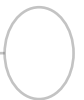
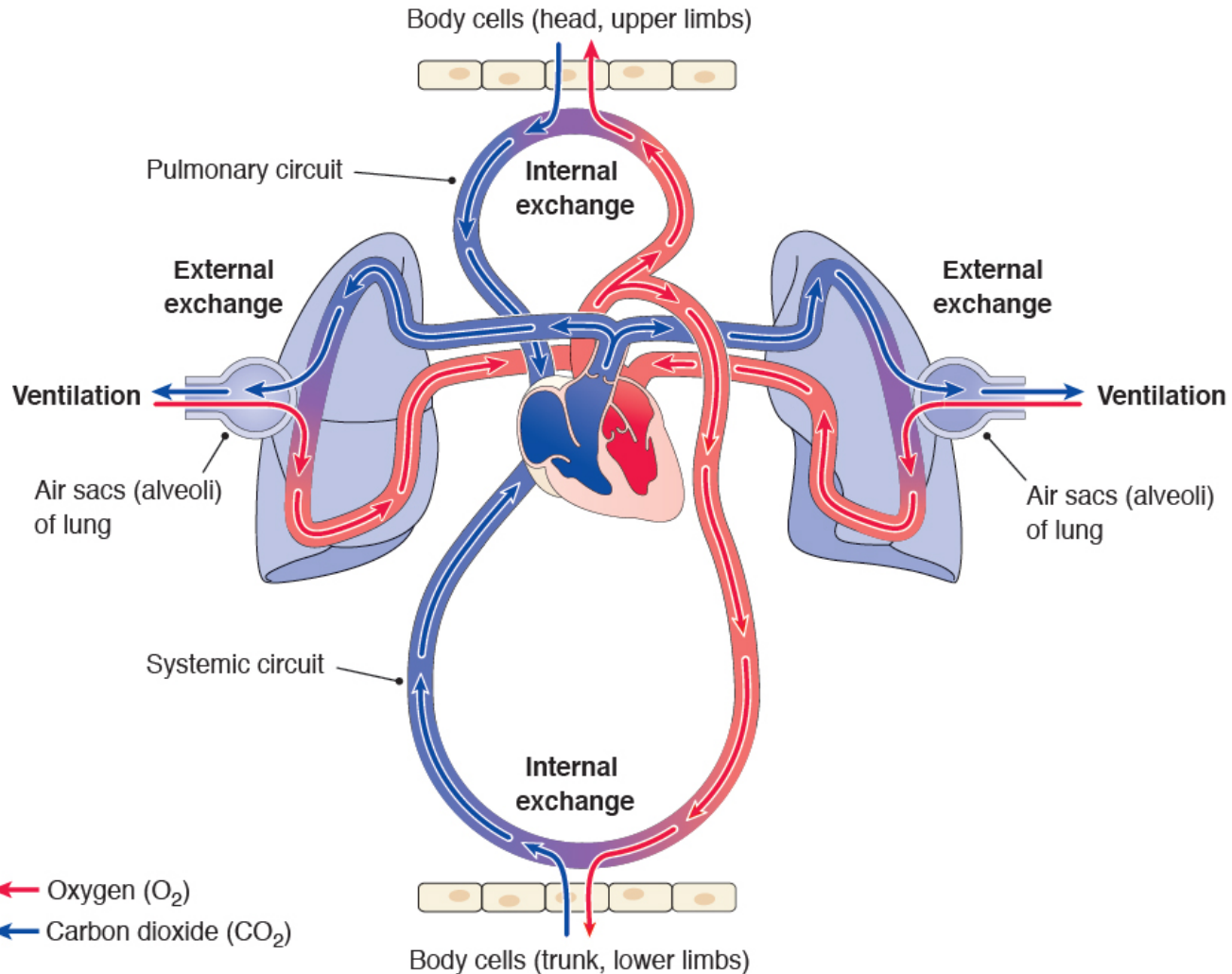


# Respiratory System

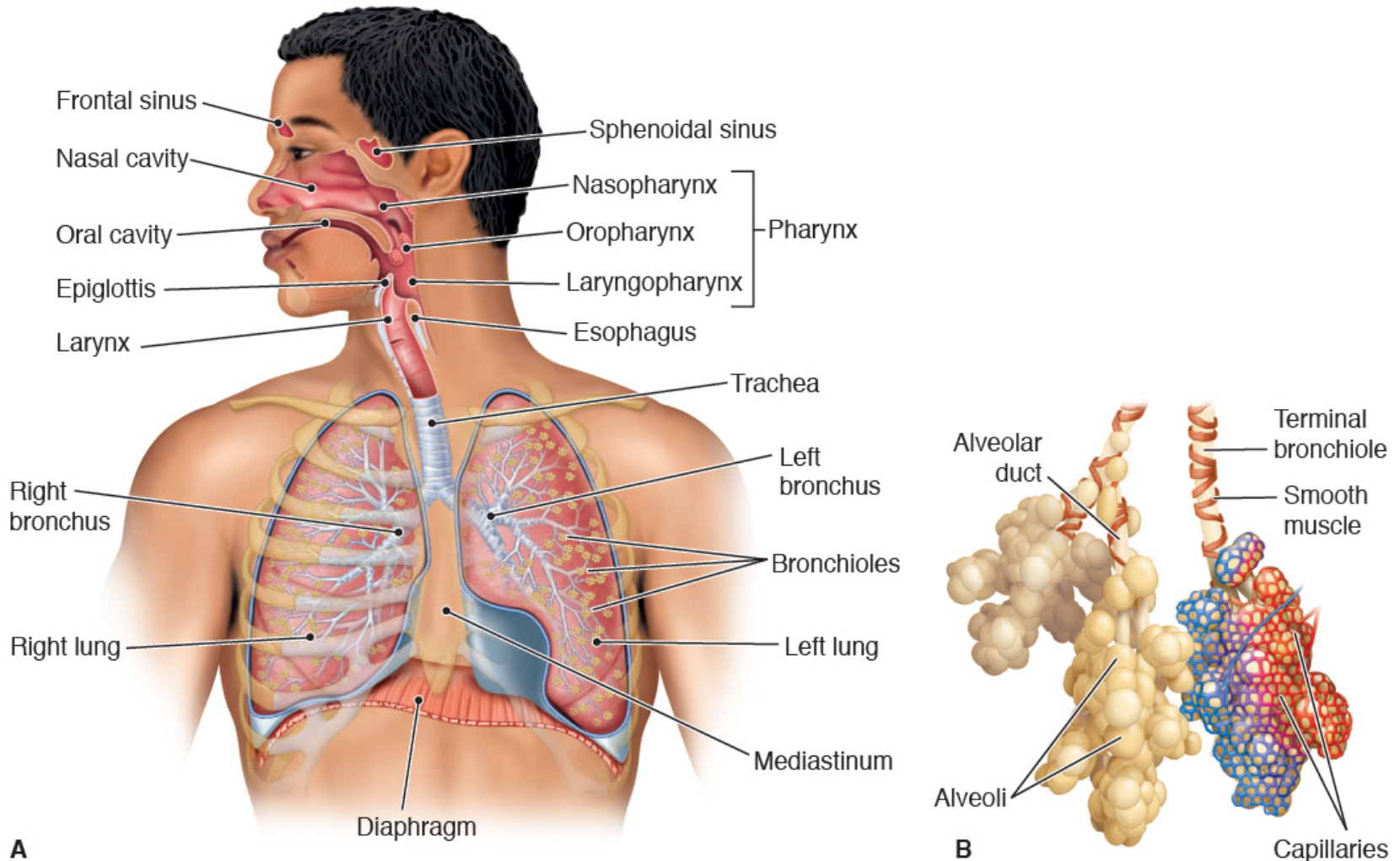




Respiration. In ventilation, gases are moved into and out of the lungs. In external exchange, gases move between the air sacs (alveoli) of the lungs and the blood. In internal exchange, gases move between the blood and body cells. The circulation transports gases in the blood.

