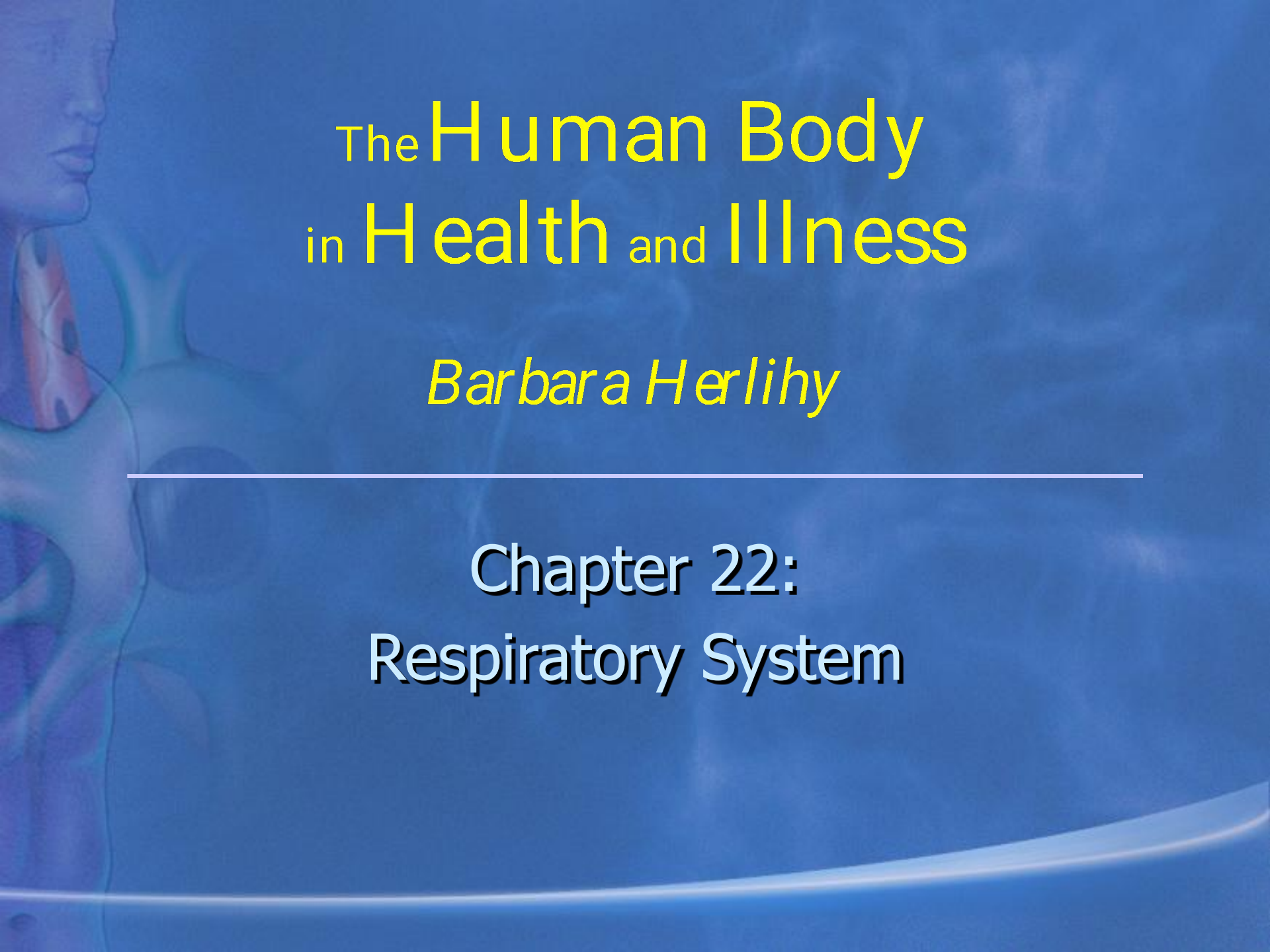


An anatomical illustration of the human respiratory system, showing the trachea, bronchi, and lungs, rendered in a stylized, semi-transparent manner against a blue background.

