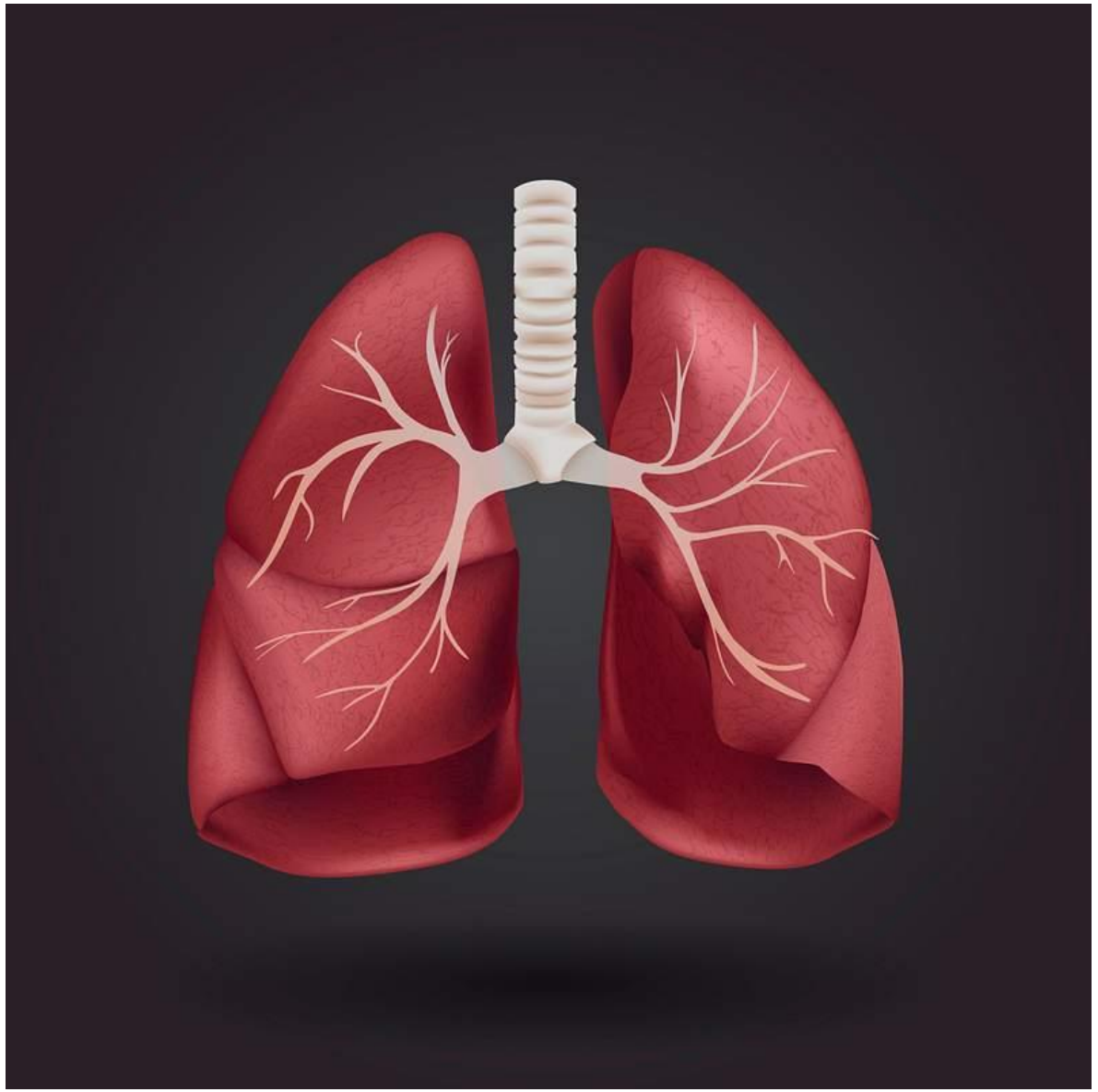
Respiratory Illness

South Cook County EMS

Module # 1 - January 2025

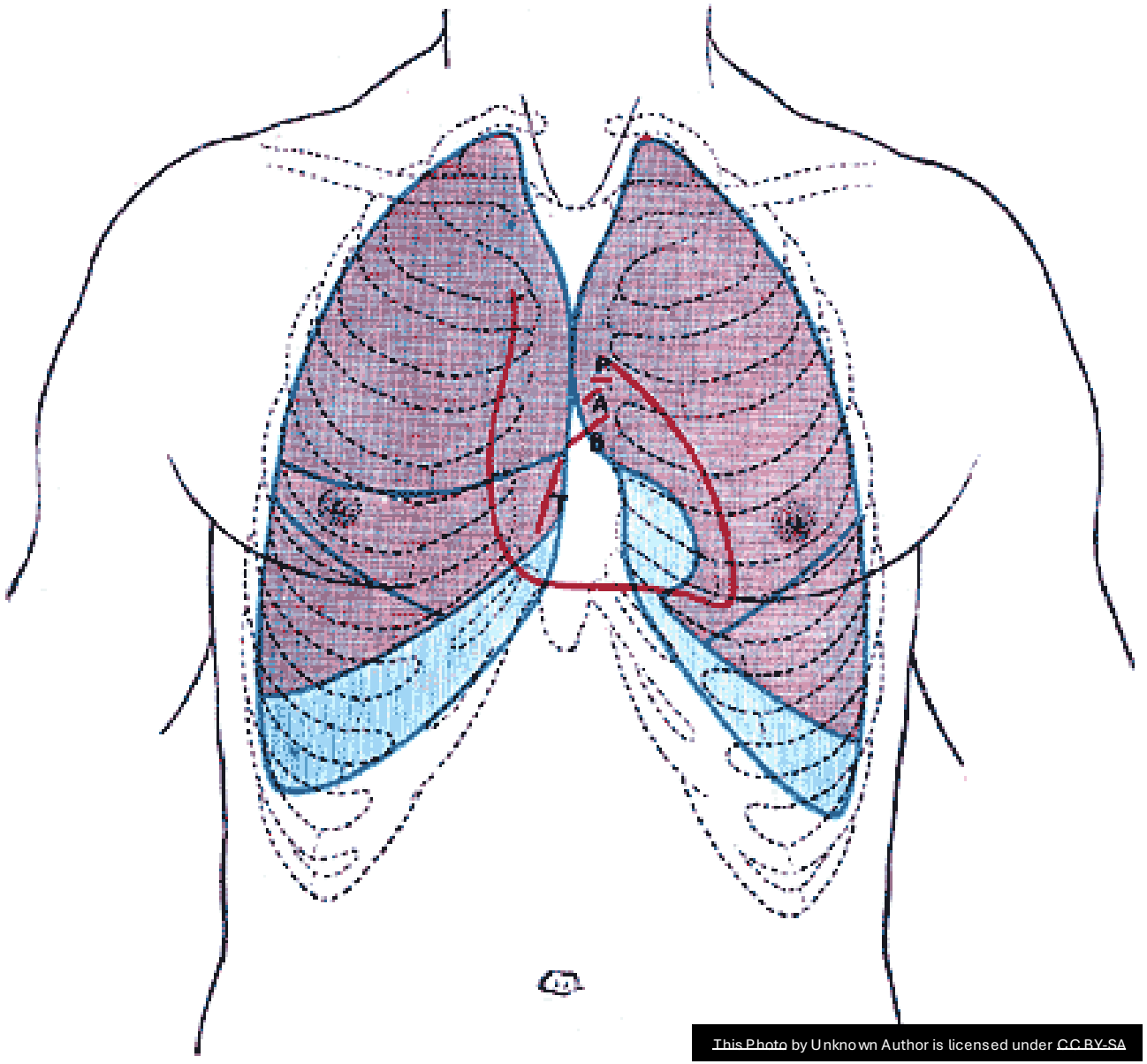
Continuing Education – 3 hours



South Cook County
Continuing Education

2025

