The most important tools for diagnosing COPD and asthma are medical history, physical examination, and spirometry. Interpreting your spirometry results correctly will help assure an accurate diagnosis and disease classification (severity).

1. The first step is to make sure that the quality of the spirometry test is good. Poor quality tests can cause diagnostic misclassifications. For more information, see 10 Steps to Good Results on our website.

2. Look at the curve patterns and numbers to help guide your interpretation.

3. A normal flow-volume curve looks like a sail, rising rapidly to a peak then descending at about a 45-degree angle.

4. A concave flow-volume curve suggests mild to moderate airways obstruction, while a prolonged finish “rat’s tail shape” suggests severe obstruction.

Sample F/V curves

5. A normal volume-time curve rises sharply from the baseline and reaches a flat plateau. A gradual curve that never plateaus suggests airway obstruction.

Sample V/T curves

Note: If the effort stops before 6 seconds in adults (3 seconds in children) the FVC may be underestimated.

To view additional curve samples, see Sample Spirometry Tracings on our website.

6. A low (< 70% pred) FEV1% (FEV1/FVC) indicates airway obstruction. A low (< 80% pred) FVC and FEV1 with a normal FEV1% suggests restriction without obstruction. However, to make a definitive diagnosis of restrictive lung disease, the patient should be referred to a pulmonary lab for additional lung volume testing.

7. Patients with symptoms and airway obstruction should receive a post-BD (bronchodilator) spirometry test. After administration of a bronchodilator (i.e., albuterol, 2-4 puffs of 90 mcg/puff), allow 10-15 minutes prior to performing the post-BD spirometry test. An increase of 12% (and more than 0.2 liters) in the measured FEV1 suggests reversible airways disease, such as asthma. COPD can be as much as 5-6% reversible, but not much more. For more information, see Differential Diagnosis on our website.

8. In patients with intermittent respiratory symptoms and normal spirometry, consider performing a post-BD test to identify intermittent or mild asthma which is confirmed by a >12% improvement in FEV1, despite normal pre-BD spirometry results.

9. Adult onset airway obstruction in the long-term smoker (>10 to 20 pack year history) is usually due to COPD.

10. Once a diagnosis of asthma or COPD has been determined, disease classification and appropriate treatment can be easily established by utilizing the corresponding tables on the following page.

If a diagnosis is still uncertain, consider referral to a specialist for consultation or co-management.
Classification: First, identify the appropriate classification chart below. Then simply reference the patients’ post-BD spirometry results to determine an accurate classification and treatment regimen.

### CLASSIFYING ASTHMA SEVERITY IN CHILDREN 5 - 11 YEARS OF AGE
Assessing severity and initiating therapy in children who are not currently taking long-term control medication

**Components of Severity**

<table>
<thead>
<tr>
<th>Classification of Asthma Severity (5 - 11 years of age)</th>
<th>Intermittent</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>12 days/week</td>
<td>2 days/week</td>
<td>Daily</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>12/night</td>
<td>3 - 4/night</td>
<td>3 - 4/night</td>
<td>Not nightly</td>
</tr>
<tr>
<td>Short acting beta-agonist use for symptom control (not prevention of EIB)</td>
<td>2 days/week</td>
<td>2 days/week</td>
<td>Daily</td>
<td>Several times per day</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
<td>Minor limitation</td>
<td>Some limitation</td>
<td>Extremely limited</td>
</tr>
<tr>
<td>Long function</td>
<td>Normal FEV1/FVC predicted</td>
<td>FEV1 &gt; 75% predicted</td>
<td>FEV1 &gt; 60% predicted</td>
<td>FEV1 &gt; 50% predicted</td>
</tr>
<tr>
<td>Risk</td>
<td>Exacerbations requiring oral systemic corticosteroids</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended Step for Initiating Therapy</td>
<td>Step 1</td>
<td>Step 2</td>
<td>Step 3, medium-dose ICS option and consider short course of oral systemic corticosteroids</td>
<td>Step 4, medium-dose ICS option or Step 5</td>
</tr>
</tbody>
</table>

In 2 - 6 weeks, evaluate level of asthma control that is achieved, and adjust therapy accordingly.