The Human Body in Health and Illness

Barbara Herlihy

Chapter 22: Respiratory System

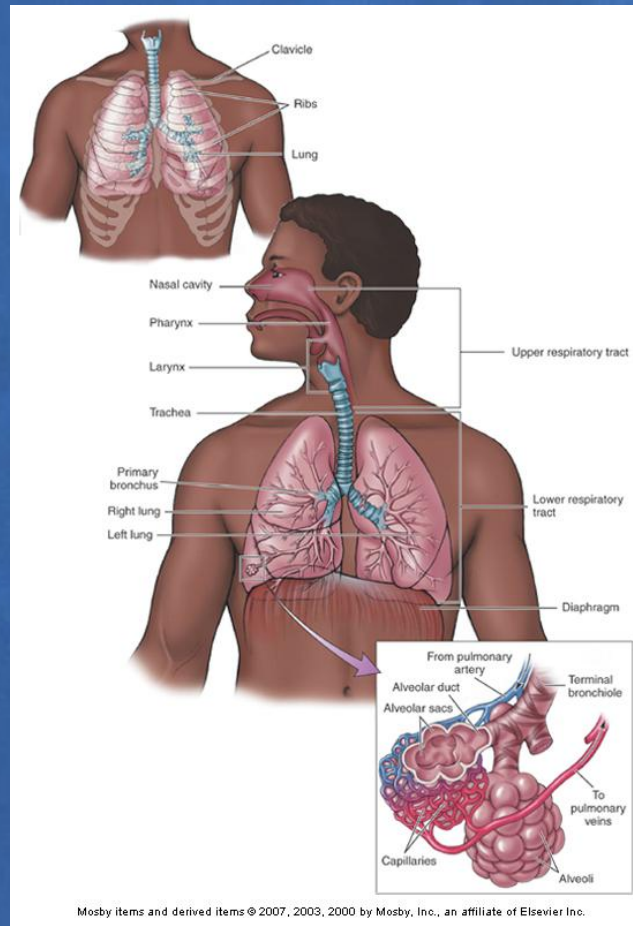
Lesson 22.1 Objectives

- Describe the structure and functions of the organs of the respiratory system.
- Trace the movement of air from the nostrils to the alveoli.
- Describe the role of pulmonary surfactants.

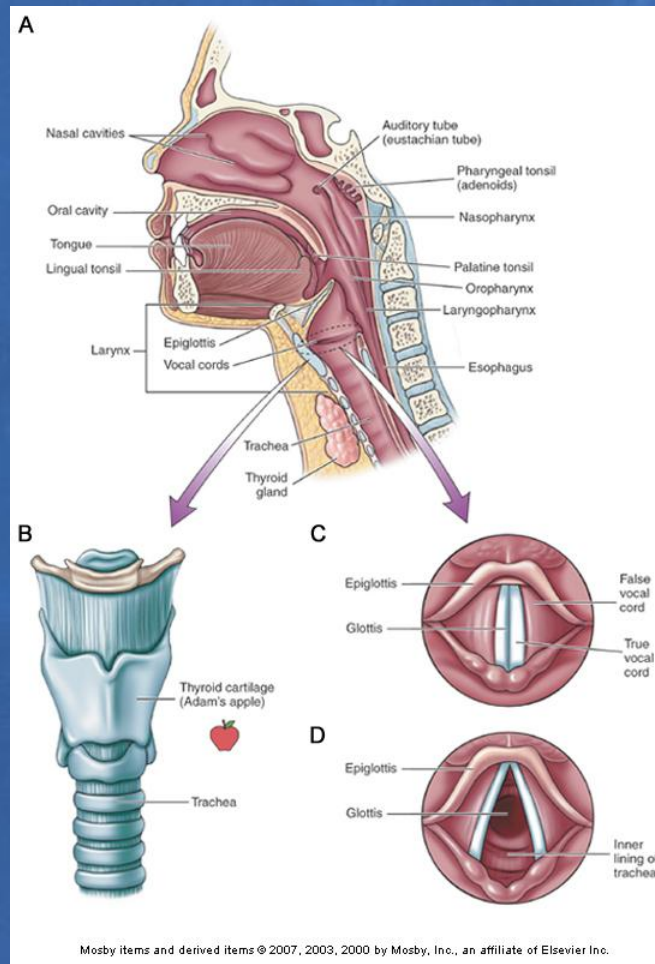
Structure: Organs of the Respiratory System

- Upper respiratory tract: respiratory organs located outside chest cavity
- Lower respiratory tract: organs located inside the chest cavity

Structure: Organs of the Respiratory System (cont'd.)



