

Introduction to Respiratory System

By

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A. Prof. of Chest diseases

Which of the following conditions is not associated with dyspnea?

Severe anemia

Metabolic acidosis

Fluid in the lungs

None of the above

Dyspnea in asthma patients is often associated with wheezing.

True

False

Which of the following leads to chest pain when a person exerts himself physically?

- A. Pulmonary embolism
- B. Pneumonia
- C. Unstable angina
- D. Heart burn

Which of the following conditions is the most common cause of Hemoptysis?

- A. Bronchiectasis**
- B. Bronchogenic carcinoma**
- C. Acute Bronchitis**
- D. Pneumonia**

Bronchiolar
Muscle

Alveoli

Nasal Cavity

Oral Cavity

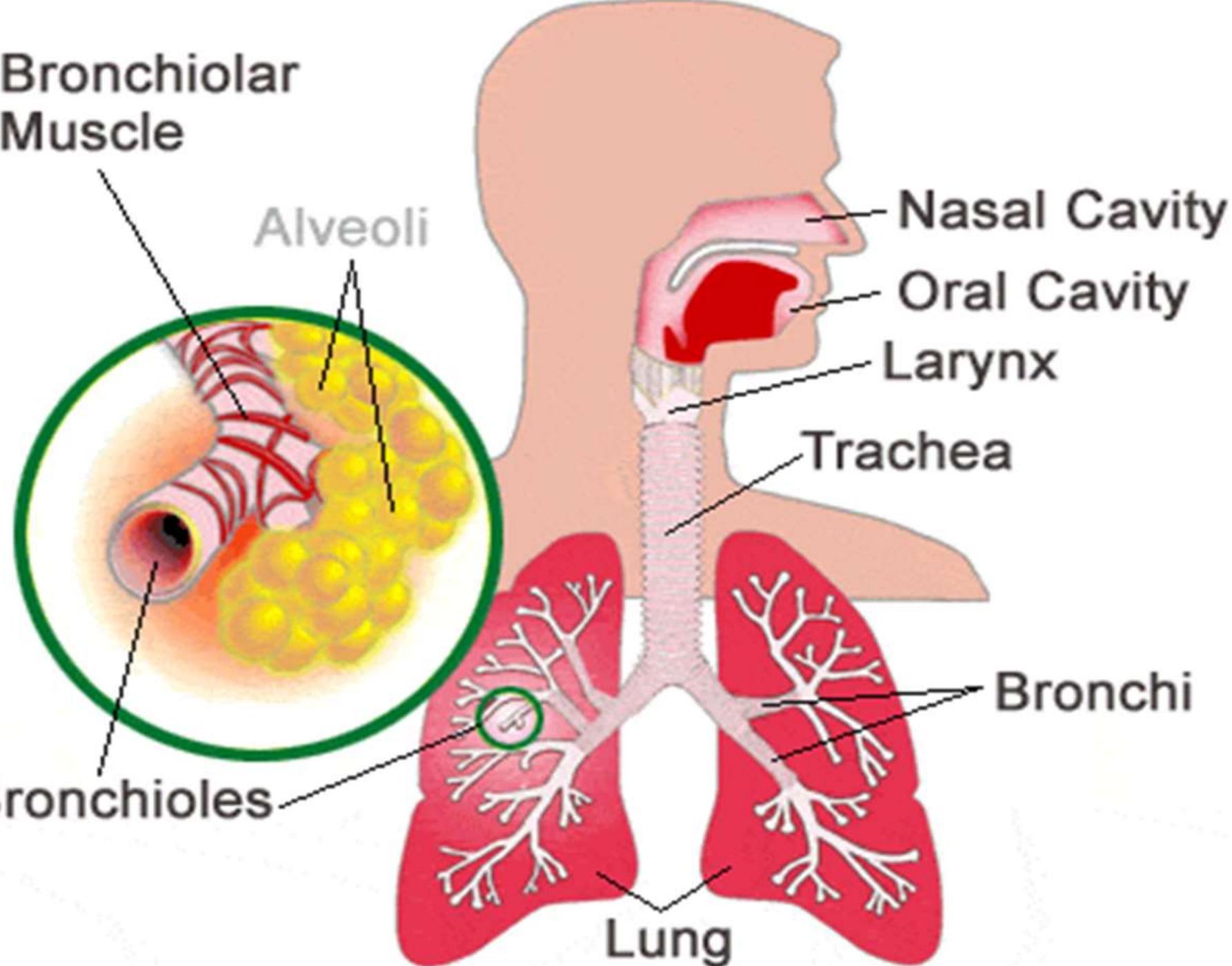
Larynx

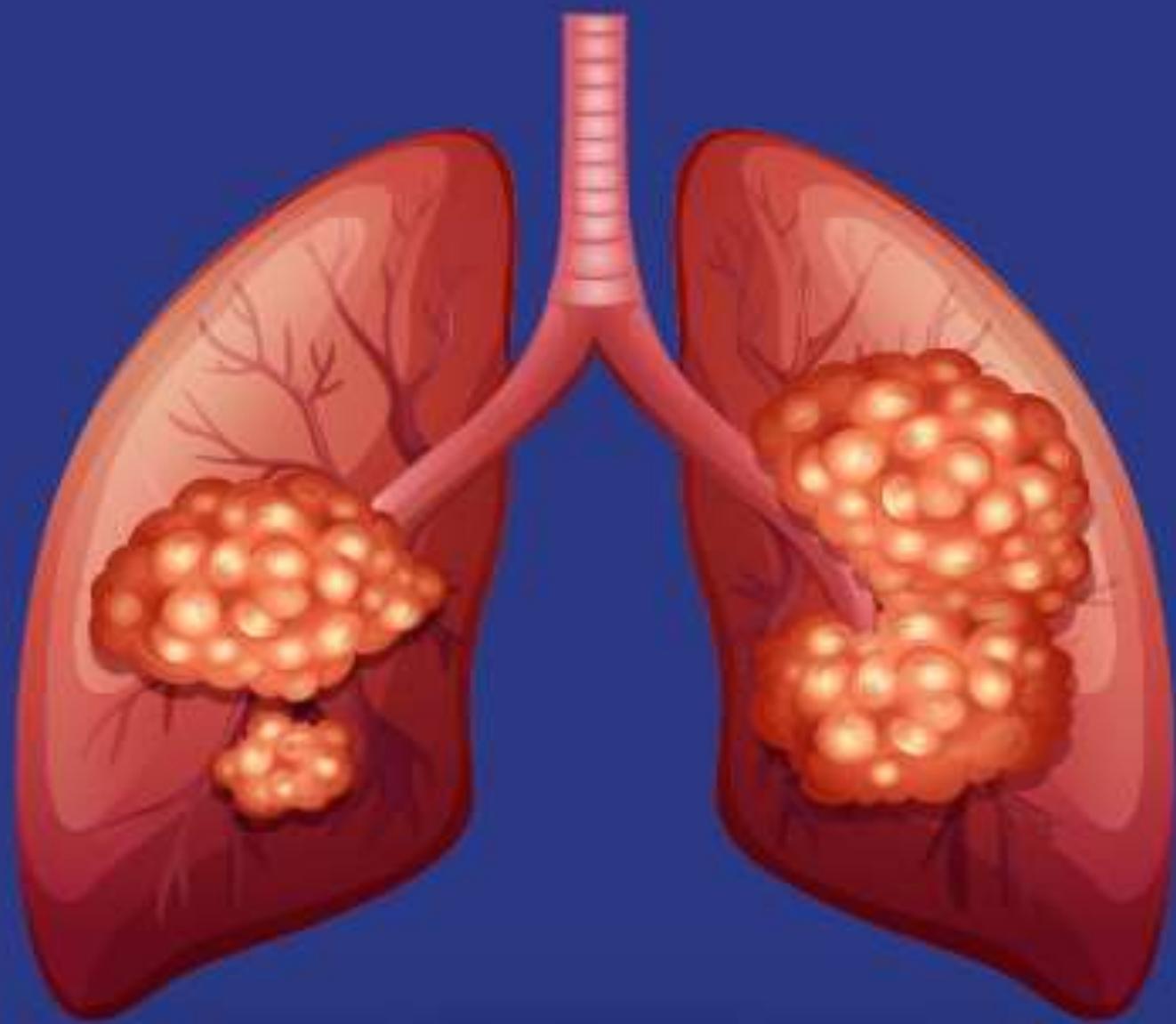
Trachea

Bronchi

Bronchioles

Lung





Lung Diseases Affecting the Airways

Acute bronchitis

Asthma

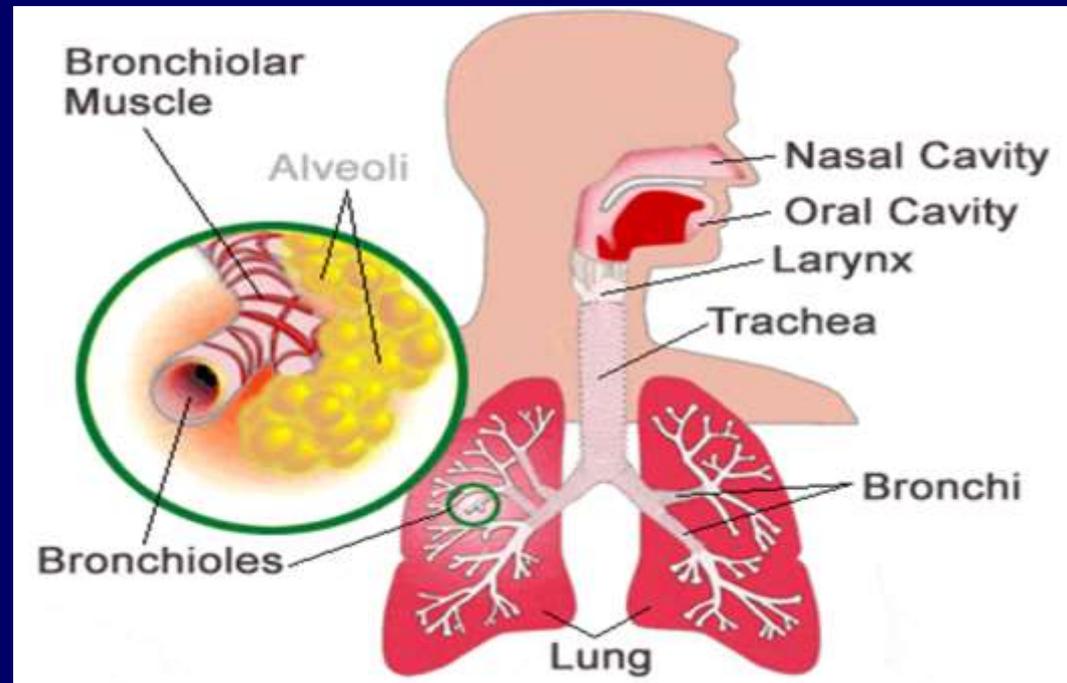
Chronic obstructive pulmonary disease “COPD”