Cohen B, Hull K. Memmler's The Human Body in Health and Disease. 14th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2019.





The respiratory system. A. Overview including some nearby structures. B. Enlarged section of lung tissue showing the relationship between the alveoli (air sacs) and the blood capillaries.

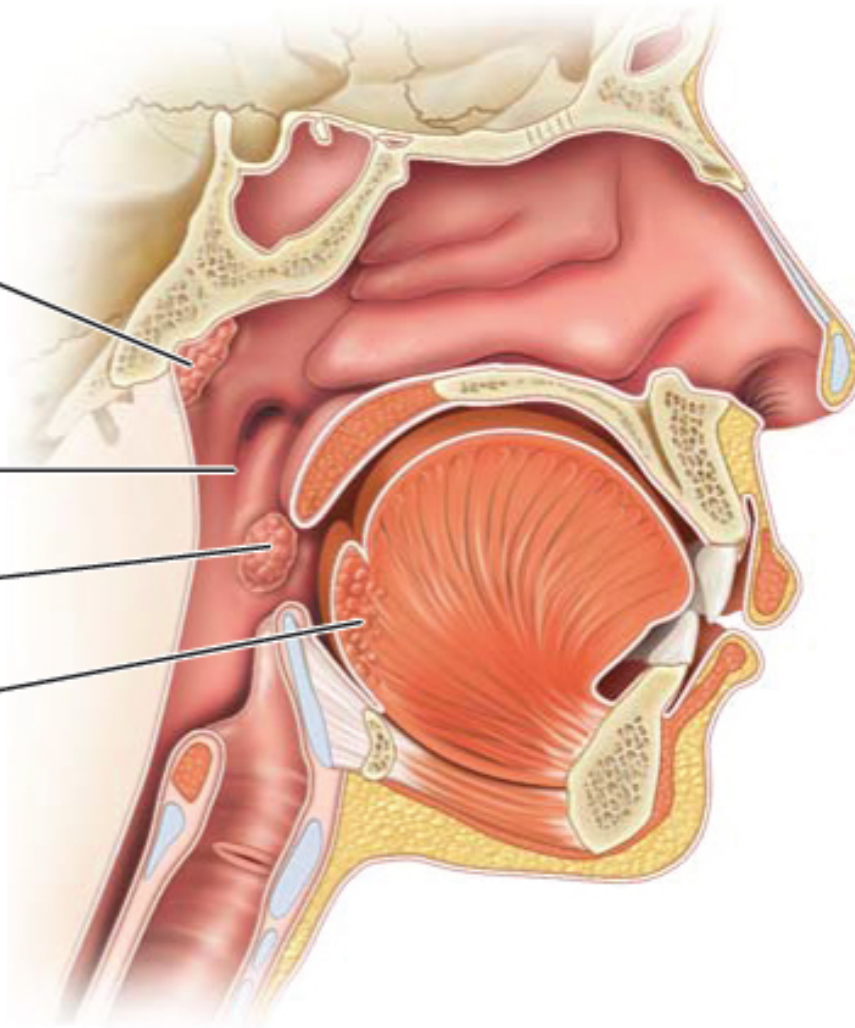
A, B: McConnell T, Hull K. Human Form, Human Function. Philadelphia, PA: Lippincott Williams & Wilkins; 2011.

Pharyngeal  
tonsil  
(adenoids)

Pharynx

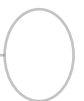
Palatine  
tonsil

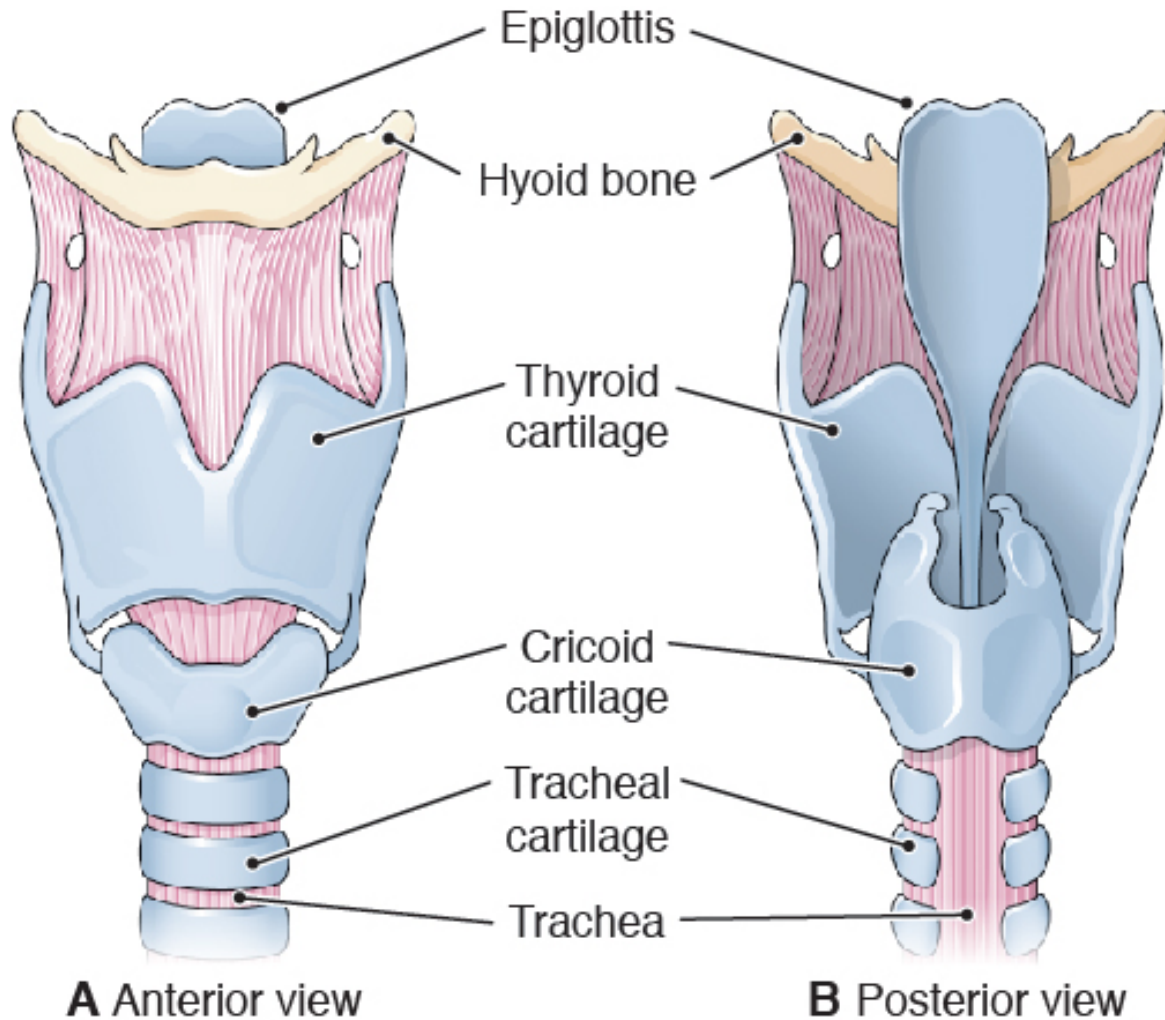
Lingual  
tonsil



The tonsils. All of the tonsils are located in the vicinity of the pharynx (throat).

