

PULMONARY FUNCTION TESTING (Lung Function Tests)

These are breathing tests to find out how well you move air in and out of your lungs and how well oxygen enters your body.

Lung function tests can be used to:

- Compare your lung function with known standards that show how well your lungs should be working.
- Measure the effect of chronic diseases like asthma, chronic obstructive lung disease (COPD), or cystic fibrosis on lung function. *Sarcoidosis, pulmonary fibrosis*
- Identify early changes in lung function that might show a need for a change in treatment.
- Detect narrowing in the airways.
- Decide if a medicine (such as a bronchodilator) could be helpful to use.
- Show whether exposure to substances in your home or workplace have harmed your lungs.
- Determine your ability to tolerate surgery and medical procedures.

TYPES OF PULMONARY FUNCTION TESTING:

SPIROMETRY – This is one of the most commonly ordered lung function tests. The Spirometer measures how much air you can breathe into your lungs and how much air you can quickly blow out of your lungs. This test is done by having you take in a deep breath and then, as fast as you can, blow out all of the air. You will be blowing into a mouthpiece connected to a machine (spirometer).

SPIROMETRY PRE & POST BRONCHODILATOR – This is the spirometry test but it is repeated after giving you a breathing medicine (bronchodilator) to find out how much better you might breathe with this type of medicine.

MAXIMUM VOLUNTARY VENTILATION – This is the greatest volume of air that can be breathed per minute by voluntary effort. This test is done by having you breathe in and out of a mouthpiece fast and deep for a pre-determined amount of time (usually 12 seconds).

LUNG VOLUME MEASUREMENTS – We can do this 2 different ways.

1. **BODY PLETHYSMOGRAPHY** - This is a test to find out how much air is in your lungs after you take in a deep breath, and how much air is left in your lungs after breathing out as much as you can. No matter how hard you try, you can never get all of the air out of your lungs. Measuring the total amount of air that your lungs can hold and the amount of air left in your lungs after you breathe out gives your health care providers information about how well your lungs are working and helps guide them in your treatment. This test requires that you sit in an enclosed clear box that you can see through, while breathing in and out into a mouthpiece. Changes in pressure inside the box help determine the lung volume.
2. **NITROGEN WASHOUT** -In the nitrogen-washout technique, the patient breathes 100% oxygen, and all the nitrogen in the lungs is washed out. The exhaled volume and the nitrogen concentration in that volume are measured.

This test requires that you breath in 100% oxygen for approximately 2-5 minutes while keeping a tight seal on a mouthpiece connected to a machine.

DIFFUSION CAPACITY (DLCO) - This test finds out how well the oxygen in the air you breathe into your lungs moves from your lungs into your blood. This test is done by having you breathe into a mouthpiece connected to a machine. You will be asked to empty your lungs by gently breathing out as much air as you can. Then you will breathe in a quick but deep breath, hold your breath for 10 seconds, and then breathe out as instructed.

OTHER PULMONARY TESTING

METHACHOLINE CHALLENGE TEST (BRONCHIAL PROVOCATION CHALLENGE) - The purpose of this test using Methacholine is to determine how responsive (or irritable) your airways are and to determine the severity, if any of asthma. This test is a series of nebulized treatments containing different concentrations of Methacholine followed by a series of breathing tests called spirometry (see description above). Please allow up to 2 hours for this test. See patient instructions below.

EXHALED NITRIC OXIDE (FENO) – This test is used to determine airway inflammation in patients with underlying asthma. This test is done by having you take in a full breath & then exhale through a mouthpiece into a small handheld machine.

MAXIMAL PRESSURES (MIP/MEP)

6 MINUTE WALK EVALUATIONS



SPECIAL PROCEDURES ARE AVAILABLE FOR INFANTS AND YOUNG CHILDREN:

CRYING VITAL CAPACITIES

END TIDAL CARBON DIOXIDE

Duke Asthma, Allergy and Airway Center

Patient Instructions for Methacholine Challenge

The Methacholine test has been ordered by your doctor to help diagnose your breathing problem. The test is a series of nebulized treatments containing Methacholine followed by a series of breathing tests called spirometry. Please allow up to 2 hours for this test. In preparation for this test, there are certain medications, foods, and beverages that you must avoid.

One week before the test

Do not take **Spiriva** (Tiotropium)

4 Days before the test

Do not take **Arcapta** (Indacaterol)

3 Days before the test

Do not take **Zyrtec (Ceterizine)**, **Vistaril or Atarax (Hydroxyzine)**, **Allegra (Fexofenadine)**, **Claritin or Alavert (Loratadine)**, **Xyzal (Levocetirizine)**, and **Clarinx (Desloratadine)**.

48 hours before the test

Do not take **Serevent (Salmeterol)**, **Foradil (Formoterol)**, **Dulera (Formoterol/Mometasone)**, **Advair (Fluticasone/Salmeterol)**, **Symbicort (Budesonide/Formoterol)**, **Brovana (Arformoterol)**, **Tudorza (Aclidinium bromide)**, **Breo (Fluticasone furoate/vilanterol)** and **Perforomist (Formoterol .)**

24 hours before the test

Do not take **Singulair (Montelukist)**, **Accolate (Zafirlukast)**, **Zyflo (Zileutin)**, **Theo-Dur**, **Theo-24**, **Uniphyl (Theophylline)**, **Atrovent (Ipratropium)**, **Respimat (Ipratropium/Albuterol)**, **Duoneb (Ipratropium/Albuterol)**, and **Sudafed (psuedoephedrine)**.

Avoid all foods, beverages, ad medications containing **caffeine**, which includes coffee, tea, chocolate, many soft drinks, and some over the counter migraine medications.

8 hours before the test

Do not take **Albuterol (ProAir, Proventil, Ventolin, Accuneb)**, **Maxair (Pirbuterol)**, and **Xopenex (Levalbuterol)**.

Warning: Please notify your doctor if you are taking a beta blocker, such as, **Propranolol (Inderal)**, **Atenolol (Tenormin)**, **Labetalol (Trandate)**, **Metoprolol (Lopressor, Toprol)**, **Nebivolol (Bystolic)**, **Carvedilol (Coreg)**, and **Nadolol (Corgard)**. Also, notify your doctor if you are currently taking **Prednisone**.