Chronic bronchitis

Emphysema

Bronchiectasis

Bronchiolitis



Lung Diseases Affecting airspaces

Pneumonia

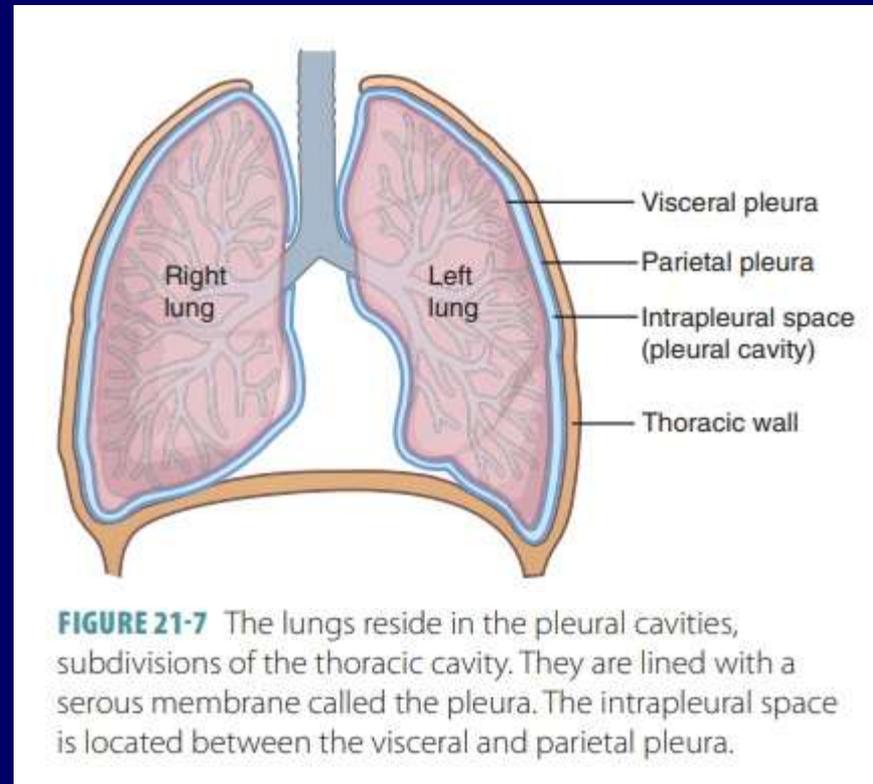
Tuberculosis

Lung abscess

Lung cancer

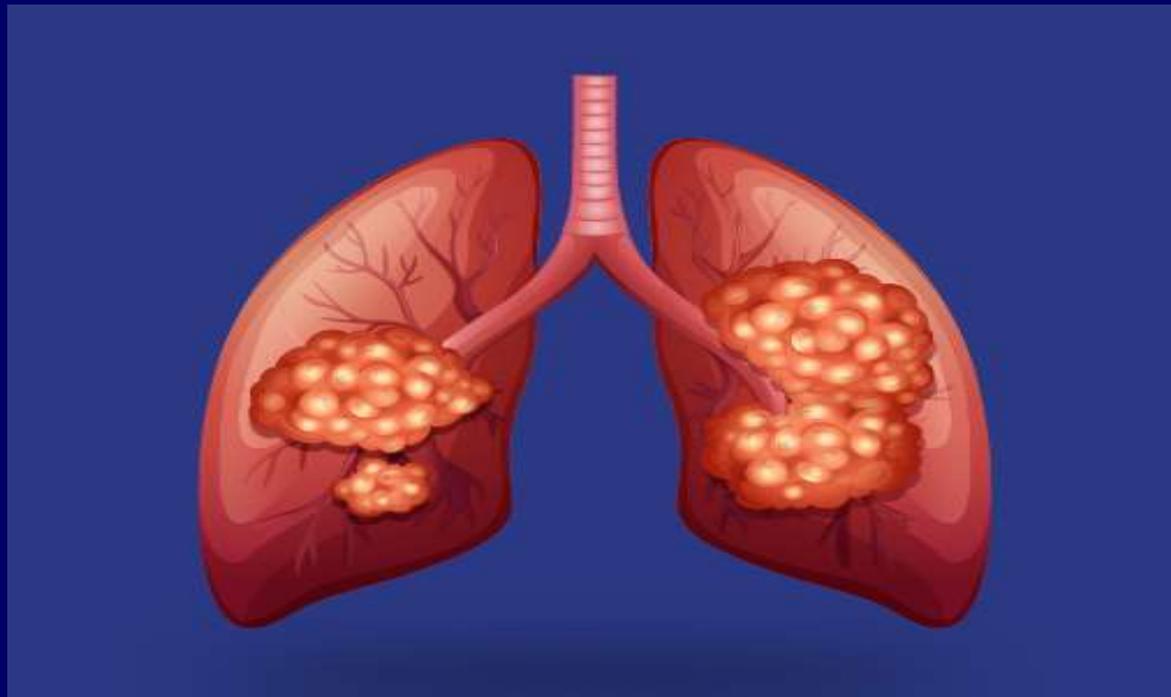
Pulmonary oedema

Pulmonary embolism



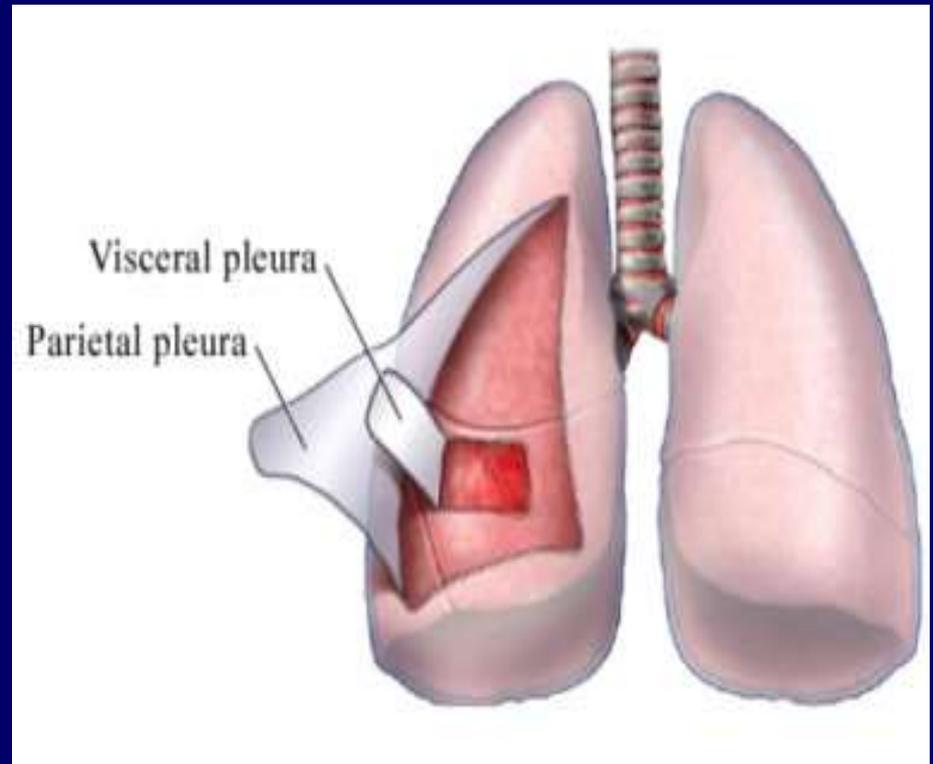
Diseases Affecting the Interstitium

Interstitial lung disease “ILD”



Diseases Affecting Pleura

Pleural effusion
Pneumothorax
Pleural tumors



The standard history framework

- Personal history
- Complaint
- Present history
- Past medical history
- Family history

Personal history

- Name
- Age
- Sex
- Occupation
- Residence
- Marital state
- Special habits of medical importance

□ **Name:** to be familiar with patients & Documentations.

□ **Age :**

➤ **Infancy and childhood** (Congenital bronchiectasis, FB aspiration, bronchial asthma)

➤ **Middle age** (COPD, post-primary TB, collagen vascular)

➤ **Elderly** (bronchogenic CA, IPF)

□ Sex:

- Diseases common in **males** (COPD, bronchogenic CA, occupational lung diseases)
- Diseases common in **females** (Bronchial adenoma, SLE, sarcoidosis).

□ Occupation:

- **Farmers** (asthma, B cor-pulmonale)
- **Chemicals** as heavy metals or insecticides
- **Infection** as doctors , nurses
- **Dusty areas**(pneumoconiosis).

□ Residence:

- **Industrial area** (occupational lung diseases)
- **Endemic areas** of certain diseases:
- **Travelling abroad:**
 - Western countries → AIDS, fungal infection
 - India and Indonesia → TB

□ **Marital state:**

- For infertility → TB, Kartagnar syndrome, cystic fibrosis

□ **Habits of medical importance**

- Smoking, Alcohol, Morphine.

Smoking is mostly related to COPD and Lung cancer

Use '**pack years**' to estimate the risk of tobacco-related health problems .

pack years of cig. smoking

= No of cig/day × No of years

20

Mild smoker.....up to 19

Moderate smoker.....20-49

Heavy smoker.....≥ 50

Complaint

- This is the patient's chief symptoms in **his own words**.
 - Haemoptysis' is mentioned as 'coughing of blood.
 - Dyspnea is mentioned as awareness of breathing

- **Duration of illness** should be mentioned

Present history

- You ask about and document the details of:
 - Presenting complain.
 - Other symptoms related to chief system
 - Other symptoms related to other systems
- Use medical terms
- Long-standing problems ask why the patient is seeking help now.