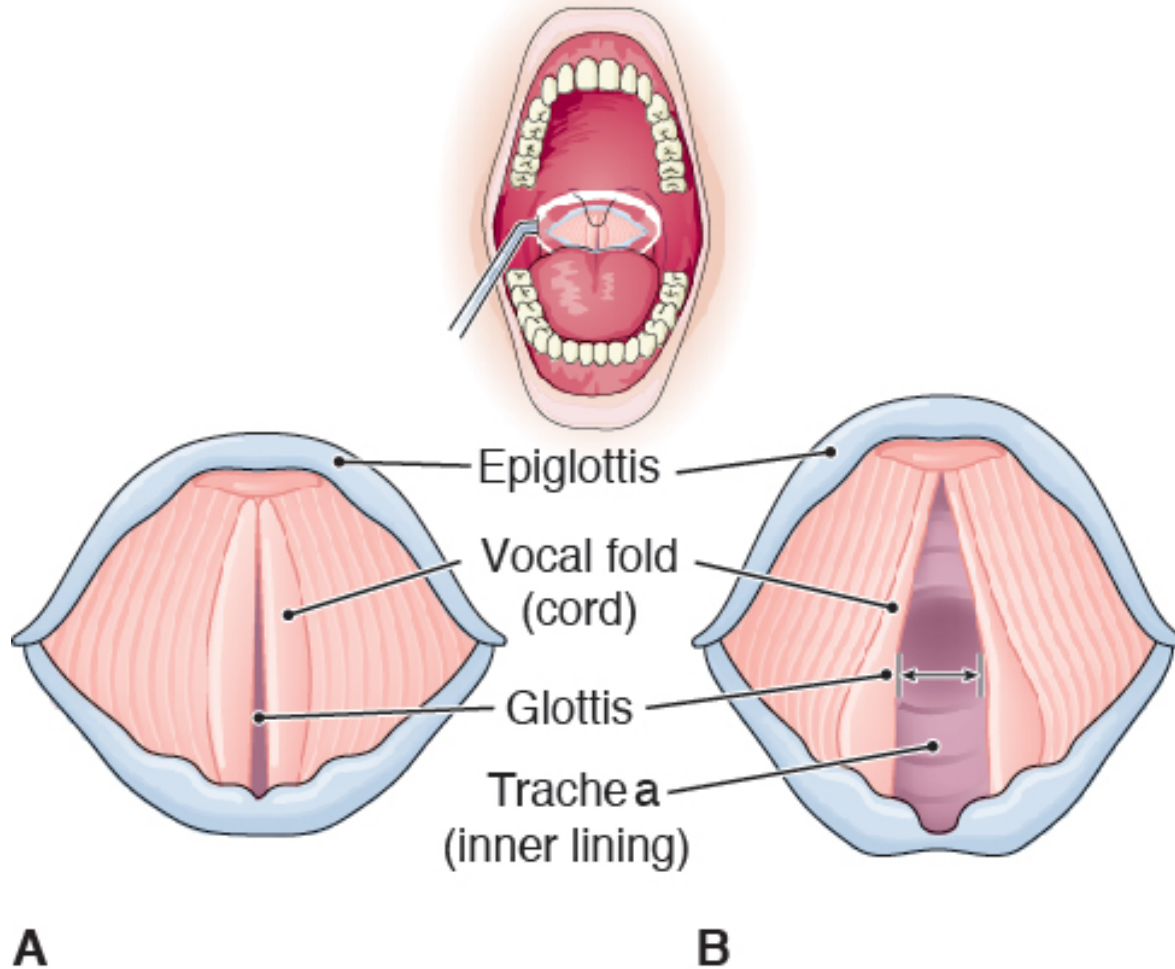
Archer P, Nelson LA. Applied Anatomy and Physiology for Manual Therapists. Philadelphia, PA: Lippincott Williams & Wilkins; 2012.



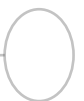


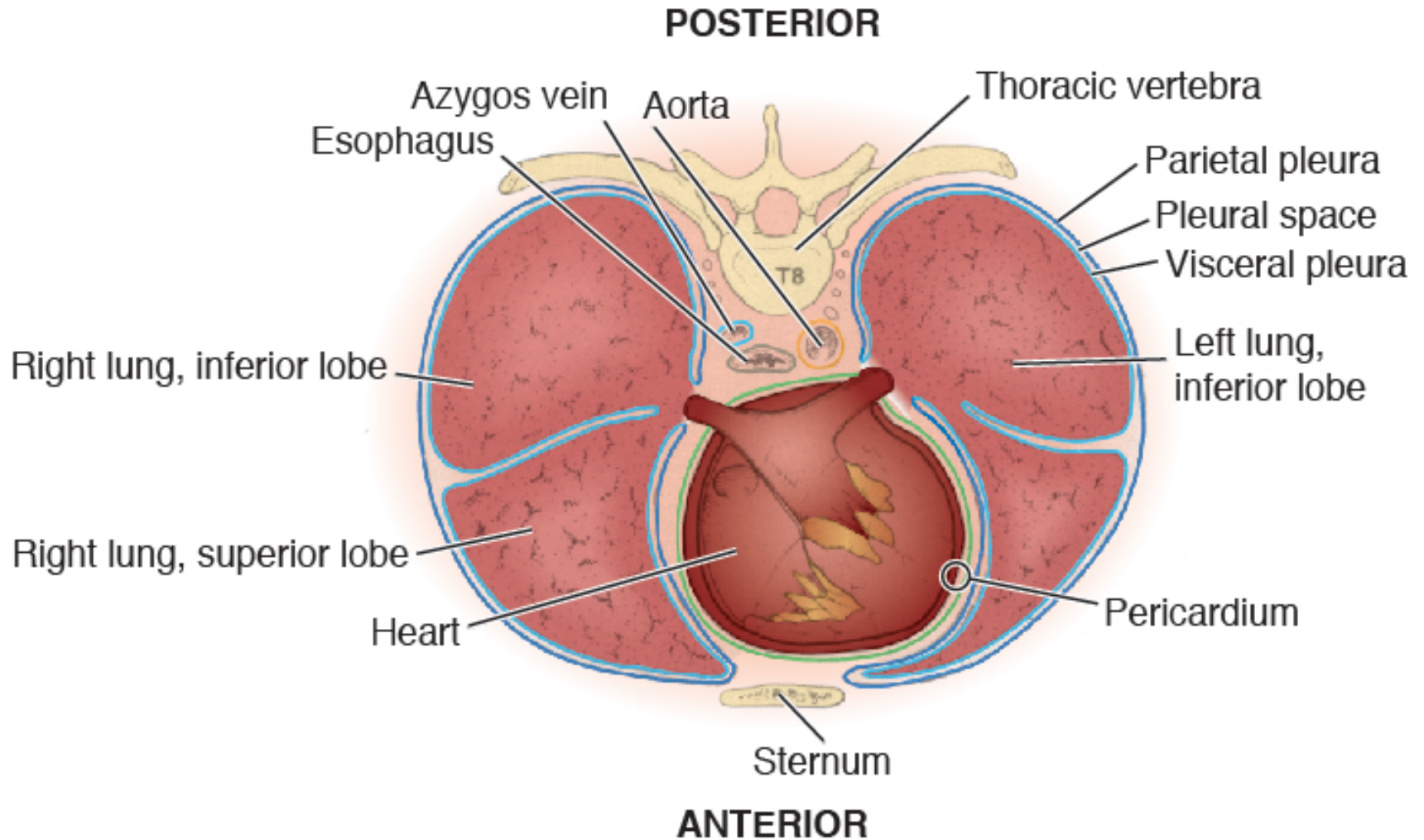
The larynx from anterior (A) and posterior (B) views.





