

The sequence of studies is dictated by the clinician's differential diagnosis, as determined by the history and physical examination. Acute respiratory symptoms are often evaluated with multiple tests performed at the same time in order to diagnose any life-threatening diseases rapidly (e.g., pulmonary embolism or multilobar pneumonia). In contrast, chronic dyspnea and cough can be evaluated in a more protracted, stepwise fashion.

Pulmonary Function Testing (See also [Chap. 286](#)) The initial pulmonary function test obtained is spirometry. This study is an effort-dependent test used to assess for obstructive pathophysiology as seen in asthma, COPD, and bronchiectasis ([Table 284-1](#)). A diminished-forced expiratory volume in 1 second (FEV_1)/forced vital capacity (FVC) (often defined as $<70\%$) is diagnostic of airflow obstruction. In addition to measuring FEV_1 and FVC, the clinician should examine the flow-volume loop (which is less effort-dependent). A plateau of the inspiratory and expiratory curves suggests large-airway obstruction in extrathoracic and intrathoracic locations, respectively.

Spirometry with symmetric decreases in FEV_1 and FVC warrants further testing, including measurement of lung volumes and the diffusion capacity of the lung for carbon monoxide (DL_{CO}). A total lung capacity $<80\%$ of the patient's predicted value defines restrictive pathophysiology. Restriction can result from parenchymal disease, neuromuscular weakness, or chest wall or pleural diseases ([Table 284-1](#)). Restriction with impaired gas exchange, as indicated by a decreased DL_{CO} , suggests parenchymal lung disease. Additional testing, such as measurements of maximal inspiratory and expiratory pressures, can help diagnose neuromuscular weakness. Normal spirometry, normal lung volumes, and a low DL_{CO} should prompt further evaluation for pulmonary vascular disease.

Arterial blood gas testing is often helpful in assessing respiratory disease. Hypoxemia, while usually apparent with pulse oximetry, can be further evaluated with the measurement of arterial PO_2 and the calculation of an alveolar gas and arterial blood oxygen tension difference ($[A-a]DO_2$). Patients with diseases that cause ventilation-