

Sound	Physiology	Auscultation Characteristics			Associated Clinical Disorders	Other
<b>Normal Tracheal Breath Sounds</b>	Due to Turbulent Pharyngeal/Glottic/Subglottic Airflow (In Addition, Intrapulmonary Lung Sounds May Be Transmitted to the Trachea)	Hollow Non-Musical	Inspiratory and Expiratory	Sounds Similar to Bronchial Breath Sounds		
<b>Normal Vesicular Breath Sounds</b>	Due to Non-Alveolar Turbulent Airflow, Vortexes, and Other Mechanisms  In Pathologic States, May Be Decreased by Diminished Sound Generation (Hypoventilation, Airway Narrowing) and/or Diminished Sound Transmission (Lung Destruction, Pleural Effusion, Pneumothorax)	Soft Non-Musical	Inspiratory and Early Expiratory			
<b>Bronchial Breath Sounds</b>	Due to Patent Airway Surrounded by Consolidated Lung (Pneumonia) or Pulmonary Fibrosis	Soft Non-Musical	Inspiratory and Expiratory	Sounds Similar to Tracheal Breath Sounds	Pneumonia Pulmonary Fibrosis	
<b>Fine Crackles</b>	Not Related to Secretions	Short Non-Musical Explosive	Mid-Late Inspiratory and Occasionally Expiratory  Does Not Clear with Cough	Gravity-Dependent  Not Transmitted to Mouth	Congestive Heart Failure Interstitial Lung Disease Pneumonia	May Precede Radiographic Changes
<b>Coarse Crackles</b>	May Be Related to Secretions  Due to Intermittent Airway Opening	Short Non-Musical Explosive	Early Inspiratory and Expiratory  May Clear with Cough	Transmitted to Mouth	Chronic Bronchitis	
<b>Rhonchi</b>	Due to Rupture of Fluid Films and Abnormal Airway Collapsibility (Common with Airway Narrowing Due to Airway Edema or Bronchospasm)  May Be Related to Secretions in Larger Airways	Musical Low Frequency (Sounds Like Snoring)	Inspiratory and/or Expiratory  Often Clears with Cough		Acute Tracheobronchitis Chronic Obstructive Pulmonary Disease	
<b>Wheezes</b>	Due to Localized Airway Narrowing (Tumor, Foreign Body, etc) or Generalized Airway Narrowing (Asthma, etc)	Musical/Polyphonic High Frequency	Inspiratory and/or Expiratory		Asthma Chronic Obstructive Pulmonary Disease	
<b>Pleural Friction Rub</b>	Due to Pleural Surface Friction	Non-Musical Explosive	Typically Biphasic  Basilar-Predominant		Pleural Inflammation Chest Tube Pleural Tumor	
<b>Squawk</b>	Due to Distal Airways Disease	Mixed Sound with Short Musical Component (Short Wheeze) Preceded or Followed by Crackles			Distal Airways Disease (Hypersensitivity Pneumonitis, Interstitial Lung Disease, Pneumonia)	
<b>Stridor</b>	Due to Upper Airway Obstruction	Musical High Frequency	Loudest Over Anterior Neck (May Be Transmitted to the Trachea)	If Severe, May Be Heard Even without Stethoscope	Extrathoracic (Vocal Cord Lesion, etc) or Intrathoracic (Tracheobronchomalacia, etc) Upper Airway Obstruction  Fixed Upper Airway Obstruction (Bilateral Vocal Cord Paralysis, etc)	

## Lung Exam Findings by Disorder

Disorder	Breath Sounds	Crackles	Percussion	Vocal/Tactile Fremitus (Say 99 -> Palpate)	Whispered Pectoriloquy (Whisper 99 -> Auscultate)	Egophony (E-> A) (Say E -> Auscultate)	Tracheal Deviation	Other
1	Small Pleural Effusion	Decreased	Absent	Dull	Decreased	Decreased	Absent	Absent
	Large Pleural Effusion	Decreased (May Be Bronchial if Atelectasis is Also Present)	Absent	Dull (Hyperresonant Above Level of Fluid)	Decreased	Absent (May Be Present If Atelectasis is Also Present)	Absent (May Be Present If Atelectasis is Also Present)	Toward Contralateral Side
2	Small Consolidation (Alveolar Filling)	Bronchovesicular/ Bronchial	Usually Present	Slightly Dull	Normal/ Increased	Variable	Present	Absent
	Large Consolidation (Alveolar Filling)	Bronchial	Present	Dull	Increased	Increased	Present	Absent
3	Emphysema	Decreased/ Absent	Variable	Hyperresonant	Decreased	Decreased/ Absent	Absent	Absent
4	Pneumothorax	Decreased/ Absent	Absent	Hyperresonant	Absent	Decreased/ Absent	Absent	Toward Ipsilateral Side  Coin Sound (Bell Tympany)
5	Tension Pneumothorax	Decreased/ Absent	Absent	Hyperresonant	Absent	Decreased/ Absent	Absent	Toward Contralateral Side  Coin Sound (Bell Tympany)
	Hydro- pneumothorax	Absent	Absent	Hyperresonant Above Fluid Level/ Dull Below Fluid Level	Absent	Absent	Absent (May Be Present if Atelectasis is Also Present)	Toward Contralateral Side  Succession Splash/ Shifting Dullness/ Coin Sound (Bell Tympany)
6	Atelectasis with Endobronchial Obstruction	Absent	Absent	Dull	Decreased	Absent	Absent	Toward Ipsilateral Side
	Consolidation with Endobronchial Obstruction	Decreased/ Absent	Absent	Dull	Decreased	Decreased/ Absent	Absent	Absent
7	Pleural Thickening	Decreased	Absent	Dull	Decreased	Decreased	Absent	Absent (Toward Ipsilateral Side in Severe Cases)
	Thick-Walled Cavity	Bronchovesicular/ Amphoric (Hollow, Low-Pitched)	Present	Slightly Dull	Normal/ Increased	Increased	Present	Absent