Upper Respiratory System



Upper Respiratory System (cont'd.)

- Nose: external portion forms part of the face
- Nasal cavities: internal portion of the nose
 - Nasal septum: partition between right and left halves of the nasal cavities
 - Nostrils: two openings in the nasal cavities through which air enters; also called nares
 - Olfactory organs: receptor cells for the sense of smell
 - Nasal conchae: three bony projections on the lateral walls of the nasal cavities
 - Paranasal sinuses: drainage openings

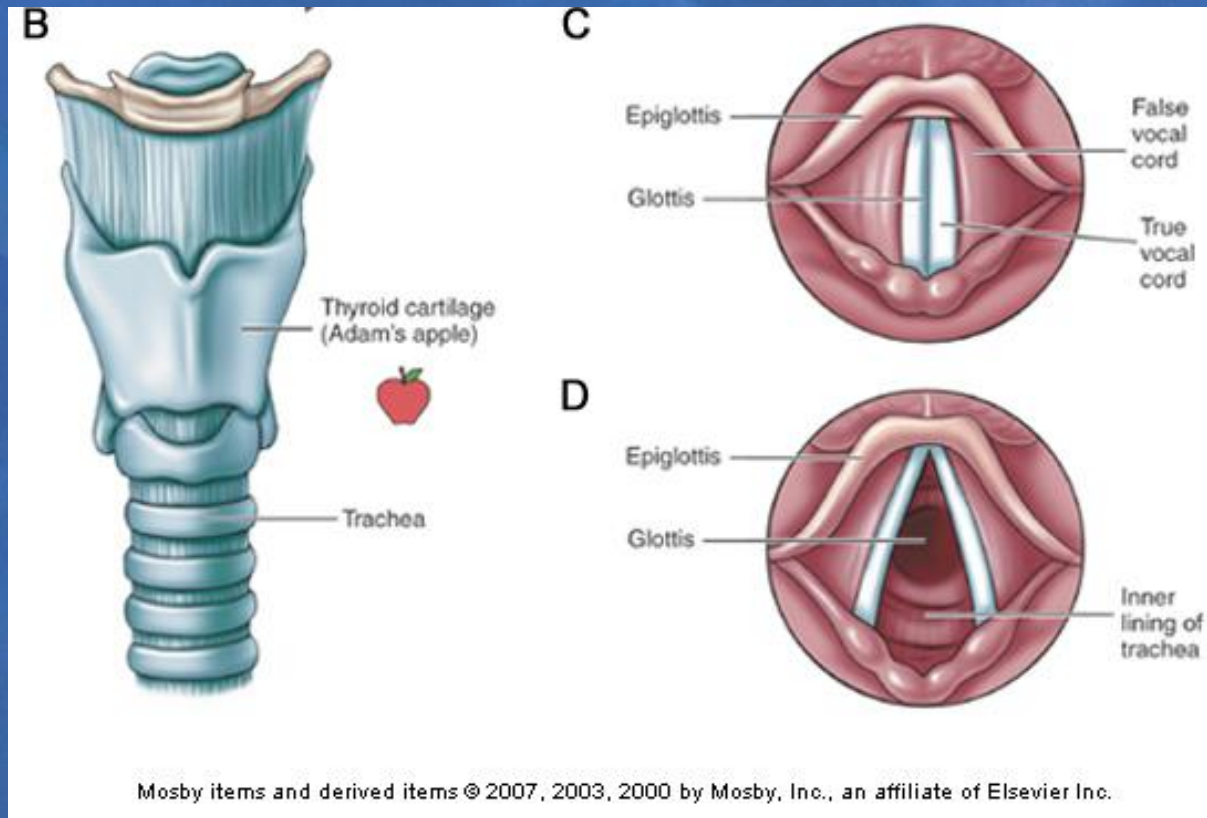
Upper Respiratory System (cont'd.)

