
Glossary

A2 Aortic component of S_2 .

Accessory muscles of respiration Muscles involved in labored, or forceful, breathing. They include the sternocleidomastoid, scalene, trapezius, rhomboid, and abdominal muscles.

Acoustical mismatch Phenomenon in which sounds transmitted through two different media, such as air and tissue, are diminished in intensity or blocked.

Acute pulmonary hypertension Sudden increased pressure within the pulmonary circulation (above 30 mm Hg systolic and 12 mm Hg diastolic).

Adult respiratory distress syndrome Disease with numerous etiologies that's characterized by interstitial and alveolar edema and progressive hypoxemia; also known as *shock lung* or *posttraumatic lung*.

Adventitious sound An acquired (usually) abnormal sound superimposed over normal or abnormal breath sounds.

AES Aortic ejection sound.

Alveolar-capillary membrane Cell membrane across which oxygen and carbon dioxide must diffuse for respiration to occur.

Alveolar duct Portion of the airway that is completely lined with alveoli.

Alveolus One of the millions of very small, saclike lung structures where oxygen-carbon dioxide exchange occurs.

Amplitude Magnitude or intensity of a sound or pulsation.

Anatomic dead space Air that remains in the conducting airways during each breath. This air isn't involved in oxygen-carbon dioxide exchange.

Antigen Substance or material foreign to the body that causes a reaction leading to the formation of antibodies.

Aortic ejection sound Opening sound of a stenotic aortic valve. It follows S_1 early in ventricular systole and appears just after the QRS complex on the ECG.

Aortic regurgitation Abnormal condition of turbulent backward blood flow through the aortic valve into the left ventricle during diastole.

Aortic stenosis Narrowing or constriction of the aortic valve or of the aorta itself.

- Aortic valve** Membranous folds that prevent blood reflux from the aorta into the left ventricle.
- Aortic valvular stenosis** Constriction of or damage to the aortic valve that restricts forward blood flow from the left ventricle to the aorta during systole.
- ARDS** *See* Adult respiratory distress syndrome.
- Arteriovenous shunt** Direct passage of blood from arteries to veins, bypassing the capillary bed. This can refer to a physiologic response of the body or to an abnormal condition sometimes caused by trauma or surgery.
- Asbestosis** Lung disease characterized by pulmonary inflammation and fibrosis; caused by prolonged asbestos exposure.
- Ascending aortic aneurysm** Dilation of the thoracic portion of the aorta.
- Aspiration** Usually refers to the breathing in of foreign materials.
- Asthma** Disease characterized by bronchoconstriction, bronchospasm, mucosal edema, and excess mucus production, which lead to obstructed airflow, wheezing, and shortness of breath.
- Atelectasis** Incomplete expansion of the lung tissue, usually caused by pressure from exudate, fluid, tumor, or an obstructed airway; may involve a lung segment or an entire lobe.
- Atrial septal defect** Imperfection, failure to develop fully, or absence of the dividing wall (septum) between the heart's atria.
- Atrioventricular node** Small mass of specialized cardiac tissue, located in the lower portion of the right atrium near the septum, that transmits electrical impulses from the sinoatrial node to the bundle of His.
- Atrioventricular valves** Valves between the atria and the ventricles — specifically, the tricuspid valve of the heart's right side and the mitral valve of the heart's left side.
- Attenuation** Decrease in the intensity or loudness of a breath sound.
- Auscultation** Act of listening to sounds made by the body; usually performed with a stethoscope.
- Austin Flint murmur** Diastolic heart sound generated by turbulent blood flow across the mitral valve; caused by aortic regurgitation, which closes the mitral leaflets.
- AV** Atrioventricular.
- Axillary fold** One of two anatomic landmarks anterior and posterior to the armpit, formed by the normal contour of

the skin over the pectoralis major muscle anteriorly and the latissimus dorsi muscle posteriorly.

Ball-in-cage valve Prosthetic heart valve characterized by a caged ball that moves with ventricular pressure to open and close a valvular opening.

Bell Cup-shaped portion of the stethoscope that is best suited for listening to low-pitched sounds.

Bifurcate To divide into two branches.

Bileaflet valve (1) Prosthetic heart valve characterized by two small wings that control blood flow; (2) mitral valve.

Binaural headpiece Stethoscope headpiece that supplies sounds to both ears simultaneously.

Blowing Term used to describe a continuous murmur sound like the sound of air passing through pursed lips.

Booming Term used to describe a deep, resonant heart sound that is sudden and percussive.

Bronchial circulation Oxygenated blood that arises from the aorta or subclavicular artery and supplies the tracheobronchial tree with oxygen and nutrients.

