

## Pearl of Knowledge

Evidence-based Summary Documents



### **Spirometry and COPD: A valuable tool and new HEDIS measure**

#### **Introduction**

Chronic Obstructive Pulmonary Disease (COPD) is the fourth leading cause of death and disability in the United States. COPD is a disease characterized by airflow obstruction that leads to shortness of breath. Emphysema and chronic obstructive bronchitis are the two most common forms of COPD. There is evidence that early diagnosis of COPD can improve health outcomes for patients. Spirometry is a simple, inexpensive test that can diagnose COPD. While Spirometry is needed to establish a diagnosis of COPD, it is currently underused. In one study, less than one-third of COPD patients from five health plans underwent spirometry testing following their new diagnosis. Based upon these data and national guideline consensus, HEDIS has adopted for reporting the percentage of members 40 years of age and older with a new diagnosis or newly active COPD who received appropriate spirometry testing to confirm the diagnosis.

#### **Who should have spirometry testing performed?**

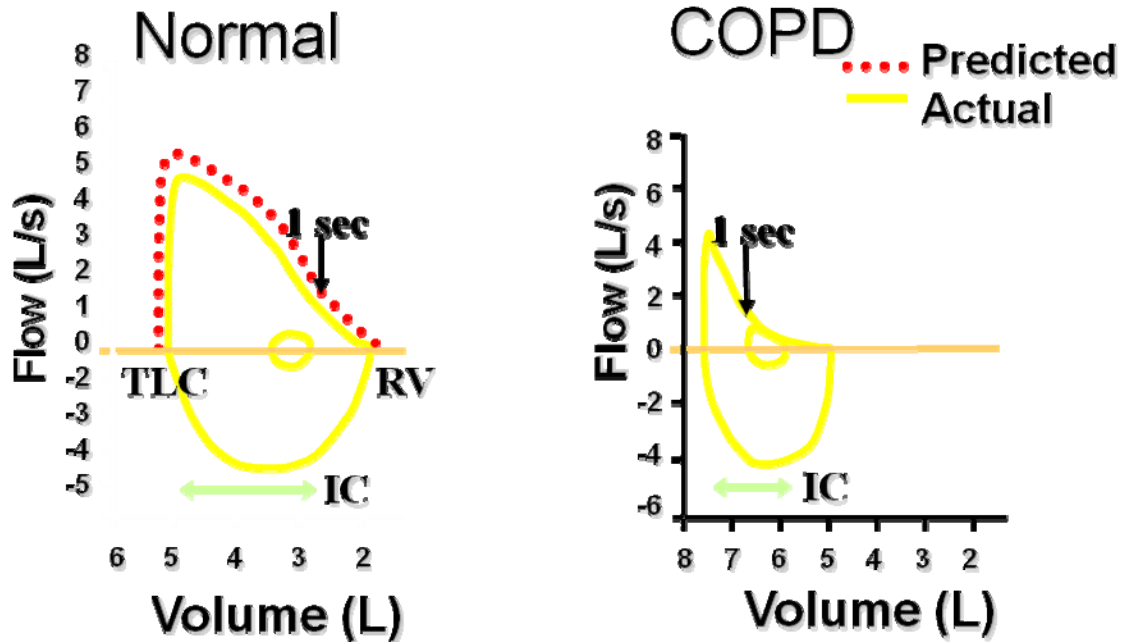
Both national and international guidelines support the recommendation to use spirometry as a diagnostic tool in at risk individuals who are symptomatic. COPD is generally caused by cigarette smoking and symptoms often do not occur until after 10 years of smoking. While AHRQ does not support widespread spirometry screening based on a lack of supportive evidence, it does recommend spirometry testing as a diagnostic tool “for individuals that present to clinicians reporting chronic cough, increased sputum production, wheezing or dyspnea.”

The Global Initiative for Chronic Obstructive Lung Disease 2007 states that the diagnosis of COPD should be confirmed by spirometry and should be considered in individuals over the age of 40 who have any of the following indicators:

- Dyspnea that is: Progressive; Usually worse with exercise; Persistent; Described by the patient as an “increased effort to breath,” “heaviness,” “air hunger,” or “gasping.”

- Chronic cough: May be intermittent or unproductive
- Chronic sputum production: Any pattern of chronic sputum production may indicate COPD
- History of exposure to risk factors: Tobacco smoke, occupational dusts and chemicals, smoke from home cooking and heating fuel.

### Images of normal spirometry and obstructive spirometry



TLC = Total lung capacity  
 RV = Residual volume  
 FEV1 = Forced expiratory volume in one second  
 FVC = Forced vital capacity

### Spirometry: What does it tell us?

Spirometry is a measure of airflow from fully inflated lungs. It represents the balance of elastic forces involved in breathing, an outward pulling on the lungs by the chest wall and the inward suction created by the lungs elasticity. Expiratory airflow is the result of muscular effort forcing all the air out of the lungs combined with the elastic recoil and patency of both the large and small airways.

Only three of the commonly listed parameters of expiratory airflow are of clinical importance: the forced expiratory volume in one second (FEV1), the forced vital capacity (FVC), and the FEV1/FVC ratio. The FEV1 tells you how fast the air is getting out and is a measure of the airflow obstruction. The FVC is how much air can be

blown out from a whole breath and is an index of restrictive ventilatory processes. The ratio of FEV1 to FVC is used to distinguish between obstruction and restriction when both indices are reduced. While spirometry can diagnose airflow obstruction, formal lung volumes are required to confirm restriction.

In patients who have evidence of airflow limitation on baseline spirometry, and no prior diagnosis of asthma or COPD, post-dilator spirometry may be useful. If post-bronchodilator spirometry is normal, COPD is ruled out. However, in most cases the use of inhaled bronchodilators in office assessment of COPD is not necessary.

### **Interpreting spirometry**

Interpretation of spirometric tests is easy. There are only four possibilities: normal, obstructive, restrictive or mixed defects. Normal values are based on reference data sets based on patient's age, gender, height and race. Greater than 80% of predicted is the cutoff point for normal for both the FEV1 and FVC. A fixed ratio of FEV1 to FVC below 0.70 indicates airflow obstruction. A normal ratio with a reduced FVC may indicate restriction but requires confirmation with a more specific measurement of lung volumes. Once obstruction is confirmed by a reduced FEV1/FVC, the severity of COPD is determined by the percent predicted FEV1.

<b>Stage</b>	<b>Characteristics</b>
I: Mild COPD	FEV1/FVC < 70% FEV1 > 80% predicted
II: Moderate COPD	FEV1/FVC < 70% 50% < FEV1 < 80% predicted
III: Severe COPD	FEV1/FVC < 70% 30% < FEV1 < 50 % predicted
IV: Very Severe COPD	FEV1/FVC < 70% FEV1 < 30% predicted or FEV1 < 50% predicted plus chronic respiratory failure

### **References**

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### **Questions**

Please reply to this e-mail, and your questions(s) will be directed to the author of this Pearl, Dr. Charlene McEvoy.

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