measures changes in pressure at the mouth. During these lung function tests, parents can help comfort their children and encourage them to cooperate.

Very young children (younger than 2 years) may need an infant lung function test. This requires special equipment and medical staff. This type of test is only available at a few centers. The doctor gives the child medicine to help him or her sleep through the test.

A technician places a mask over your child's nose and mouth and a vest around your child's chest. The mask and vest are attached to a lung function machine. The machine gently pushes air into your child's lungs through the mask. As your child exhales, the vest slightly squeezes his or her chest. This helps push more air out of the lungs. The exhaled air is then measured.

In children younger than 5 years, the doctor likely will use signs and symptoms, medical history, and a physical exam to diagnose lung problems.

Pulse oximetry and arterial blood gas tests may be used for children of all ages.

Adapted from the NHLBI web site.

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