Bronchial gland One of the glands secreting mucus and serous liquid in the tracheobronchial tree. These glands are most numerous in the medium-sized bronchi and are the main source of bronchial secretions.

Bronchiectasis Irreversible dilatation of the bronchi characterized by chronic cough, sputum production, fibrosis, and atelectatic lung tissue surrounding the affected airways.

Bronchophony Voice sound auscultated over the chest wall that reveals exaggerated vocal resonance.

Bronchospasm Smooth muscle contraction within the airway walls, which leads to airway narrowing and reduced airflow.

Bronchovesicular breath sound Normal breath sound auscultated between the mainstem bronchi and lung periphery; also known as a *transitional breath sound*.

Bundle of His Small band of specialized cardiac muscle fibers located in the intraventricular septum that relay the atrial electrical impulses to the ventricles.

Capacitance Heart's or vasculature's ability to receive or admit blood volume and the decreased resistance that accompanies it.

Capillary hydrostatic pressure Fluid pressure within the capillary system, which, when elevated, leads to fluid extravasation out of the capillary system into the interstitium.

- Cardiac cycle** Sequence of events (systole and diastole) that enables the heart to receive and pump blood.
- Cardiac output** Quantity of oxygenated blood pumped through the body by the heart, usually expressed in liters per minute. Is computed as stroke volume \times heart rate.
- Cardiac tamponade** Heart compression caused by effusion or collection of fluid in the pericardium, resulting in decreased cardiac output.
- Cervical venous hum murmur** Murmur caused by rapid downward blood flow through the jugular veins in the lower part of the neck.
- Chordae tendineae** Tendinous cords that connect each cusp of the two atrioventricular valves to appropriate papillary muscles in the ventricles.
- Chronic bronchitis** Disease characterized by chronic cough and sputum production that persists over a long period of time.
- Chronic obstructive pulmonary disease** Chronic lung disease characterized by obstructed bronchial airflow or exhalation. Chronic bronchitis, emphysema, and asthma are types of obstructive lung disease.
- Cilia** Motile, whiplike extensions from cell surfaces. Ciliated columnar epithelial cells line the walls of the tracheobronchial tree.
- Click** Short heart sound; also, another term for a midsystolic sound that occurs when a prolapsed mitral valve's leaflet and chordae tendineae tense.
- Click-murmur syndrome** Condition in which a click is followed by a murmur, as in mitral valve prolapse syndrome.
- Closing click** Heart sound generated by valve closure. Closing clicks are heard with all prosthetic valves regardless of their type or position.
- Coarctation of the aorta** Localized aortic malformation characterized by deformity of the aortic media and causing severe narrowing of the aortic lumen.
- Compliance** Tissue's or organ's ability to yield to pressure without disruption; often used to describe the distensibility of an air- or fluid-filled organ, such as the heart or lungs.
- Conchae** Shell-shaped turbinate bones in the nasal cavity that stimulate turbulent airflow within the nasal passages. The dense mucus and capillary beds that line the turbinates' surface encourage warming and humidification of inspired air.

- Conducting airway** One of the airways beginning at the nose and ending at the terminal bronchioles. These airways are responsible for transporting air during breathing but are not involved in oxygen-carbon dioxide exchange.
- Conduction system** Specialized cardiac cells and fibers that initiate and/or relay the electrical impulses, stimulating the heart muscle to contract.
- Configuration** Shape of a murmur's sound as recorded on a phonocardiogram; one of the characteristics used to describe murmurs.
- Congestion** Abnormal accumulation of fluid or blood in an organ or organ part.
- Consolidation** Inflammatory solidification of lung tissue.
- Constrictive pericarditis** Inflammation of the pericardium that leads to thickening and possible calcification of the pericardial sac, resulting in impaired diastolic filling, inflow stasis, or a constrictive effect.
- Continuous murmur** Murmur that begins in systole and persists, without interruption, through S₂ into diastole.
- Contractile cell** One of the myocardial cells that contract to start systole. These cells depolarize and repolarize by means of ion flow.
- Contralateral** Referring to the opposite side or opposing symmetrical structure.
- COPD** Chronic obstructive pulmonary disease.
- Cor pulmonale** Heart disease caused by pulmonary hypertension secondary to disease of the lung or its blood vessels, resulting in hypertrophy of the right ventricle.
- Crackle** An adventitious lung sound characterized by short, explosive or popping sound usually heard during inspiration; described as *coarse* (loud and low in pitch) or *fine* (less intense and high in pitch); formerly known as a *rale*.
- Creptitation** Crackling sound that resembles the sound made by rubbing hair between two fingers.
- Crescendo** Term used to describe the configuration of a murmur that increases in intensity.
- Crescendo-decrescendo** Term used to describe the configuration of a murmur that rises in intensity and then fades away.
- Cusp** One of the triangular segments of a cardiac valve or one of the semilunar segments of the aortic or pulmonary valve.
- Dampened** Diminished sound intensity or amplitude; term used to describe sounds.