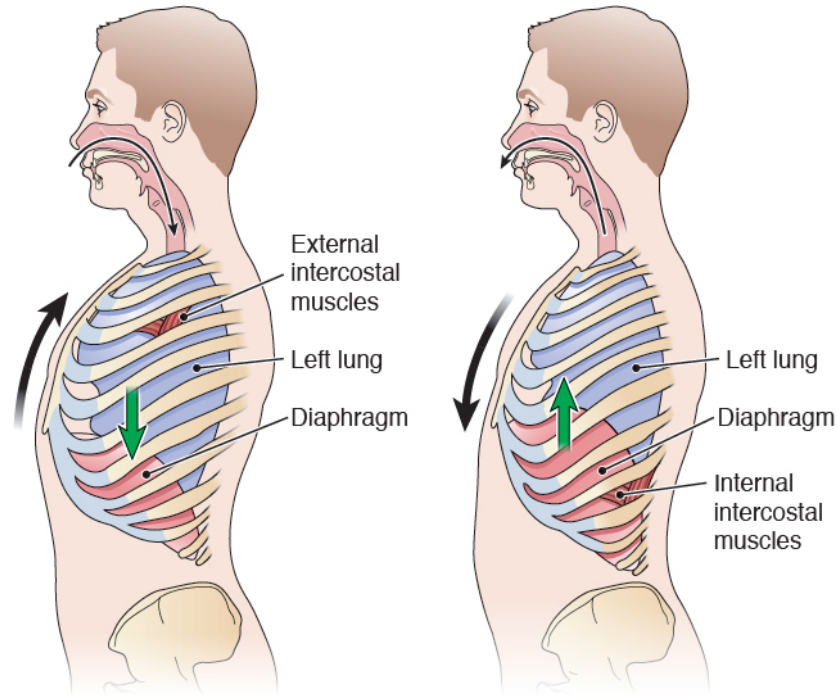
The vocal folds, superior view. A. The glottis in closed position. B. The glottis in open position.





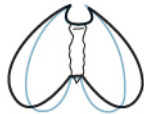
The pleura. A transverse section through the lungs shows the parietal and visceral layers of the pleura as well as structures in the mediastinum.





During inhalation, the diaphragm presses the abdominal organs downward and forward.

During exhalation, the diaphragm rises and recoils to the resting position.



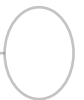
**A** Action of rib cage in inhalation



**B** Action of rib cage in exhalation

**Pulmonary ventilation. A.** In inhalation, the diaphragm lowers, and the external intercostals elevate the rib cage. **B.** In exhalation, the breathing muscles relax, the diaphragm rises, and the lungs spring back to their original size. The internal intercostals draw the ribs downward in forceful exhalation.

Cohen B, Hull K. Memmler's The Human Body in Health and Disease. 14th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2019.





## Suffixes for Respiration

Suffix	Meaning	Example	Definition of Example
-pnea	breathing	dyspnea <i>disp-NE-ah</i>	shortness of breath; painful or difficult breathing
-oxia*	level of oxygen	hypoxia <i>hi-POK-se-ah</i>	decreased amount of oxygen in the tissues
-capnia*	level of carbon dioxide	hypocapnia <i>hi-po-KAP-ne-ah</i>	decreased carbon dioxide in the tissues
-phonia	voice	aphonia <i>ah-FO-ne-ah</i>	loss of voice

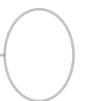
\*When referring to levels of oxygen and carbon dioxide in the blood, the suffix -emia is used as in hypoxemia, hypercapnemia



## Roots for the Respiratory Passageways

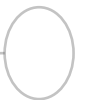
Root	Meaning	Example	Definition of Example
nas/o	nose	intranasal <i>in-trah-NA-zal</i>	within the nose
rhin/o	nose	rhinoplasty <i>RI-no-plas-te</i>	plastic repair of the nose
pharyng/o*	pharynx	pharyngeal <i>fah-RIN-je-al</i>	pertaining to the pharynx
laryng/o*	larynx	laryngospasm <i>lah-RIN-go-spazm</i>	spasm (sudden contraction) of the larynx
trache/o	trachea	tracheotome <i>TRA-ke-o-tome</i>	instrument used to incise the trachea
bronch/o, bronch/i	bronchus	bronchogenic <i>brong-ko-GEN-ik</i>	originating in bronchus
bronchiol	bronchiole	bronchiolectasis <i>brong-ke-o-LEK-tah-sis</i>	dilation of the bronchioles

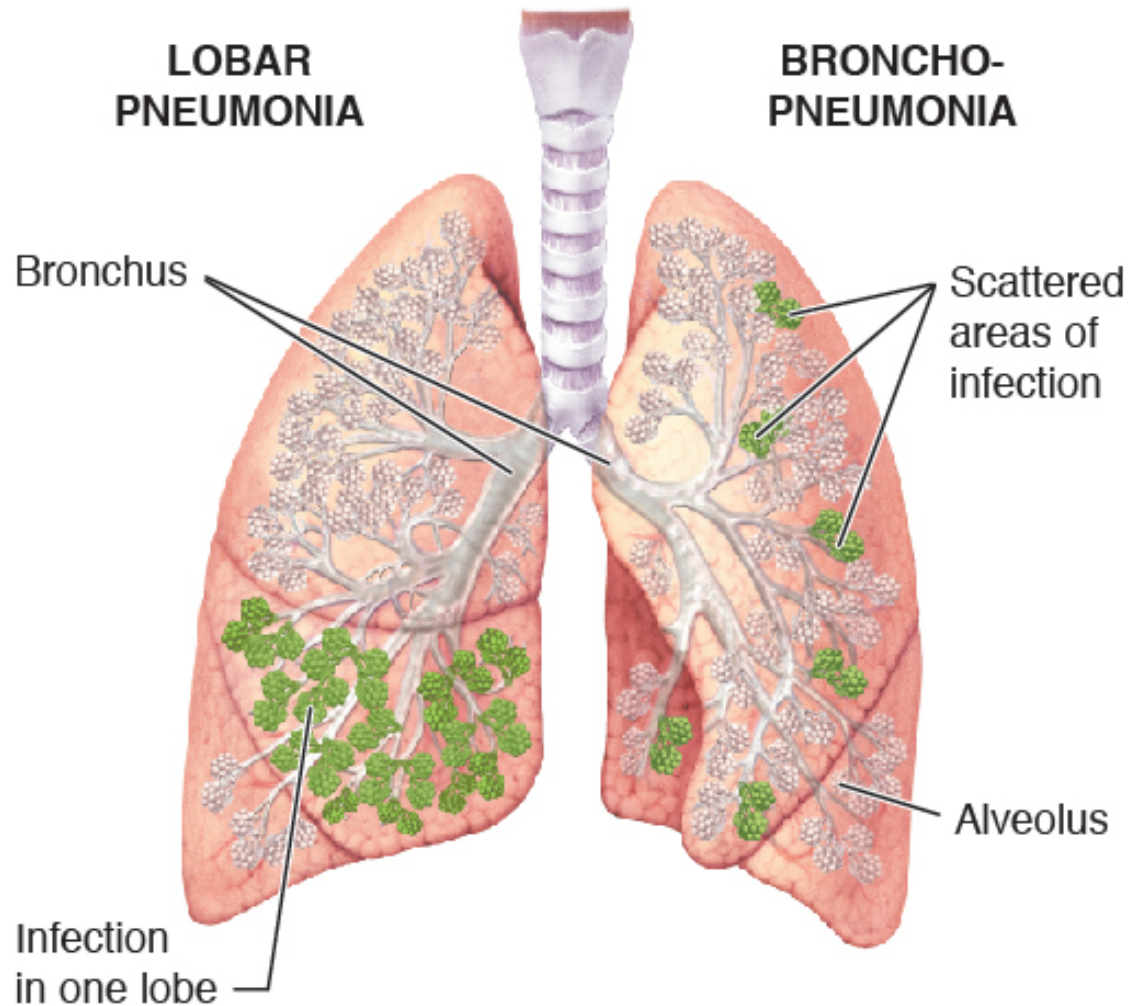
\*An e is added to the root before the adjective ending -al.