Anatomy & Physiology Review



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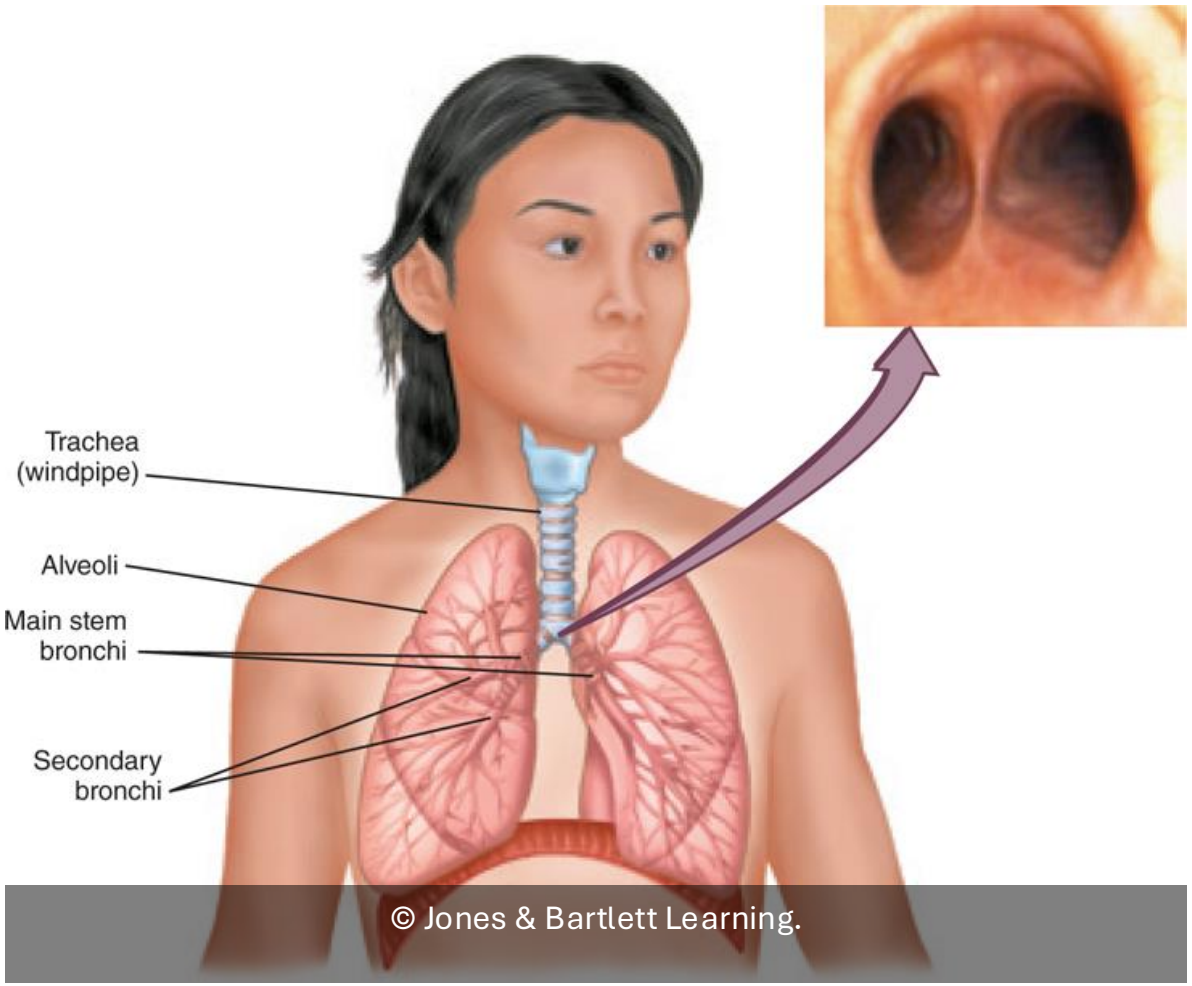
Tracheobronchial Tree: Trachea

- Carries air to lungs
- Extends from larynx to mainstem bronchi
  - 4 to 5 inches
  - Carina: where tracheal cartilage bifurcates
  - Right mainstem bronchus branches at less acute angle



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Tracheobronchial Tree: Bronchi

Mainstem bronchi branch into lobes of the lungs, then into:

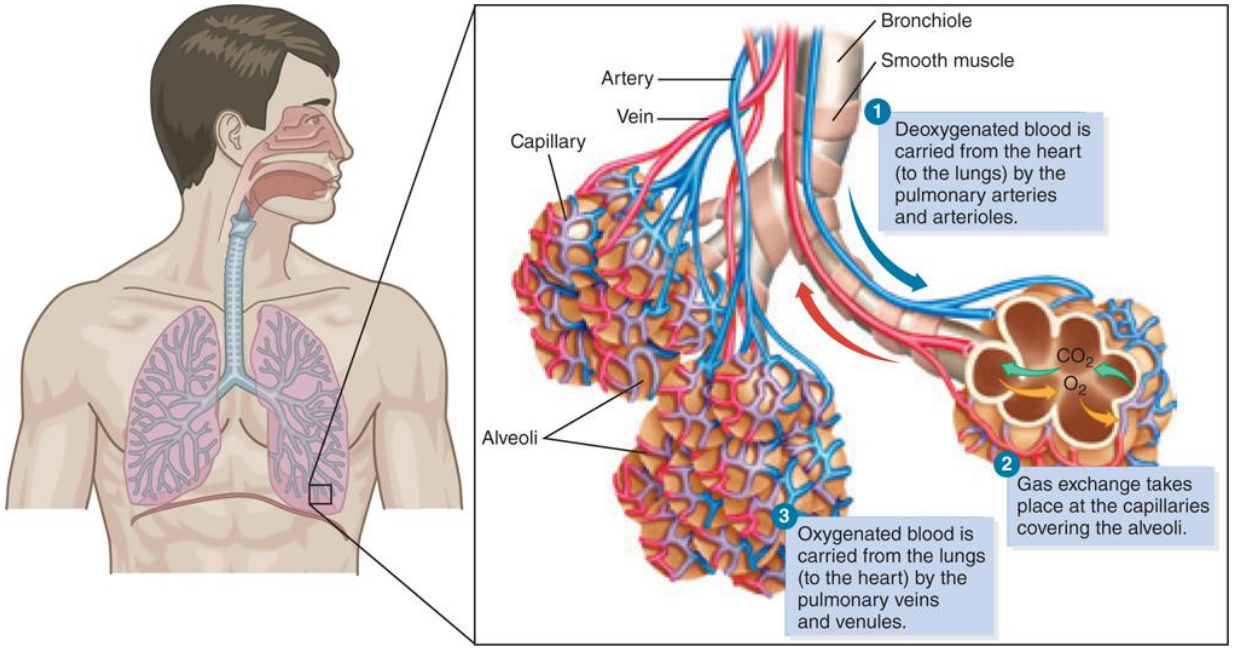
- Tertiary (segmental) bronchi
- Subsegmental bronchi
- Bronchioles

Dead space

- Airways do not participate in gas exchange
- Greater in patients with respiratory disease

Tracheobronchial Tree: Bronchioles (1 of 2)

- Gas exchange
- Lack cilia



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Tracheobronchial Tree: Alveoli

Branches 16 to 24

- Terminal airways
- Alveoli

Entire surface covered in capillaries

Participate in gas exchange

Mechanisms of Respiratory Control

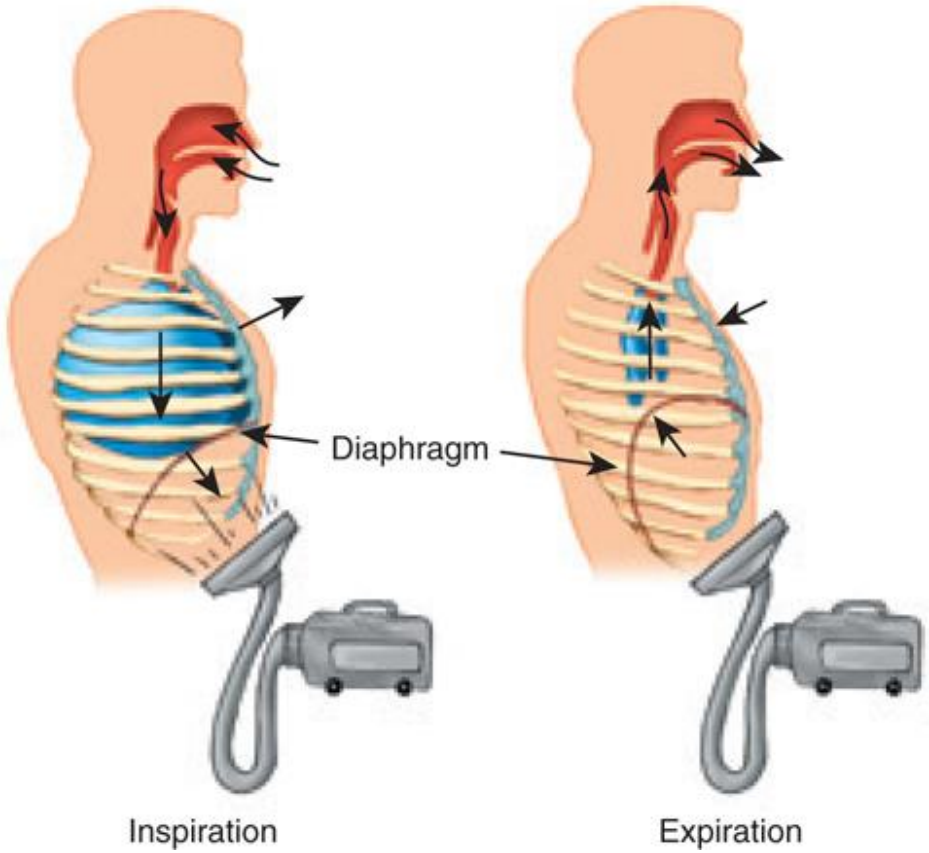
- Cardiovascular regulation
  - Lungs closely linked to cardiac function
  - Heart changes have pulmonary consequences
  - Left-sided heart failure progresses faster than right-sided heart failure
  - Mild hypoxia increases in heart rate
  - Severe hypoxia causes bradycardia
  - Uncorrected hypoxic insults may trigger lethal cardiac arrhythmia