- Decrescendo** Term used to describe the configuration of a murmur that decreases in intensity.
- Dependent lung regions** Lowest lung regions (the lung bases when the patient is upright).
- Depolarization** Movement of sodium ions into a contractile cell, creating a positive charge inside the cell.
- Diamond-shaped murmur** Crescendo-decrescendo murmur.
- Diaphragm** Primary muscle of respiration, which separates the thoracic and abdominal cavities; also the part of the stethoscope used to auscultate for high-pitched sounds.
- Diastole** Expansion of the ventricles occurring in the interval between S_2 and S_1 . The heart muscle, relaxing, fills with blood during this part of the cardiac cycle.
- Diffuse** Widely distributed; not localized.
- Dilation of pulmonic valve ring** Expansion of a valve aperture. A dilated pulmonic valve can contribute to a Graham Steell murmur.
- Distribution of ventilation** Movement or circulation of air to specific lung regions during breathing.
- Dull percussion note** Deadened, or nonresonant, sound heard when a solid organ or dense body part is percussed.
- Duration** Length of time a heart or breath sound is heard; one of the six characteristics used to describe heart sounds.
- Dynamic airway compression** Narrowing of the airways during expiration caused by properties of intrapleural pressure, radial traction exerted by lung parenchyma, and the loss of elastic recoil within the lung.
- Dynamic obstruction** Blocked outflow from one of the heart's chambers that can be demonstrated only during myocardial contraction or systole.
- Dyspnea** Difficult or labored breathing.
- Early diastolic aortic regurgitation** Blood backflow from the aorta that occurs early in diastole, when the ventricle is resting and filling with oxygenated blood.
- ECG** Electrocardiogram; also written as EKG.
- Ectopic beats** Arrhythmic heartbeats arising from places other than the heart's normal pacemaker, the sinoatrial node.
- Edema** Excessive accumulation of fluid in intercellular tissue spaces of the body.
- Egophony** Voice sound that has a nasal or bleating quality when auscultated over the chest wall; "ee" is heard as "ay;" an "A" to "E" change.

- Ejection sound** Sound caused by the opening of a stenotic aortic or pulmonic valve, usually occurring early in systole.
- Ejection velocity** Measure of the speed of blood flow.
- Elastic recoil** Spontaneous contraction of lung parenchyma that occurs during expiration and that helps move air out of the lungs.
- Elastic tension** Support and traction exerted on the airways because of the natural elastic recoil properties of the surrounding lung parenchyma.
- Epicardial pacing** Regulation of the rate of heart muscle contraction by an artificial cardiac pacemaker stimulating the heart through electrical leads attached to the heart surface.
- Epiglottis** Small elastic cartilage attached at the larynx that covers the opening to the trachea during swallowing.
- Equal pressure point** Point in the airways where intrapulmonary and intrapleural pressures are equal.
- ES** Ejection sound.
- Exudate** Inflammatory fluid leaked from body cells or tissues.
- Fibrosis** Abnormal formation of fibrous connective tissue that usually occurs as a reparative or reactive process within an organ or tissue but ultimately replaces healthy, functional tissue.
- 5LMCL** Fifth intercostal space, left midclavicular line (mitral area).
- 5LSB** Fifth intercostal space, left sternal border (tricuspid area).
- FRC** Functional residual capacity.
- Frequency** Pitch of a breath sound measured in hertz.
- Functional murmur** Benign murmur that does not impair heart function.
- Gallop rhythm** Triple rhythms; the S_1, S_2, S_3 sequence; the S_4, S_1, S_2 sequence; or both. Sounds like a horse's gallop.
- Gas exchange surface** Alveolar capillary surface that is actively involved in diffusing oxygen and carbon dioxide.
- Graham Steell murmur** Pulmonic regurgitation murmur caused by pulmonic hypertension and pulmonic valve ring dilation.
- Heart failure** Clinical syndrome caused by left or right heart dysfunction. Left heart failure results in pulmonary edema and breathlessness. Right heart failure results in

liver congestion, increased venous pressure, and peripheral edema.

Hemidiaphragm One half of the diaphragm (either the right or left side).

