



UNDERSTANDING PULMONARY FUNCTION TESTS INFORMATION FOR PATIENTS

If you have been experiencing symptoms such as shortness of breath, a condition like asthma, or other possible respiratory problems, and after your doctor takes a full history and physical, your physician may order a Pulmonary Function Test (PFT). The purpose of this information sheet is to explain what a PFT is, what happens during the test, what the test measures, and how it is used to evaluate your respiratory health concerns.

What Is a Pulmonary Function Test?

Think of the lungs as a pipe (your trachea) with smaller pipes branching off (bronchi), and the smallest pipes (the bronchioles) have balloons on the ends (alveoli) – all in the shape of an inverted tree. If we think of the lungs this way, it makes it easier to describe what each test in the PFT does and the important information it provides. A PFT, is a series of tests that measure how well your lungs are working. The tests measure lung volumes, rates of airflow, and gas exchange. The results from PFTs can help your healthcare provider diagnose and decide on treatment options for certain lung disorders.



What Happens Before and During the Tests?

In order to get the best results on a PFT, your doctor will recommend you:

- **HOLD** use of long acting inhalers 24 hours before testing.
- **HOLD** use of short acting inhalers 6-8 hours before testing.
- **HOLD** use of nicotine and caffeine up to 6 hours before testing.
- **Have** a light breakfast.



You will be given instructions before each component of the test to guide you through what happens. During the test, you will wear a nose clip to keep all the air moving in and out of your mouth, and you will breathe through a tube attached to a machine that measures the results. Some of the tests ask you to breathe air out forcefully, while another test ask you to take rapid breaths. Some portions of the tests are completed in a see through, airtight box, that looks like a telephone booth (see picture). The person administering the PFT will carefully explain the instructions for each test prior to its completion. Each portion of the PFT is done multiple times to ensure consistent results.



Determining Lung Volumes:

One of the first series of measurements done in a PFT is to determine how much air your lungs are able to hold and release, referred to as the lung volumes. The test for this evaluates how much air the balloons can hold and how much air remains in the balloons after it is “breathed out”. An abnormal result can be indicative of restrictive lung disease.

Spirometry (before and after bronchodilator):

The next series of measurements are known collectively as spirometry. This test measures how well the air moves in and out of the pipes and measures the flow and the volume of the air you can breathe out. An abnormal spirometry result can be an indication of obstructive lung disease such as chronic bronchitis or emphysema. Abnormal spirometry can also be indicative of small airways disease.

Spirometry testing may also be repeated with a bronchodilator, an inhaler medication. A bronchodilator helps to expand the airways and make breathing easier. A significant improvement in spirometry before and after bronchodilator is an indication of reversible obstruction such as in asthma.

Diffusion Capacity:

The last measurement is the diffusion capacity test. This test measures how well oxygen goes through the balloon membrane and into your bloodstream. A decrease in diffusion capacity may be due to anemia. It also could be the first sign that the lungs are not performing as well as they could.

The Pulmonary Function Test is an important tool for providers to determine how well your lungs are functioning and a part of an overall plan to better understand persistent breathing or any other respiratory ailments.

Obstructive Lung Disease: When air has trouble flowing out the lungs due to airway resistance, which causes a decreased airflow. Obstructive lung diseases may include: asthma, emphysema, and chronic bronchitis.

Restrictive Lung Disease: When the lung tissue and/or chest muscles cannot expand enough, which creates problems with air flow, mostly due to lower lung volumes. Restrictive lung disease may include: interstitial lung disease, fibrosis, or fluid in the lungs.

Gas Exchange Abnormality: When the mechanism for moving respiratory gases, oxygen and carbon dioxide, across the surfaces in the lungs is not happening as it should. This could mean either lungs are not transporting oxygen as it should, or that your body is holding onto carbon dioxide.

Evaluating Results and making a diagnosis:

The results of a PFT are interpreted by a pulmonologist. The pulmonologist will look at all of the test results to see if the numbers and graph outputs associated with each test are considered normal. To decide whether the results of a PFT are within normal limits. Experts define “normal” by comparing an individual’s values to a database of people, similar in age, height, gender, and ethnicity, whose results are considered to be “normal.” The results of your PFTs, along with a thorough history and physical examination, and other breathing tests, will help the pulmonologist determine a diagnosis/diagnoses. Your pulmonologist will recommend any follow up care and treatment as needed.