Mechanisms of Respiratory Control

- Heath failure caused by changes in:
  - Fluid balance
  - Right-sided heart pumping pressure
  - Left-sided heart pumping pressure

Mechanisms of Respiratory Control

- Muscular control
  - Body takes in air by negative pressure
  - Air pulled through mouth and nose, over turbinates, around epiglottis and glottis



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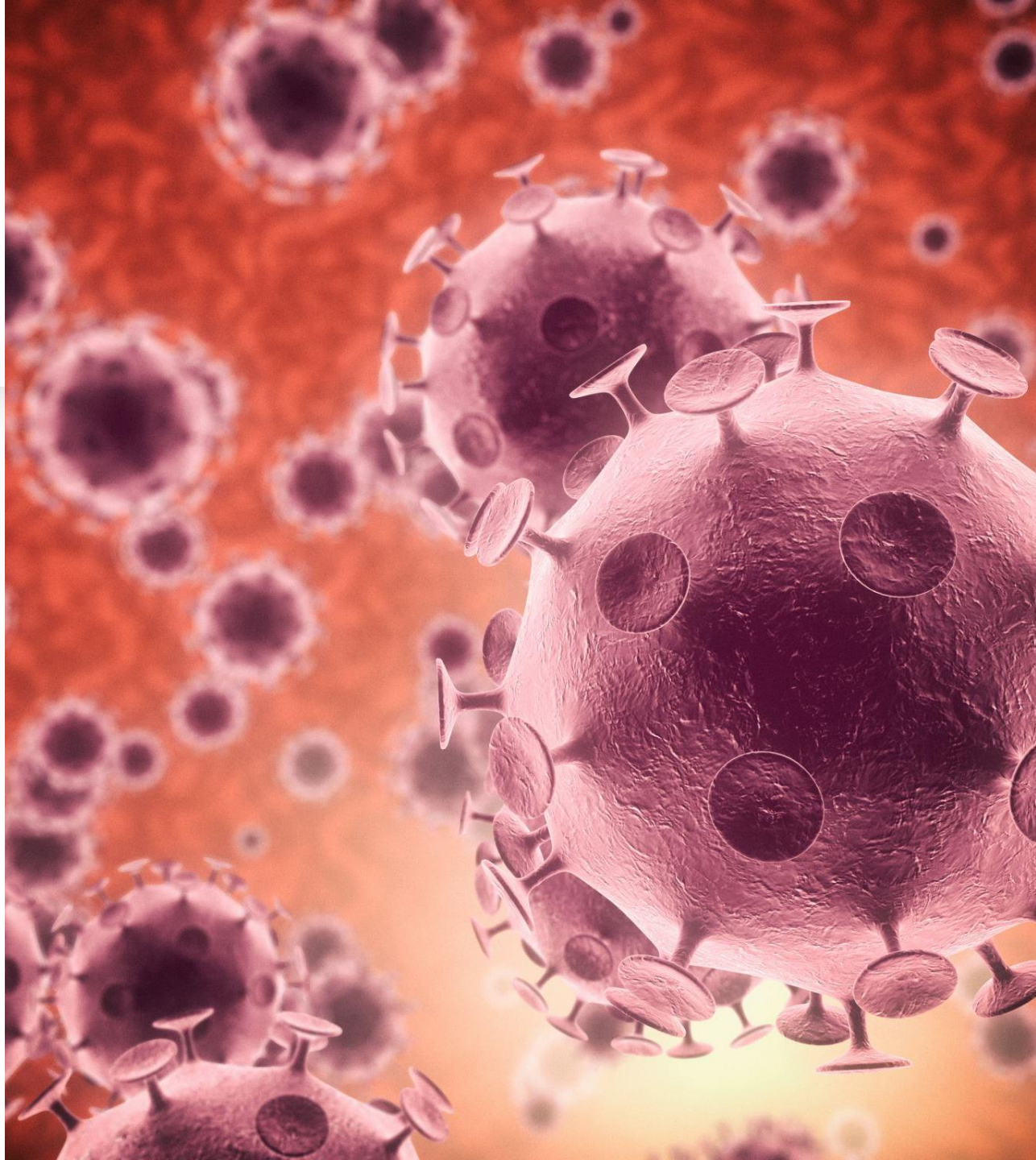
Causes of Obstruction

