

# Lung Function Testing



## What does it involve?

There are a number of tests that we perform here in the laboratory. Your doctor has requested that you have one or more of the following tests:

### **Flow Volume Loops, before and after bronchodilator**

You will be asked to breathe normally at first on the machine, then take a full breath in, then blow out as hard and as fast as you can and continue blowing until your lungs are emptied. You will then be asked to breathe in rapidly to a full breath. You may need to do this several times. The scientist will then give you 4 puffs of an inhaler and ask you to take a seat again in the waiting room. After 10 minutes you will be called back in to repeat the test to see if the inhaler has improved your lung function. This test can cause some patients to feel dizzy, or faint, therefore it is important to perform the test whilst seated.

### **Lung Volumes (Body Plethysmography)**

You will be asked to sit in the body box with the door closed for the first minute. Then you will be asked to position the nose clip and commence breathing on the mouth piece keeping your lips tight. After your breathing has become stabilized a shutter in the machine will now close and you are asked to perform panting breaths in and out against the closed shutter for approximately 3 seconds. The shutter is then opened and you will be asked to breathe out fully, then breathe in fully, then out again fully then return to normal breathing. You will be asked to do this several times

### **Gas Transfer (DLCO)**

This test is used to assess how well your lungs can absorb oxygen. You will need to breathe normally on the mouth piece, then breathe out all the way followed by a full breath in fast and hold your breath for about 10 seconds, then blow out all the way. It is important to keep your lips very tight during this test. You will need to repeat this test to show consistency.

### **Bronchial Provocation Test**

Your doctor has requested a test to investigate how reactive your airways are to either Mannitol, histamine or hypertonic saline. You may need to stop some of your respiratory medications or hay fever medications before the test, so please contact the lab if you have not been given a list of withholding times for these medications. You will be given a consent form to read through and sign before commencing the test.

There are 3 types of Bronchial Provocation Tests that we perform

**Mannitol:** Firstly you will be asked to perform a flow volume loop test as listed earlier. You will be asked to breathe in a dry powder and hold your breath for five seconds. After 60 seconds you will be asked to blow into a machine, in a similar manner as explained with flow volume loops. This is repeated several times, as the amount of Mannitol is increased. Towards the end of the test you will be given an inhaler to relieve any effects of the powder and then you will blow into the machine again after approximately 10 minutes.

**Histamine / Hypertonic Saline:** Firstly you will be asked to perform a flow volume loop test as listed earlier. You will be given a nebulised solution of either Histamine or Hypertonic Saline, depending on what your doctor has asked you to have. After the nebuliser you will be asked to blow into the machine. This is repeated several times. An inhaler will be given towards the end of the test to relieve any effects of the solution and then you will blow into the machine again after approximately 10 minutes.

### **CPET: Cardiopulmonary Exercise Test**

Your doctor has requested that you have a Cardiopulmonary Exercise Test in order to measure how your heart and lungs respond to exercise. This test can help tell us what level of exercise you can perform, if there are any problems affecting your ability to exercise or how your condition is changing with time or treatment. This test may also be requested to assess if you are fit for surgery. You may need to withhold some of your respiratory medications before the test, so please contact the lab if you have not been given a list of withholding times for these medications. You will be given a consent form to read through and sign before commencing the test. Your test will be supervised by a doctor and a scientist. You will perform the test on an exercise bike while a heart monitor with leads applied to your chest will obtain an electrocardiogram (ECG). Your blood pressure will also be assessed throughout the test. A small probe will be placed on your finger to monitor your oxygen levels during exercise and you will wear a mask to monitor your

breathing. You will pedal the exercise bike at a set speed and each minute the bike will become harder to pedal. The test will go until you reach your max and are unable to continue. During the test you will be asked to point to a numbered chart to let us know how breathless you are. If you experience any chest pain, dizziness or discomfort then the test will be stopped. At the end of the test we will ask you to keep pedaling on the bike for a short time. It will be easy to pedal at this time and this will help to reduce any risk of fainting. Your vital signs will be checked carefully during the recovery period. If you are not feeling well at any time please tell the staff at once. The staff have been trained to deal with any complications that may arise.

### **6 Minute Walk Test**

Your doctor would like us to check your oxygen levels and heart rate while doing light exercise. You will have an oximeter probe attached to your finger to observe oxygen saturation and pulse readings during the test. You will be asked to walk as far as you can, doing laps of a corridor, for 6 minutes. If you need to stop the test due to shortness of breath, chest or leg pain briefly or completely you may do so and state the reason for needing to stop. You will be asked to rate your shortness of breath throughout on a scale of 1-10.

### **Allergen Skin Testing**

You will need to withhold from using any antihistamines for 72 hours prior to testing. You will need to sit with your arm extended out on a pillow. The scientist will need to draw on your arm to allocate areas for each skin allergen to be applied. The scientist will then apply a drop of each allergen and then using a small lancet, prick the skin to introduce the allergen. The second allergen applied is a positive control which will become itchy, so don't be alarmed as this is meant to happen. The positive control will be measured after 10 minutes and the allergens will be measured after 20 minutes, to ascertain if you have any hypersensitivity to the allergens.

### **Respiratory Muscle Strength**

For this test we will be measuring the strength of your diaphragm and respiratory muscles. You will start by breathing normally, then to obtain the expiratory strength you will be asked to breathe in fully, a shutter will then close and you will be asked to blow as hard as you can against the shutter, keeping your lips tight and using your hands to help keep your lips tight on the mouth piece. To obtain the inspiratory pressure you will be asked to breathe out all the way, then a shutter will close and you will be asked to breathe in as fast and hard as you can against the shutter. In both directions you will need to try and maintain the effort for at least 2 seconds.

### **HAST: Hypoxic Altitude Simulation Test**

For this test we will need you to breathe through a mouth piece to simulate the oxygen levels at high altitude. You will breathe through the mouth piece for 20 minutes while you sit in a chair. You will then be asked to do some light exercise like sitting and standing for a minute or two minute whilst continuing to breathe on the mouth piece. We will monitor your oxygen levels and heart rate throughout the test.

### **Overnight Oximetry**

You will be given what looks like a wrist watch to wear overnight. This 'wrist watch' has a small probe attached that goes over your finger. You will be asked to put this on before you go to sleep and simply take it off again when you wake in the morning. This will be useful to assess your oxygen levels and heart rate during sleep. After you have used this overnight just bring it back to the lab and we will download the results and send it to your doctor.

### **FeNO: Fractional Exhaled Nitric Oxide**

The doctor has asked that you have a FeNO test. This is to check for particular types of asthma and if so, would you benefit from a particular type of inhaler. The test is very quick, but we do ask that you fast and don't smoke for one hour before the test. We also ask that you don't do any exercise before the test. If you are currently using any inhalers such as Ventolin, Asmol or Bricanyl, please refrain from using these if possible for 4 hours prior to your test. When you perform the test, we will ask you to breathe in, then blow slow and steadily into a handheld device for approximately 10 seconds.

If you have any further queries please ask the scientist when you come in for your test or prior by phoning 3607 5194.