## Roots for the Lungs and Breathing

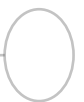
Root	Meaning	Example	Definition of Example
phren/o	diaphragm	phrenic <i>FREN-ik</i>	pertaining to the diaphragm
phrenic/o	phrenic nerve	phrenicectomy <i>fren-ih-SEK-to-me</i>	partial excision of the phrenic nerve
pleur/o	pleura	pleurodesis <i>plu-ROD-eh-sis</i>	fusion of the pleura
pulm/o, pulmon/o	lung	extrapulmonary <i>EKS-trah-pul-mo-nar-e</i>	outside the lungs
pneumon/o	lung	pneumonitis <i>nu-mo-NI-tis</i>	inflammation of the lung; pneumonia
pneum/o, pneumat/o	air, gas; also respiration, lung	pneumothorax <i>nu-mo-THO-raks</i>	presence of air in the thorax (pleural space)
spir/o	breathing	spirometer <i>spi-ROM-eh-ter</i>	instrument for measuring breathing volumes

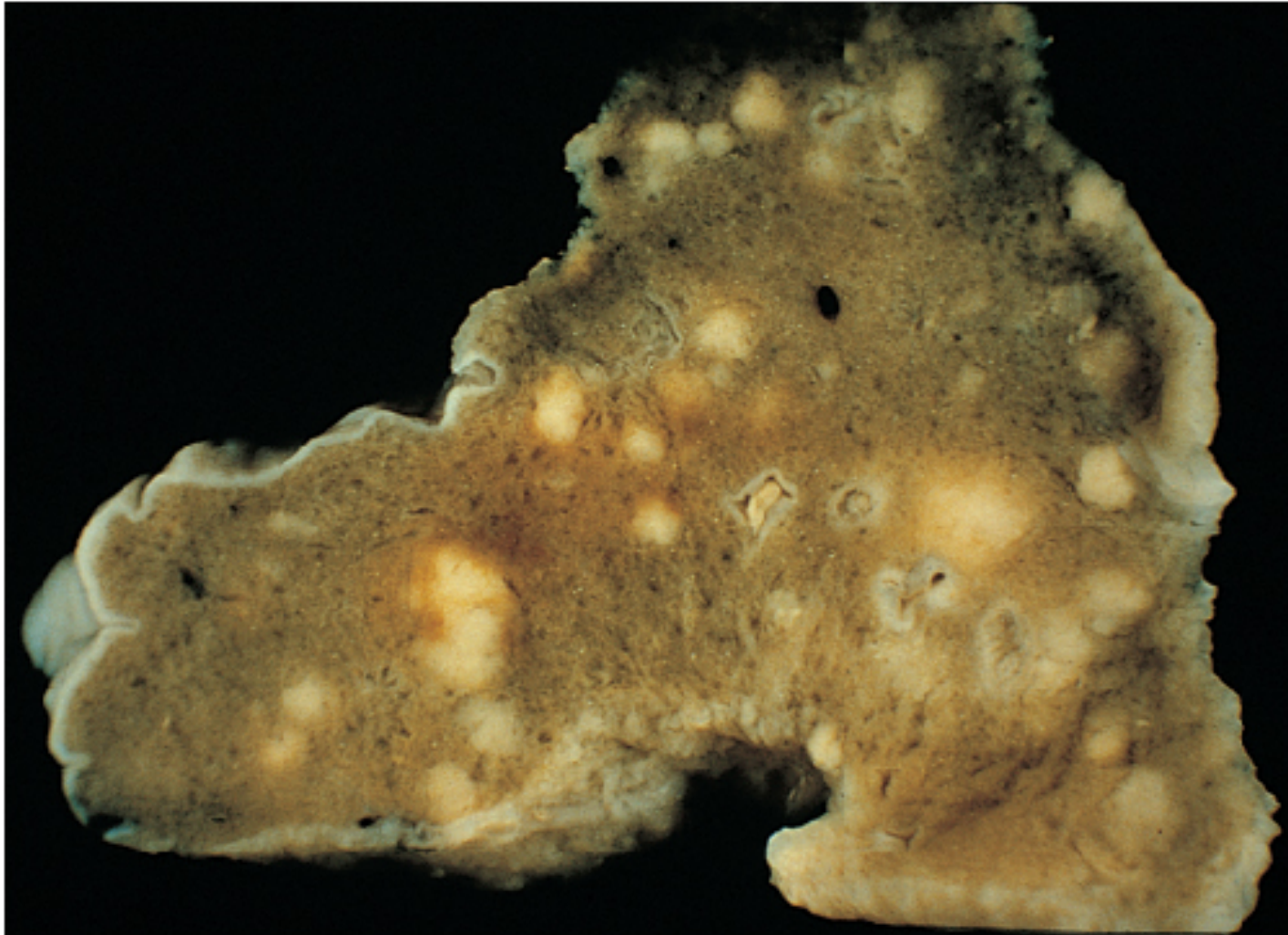




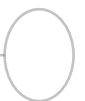
Pneumonia. In lobar pneumonia (right lung), an entire lobe is consolidated. In bronchopneumonia (left lung), patchy areas of consolidation occur throughout the lung.

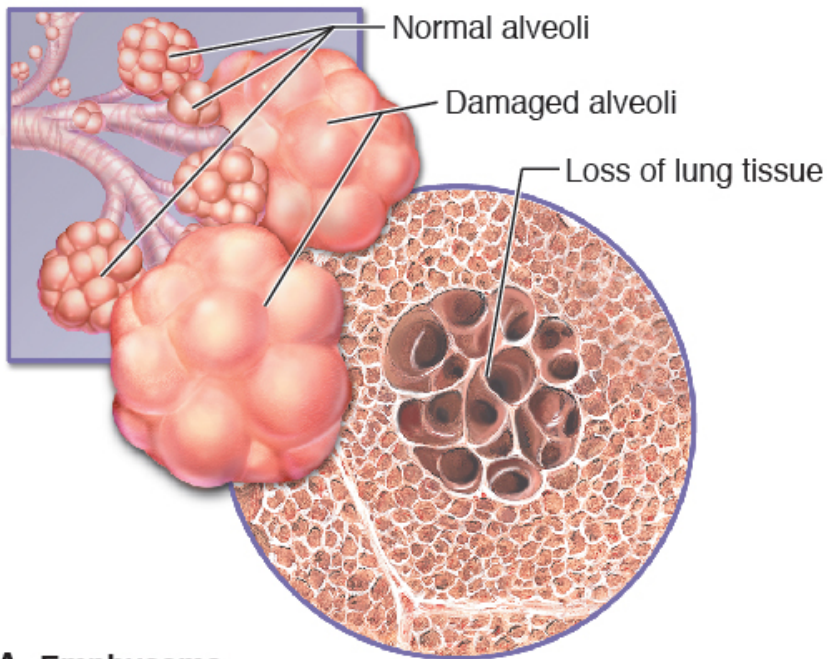
Lippincott's Visual Nursing, 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2011.