For each symptom, determine The exact nature of the symptom

- ❑ **Onset:** Suddenly, acute or gradually
- ❑ **Course :** Stationary , progressive or regressive intermittent.
- ❑ **Duration**

- ❑ **Exacerbating and Relieving factors ?**
- ❑ **Special characters ?**

Past History

□ Diseases :

- DM, HTN

- TB

- SLE, RA

□ Drug

- **Trauma** and accidents: pneumothorax, fracture rib

□ Operations

- **Allergies:** Hay fever, asthma, food, drugs

Family History:

- History of diseases that have genetic predisposition:
 - Asthma
 - Idiopathic pulmonary fibrosis,
 - Pulmonary hypertension

- History of disease that contact may play a role:
 - TB,
 - Corona

Symptoms of Pulmonary Disorders

◎ Primary symptoms:

- ❑ Cough
- ❑ Expectoration
- ❑ Dyspnea
- ❑ Chest pain
- ❑ Hemoptysis
- ❑ Wheezing

◎ Secondary symptoms:

- Hoarseness or voice
- Dysphagia
- Syncope/ fainting

- Fever, Chills, Night sweats
- Bone, joint, muscle pain

- Respiratory failure

1- Cough

- It is an **explosive expiratory maneuver** which can be performed voluntarily or involuntarily, **to remove** foreign objects and abnormal excessive secretions.
- **Most common** pulmonary symptom
- **Phases** of cough mechanism:
 - ❖ Inspiratory.
 - ❖ compression
 - ❖ Expiratory.
- **Cough Receptors:** Ear, nose, pharynx, larynx, trachea, bronchi, parenchyma, pleura.



Cough : causes

□ Respiratory diseases:

■ Airway

□ Pharyngitis

□ Bronchitis, bronchiectasis, asthma, endobronchial tuberculosis, tumor,

■ Lung agents

□ Infection, edema, fibrosis, tumor

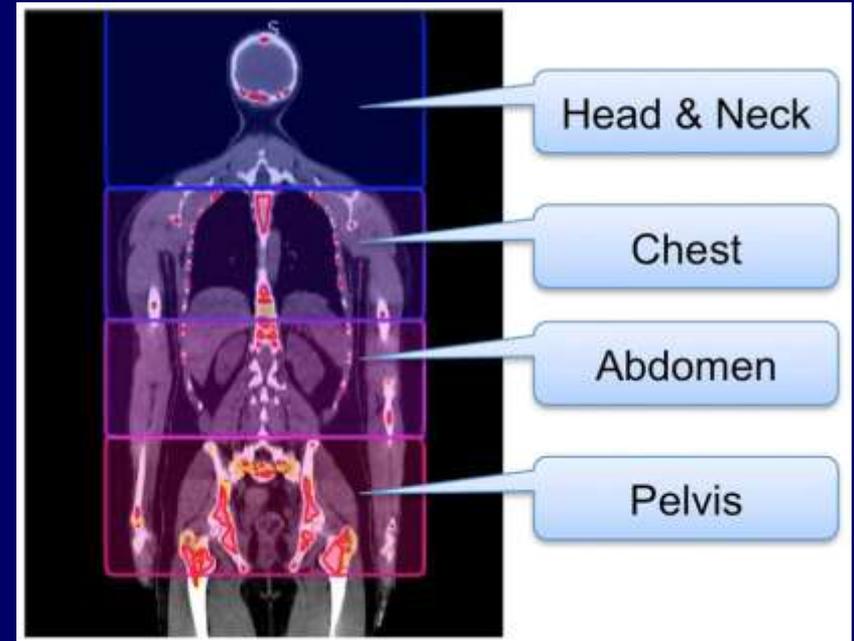
■ Pleural agents

□ Pleurisy, pneumothorax, mesothelioma of pleura

Cough : causes

□ Cardiovascular diseases

- Congestive heart failure,
- Mitral stenosis
- Pulmonary embolism



□ Upper respiratory tract:

- Pharyngitis and Nasopharyngitis “flu”
- Allergic rhinitis and Postnasal drip syndrom
- Laryngitis

□ Gastrointestinal causes: GERD

Cough : chch.

