Diagnosing Respiratory Diseases

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1 Pulmonary function tests (PFT)

There are many different pulmonary function tests (PFTs) that assess the condition of both the lungs and bronchii. These test should be performed if there are symptoms indicating the patients can have a respiratory disorder.

1.1 Types of pulmonary function tests

Spirometry testing is the most common PFT. It measures the volume of air moving in and out when you breathe, the speed of the air and how much effort it takes for you to breathe. You may have a spirometry test at your doctor's office or at a separate testing facility.

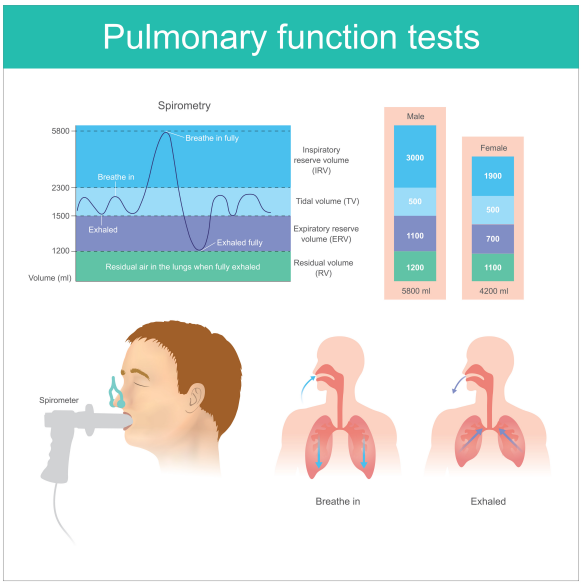
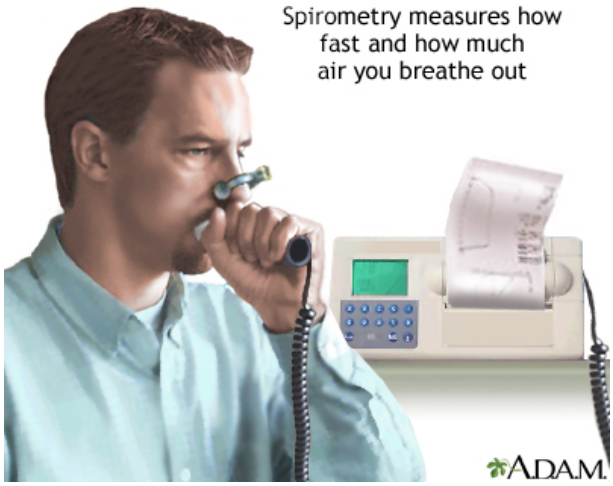


Figure 1: Images show a sample graph of air volume during a common pulmonary function test, bar graphs of average air volume levels, and a spirometer inserted in a person's mouth



Spirometry is the most useful pulmonary function test, as it measures the volume of air exhaled at specific time points during a forceful and complete exhalation after a maximal inhalation. IT meauseres:

- The total exhaled volume = **forced vital capacity** (FVC)
- The volume exhaled at the first second = f**orced expiratory volume in one second** (FEV1)
- **Ratio (FEV1/FVC)**

Spirometry is the key diagnostic test for **asthma** and chronic obstructive pulmonary disease (**COPD**) when performed before and after bronchodilator administration (is used to determine the degree of bronchodilator responsiveness).

Other common respiratory function tests are:

1. **Diffusing capacity**: Measures how efficiently oxygen moves through your lungs to your blood. It measures the **diffusing capacity for carbon monoxide** or **DLCO**.
2. Lung volumes or body **plethysmography**, this test measures how much air the patient can hold in his/her lungs and how much air remains after he/she exhale.
3. **Peak flow**. The peak expiratory flow (PEF, also known as a peak flow or peak flow rate) is the maximal rate that a person can exhale during a short maximal expiratory effort after a full inspiration. In patients with asthma, the PEF percent predicted correlates reasonably well with the percent predicted value for the forced expiratory volume in one second (FEV1) and provides an objective measure of airflow limitation when spirometry is not available
4. Pulse oximetry. Assessment of oxygen saturation can be used to identify a gas transfer defect and to titrate the amount of oxygen needed to maintain adequate oxygenation. At sea level **SpO2 less than 95 percent** are considered abnormal, and a value of SpO2 less than 88-99 percent is generally an indication for supplemental oxygen.

2 Other tests

Arterial blood gas (ABG) test that measures the amount of carbon dioxide and oxygen in the patients's blood. Other pulmonary function tests the patient may undergo are **bronchoscopy** and **endobronchial ultrasound (EBUS)**. X-rays may also be ordered to provide a look at potential lung damage.