- Pharynx: conducts food to esophagus and air to larynx
 - Nasopharynx: upper
 - Oropharynx: middle
 - Laryngopharynx: lower

Upper Respiratory System (cont'd.)

- Larynx: voicebox; triangular structure of cartilage, muscles, and ligaments
 - Thyroid cartilage
 - Epiglottis
 - Vocal cords
 - Glottis
- Three functions:
 - Passageway for air
 - Produce sound
 - Prevents objects from entering breathing structures

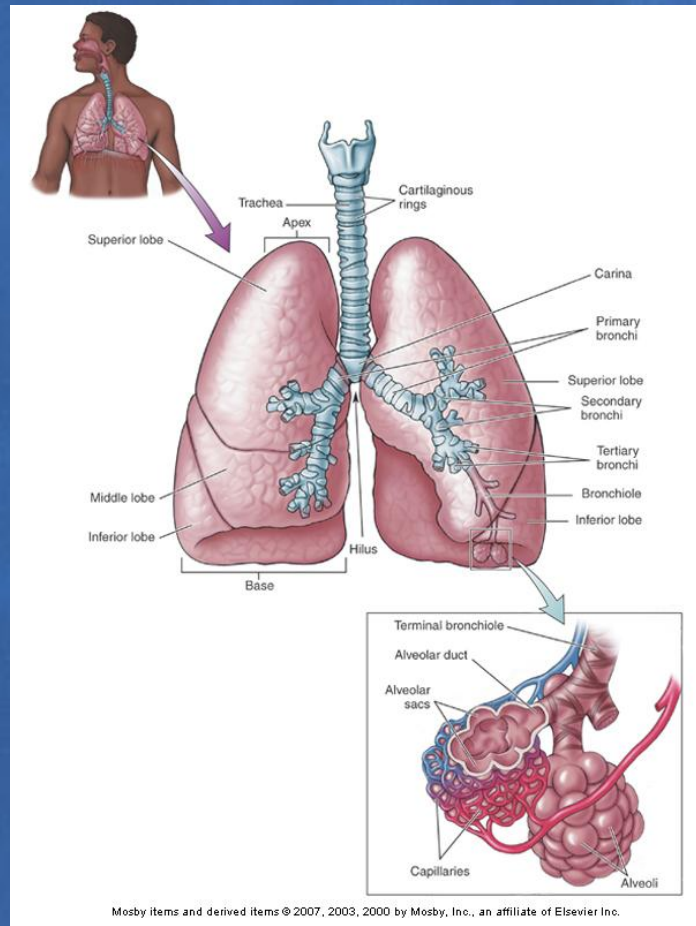
Upper Respiratory System (cont'd.)



Upper Respiratory System (cont'd.)

- Trachea: windpipe; splits into left and right bronchi in thoracic cavity
 - Carina: point at which trachea splits at the manubriosternal junction

Lower Respiratory System



Lower Respiratory System (cont'd.)

