

## **Pulmonary Exercise Testing**

### **Purpose**

- To detect an abnormality causing unexplained shortness of breath or inability to exercise. In particular, to determine whether the shortness of breath and inability to exercise is due to a heart or lung problem.
- To identify the cause of shortness of breath not revealed by pulmonary function tests, electrocardiogram, or other procedures.
- To detect lung disease that is apparent only during exercise.
- In people seeking disability evaluation, to determine the level of physical exertion they are able to achieve.

### **How it works**

Your ability to exercise under controlled conditions is an indication of heart and lung fitness and capacity. It can be measured using equipment that records your heart rate, blood pressure, and respiration.

### **Preparation**

- Wear loose-fitting, comfortable clothing and tennis or other comfortable shoes for pedaling on an exercise bike or walking on a treadmill.
- Avoid heavy meals for at least two hours before the test.
- Your medical history, height, and weight are recorded and used to calculate the workload you are expected to achieve during the test.
- ECG electrodes are attached to your chest (the area may be shaved if necessary), a blood pressure cuff is placed on your arm, and a pulse oximeter is placed on your finger, ear, or nose.
- A clip is placed on your nose to prevent air from leaking through the nostrils.

### **Test procedure**

- You insert the mouthpiece between your teeth and make sure your lips form a tight seal (loose-fitting dentures may have to be removed).
- You start pedaling on a stationary bicycle at a given rate, or start walking on the treadmill.
- After two or three minutes, the workload is increased. The increases continue and are intended to bring you to the point of maximal exercise capacity within eight to 12 minutes.
- You stop exercising when you cannot reach maximal exercise capacity, cannot continue due to exhaustion, or because of medical reasons—for example, if the ECG shows an abnormality.
- The ECG recording is performed continuously during the test, and your blood pressure and the amount of oxygen in your blood are

monitored.

- Measurements taken during the test include heart rate, breathing rate, oxygen uptake by the lungs, and the concentration of oxygen and carbon dioxide in the exhaled air. A sample of arterial blood may be drawn to determine the amounts of various gases it contains.

#### After the test

- You slow down gradually to let your heart rate and breathing return to normal.
- All equipment that was attached to your body is removed, except the blood pressure cuff.
- Blood pressure is measured until it returns to normal.

#### Factors affecting results

- Failure to apply maximum effort during the test.
- Lack of a tight seal over the mouthpiece.
- Medications or the presence of disease.
- Ability to complete the test.

#### Interpretation

The doctor analyzes your oxygen consumption, carbon dioxide exhaled, and other measurements obtained during the test; correlates them with values expected for a person of your age, height, weight, and sex; and tries to establish the cause of any limitation in your ability to exercise. In disability evaluations, specific jobs are assigned levels of oxygen consumption that a worker must be able to achieve comfortably in order to be judged able to perform those jobs.

#### Advantages

- Its noninvasive.
- The risk of serious complications is extremely low (lower than in a cardiac stress test) because these patients normally do not have heart disease.

#### Disadvantages

- It cannot be performed in people who are unable to exercise.
- It detects the existence of a problem but not its cause.

#### The next step

- An abnormal test result may help your doctor decide which system (lungs, heart, or other) should be further evaluated.
- A normal test indicates that your lungs are not the source of the shortness of breath or inability to exercise.