- Upper Airway Obstruction
  - Thorax
    - Airtight box
    - Diaphragm at bottom
    - Trachea at top
  - Diaphragm flattens during quiet breathing

Pulmonary Infections: Pathophysiology

- Infections caused by:
  - Bacteria
  - Viruses
  - Fungi
  - Protozoa
  - Other organisms



Pulmonary Infections: Pathophysiology

Infectious diseases cause:

Swelling of the respiratory tissues	Increase in mucus production	Production of pus

↓

Resistance to airflow increases as airway diameter is narrowed (Poiseuille law).

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Alveoli can become nonfunctional if filled with pus.

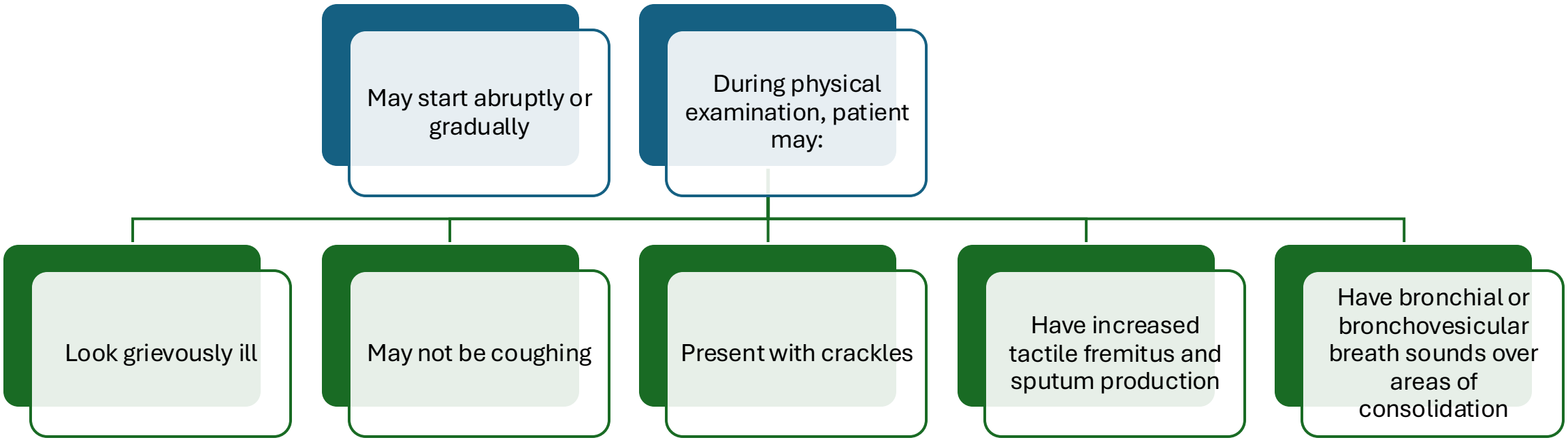
Pulmonary Infections: Pathophysiology

- At greater risk of pneumonia:
  - Older people
  - People with chronic illnesses
  - Smokers
  - Anyone not ventilating efficiently
  - Those with excessive secretions
  - Immunocompromised people

Pulmonary Infections: Assessment

- Patients report:
  - Several hours to days of weakness
  - Productive cough
  - Fever
  - Chest pains worsened by cough

Pulmonary Infections: Assessment



Pulmonary Infections: Assessment

Pneumonia occurs in lung bases

Patients often dehydrated

Supportive care

- Oxygenation
- Secretion management (suctioning)
- Transport to the closest facility

Pulmonary Infections: Management

Upper airway infections

- Require aggressive airway management

Lower airway infections

- Supportive care
- Transport to facility