- Bronchial tree:
 - Bronchi
 - Bronchioles
 - Alveoli

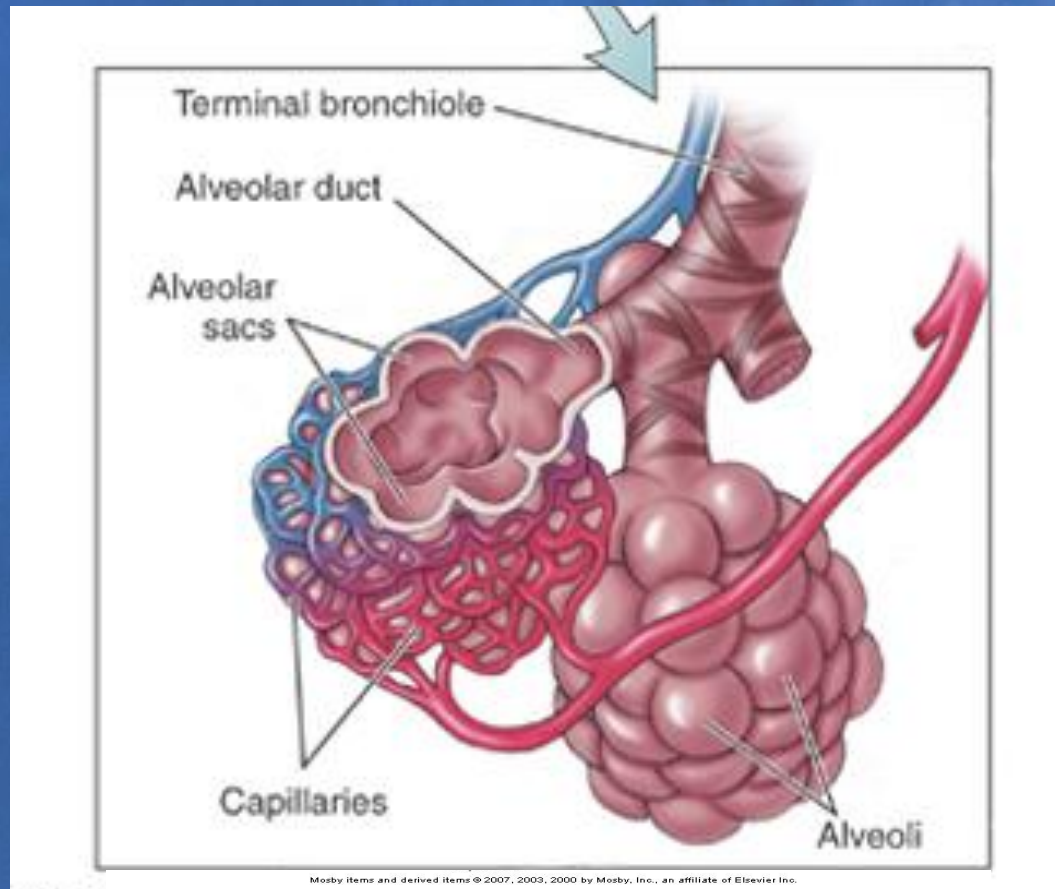
Lower Respiratory System (cont'd.)

- Bronchi: formed from lower trachea dividing into two parts, left and right bronchi
 - Primary bronchi: enter lungs at the hilus, branch into secondary bronchi
 - Secondary bronchi: branch into smaller tertiary bronchi
 - Tertiary bronchi

Lower Respiratory System (cont'd.)

- Bronchioles: smaller tubes formed from repeated division of bronchi; regulate flow of air to the alveoli
- Alveolar ducts: formed from the division of bronchioles
- Alveoli: small grape-like structures at the end of the alveolar ducts; tiny air sacs

Lower Respiratory System (cont'd.)