High-output condition Physiologic state that causes or results in increased cardiac output.

Hila Medial lung aspects where the bronchi, nerves, and vessels enter and leave.

Holodiastolic Pertaining to the entire diastole; used to describe a murmur that persists throughout diastole.

Holosystolic Pertaining to the entire systole; used to describe a murmur that persists throughout systole.

Holosystolic mitral regurgitation Blood backflow that is caused by an incompetent mitral valve and that can be heard throughout systole.

Hyperinflation Overinflation of the lung that occurs with air trapping in obstructive lung diseases such as emphysema.

Hypertrophic cardiomyopathy Narrowing or constriction of the left ventricle's subaortic region caused by tissue enlargement in that area; also known as idiopathic hypertrophic subaortic stenosis. This condition can be a cause of subvalvular aortic stenosis.

Hypertrophy Enlargement or overgrowth of an organ, or part of an organ, caused by an increase in the size of its constituent cells.

Hypoxemia Abnormally low oxygen tension in arterial blood.

Hz Hertz.

Idiopathic Of unknown cause.

I:E ratio Inspiratory-expiratory ratio.

Impedance matching Similar acoustical characteristics of two organs or types of tissue that allow effective sound transmission.

Incompetent valve Heart valve that cannot perform its functions because of congenital defects, disease, or trauma.

Infective endocarditis Inflammation of the endocardium caused by infection with microorganisms (bacteria or fungi); primarily affects the heart valves.

Inferior vena cava Venous trunk for the lower extremities and the pelvic and abdominal viscera.

Inspiratory-expiratory (I:E) ratio Numerical expression of the duration of inspiration in relation to the duration of expiration.

Intensity Degree of loudness; one of six characteristics used to describe heart sounds.

- Intercostal muscle** One of the muscles found between the ribs. Internal and external intercostal muscles help stabilize and expand or lower the rib cage with ventilation.
- Internodal pathway** One of the fibers connecting the small masses of tissue that transmit the electrical impulses setting the heart's rate and rhythm.
- Interstitial fibrosis** Abnormal formation of fibrous tissue that occurs as a reparative or reactive process within the alveolar septa and interstitial areas of the lungs.
- Interstitium** Small gap in an organ or a tissue; in lung parenchyma, the space between the alveolar and capillary membranes.
- Interventricular septum** Dividing wall between the heart's ventricles.
- Intrapleural pressure** Relative pressure that occurs between the pleurae. Negative pressure occurs during inspiration; positive pressure occurs during expiration.
- Intrapulmonary pressure** Pressure within the lung. Negative pressure causes air to flow inward; positive pressure causes air to move outward.
- Isovolumic contraction** Initial period in early systole when the atrioventricular and semilunar valves are closed and intraventricular pressures rise but blood has not yet been ejected from the ventricles.
- Isovolumic relaxation** Brief period in early diastole when the atrioventricular and semilunar valves are closed, just before the atrioventricular valves open and passive filling of the ventricles begins.
- Laminar airflow** Orderly, linear airflow.
- Larynx** Cartilaginous organ located between the pharynx and the trachea that houses the vocal cords and allows for voice production.
- LBBB** Left bundle-branch block.
- Leaflet** Structure resembling a small leaf, especially a heart valve's cusps.
- Left atrial shunt** Small amount of deoxygenated blood that returns to the left atrium; normally, this is venous return from bronchial circulation.
- Left bundle-branch block** Interrupted conduction through the fiber that activates the left ventricle, resulting in a prolonged or abnormal QRS complex.
- Left lateral recumbent position** Position that brings the heart's apex closer to the chest wall for auscultation. The patient lies on his left side, with his right knee and thigh drawn up to his chest.

Left mainstem bronchus One of two main branches extending from the trachea that supplies air to the left lung. It leaves the trachea at a sharper angle than the right mainstem bronchus and passes under the aortic arch before entering the lung.

Left ventricular decompensation Failure of the left ventricle's myocardium to contract and maintain adequate cardiac output.

Left ventricular heart failure Inability of the left ventricle to pump blood adequately, causing decreased cardiac output, which results in pulmonary congestion and edema.

Left ventricular hypertrophy Enlargement of the left ventricle's myocardium, which can result in reduced or abnormal ventricular functioning.

Left ventricular outflow obstruction Stenosis or other blockage preventing flow of oxygenated blood from the left ventricle into the aorta.

Left ventricular pressure overload Increased pressure within the left ventricle that impairs its ability to function normally; often caused by excessively elevated systemic blood pressure.

Left ventricular volume overload Excessive volume within the left ventricle that causes it to become distended and impairs its ability to function normally.

