

Airway and Lungs Assessment

The airway assessment begins by examining the back of the patient's chest and positioning to determine the presence of respiratory distress. Note any abnormal findings like pursed-lip breathing, use of accessory muscles for inspiration or irregular spinal curvatures and determine the patient's respiratory rate for 1 minute. The chest wall should move symmetrically, evenly, bilaterally and without accessory muscle use in a healthy patient when assessing abnormalities of uneven chest wall movement or use of accessory muscles. Next, inspect the patient's skin, nails and mucous membranes for the presence of cyanosis, indicating a lack of perfusion or oxygenation to these tissues. Palpate the patient's chest wall for crepitus, tenderness, alignment, masses or retractions (e.g. use of accessory muscles) and then palpate for tactile fremitus, or the vibration of the chest wall with patient vocalization. Another exam is checking or assessing chest-wall symmetry and expansion when the patient ventilates on inspiration. This exam can reveal active expansion or decreased expansion in patients with underlying respiratory conditions, like COPD or pneumonia. Percussion can assess the density of the lungs in relation to the presence of solid tissue, fluid or air. Resonance is common within the lungs, dullness can be present over solid or fluid-filled densities and hyperresonance is percussed over hyperinflated areas of lung common in pulmonary conditions like COPD. Finally, auscultation using the diaphragm of the stethoscope assesses the presence of normal or abnormal breath sounds as the patient takes deep, slow breaths through their mouth.



PLAY PICMONIC

Inspection

Examine Back of Chest

[Examining Back of Chest](#)

Prior to inspection, note the patient's posture and position of comfort. A patient in respiratory distress may be postured in a "tripod position" while seated, where they lean on their hands or elbows in an effort to improve their ventilation. Preferentially, examination of the chest is best performed with a seated patient in a well-lit room. Undress the patient to expose the anterior and posterior chest while maintaining patient comfort and modesty. Next, note any evidence of respiratory distress such as tachypnea, pursed-lip breathing, or use of accessory muscles. Finally, determine the shape and symmetry of the chest. A barrel chest appearance of the chest may be due to normal aging or a result of COPD, emphysema, osteoarthritis, or cystic fibrosis. Spinal curvature (e.g. kyphosis, scoliosis) can affect the patient's ability to breathe.

Determine Respiratory Rate for 1 Minute

[Lungs-timer and \(1\) Wand](#)

Examine the rate and rhythm of breathing with symmetrical movement of the bilateral chest rising and falling with inspiration and expiration. The expected respiratory rate of a healthy adult is 12-20 respirations per minute.

Assess for Abnormalities with Uneven Movement or Use of Accessory Muscles

[Assess-man assessing for Abnormalities with Uneven Movement and Accessories Muscle-man](#)

Position yourself with the seated patient at the midline of the patient's back. Observe the position of the spine, the ribs, and movement of the intercostal spaces during inspiration. When a patient is relying upon accessory muscles for ventilation, the intercostal spaces become more prominent (e.g. notable, "deeper") with inspiration.

Inspect Skin, Nails and Mucous Membrane

[Skin-suit with Nails and Mucous Membrane](#)

The patient's skin, nail and mucous membrane color can reveal a lot about systemic oxygenation. Assess the patient's skin for pallor (pale skin) as this can be an indication of decreased perfusion. Grayish or blue skin can be the result of a lack of oxygenated blood in the observable tissue, also known as cyanosis. The nail beds and mucous membranes (e.g. buccal mucosa of the mouth) can also reveal cyanosis. Cyanosis may be the result of COPD, asthma, acute respiratory distress syndrome, or pneumonia. Nail clubbing occurs as a result of chronic low blood oxygen in various types of lung disease.

Palpation

Palpate for Crepitus, Tenderness, Alignment, Masses or Retraction

[Paw Carpenters, Tenderizer, Alignment, Bulge and Retractions at Ribcage](#)

Palpate the patient's chest for areas of tenderness, masses, and crepitus. Avoid active palpation in the presence of significant tenderness. Crepitus, misalignment, pain or tenderness could indicate a fractured or broken rib. The spine should be straight, and the ribs should slope across and down. The expansion and retraction of the ribs should be even bilaterally.

Palpate for Tactile Fremitus

Paw for Chest Vibration

Fremitus is the vibration of the chest wall. To feel tactile fremitus, place the palms of your hands against the patient's posterior chest with your fingers hyperextended. Ask the patient to repeat the phrase, "boy-oh-boy" in a deep and loud voice. At the same time move your hands from top to bottom of the patient's chest and compare the vibrations bilaterally. Increased fremitus occurs when the lungs become filled with fluid or is denser. This happens with pneumonia, lung tumors, and thick secretions. Absent fremitus, or the presence of abnormal air or space, may indicate pneumothorax.

Check Chest-Wall Symmetry and Expansion

Chest-Wall Symmetry and Expansion

Place your hands over the lower anterior chest wall and move them together until your thumbs meet at the midline. Ask the patient to breathe deeply. Observe the movement of the thumbs away from each other. Normal expansion is 1 inch and the chest movement is equal and even. Unequal expansion occurs when air entry is limited in the lungs or chest wall. Equal but decreased expansion occurs with hyperinflation. Movement may be absent or unequal with atelectasis, or the presence of numerous collapsed alveoli or with a pneumothorax.

Note Resonance, Hyperresonance, Dullness and Tympany

Hiker-resonating, Dull-pillow and Tympany-drumy

Percussion is used to assess the density of the lungs. Dullness is a medium-pitch sound over areas that normally make a resonant sound (low-pitch hollow sound). It is usually the result of an increase in density of the lung (e.g. pneumonia) or an increase in fluid in pleural space (pleural effusion). Hyperresonance is a loud, lower-pitched sound caused by lung hyperinflation (COPD), lung collapse, or asthma.

AUSCULTATION

Use Diaphragm of Stethoscope to Listen to Full Inspiration and Full Expiration

Stethoscope Listening to Inflation and Exhaust-pipe

Listen from the lung apices to the bases bilaterally and compare bilaterally. A technique to fully assess auscultation is to start at one anterior apex and move to the corresponding apex. Next, move the diaphragm back to the original side and slightly inferior or below the starting position. Continue this progression until each base is assessed and move to the posterior apex, repeating this assessment. At each position, listen to at least one cycle of inspiration and expiration.

Ask Patient to Breathe Through Mouth

Breathing Through Mouth

Have the patient breathe in deeper and slower than normal through their mouth. This facilitates deeper inspiration and expiration, especially if the patient has obstructed upper airways of the nose (e.g. allergic rhinitis), pharynx or bronchioles.

Normal Breath Sounds

Breath Sound-waves

There are three normal breath sounds that are heard. The first is bronchial sounds, which are loud, high-pitch sounds heard next to the trachea in the neck. The second are bronchovesicular sounds with a medium pitch and intensity and are heard at the anterior chest between the first and second intercostal space or at the posterior chest between the scapula. The final is vesicular sounds that are soft, low-pitched, gentle rustling sounds heard along the periphery of the lungs (e.g. bases).

Abnormal Breath Sounds

Abnormal Breath Sound-waves

Abnormal breath sounds are adventitious breath sounds such as crackles, wheezes, stridor, and pleural friction rub. Focus your assessment on any areas with abnormal sounds and note the location, tone, and duration the sound is heard.