**SPIROMETRY BASICS**

Simple, inexpensive, and noninvasive, spirometry is a versatile measure of lung function and is the most objective, reproducible test for COPD. Spirometry measures the volume of air forcefully exhaled from the point of maximal inspiration and the amount of time (in seconds) taken to complete. In obstructive lung disease, such as COPD, lung volume may be normal, but air flow is diminished. Conversely, in restrictive lung disease, such as pulmonary fibrosis, lung volume is reduced, but air flow may be normal. Postbronchodilator spirometry can be used for the differential diagnosis of COPD and asthma because it can confirm the partially reversible airway limitation that is characteristic of COPD.

**PERFORMING SPIROMETRY**

Spirometry can be performed in the primary care setting, provided that good skills training and an ongoing quality assurance program are available. To ensure a meaningful test result, patients should be fully instructed as follows:

- Explain or demonstrate how the procedure works to aid compliance and ease anxiety
- Make sure patients are seated upright rather than bent over
- Place and adjust nose clips to prevent air leakage
- Instruct patients to breathe in as deeply as they can and exhale as forcefully as they can. For a COPD diagnosis, an expiratory time of at least 6 seconds generally is recommended.

**REFERENCES**


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PERFORMING SPIROMETRY (cont.)

Accurate spirometry requires three acceptable spirometry tests that demonstrate reproducibility. The FVC and FEV₁ values from these three tests should vary by no more than 5% or 100 mL, whichever is greater. The FEV₁/FVC ratio should be taken from the technically acceptable tests with the largest sum of FVC and FEV₁.⁴

The following spirometric measurements are used in diagnosing COPD:

- **FVC** (forced vital capacity): maximum volume of air that can be exhaled during a forced maneuver⁴
- **FEV₁** (forced expiratory volume in 1 second): volume exhaled in the first second of this maneuver⁴
- **FEV₁/FVC**: the ratio of these 2 measurements should be calculated⁴

In normal adults, the ratio FEV₁/FVC is between 70% and 80%; a value less than 70% indicates airflow limitation and the possibility of COPD.⁴

INTERPRETING THE RESULTS

Spirometry measurements are evaluated by comparison with reference values based on age, height, sex, and race.⁴ The major differential diagnosis for COPD is asthma. Although a clear distinction between the two is not always possible, postbronchodilator spirometry may confirm the partially reversible airway obstruction characteristic of COPD.⁴ For in-office classification of COPD, practitioners can use postbronchodilator spirometry values expressed as a percentage of the predicted normal value range for the individual:

<table>
<thead>
<tr>
<th>COPD DISEASE CLASSIFICATIONS**</th>
<th>FEV₁/FVC</th>
<th>FEV₁, % predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild COPD</td>
<td>&lt;0.7</td>
<td>≥80</td>
</tr>
<tr>
<td>Moderate COPD</td>
<td>0.7 to &lt;0.7</td>
<td>50 to &lt;90</td>
</tr>
<tr>
<td>Severe COPD</td>
<td>0.7 to &lt;0.7</td>
<td>30 to &lt;50</td>
</tr>
<tr>
<td>Very Severe COPD</td>
<td>0.7 to &lt;0.7</td>
<td>&lt;30 or &lt;50 with chronic respiratory failure</td>
</tr>
</tbody>
</table>

*Based on postbronchodilator spirometry.
°FVC = forced expiratory volume in 1 second.
*FEV₁ = forced expiratory volume in 1 second.
*Values are based on age, sex, ethnicity, and height.
*Adapted from Global Initiative for Chronic Obstructive Lung Disease (GOLD).⁴

If spirometry is performed at a laboratory, it is important for physicians to know what reference values the lab is using for interpretation. While the theory behind spirometry is fairly simple, test procedures have to be handled with care and results interpreted with understanding of test parameters to decide what constitutes a normal value for the particular patient.⁴

A HEDIS® MEASURE FOR SPIROMETRY

The National Committee for Quality Assurance (NCQA) has recognized the importance of COPD with a HEDIS measure for spirometry. The measure targets the use of spirometry testing in assessment and diagnosis and determines whether spirometry was included in the clinical workup and assessment of a new diagnosis/new onset of COPD.³

The CPT codes used to identify spirometry testing in the HEDIS measure are 94010, 94014, 94015, 94016, 94060, 94070, 94620.³

A HEDIS® (Healthcare Effectiveness Data and Information Set) is a registered trademark of the National Committee for Quality Assurance (NCQA).