Lobar Referring to or involving any lung lobe.

Location Site at which a breath or a heart sound can be auscultated.

Lower airway See Tracheobronchial tree.

Low-pitched wheeze Continuous, low-pitched sound that resembles snoring; previously classified as a *sonorous bronchus* or a *sonorous rale*.

M₁ Mitral component of S₁.

Macrophage Large ameboid, mononuclear cell that acts as a defense mechanism against infection; one of three cell types lining the alveoli.

Mainstem bronchi breath sound Harsh, tubular (hollow) breath sound heard over a mainstem bronchus; also known as rhonchi.

Mast cell Connective tissue cell whose specific physiologic function remains unknown. The secretory mast cells on the surface of the large airways may be stimulated or affected by drugs, hormones, antigens, or other messenger cells to precipitate or control bronchoconstriction.

Mean airflow velocity Air flow rates occurring within an airway during the middle part of exhalation.

- Mechanical ventilation** Breathing that is assisted or controlled by a machine (a ventilator).
- Mediastinal crunch** Heart sound created by heart movement against air in the mediastinum; also known as Hamman's sign.
- Mediastinum** Tissues separating the two lungs, between the sternum and the vertebral column and from the thoracic inlet to the diaphragm. It contains the heart and its vessels, the trachea, esophagus, thymus, lymph nodes, and other organs and tissues.
- Middiastolic aortic regurgitation** Turbulent backward blood flow through the aorta into the left ventricle occurring midway between S_2 and S_1 .
- Middiastolic click** Click heard midway between S_2 and S_1 in the cardiac cycle; usually associated with a stenotic or rigid atrioventricular valve.
- Midsystolic ejection murmur** Crisp, high-frequency sound resulting from a stenotic aortic or pulmonic valve opening in systole.
- Mitral regurgitation** Turbulent backward blood flow from the left ventricle into the left atrium caused by the mitral valve's inability to close completely.
- Mitral stenosis** Mitral valve narrowing or constriction.
- Mitral valve** Tissue folds that, when closed, prevent blood flow from the left ventricle to the left atrium; also called the bicuspid valve.
- Mitral valve prolapse** Mitral valve bulging from the proper position back toward the left atrium during systole. It can result in mitral regurgitation.
- Monophonic** Having one distinct musical sound or tone; used to describe selected wheezes.
- MSC** Midsystolic click.
- Mucus** Serous, watery liquid secreted by bronchial glands and goblet cells within the airways.
- Murmur** Sound heard during auscultation that results from vibrations produced by blood moving within the heart and adjacent blood vessels; may be benign or abnormal.
- Myocardial infarction** Tissue death in the heart's muscle; usually caused by inadequate coronary artery perfusion.
- Myocardium** Heart wall, comprised of cardiac muscle tissue.
- Nonejection click** Click caused by a valve that is not associated with movement of blood through or across the valve; often used to describe the click of mitral valve prolapse.
- Normal breath sound** Sound auscultated over chest wall areas of a healthy person.

Normal sinus rhythm Normal physiologic heart rhythm originating in the sinoatrial node; usually considered to be 60 to 100 beats per minute.

O₂-CO₂ exchange Oxygen-carbon dioxide exchange.

Opening click Opening sound created by some prosthetic heart valves or by a diseased valve.

Opening snap Sound created by mitral valve leaflets that have become stenotic or abnormally narrowed but that are still somewhat mobile.

OS Opening snap.

Oscillation Vibration, fluctuation.

P₂ Pulmonic component of S₂.

Papillary muscle Muscular protrusion, or projection, in the ventricles that attaches to and regulates the atrioventricular valves by way of the chordae tendineae.

Parasympathetic nervous system Part of the involuntary nervous system that supplies innervation to the internal organs. The hormone mediator is acetylcholine. The vagus nerve is a parasympathetic nerve that innervates the airways and, when stimulated, causes smooth muscle contraction, cough, and mucus discharge from the bronchial glands.

Parenchyma Functioning cells of an organ that distinguish or determine the primary organ function.

Patent ductus arteriosus Abnormal channel connecting the pulmonary artery to the descending aorta; results in arterial blood recirculation through the lungs.

PCG Phonocardiogram.

PDA Patent ductus arteriosus.

PEEP Positive end-expiratory pressure.

Perfusion Blood flow to or through an organ or tissue supplied by the blood vessels.

Pericardial fluid Fluid in the space between the visceral and parietal layers of the pericardium.

Pericardial friction rub Characteristic high-pitched friction noise created by inflamed or dry pericardial surfaces rubbing together.