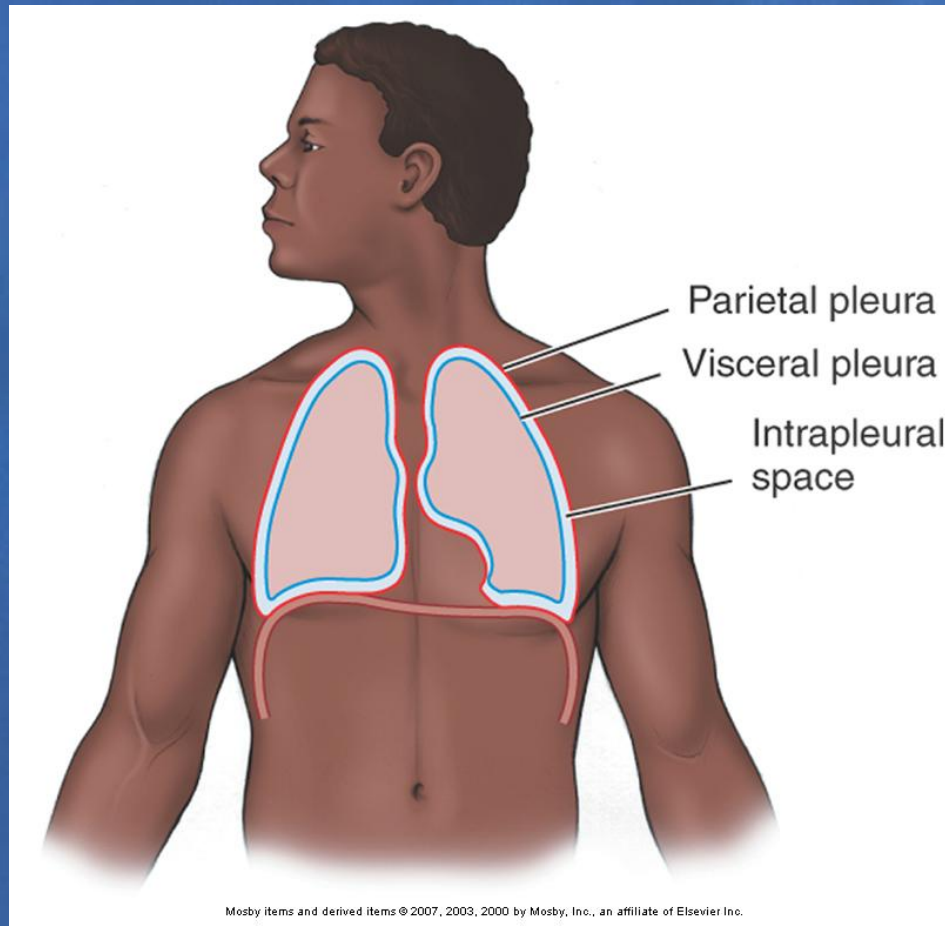
Lower Respiratory System (cont'd.)

- Lungs: large, soft, cone-shaped organs; occupy most of the thoracic cavity
- Right lung: three lobes
 - Superior
 - Middle
 - Inferior
- Left lung: two lobes
 - Superior
 - Inferior

Lower Respiratory System (cont'd.)

- Pleura: continuous serous membrane
 - Visceral pleura
 - Parietal pleura
- Pleural cavity: space between visceral pleura and parietal pleura

Lower Respiratory System (cont'd.)