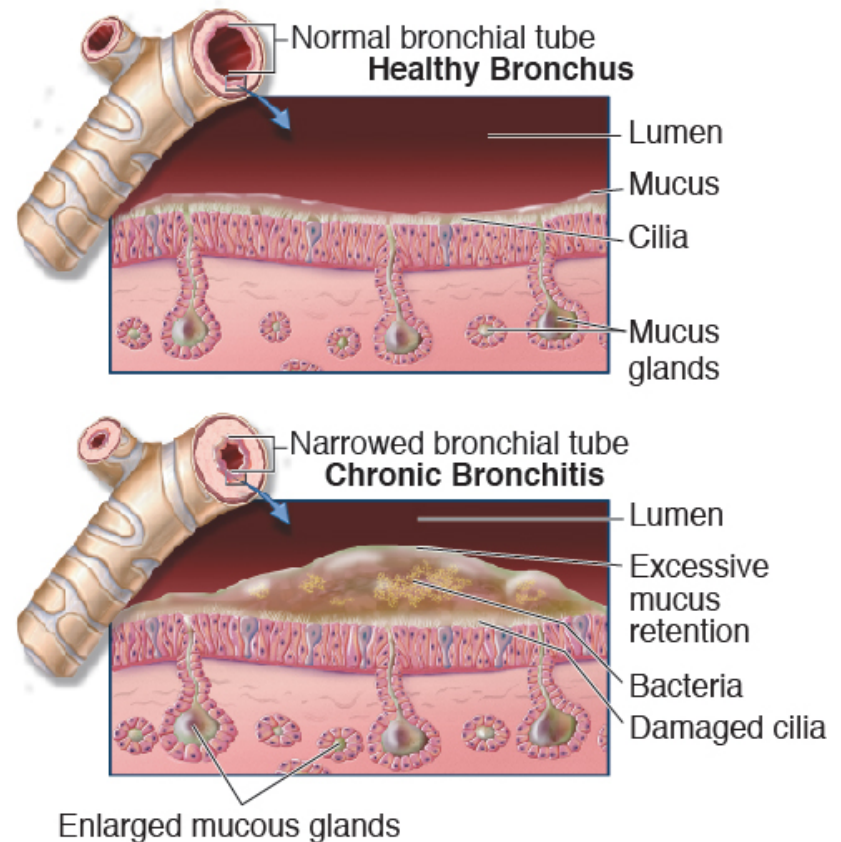


Tuberculosis. The cut surface of the lung reveals numerous white nodules in miliary (generalized) tuberculosis.





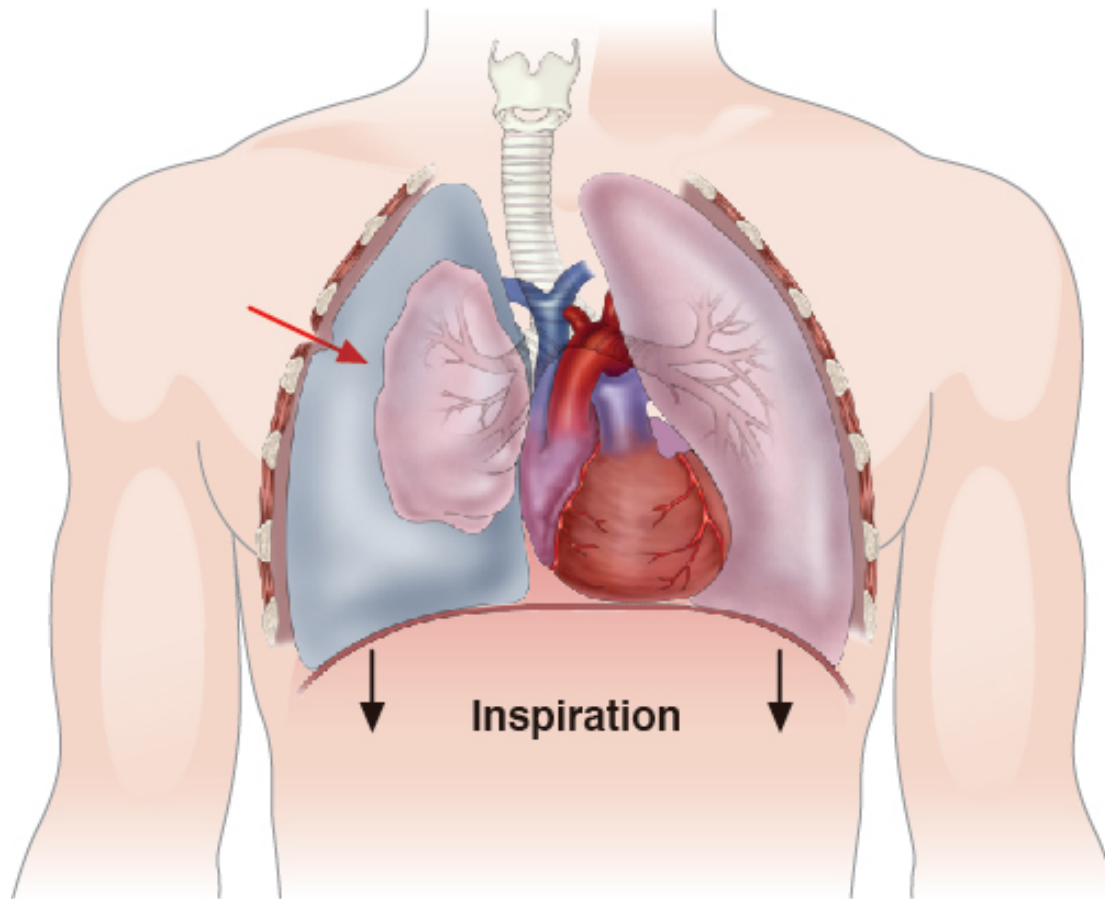
**A. Emphysema**



**B. Chronic Bronchitis**

Types of chronic obstructive pulmonary disease (COPD). A. Emphysema results in dilation and destruction of alveoli. B. Chronic bronchitis involves airway inflammation, damage to cilia, and excess mucus secretion.

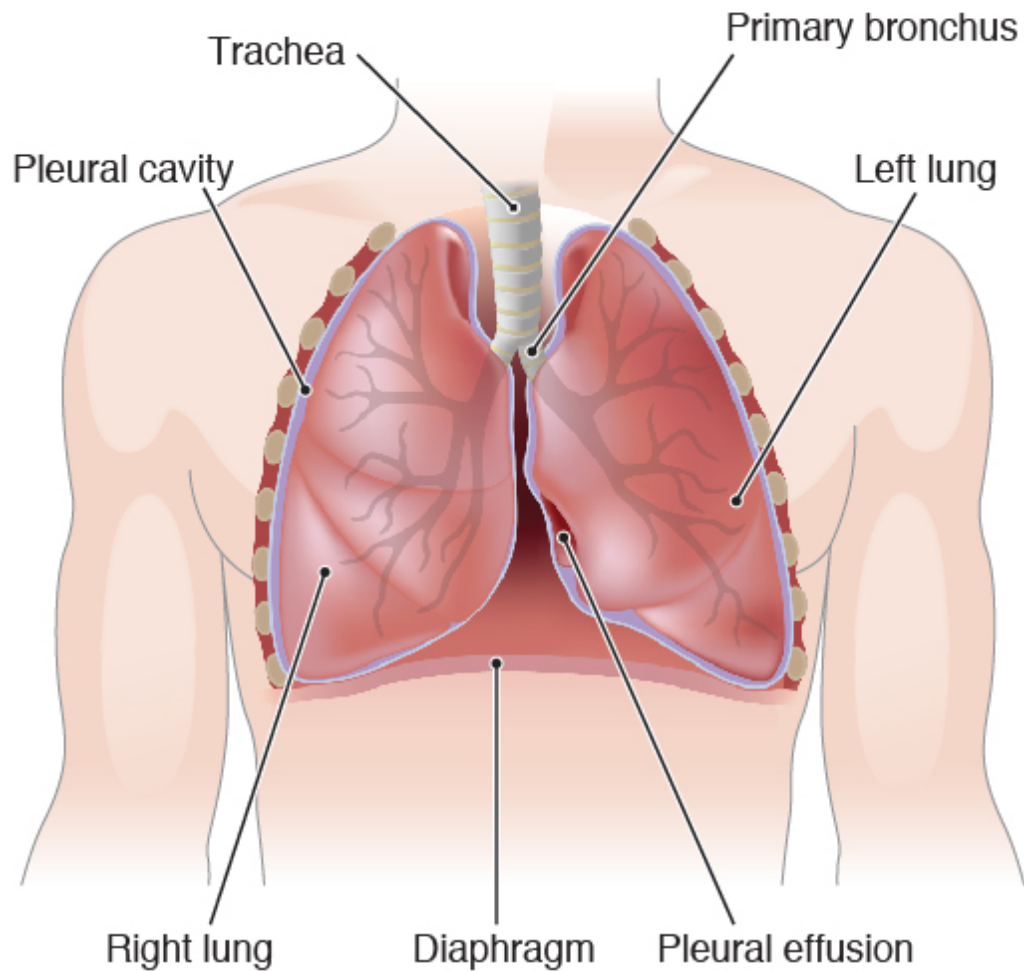
Anatomical Chart Company. Diseases and Disorders. Philadelphia, PA: Lippincott Williams & Wilkins; 2008.



