

## DIFFERENTIAL DIAGNOSIS

The onset of COPD is insidious. Pathological changes may begin years before symptoms appear. The major differential diagnosis is asthma, and in some cases, a clear distinction between COPD and asthma is not possible. Some people have coexisting asthma and COPD. Other potential diagnoses are easier to distinguish from COPD<sup>2</sup>:

DIAGNOSIS	SUGGESTED FEATURES
COPD	<ul style="list-style-type: none"> <li>Onset is as early as age 40</li> <li>Slow progression of symptoms</li> <li>≥10 years of smoking one pack per day or equivalent<sup>3</sup></li> <li>Dyspnea during exercise</li> <li>Partially reversible airflow limitation</li> </ul>
Asthma	<ul style="list-style-type: none"> <li>Onset early in life</li> <li>Symptoms vary from day to day</li> <li>Symptoms during the night/early morning</li> <li>Presence of allergy, rhinitis and/or eczema</li> <li>Family history of asthma</li> <li>Largely reversible airflow limitation</li> </ul>
Congestive heart failure	<ul style="list-style-type: none"> <li>Fine basilar crackles on auscultation</li> <li>Chest X-ray shows dilated heart, pulmonary edema</li> <li>Volume restriction, not airflow limitation, on pulmonary function tests</li> </ul>
Bronchiectasis	<ul style="list-style-type: none"> <li>Large volume of purulent sputum</li> <li>Commonly associated with bacterial infection</li> <li>Coarse crackles/clubbing on auscultation</li> <li>Chest X-ray/CT shows bronchial dilation and bronchial wall thickening</li> </ul>
Tuberculosis	<ul style="list-style-type: none"> <li>Onset at all ages</li> <li>Chest X-ray shows lung infiltrates</li> <li>Microbiological confirmation</li> <li>High local prevalence of tuberculosis</li> </ul>
Obliterative bronchiolitis	<ul style="list-style-type: none"> <li>Younger onset and in nonsmokers</li> <li>History of rheumatoid arthritis/fume exposure</li> <li>CT on expiration shows hypodense areas</li> </ul>
Diffuse panbronchiolitis	<ul style="list-style-type: none"> <li>Affects mostly male nonsmokers</li> <li>Almost all have chronic sinusitis</li> <li>Chest X-ray and HRCT show diffuse small centrilobular nodular opacities and hyperinflation</li> </ul>

CT = computed tomography; HRCT = high-resolution computed tomography.

These features tend to be characteristic of the respective diseases but do not occur in every case. For example, a person who has never smoked may develop COPD; asthma may develop in adult and even elderly patients.<sup>2</sup>

**References:** **1.** Celli BR, Snider GL, Heffner J, et al. Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. American Thoracic Society. *Am J Respir Crit Care Med.* 1995;152:S77-S121. **2.** Global Initiative for Chronic Obstructive Lung Disease. *Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease* (Updated 2006). [www.goldcopd.org](http://www.goldcopd.org). Accessed March 7, 2007. **3.** Movahed M-R, Milne N. Association between amount of smoking with chronic cough and sputum production. *The Internet Journal of Pulmonary Medicine™.* 2007;7:1-5. **4.** Doherty DE. The pathophysiology of airway dysfunction. *Am J Med.* 2004;117(suppl 12A):11S-23S. **5.** Pauwels RA, Buist AS, Calverley PMA, et al, on behalf of the GOLD Scientific Committee. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: NHLBI/WHO Global Initiative for Chronic Obstructive Lung Disease (GOLD) Workshop summary. *Am J Respir Crit Care Med.* 2001;163:1256-1276. **6.** Barnes PJ. Chronic obstructive pulmonary disease. *N Engl J Med.* 2000;343:269-280. **7.** Murphy S, Bleecker ER, Boushey H, et al. Expert panel report 2: guidelines for the diagnosis and management of asthma. Bethesda, MD: National Heart, Lung, and Blood Institute; National Institutes of Health; 1997. NIH Publication No. 97-4051. **8.** American Thoracic Society/European Respiratory Society Task Force. Standards for the diagnosis and management of patients with COPD (Internet). Version 1.2. New York: American Thoracic Society; 2004 (updated September 8, 2005). [www.thoracic.org/sections/copd/resources/copddoc.pdf](http://www.thoracic.org/sections/copd/resources/copddoc.pdf). Accessed March 8, 2007. **9.** National Committee for Quality Assurance. *HEDIS 2006, Volume 2: Technical Specifications.* Washington, DC: National Committee for Quality Assurance, 2005.