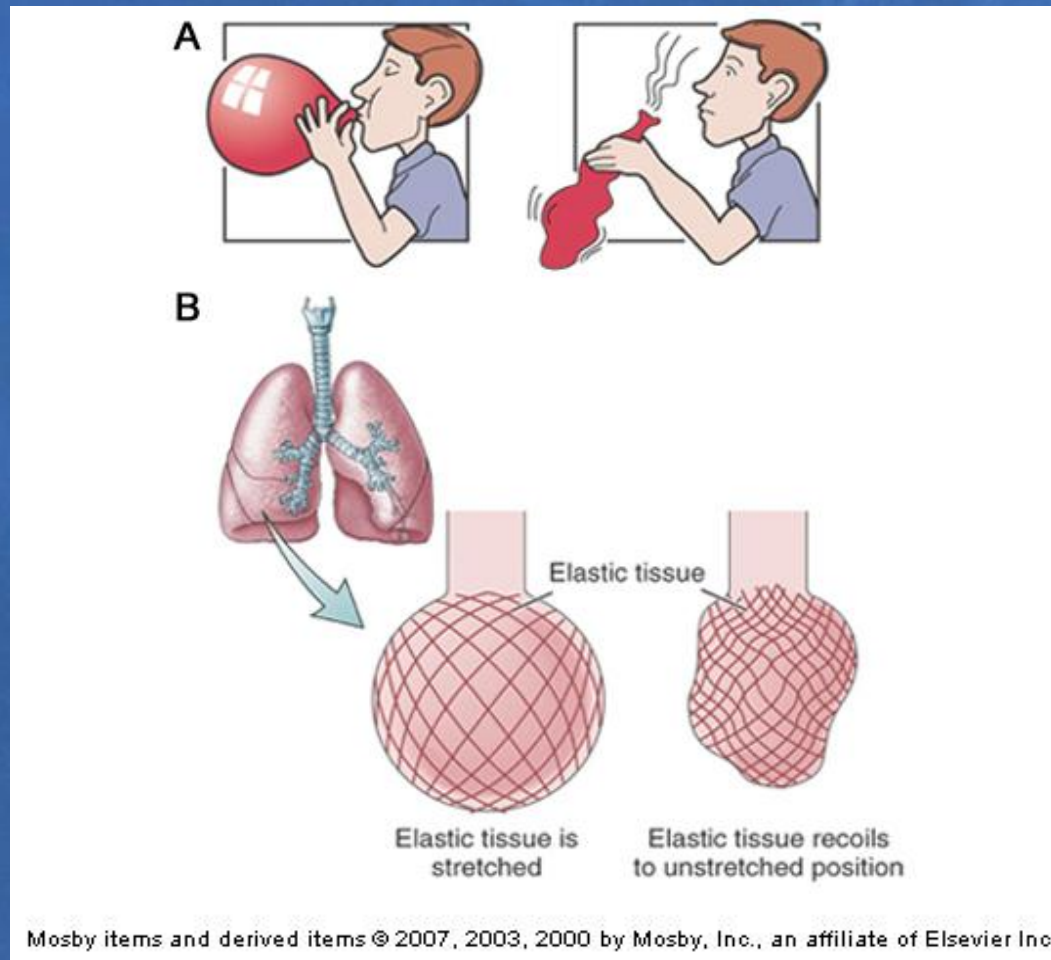


Collapsed and Expanded Lungs

- Lungs collapse because of:
 - Elastic recoil
 - Surface tension

Collapsed and Expanded Lungs

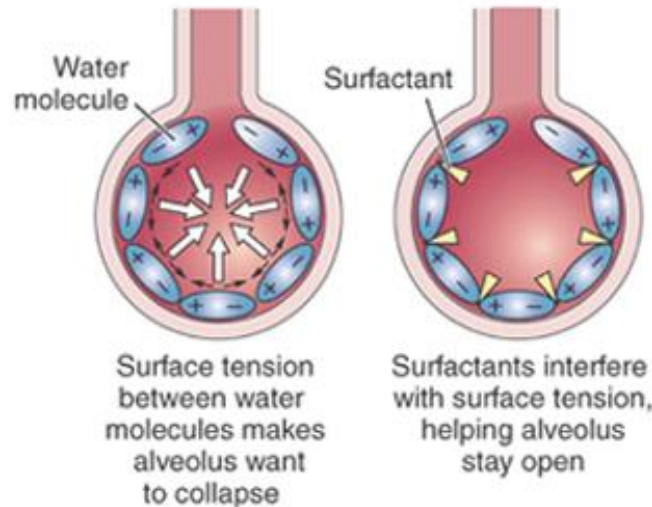
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Collapsed and Expanded Lungs

(cont'd.)

