ROSWELL PARK COMPREHENSIVE CANCER CENTER | PATIENT EDUCATION

Pulmonary Function Tests: Measuring How Your Lungs are Working

Overview

Pulmonary function tests, also called lung function tests, measure how well your lungs work. They are used to:

- find out the cause of breathing problems
- diagnose certain lung diseases, such as asthma, pulmonary fibrosis, and chronic obstructive pulmonary disease (COPD)
- check how well the lungs are functioning before surgery
- see how well treatment for lung disease is working
- screen for lung disease in people who are at high risk, such as smokers and those who breathe harmful substances at their workplace
- find out how much an existing condition has damaged the lungs

Your Appointment

Your testing is scheduled for:

_____ ____@ _____a.m./ p.m.

Please report to the Thoracic Center at your appointed time. The Thoracic Center is on the first floor of the main hospital.

Spirometry

The most common lung function test is **spirometry**. This test measures how much air you can move in and out of your lungs, and how fast you can do it. During spirometry, you breathe in and out of a special mouthpiece that's connected to a computer. As you breathe, the computer creates graphs showing how well you're breathing compared to other people your age, height, weight, and sex.
The most common lung functions measured with spirometry are:

- **Forced vital capacity (FVC)**: How much air you can exhale forcefully after you inhale as deeply as you can.
- **Forced expiratory volume (FEV)**: How much air you can exhale forcefully in one breath. The FEV may be measured at 1, 2, or 3 seconds (FEV1, FEV2, or FEV3).
- **Forced expiratory flow (FEF):** The flow (or speed) of air coming out of the lung during the middle portion of a forced exhale. It can be measured at specific times – usually labeled as a percentage (25%, 50%, and 75%) of the forced vital capacity (FVC) remaining in the lungs.
- **Peak expiratory flow (PEF)**: How quickly you can exhale. It is usually measured at the same time as your forced vital capacity (FVC).
- **Maximum voluntary ventilation (MVV)**: How much air you can breathe in and out for 1 minute.
- **Slow vital capacity (SVC)**: The most air (maximum volume) that can be exhaled or inhaled in a slow/steady manner.

Additional lung tests

There are other pulmonary function tests in addition to spirometry. These include:

- **Diffusion study**: This test measures how well oxygen (O2) passes from the air sacs of your lungs into your blood.
- **Arterial blood gas (ABG) test:** This measures the amount of oxygen and carbon dioxide (CO2) in your bloodstream.
- **Body plethysmography:** This test measures:
    - Total Lung Capacity (TLC): the maximum volume of air present in the lungs
    - Expiratory Reserve Volume (ERV): the extra volume of air that can be exhaled with maximum effort beyond the level reached at the end of a normal exhalation
    - Residual Volume (RV): the amount of air in your lungs after you have exhaled completely

How are the tests done?

During *spirometry,* you breathe into a mouthpiece attached to a computer. You'll wear a nose clip to make sure you only breathe through your mouth. A respiratory technician will be with you, and will tell you what to do for each part of the test. For example, you may be asked to breathe normally, slowly, or deeply. You might be asked to do some tests before and after taking medication.

During a *diffusion study*, you breathe in a very small amount of carbon monoxide (CO). You hold your breath for 10 seconds, and then exhale. The breath you exhale is measured to see how much of the carbon monoxide was absorbed while you were holding your breath.

For an *arterial blood gas test*, a needle is used to take a small amount of blood from an artery, usually in your wrist. The blood sample is analyzed to see how much oxygen and carbon dioxide it contains.
During *plethysmography,* you sit in an airtight enclosure that looks like a telephone booth. Again, you will wear a nose clip and breathe with a mouthpiece. The respiratory technician will be right next to you, and will tell you what to do.

How do I prepare?

- Don't eat a heavy meal on the day of your test—it might keep you from breathing as well as you usually do.
- Wear loose clothing that won't restrict your breathing or abdominal muscles.
- Don't smoke or exercise for 8 hours before your test.
- If you take breathing medicine, you may need to stop for a short time before your test. Check with your healthcare provider beforehand to find out whether or not to take your medications.
- Avoid food and drink that contains caffeine. This can change the results of your test.
- If you have dentures, wear them during the test to help you form a tight seal around the mouthpiece of the spirometer.

How long will the procedure take?

This depends on how many different tests your healthcare provider wants you to do. You should be able to complete your session in approximately 1 hour.

After the exam

There are no special instructions for after the exam.

Are there any risks?

There are no serious risks to pulmonary functions tests.

- You may get tired or feel light-headed from breathing in and out forcefully, but you will be allowed to rest when you need to.
- You might feel uncomfortable in the enclosed booth if you are having plethysmography. The respiratory technician will be there the whole time and will help you if you become too uncomfortable.
- If your arterial blood gas is tested, you may feel some pain from the needle that is used to draw blood.

Questions?

The thoracic center is open Monday to Friday from 8 a.m. to 5 p.m. If you have any questions or concerns, please contact us at **716-845-8786.**

If you are having a problem on a weekend, night, or holiday, call our main number **716- 845-2300,** which is open 24/7, and our Call Center will assist you. If it is determined you need to be seen, you may be asked to come to our Assessment & Treatment Center (ATC), which is open 24/7. Please note: You must be referred to the ATC by your doctor (or the doctor on call). The ATC is not a walk-in clinic.