Pneumothorax. Injury to the chest wall or lung tissue allows air to leak into the pleural space (red arrow) and put pressure on the lung. This may result in partial or complete collapse of the lung.

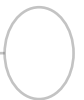
Paul P, et al. Brunner and Suddarth's Canadian Textbook of Medical Surgical Nursing. 3rd ed. Philadelphia, PA: Wolters Kluwer Health; 2015.





**Pleural effusion. An abnormal volume of fluid collects in the pleural space.**

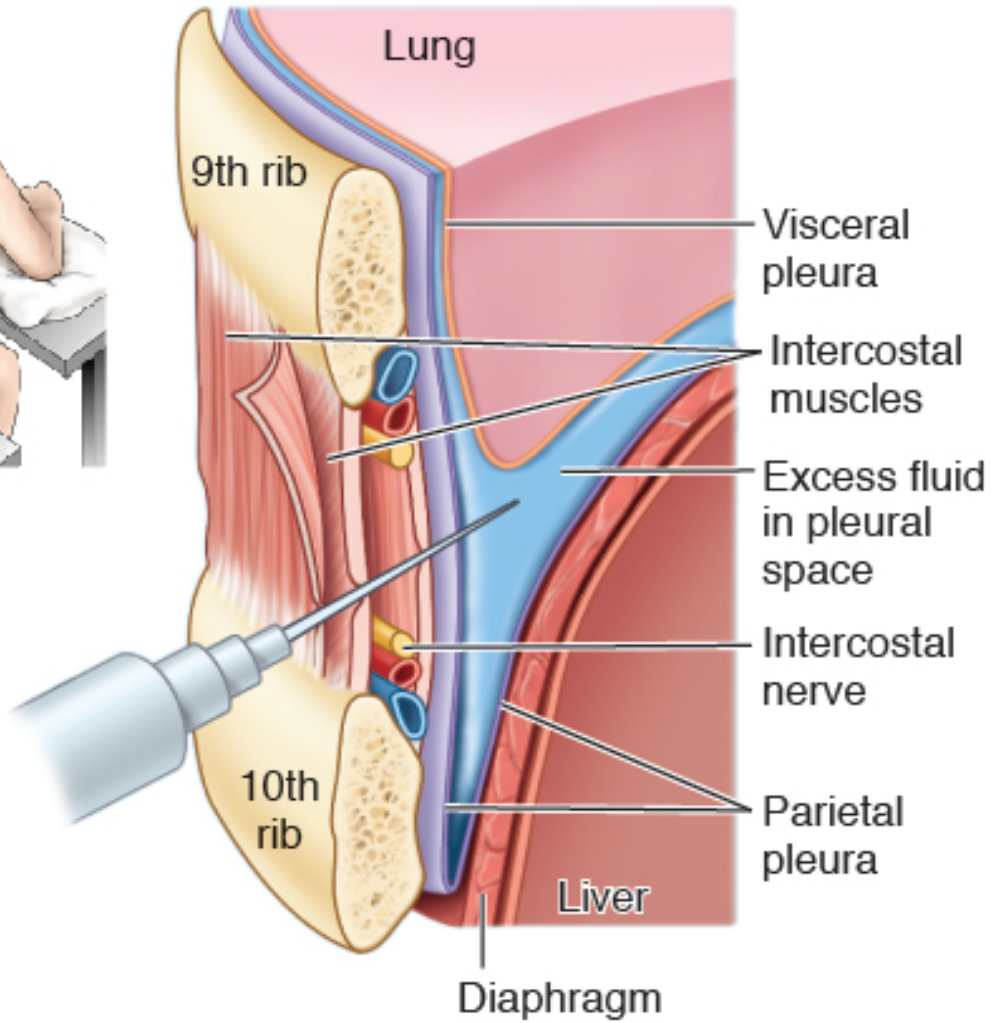
Labus D, Cohen A, Lippincott Advisor, Lippincott Williams & Wilkins; 2016.





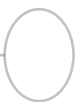


Needle  
insertion  
area



Thoracentesis. A needle is inserted into the pleural space to withdraw fluid.

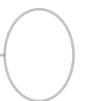
Moore KL, et al. Clinically Oriented Anatomy. 7th ed. Philadelphia, PA: Wolters Kluwer Health; 2014.