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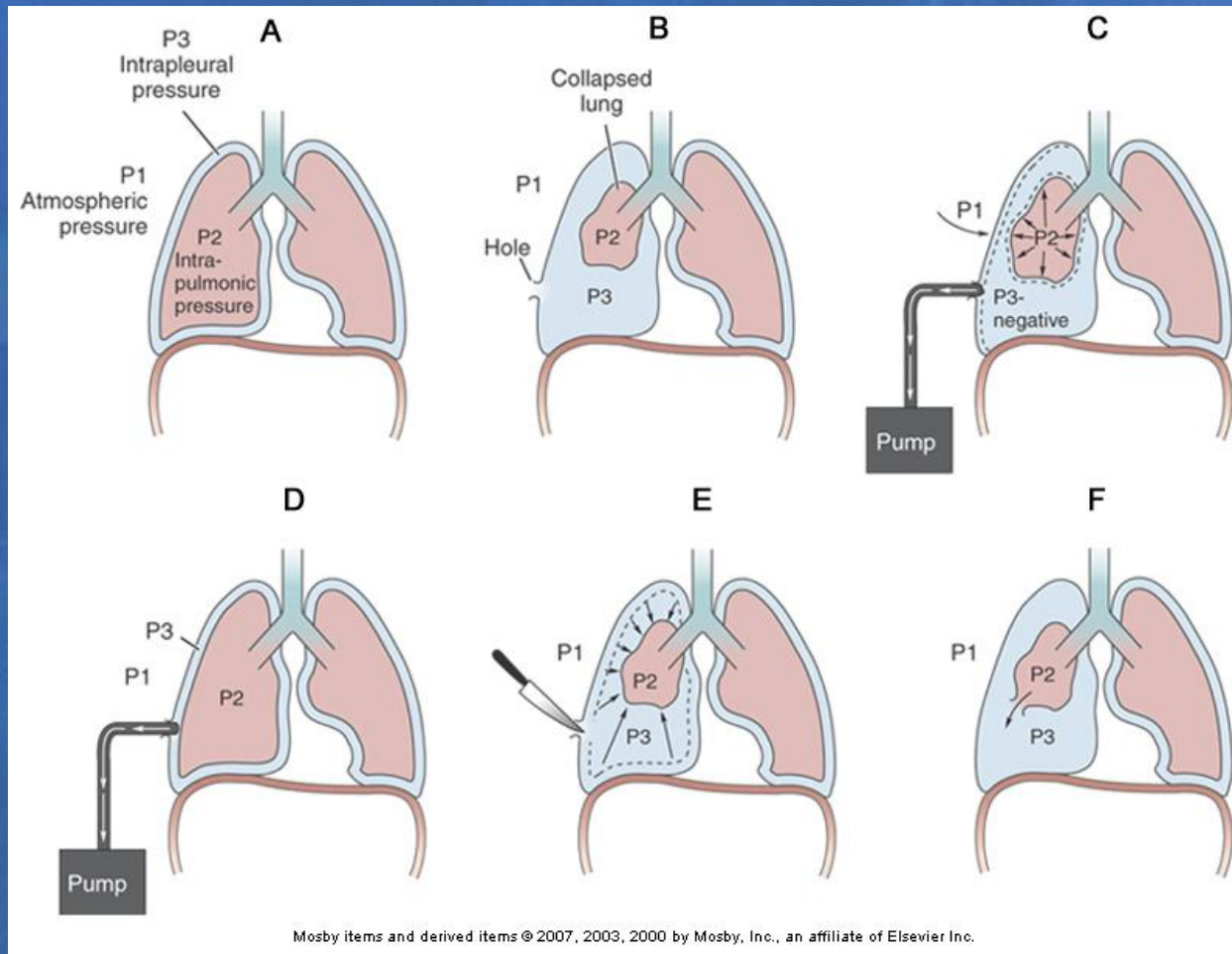
Collapsed and Expanded Lungs

(cont'd.)

- Lungs expand due to negative pressure within the intrapleural space
 - Atmospheric pressure
 - Intrapulmonic pressure
 - Intrapleural pressure

Collapsed and Expanded Lungs

(cont'd.)



Common Respiratory Terms

- Apnea: temporary cessation of breathing
- Dyspnea: difficult or labored breathing
- Tachypnea: rapid breathing
- Eupnea: normal, quiet breathing
- Orthopnea: difficulty in breathing that is relieved by a sitting-up position

Common Respiratory Terms (cont'd.)

- Cheyne-Stokes respirations: irregular breathing pattern characterized by a series of shallow breaths that gradually increase in depth and rate
- Kussmaul breathing: increase in rate and depth of respiration stimulated by acidosis
- Cyanosis: bluish color of the skin or mucous membrane due to a low concentration of oxygen in the blood

Common Respiratory Terms (cont'd.)

- Hypoxia: abnormally low concentration of oxygen in the tissues
- Hypoxemia: abnormally low concentration of oxygen in the blood
- Hypercapnia: abnormally high concentration of carbon dioxide in the blood
- Hypocapnia: abnormally low concentration of carbon dioxide in the blood