□ Characteristics

- Dry cough (no sputum): Viral, irritants, cardiac
- Dry progressed to productive: Pneumonia, BA
- Productive cough (sputum) suppurative syndrome, TB

□ Attack

- Time: nocturnal Cardiac, GERD
Early morning Asthma
- Disappear during sleepPsychogenic

2- Expectoration

- Sputum is abnormal secretion expelled from the **Broncho-pulmonary** system.
- It is **NOT** saliva ...
NOT nasopharyngeal in origin
- May need to collect and inspect mucus **over 24 hours** for accurate analysis

Expectoration: chch

- Frothy and blood tinged “pink” sputum
 - Pulmonary edema
- Purulent (frank pus) in SLS
 - Bronchiectasis
 - Lung abscess
 - Empyema
 - Infected cystic lung
- Muroid sputum
 - Bronchitis and asthma (without bacterial infection)
- Mucopurulent sputum
 - In any bacterial infection , yellow or green

Expectoration: chch

Rusty : Reddish brown due to altered blood
Lobar pneumonia

Odor ... fetid in Anaerobic infections due to release of indole and skatol metabolites from tryptophan metabolism

Relation to posture

Bronchiectasis

Lung abscess

3- Hemoptysis

- **Expectoration of blood or blood stained sputum from lower respiratory tract**
- It is an Alarming Symptom that indicate serious disease or massive hemorrhage.
- **Differential diagnosis**
 - Bleeding from upper respiratory tract
 - Hematemesis

Distinguished Hemoptysis from hematemesis

	Hemoptysis	Hematemesis
Causes	Pulmo or cardiac	digestive system
Previous symptoms	Cough, chest tightness	Nausea, vomiting
Color	Bright red	Dark red
Mixture	Sputum, frothy	Gastric contents
pH	alkality	acidity
Tarry stools	-	+

Hemoptysis: causes

□ Pulmonary

■ Bronchial disorders

- Acute bronchitis
- Bronchiectasis
- Bronchogenic carcinoma

■ Pulmonary Disorders

- Pneumonia
- Pulmonary TB
- Lung abscess
- Pulmo embolism

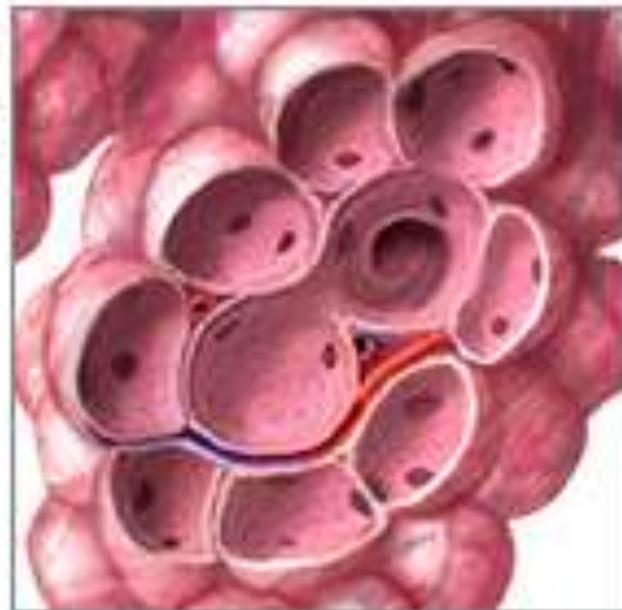
□ Cardiovascular disorders

- Acute left heart failure
- Mitral stenosis

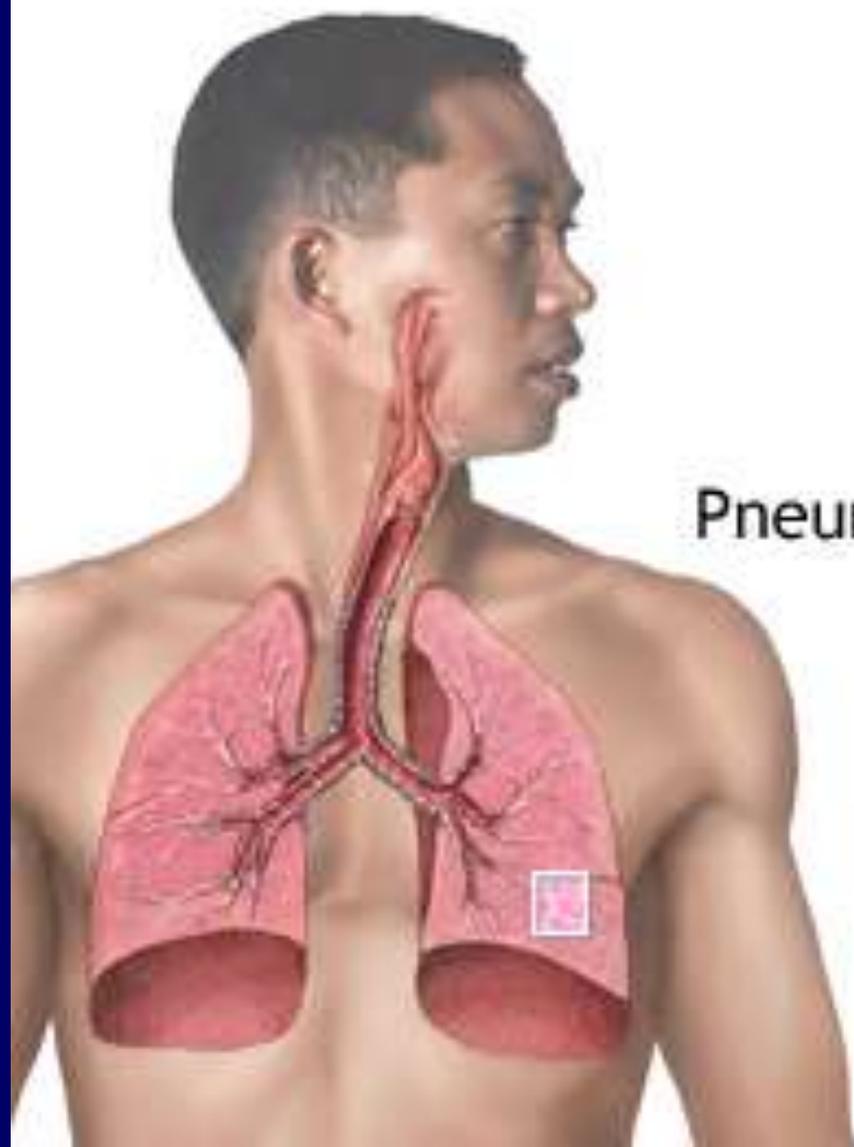
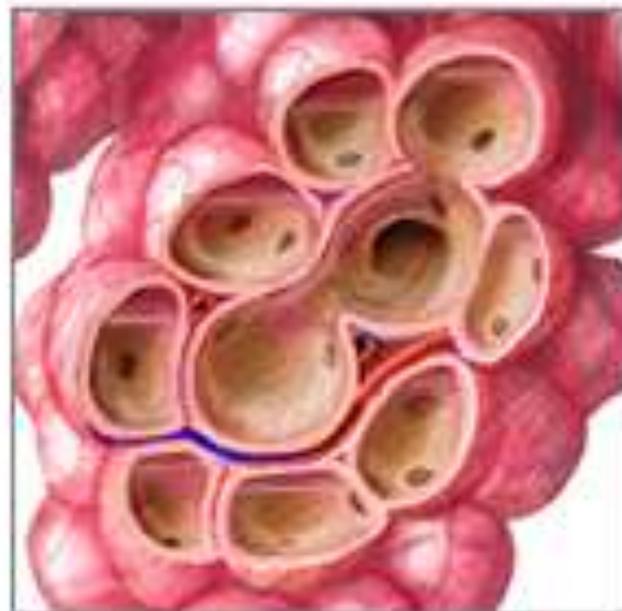
□ General causes:

- Hematologic disease,
- Anticoagulants,
- Coagulopathy

Normal
alveoli

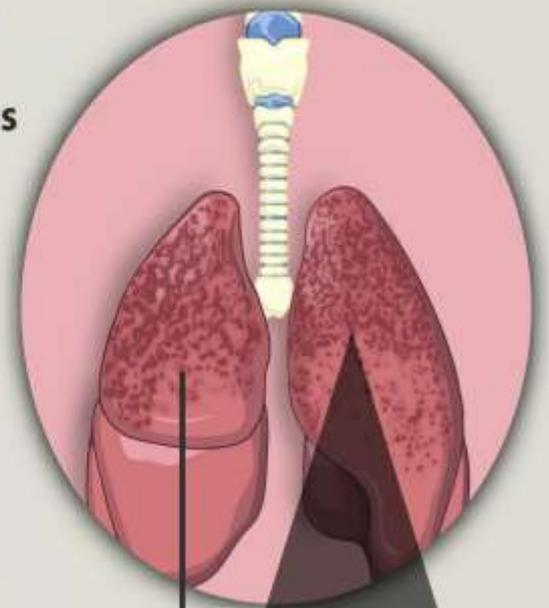


Pneumonia





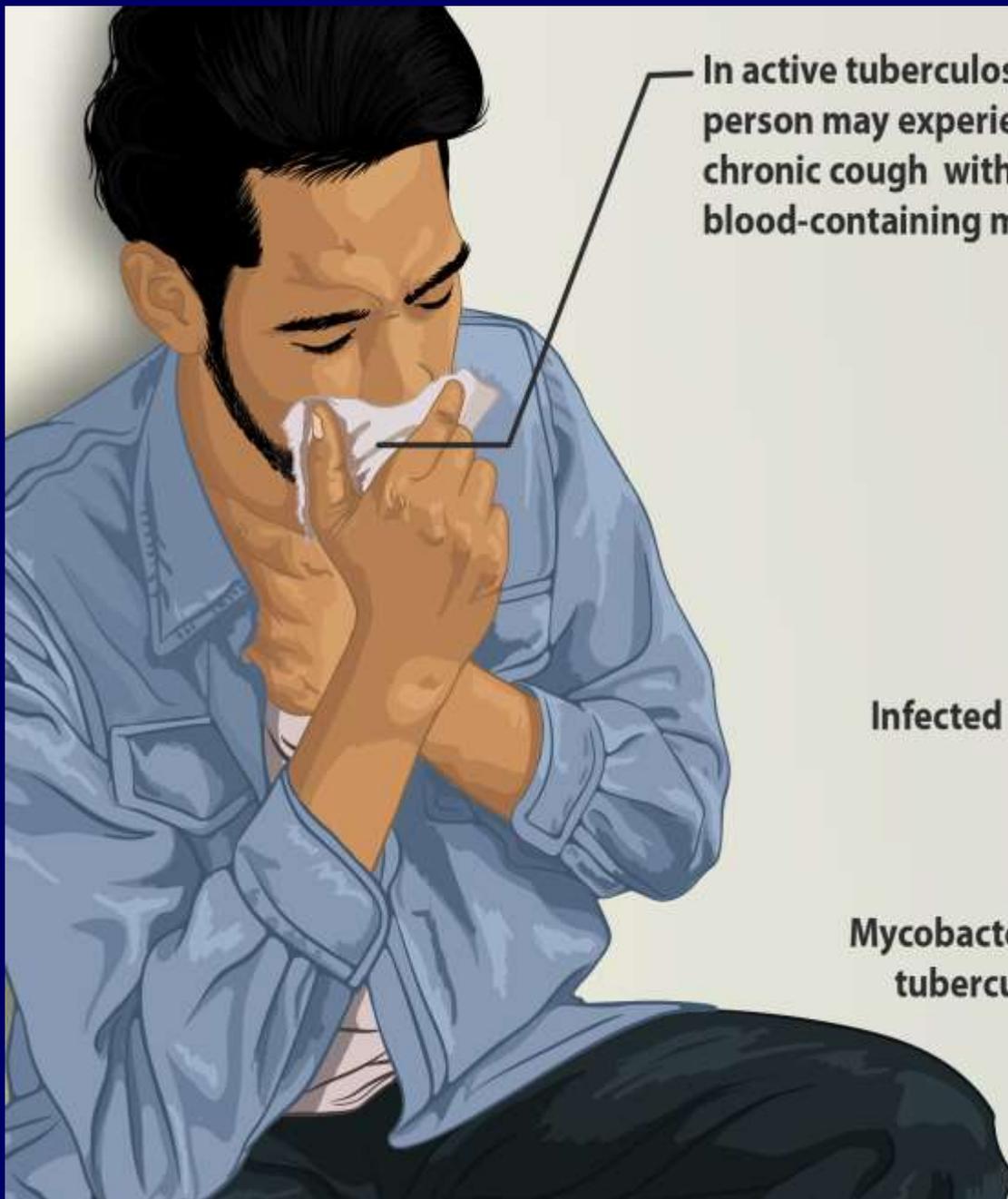
In active tuberculosis infection, person may experience chronic cough with blood-containing mucus



Infected lungs



Mycobacterium tuberculosis





iStock™
Credit: stockdevil



4- Chest pain

□ Respiratory :

- Airway: Tracheitis
- Pleura : Pleurisy and Pneumothorax,
- Pulmonary : PE

□ Cardiovascular

- Acute coronary syndrome,
- Pericarditis,
- Dissecting aneurysm

□ Chest wall :

- Herpes zoster,
- Myositis

□ Others

- Esophagitis ,
- GERD





H. Zoster

Chest pain: characteristics

- ❑ **Pleural pain** : Stitching , well localized to chest wall increase by coughing, and inspiration (Central diaphragmatic pleura referred to the lateral neck and shoulder tip)
- ❑ **Traheal pain:** Tracheitis cause retrosternal soreness, intense after cough
- ❑ **Muscular pain:** Dull ache accompanied by local tenderness, and increased with movement and violent cough.

5- Dyspnea(difficult breathing)

Definitions :

Shortness of breath

- ❑ “Difficult, labored, uncomfortable breathing”,
- ❑ “awareness of breathing”,
- ❑ “ inability to get enough air or experiencing air hunger”,
- ❑ Suffocation

Common Causes

□ Pulmonary

- Airway: Asthma, COPD
- Lung: Pneumonia fibrosis, PE,PH
- Pleura: Pleurisy, pleural effusion, pneumothorax