Pericardial knock S₃ associated with constrictive pericarditis.

Pericarditis Inflammation of the pericardium.

Pericardium Two-layer fibrous sac that surrounds the heart and the roots of the great vessels.

Peripheral Toward the outer boundary or perimeter; not central.

Peripheral vascular resistance Resistance to the passage of blood through the small blood vessels, especially the

arterioles, caused by friction between the blood and the blood vessel wall.

Pharynx Musculomembranous passage between the posterior nares and the larynx and esophagus; also referred to as the throat. It serves as a joint conduit for food and air.

Phonation Production of vocal sounds.

Phonocardiogram Graphic record of heart sounds and murmurs, including pulse tracings, produced by phonocardiography.

Physiologic S₃ S₃ that is not associated with an abnormal condition; often found in young individuals.

Pitch A tone's vibration or frequency, measured in cycles per second as sound amplitude; subjectively described as high, medium, or low.

Plateau-shaped murmur Murmur in which intensity is the same, or flat, throughout its duration.

Pleurae Thin, serous membranes that surround the lungs (visceral pleura) and line the thoracic cavity's inner walls (parietal pleura).

Pleural crackle Loud, grating sound caused by inflamed or damaged pleurae; also called *pleural friction rub*.

Pleural effusion Abnormal accumulation of fluid between visceral and parietal pleurae.

Pleural friction rub Sound created by friction between the parietal and visceral pleurae surrounding the lungs; similar to a pericardial friction rub.

PMI Point of maximum impulse.

Pneumonia Inflammation of the lung parenchyma.

Pneumothorax Accumulation of air within the pleural cavity.

Point of maximum impulse Chest wall site where the heart-beat can be seen or felt most strongly; often located over the heart's apex.

Polyphonic Having multiple distinct musical sounds or tones; used to describe selected wheezes.

Porcine valve Prosthetic heart valve made from swine (pig) products.

Positive end-expiratory pressure Application of positive pressure to exhalation during mechanical ventilation; used to help prevent expiratory airway collapse and thus improve oxygenation.

Pressure gradient Difference in pressure between two regions.

PR interval Time between atrial depolarization and ventricular depolarization, as recorded on the ECG. The PR interval begins at the onset of the P wave and lasts until

the onset of the QRS complex. Ordinarily, atrial contraction occurs during the PR interval.

Prosthetic valve Artificial heart valve replacing a nonfunctional valve. Ball-in-cage, bileaflet, porcine, and tilting-disk are four kinds of prosthetic heart valves.

Pulmonary artery Blood vessel leading from the right ventricle to the lungs.

Pulmonary artery dilation Expansion or stretching of the pulmonary artery beyond its normal dimensions.

Pulmonary circulation Blood pumped by the right ventricle into the pulmonary artery that circulates through the pulmonary capillary beds, where gas exchange occurs. The oxygenated blood is carried to the left atrium via the pulmonary veins.

Pulmonary edema Excessive accumulation of fluid within the lung.

Pulmonary hypertension Increased blood pressure within the pulmonary circulation.

Pulmonary vein One of four veins that return oxygenated blood from the lungs to the heart's left atrium.

Pulmonic ejection sound High-pitched click commonly created by the opening of a stenotic pulmonic valve. It is the only right-sided heart sound whose intensity increases during expiration and decreases during inspiration.

Pulmonic regurgitation Abnormal condition of backward blood flow across the pulmonic valve during diastole.

Pulmonic stenosis Narrowing or constriction of the pulmonic valve or the region just above or below the valve.

Pulmonic valvular stenosis Narrowing or constriction of the pulmonic valve.

Purkinje fibers Modified cardiac muscle cells found beneath the endocardium. They are part of the heart's electrical impulse-conducting system.

P wave Part of the ECG tracing that represents atrial depolarization.

QRS complex ECG waves representing the spread of electrical impulses from the bundle branches to the ventricular muscle. The QRS complex corresponds to ventricular depolarization.

Quality Heart sound characteristic determined by a combination of the sound's frequencies; one of six characteristics used to describe heart sounds. A sound's quality may be described as sharp, dull, booming, snapping, blowing, harsh, or musical.

Radiation Spread of a heart sound beyond its area of origin.

Rale *See* Crackle.

RBBB Right bundle-branch block.

Regurgitant murmur Sound created by turbulent backward blood flow through an incompetent heart valve.

Repolarization Movement of calcium ions into the cell and potassium ions out of the cell, followed by the extrusion of sodium and calcium ions from the cell and the restoration of potassium ions into the cell by the sodium-potassium pump.

Resistance Force that hinders motion; hindrance or impedance.