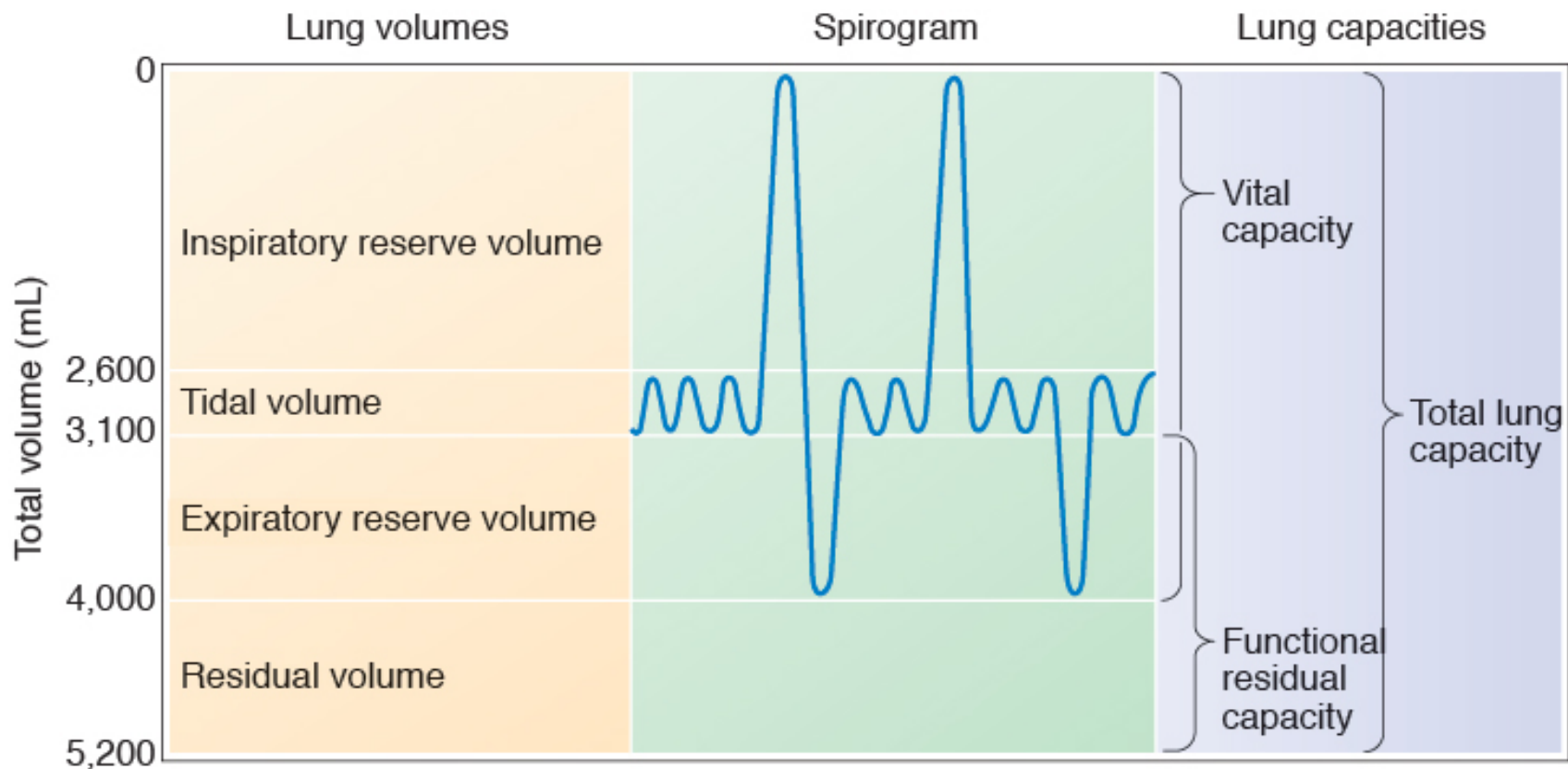




Pulse oximetry. The oximeter measures the oxygen saturation of arterial blood.

Taylor C, et al. Fundamentals of Nursing. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2005.



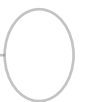


A spirogram. A spirometer produces a tracing of lung volumes and capacities (sums of volumes).

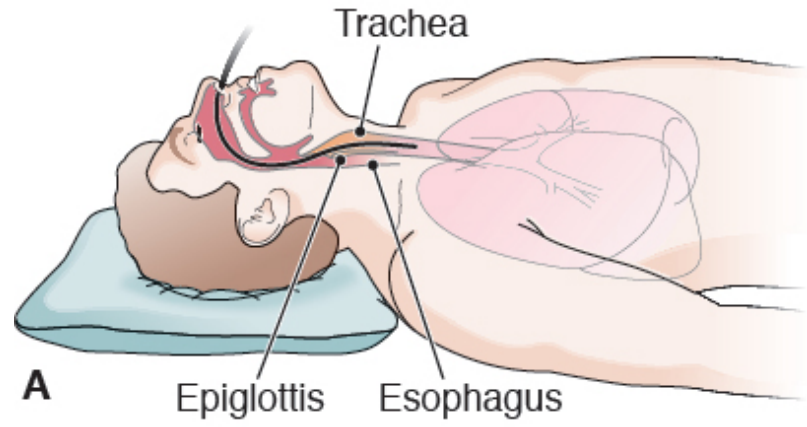




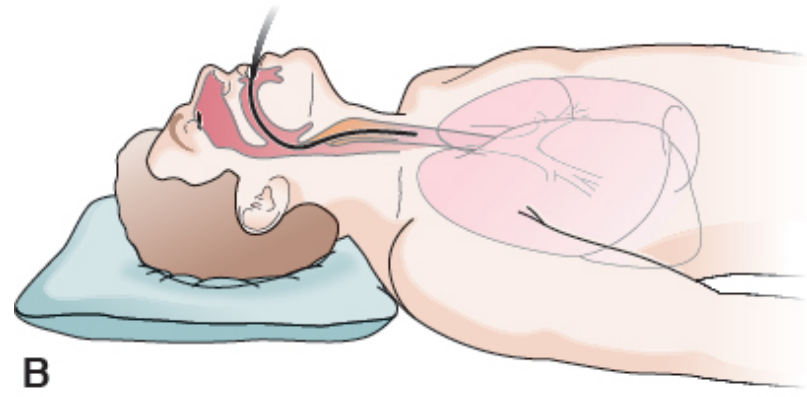
A nasal cannula.



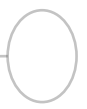
### Intranasal intubation

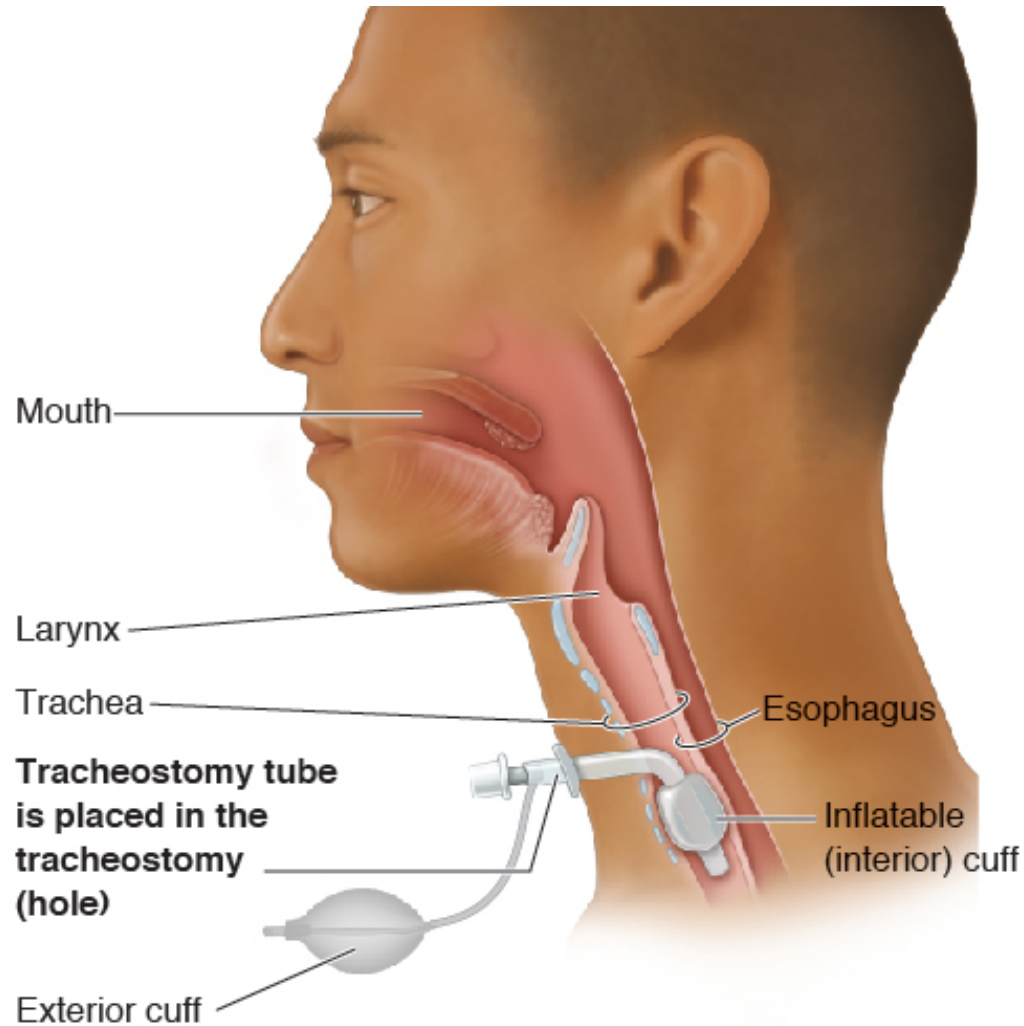


### Oral intubation



Endotracheal intubation. A. Nasal endotracheal catheter in proper position. B. Oral endotracheal intubation.





A tracheostomy tube in place.