□ Cardiac

- Heart failure,
- Cardiomyopathy

□ Abdominal causes

- Ascitis

□ Systemic e.g.

- Acute Kidney Failure,
- Anemia,
- Fever,
- Hypothyroidism and DKA

□ Physiological

- ❖ Obesity ,
- ❖ Pregnancy,
- ❖ Exercise,
- ❖ High altitude

□ Psychological

- anxiety and stress

Mode of onset and course:

Sudden onset → (over minutes) Pulmonary Embolism, Pneumothorax.

Acute → (over hours) Pneumonia.

Subacute → (over weeks) → pleural effusion.

Chronic (over months) → COPD, IPF and PPH.

Paroxysmal (intermittent) → in asthma.

Timing

Nocturnal : cardiac asthma

Early morning: bronchial asthma

Postural Dyspnea

Orthopnea: Dyspnea in the recumbent position, relieved by sitting or standing.

Paroxysmal nocturnal dyspnea (PND): Dyspnea that awakens the patient, often after 1-2 hours of sleep, usually relieved in the upright position for 5-15 minutes

Trepopnea: Dyspnea that occurs in one lateral decubitus position as opposed to the other .



Figure-1: Posteroanterior chest X ray demonstrating a significant right pleural effusion.

Right sided pleural effusion

Chest wheeze

Musical sound produced by passage of air through narrow bronchi

- **Bronchial Asthma**; Severe and paroxysmal
- **Chronic bronchitis and emphysema** “usually mild and continuous

Toxic symptoms

SLS,TB.malignancy

- Weight loss
- Loss of appetite
- Night fever
- Night sweating