Resonance Sound quality produced by percussing structures or cavities that radiate sound vibrations and energy.

Respiratory cycle One complete cycle of inspiration and expiration.

Rheumatic heart disease Valvular abnormalities that are a sequela of rheumatic fever; most commonly, mitral, tricuspid, or aortic stenosis and insufficiency.

Rhonchus *See* Low-pitched wheeze; plural form: Rhonchi.

Right bundle-branch block Interrupted conduction through the fiber that activates the right ventricle, resulting in a prolonged QRS complex.

Right mainstem bronchus One of two main branches extending from the trachea that supplies air to the right lung. It leaves the trachea at a less-acute angle than the left mainstem bronchus and is a more likely landing site for aspirated foreign bodies.

Right-sided S₃ Heart sound caused by a noncompliant right ventricle and high right atrial pressure. It is heard in patients with cor pulmonale, pulmonary embolism, right ventricular failure secondary to mitral stenosis with left-sided heart failure or pulmonary hypertension, and severe tricuspid insufficiency.

Right-sided S₄ S₄ generated in the right ventricle; often heard in conditions that create pressures greater than 100 mm Hg in that ventricle. It may accompany such conditions as pulmonic stenosis, pulmonary hypertension, or sudden tricuspid regurgitation.

Right ventricular failure Inability of the right ventricle to continue functioning properly.

Right ventricular outflow obstruction Stenosis, embolus, or other blockage preventing flow of deoxygenated blood from the right ventricle into the pulmonary artery.

S₁ First heart sound; produced by closure of the mitral (M₁) and tricuspid (T₁) valves.

- S₂** Second heart sound; produced by closure of the aortic (A₂) and pulmonic (P₂) valves.
- S₃** Third heart sound; created by vibrations caused by the rapid, passive filling of the ventricles. S₃ is abnormal in adults over age 20. The cadence is similar to the word "Tennessee."
- S₄** Fourth heart sound; generated by stretching and filling of a ventricle during late diastole; associated with atrial contraction. The cadence is similar to the word "Kentucky."
- SA** Sinoatrial.
- Sarcoidosis** Granulomatous disease of unknown origin that may cause pulmonary fibrosis.
- Scapula** Triangular flat bone that makes up part of the shoulder girdle; also known as the *shoulder blade*.
- Segmental bronchus** Airway that branches from a lobar bronchus and conducts air to a lung segment.
- SEM** Systolic ejection murmur (also referred to as SM).
- Semilunar valves** Heart valves between the ventricles and the pulmonary artery and aorta.
- Serous** Having a watery consistency.
- Shunting** Abnormal communication between the high-pressure arterial system and the low-pressure venous system.
- Silent chest** Absence of breath sounds during auscultation; usually associated with severe bronchospasm and insufficient airflow to produce sounds.
- Sinoatrial node** Small mass of tissue at the junction of the superior vena cava and the right atrium, which triggers the electrical impulses that begin the cardiac cycle.
- SM** Systolic murmur (also referred to as SEM).
- Snap** Short, sharp heart sound associated with sudden closing or opening of a heart valve.
- Status asthmaticus** Severe asthma that is resistant to treatment; characterized by respiratory insufficiency or failure, wheezing, and severe dyspnea.
- Stenosis** Narrowing or constriction of a passage, specifically a heart valve or region around the outflow tract of any of the heart's chambers.
- Sternal border** Auscultatory area along and to either side of the sternum.
- Stethoscope** Instrument used in auscultation; usually consists of a diaphragm and a bell, which are connected to one or two tubes leading to a binaural headpiece and earpieces.

- Stridor** Noisy, high-pitched sound that can usually be heard at a distance from the patient; caused by laryngeal spasm and mucosal swelling, which contract the vocal cords and narrow the airway.
- Stroke volume** Amount of blood pumped during each ventricular contraction.
- Subcutaneous emphysema** Presence of air or gas in the tissues beneath the skin. It results in crackling or crepitus when touched.
- Subvalvular aortic stenosis murmur** Murmur caused by a left ventricular outflow obstruction below the aortic valve.
- Subvalvular pulmonic stenosis** Narrowing or constriction of the region below the pulmonic valve.
- Subvalvular pulmonic stenosis murmur** Murmur caused by a right ventricular outflow obstruction below the pulmonic valve.
- Summation gallop** S_4 that occurs simultaneously with S_3 , thus sounding louder.
- Superior vena cava** Major vein that drains blood from the upper half of the body, beginning below the right costal cartilage and continuing to the right atrium.
- Supine** Lying on the back, face up.
- Supravalvular aortic stenosis murmur** Murmur caused by left ventricular outflow obstruction above the aortic valve.
- Supravalvular pulmonic stenosis** Narrowing or constriction of the region above the pulmonic valve.
- Supravalvular pulmonic stenosis murmur** Murmur caused by a right ventricular outflow obstruction above the pulmonic valve.
- Surfactant** Active surface agent that acts to decrease surface tension, thereby preventing alveolar collapse; believed to be secreted by type II alveolar cells.
- Sympathetic nervous system** Part of the nervous system that supplies innervation to the visceral and musculoskeletal system. Its primary hormone transmitter is norepinephrine. Sympathetic innervation to the airways facilitates smooth muscle relaxation, thereby causing bronchial dilatation.
- Systemic hypertension** Condition in which the patient has a higher-than-normal overall blood pressure.
- Systole** Ventricular contraction that ejects blood into the arterial system. The left ventricle ejects into the aorta, and the right ventricle ejects into the pulmonary artery.