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Managing Chronic Obstructive  
Pulmonary Disease (COPD)

## Differential Diagnosis of COPD



## FIRST CONSIDERATIONS

DIAGNOSTIC	COPD	ASTHMA
Age of onset	Usually $\geq 40$ years <sup>1</sup>	Any age (often in childhood) <sup>2</sup>
Smoking history	Usually $\geq 10$ pack year history <sup>3</sup>	Nonsmokers affected <sup>4</sup>
Usual etiology	Smoking history <sup>2</sup> Occupational/ environmental exposures <sup>2</sup> Low birth weight in the presence of viral infections <sup>2</sup> History of severe childhood respiratory infections <sup>2</sup>	Immunological stimuli; family history of asthma <sup>2</sup>
Clinical features	Persistent or worsening dyspnea; initially with exertion, eventually at rest <sup>5</sup> Cough may be intermittent, but later is present every day, often throughout the day, and may be unproductive <sup>2</sup>	Symptoms vary; near-normal lung function between exacerbations <sup>2</sup>
Predominant inflammatory cell	Neutrophils <sup>2</sup>	Eosinophils <sup>2</sup>
Airway reversibility	Partially reversible <sup>2</sup>	Largely reversible <sup>2</sup>
Steroid response in stable disease	Little or no effect on inflammation <sup>6</sup>	Inhibits inflammation <sup>7</sup>

While cigarette smoke is the primary risk factor for COPD, exposure to occupational chemicals/dusts and indoor air pollution from cooking and heating in poorly ventilated dwellings are also significant risk factors.<sup>2</sup>

## DIAGNOSTIC AND CLASSIFICATION TESTS

### Spirometry

Spirometry measures airflow limitation and is necessary to confirm a diagnosis of COPD. Postbronchodilator spirometry confirms the partially reversible component of airway obstruction in COPD patients.<sup>8</sup>

The current HEDIS<sup>®</sup>\* spirometry measure targets improving the use of spirometry in confirming a COPD diagnosis. The measure determines whether spirometry was included in the clinical workup and assessment of a new diagnosis/onset of COPD.<sup>9</sup>

The postbronchodilator spirometric values and disease classifications for asthma and COPD are:

ASTHMA DISEASE CLASSIFICATIONS <sup>7</sup>		
Severity	PEF variability %	FEV <sub>1</sub> or PEF % predicted
Mild intermittent	<20	$\geq 80$
Mild persistent	20 to 30	$\geq 80$
Moderate persistent	>30	>60 to <80
Severe persistent	>30	$\leq 60$

COPD DISEASE CLASSIFICATIONS <sup>2</sup>		
Severity	FEV <sub>1</sub> /FVC	FEV <sub>1</sub> % predicted
Mild COPD	<0.7	$\geq 80$
Moderate COPD	<0.7	50 to <80
Severe COPD	<0.7	30 to <50
Very Severe COPD	<0.7	<30 or <50 with chronic respiratory failure

PEF = Peak expiratory flow.  
FVC = Forced vital capacity; the volume of air that can be exhaled.  
FEV<sub>1</sub> = The volume of air exhaled in 1 second.  
% predicted = Values corrected for age, sex, ethnicity, and height.

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

### Chest Radiography

Chest radiography can be useful in differential diagnosis and should be obtained on all patients. It is helpful in excluding other diseases and establishing the presence of significant comorbidities such as cardiac failure.<sup>2,8</sup> Severe emphysema can be diagnosed clearly from chest X-rays; mild emphysema is not as clearly evident on X-rays, and moderate emphysema is diagnosed from chest X-rays only about 50% of the time.<sup>1</sup>

### Physical Examination

Though important to patient care, physical examinations rarely diagnose COPD. This is because the physical signs of airflow limitation are usually not present until significant lung impairment has occurred. However, the following are some things to look for that may aid in COPD diagnosis<sup>2</sup>:

- Central cyanosis
- Chest wall abnormalities (hyperinflation, "barrel chest," protruding abdomen)
- Flattening of diaphragm
- Increased resting respiratory rate (20+ breaths per minute)
- Pursed-lip breathing, which may slow expiratory flow and permit more efficient lung emptying
- Resting muscle activation while supine. Use of the scalene and sternocleidomastoid muscles is an additional indicator of respiratory distress
- Ankle or lower leg edema can be a sign of heart failure