# Diagnostic Tests of the Respiratory System (continued)

<table>
<thead>
<tr>
<th>Name of Test</th>
<th>Purpose and Description</th>
<th>Related Nursing Care</th>
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<tr>
<td><strong>Chest x-ray</strong></td>
<td>Chest x-rays are used to identify abnormalities in chest structure and lung tissue, for diagnosis of diseases and injuries of the lungs, and to monitor treatment.</td>
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<td><strong>Computed tomography (CT)</strong></td>
<td>CT of the thorax may be performed when x-rays do not show some areas well, such as the pleura and mediastinum. It is also done to differentiate pathologic conditions (such as tumors, abscesses, and aortic aneurysms), to identify pleural effusion and enlarged lymph nodes, and to monitor treatment. Images are shown in cross section.</td>
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<td><strong>Magnetic resonance imaging (MRI)</strong></td>
<td>An MRI of the thorax is used to diagnose alterations in lung tissue more difficult to visualize by CT scan and to identify abnormal masses and fluid accumulation.</td>
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<td><strong>Positron emission tomography (PET)</strong></td>
<td>This relatively noninvasive test, when used to examine the lungs, is performed to identify lung nodules (cancers). The client is given a radioactive substance and cross-sectional images are displayed on a computer. Radiation from PET is only 25% of that from a CT scan.</td>
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<td><strong>Pulmonary angiography</strong></td>
<td>This test is done to identify pulmonary emboli, tumors, aneurysms, vascular changes associated with emphysema, and pulmonary circulation. A catheter is inserted into the brachial or femoral artery, threaded into the pulmonary artery, and dye is injected. ECG leads are applied to the chest for cardiac monitoring. Images of the lungs are taken.</td>
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<td><strong>Pulmonary ventilation/perfusion scan (V/Q scan)</strong></td>
<td>This test is performed with two nuclear scans to measure breathing (ventilation) and circulation (perfusion) in all parts of the lungs. A perfusion scan is performed by injecting radioactive albumin into a vein and scanning the lungs. A ventilation scan is performed by scanning the lungs as the client inhales radioactive gas. A decreased uptake of radioisotope during the perfusion scan indicates a blood flow problem, such as from a pulmonary embolus or pneumonitis. A decreased uptake of gas during the ventilation scan may indicate airway obstruction, pneumonia, or chronic pulmonary obstructive disease (COPD).</td>
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<td><strong>Bronchoscopy</strong></td>
<td>A bronchoscopy is the direct visualization of the larynx, trachea, and bronchi through a bronchoscope to identify lesions, remove foreign bodies and secretions, obtain tissue for biopsy, and improve tracheobronchial drainage (Figure 36–9). During the test, a catheter brush or biopsy forceps can be passed to obtain secretions or tissue for examination for cancer. Provide routine preoperative care as ordered. Bronchoscopy is an invasive procedure requiring conscious sedation or anesthesia. Care provided prior to the procedure is similar to that provided before many minor surgical procedures. Provide mouth care just prior to bronchoscopy. Mouth care reduces oral microorganisms and the risk of introducing them into the lungs. Bring resuscitation and suction equipment to the bedside. Laryngospasm and respiratory distress may occur following the procedure. The anesthetic suppresses the cough and gag reflexes, and secretions may be difficult to expectorate.</td>
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**Figure 36–9** Fiberoptic bronchoscopy.
A bronchoscopy is a direct visualization of the larynx, trachea, and bronchi. During the test, lesions can be identified, foreign bodies or mucous plugs removed, and tissue taken for biopsy. In addition, a biopsy of lung tissue may be done through an incision through the chest wall.

Many different radiologic examinations are used to diagnose respiratory disorders, including a chest x-ray to evaluate structures and tissues, a CT scan to differentiate pathologic conditions, an MRI to more accurately identify abnormal masses and fluid accumulation, a PET to identify lung cancers, and a pulmonary angiogram to identify various disorders including pulmonary emboli and emphysema.

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Pulse oximetry is used to evaluate or monitor the oxygen saturation of the blood.

Arterial blood gases are conducted to evaluate alterations in acid-base balances.

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Sputum tests include a culture and sensitivity to identify organisms causing infections as well as the most effective antibiotic to treat the infection, an acid-fast smear and culture to identify the tuberculosis bacillus, and cytology to identify malignancies. See Procedure 36–1.

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Fiber-optic bronchoscopy requires 30 to 45 minutes to complete. It may be done at the bedside, in a special procedure room, or in the surgical suite.

The procedure usually causes little pain or discomfort, because an anesthetic is given. You will be able to breathe during the bronchoscopy.

Some voice hoarseness and a sore throat are common following the procedure. Throat lozenges or warm saline gargles may help relieve discomfort.

You may develop a mild fever within the first 24 hours following the procedure. This is a normal response.

Persistent cough, bloody or purulent sputum, wheezing, shortness of breath, difficulty breathing, or chest pain may indicate a complication. Notify your physician if they develop.

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