- Systolic crescendo murmur** Heart sound that begins as a faint sound, then rises in volume; occurs during the ventricular contraction phase of the cardiac cycle.
- Systolic ejection murmur** Murmur heard in systole that is caused by turbulent blood flow as the right or left ventricle ejects blood; it can be an innocent murmur.
- Systolic regurgitation murmur** Sound created by turbulent backward blood flow from either the mitral or tricuspid valve during the ventricular contraction phase of the cardiac cycle.
- T₁** Tricuspid component of S₁.
- Terminal respiratory bronchioles** Final part of the conducting airways. They mark the beginning of the respiratory zone.
- Thoracic cavity** Space within the rib cage that begins at the clavicle and ends at the diaphragm.
- Thorax** Bony structure that encloses the thoracic cavity, protecting the heart, lungs, and great vessels.
- 3LSB** Third intercostal space, left sternal border (Erb's point).
- Thrill** Abnormal tremor felt on palpation that accompanies some vascular or cardiac murmur.
- Tilting-disk valve** Prosthetic heart valve characterized by a disk that tilts with ventricular pressure to open and close the valvular opening.
- Tracheal breath sound** Loud, tubular (hollow) breath sound auscultated over the trachea that is audible during inspiration and expiration.
- Tracheobronchial tree** Portion of the airway that begins at the larynx and ends at the terminal bronchioles; also known as the *lower airway*.
- Tricuspid insufficiency** Tricuspid valve incompetence during systole, which allows turbulent backward, or regurgitant, blood flow into the right atrium.
- Tricuspid stenosis** Narrowing or constriction of the tricuspid valve.
- Tricuspid valve** Heart valve between the right atrium and right ventricle.
- Tubular breath sound** Loud, hollow sound characteristically heard over the trachea and mainstem bronchi.
- Turbinate** See Conchae.
- Turbulence** Disturbed or irregular airflow; can be caused by rapid flow rates or variations in air pressures and velocities.

- T wave** Part of the ECG tracing that represents ventricular repolarization.
- 2LSB** Second intercostal space, left sternal border (pulmonic area)
- 2RSB** Second intercostal space, right sternal border (aortic area)
- Type I alveolar cell** One of three cell types that make up the alveoli; covers approximately 95% of the alveolar surface area.
- Type II alveolar cell** One of three cell types that line the alveoli; source of pulmonary surfactant.
- Valsalva's maneuver** Attempt to exhale forcibly with the glottis closed.
- Ventilation** Movement of air in and out of the lungs.
- Ventricular ejection** Ventricular contraction that sends blood into the arterial system; called systole in the cardiac cycle.
- Ventricular filling** Ventricular relaxation and expansion that allows blood to enter; called diastole in the cardiac cycle.
- Ventricular outflow obstruction** Blockage in the valve or vessel that carries blood out of one of the heart's ventricles.
- Ventricular septal defect** Opening in the septum between the ventricles; usually represents a congenital abnormality.
- Ventricular tachycardia** Rapid heart rate originating from one or more ectopic foci in the ventricle.
- Vesicular sounds** Term frequently used to describe normal breath sounds auscultated over most of the chest wall.
- Vocal cord** One of two membranous structures in the larynx responsible for phonation.
- Vortex** Circular airflow caused by the shearing force of high-velocity airstreams alongside slower airstreams. Vortices within the airways are precipitated by airway branching that causes airflow to change direction abruptly.
- Wheeze** Continuous, high-pitched sound that has a musical quality; results from bronchospasm.
- Whispered pectoriloquy** High-frequency whispered voice sound auscultated over consolidated or atelectatic areas.