### STEPSWISE APPROACH FOR MANAGING ASTHMA IN CHILDREN 5 - 11 YEARS OF AGE

#### Step 1

**Preferred:**
High-dose ICS + LABA

**Alternative:**
High-dose ICS + either LTRA or Theophylline

**Indications:**
- FEV1/FVC < 0.70
- FEV1 ≥ 80% predicted
- FEV1/FVC < 0.70
- 30% ≤ FEV1 < 50% predicted

In 2 - 6 weeks, evaluate level of asthma control that is achieved, and adjust therapy accordingly.

### CLASSIFYING ASTHMA SEVERITY IN YOUTHS ≥12 YEARS OF AGE AND ADULTS
Assessing severity and initiating treatment for patients who are not currently taking long-term control medications

**Components of Severity**

<table>
<thead>
<tr>
<th>Classification of Asthma Severity ≥12 years of age</th>
<th>Intermittent</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>2 days/week</td>
<td>2 days/week</td>
<td>Daily</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>3 - 4/night</td>
<td>3 - 4/night</td>
<td>Daily</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Short acting beta-agonist use for symptom control (not prevention of EIB)</td>
<td>2 days/week</td>
<td>2 days/week</td>
<td>Daily</td>
<td>Several times per day</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
<td>Minor limitation</td>
<td>Some limitation</td>
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<tr>
<td>Long function</td>
<td>Normal FEV1/FVC predicted</td>
<td>FEV1 &gt; 75% predicted</td>
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<tr>
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<td>Exacerbations requiring oral systemic corticosteroids</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended Step for Initiating Therapy</td>
<td>Step 1</td>
<td>Step 2</td>
<td>Step 3, medium-dose ICS option or Step 4</td>
<td></td>
</tr>
</tbody>
</table>

In 2 - 6 weeks, evaluate level of asthma control that is achieved, and adjust therapy accordingly.

### STEPWISE APPROACH FOR MANAGING ASTHMA IN YOUTHS ≥12 YEARS OF AGE AND ADULTS

#### Step 1

**Preferred:**
SABA PRN

**Indications:**
- FEV1/FVC < 0.70
- FEV1 ≥ 80% predicted
- FEV1/FVC < 0.70
- 50% ≤ FEV1 < 80% predicted

In 2 - 6 weeks, evaluate level of asthma control that is achieved, and adjust therapy accordingly.

### COPD CLASSIFICATION AND TREATMENT

<table>
<thead>
<tr>
<th>Classification</th>
<th>I: Mild</th>
<th>II: Moderate</th>
<th>III: Severe</th>
<th>IV: Very Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV1/FVC</td>
<td>0.70 ≤ 0.70</td>
<td>0.70 ≤ 0.70</td>
<td>&lt; 0.70 %</td>
<td>&lt; 0.50 %</td>
</tr>
<tr>
<td>FEV1/FVC</td>
<td>0.70 ≤ 0.70</td>
<td>0.70 ≤ 0.70</td>
<td>&lt; 0.70 %</td>
<td>&lt; 0.50 %</td>
</tr>
</tbody>
</table>

Active reduction of risk factor(s): influenza vaccination
Add short-acting bronchodilator (when needed)
Add regular treatment with one or more long-acting bronchodilators (when needed); Add rehabilitation
Add inhaled glucocorticosteroids if repeated exacerbations
Add long-term oxygen if chronic respiratory failure.
Consider surgical treatments

Visit the [Links] page on our website for complete versions of the asthma and COPD guidelines.

**Note:** This information is intended to augment, not replace, a physician’s independent professional judgment.

1. NHLBI/WHO. GOLD COPD Guidelines; 2006 Revised

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