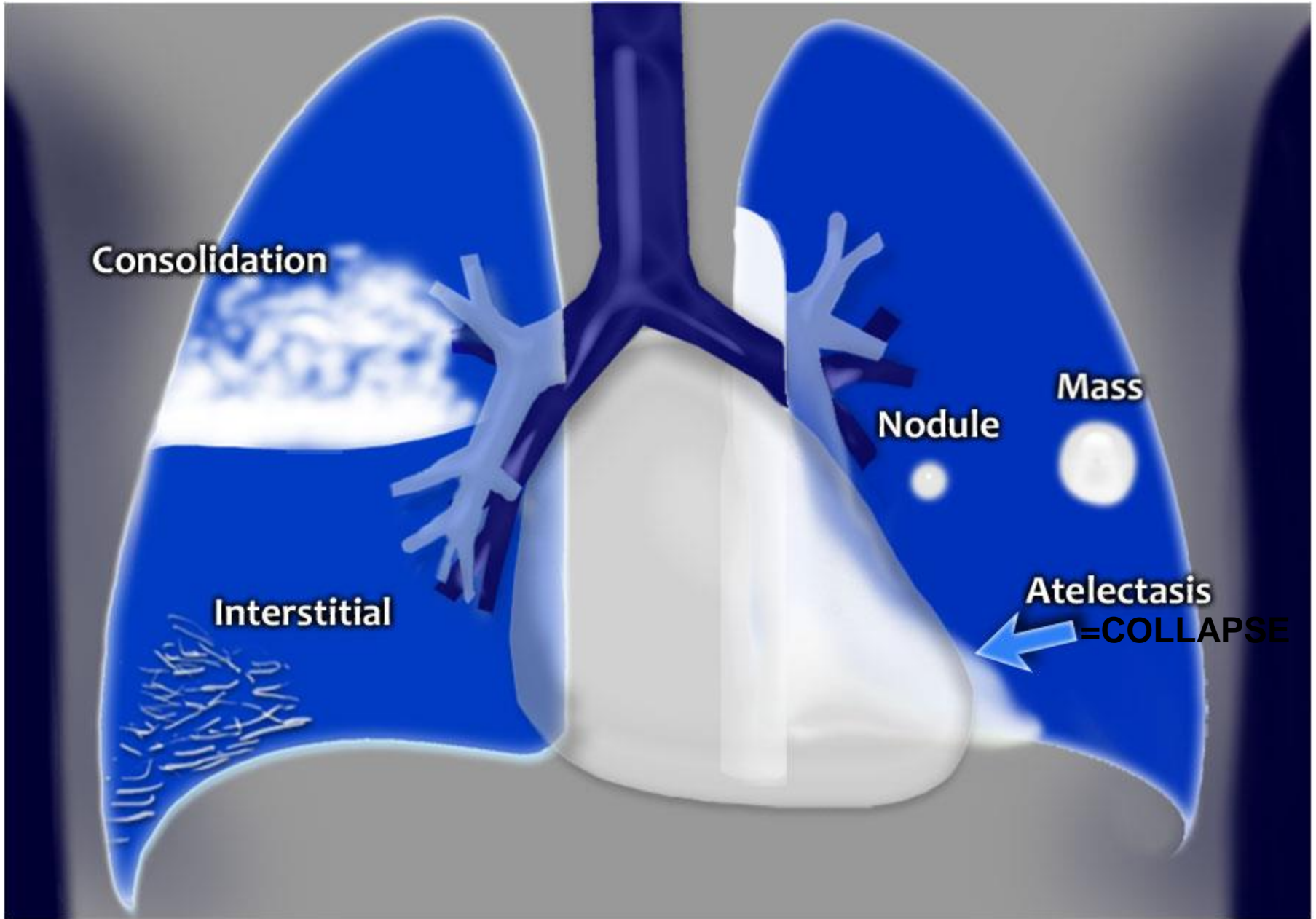




# **LUNG DISEASES**



**Consolidation**

**Interstitial**

**Nodule**

**Mass**

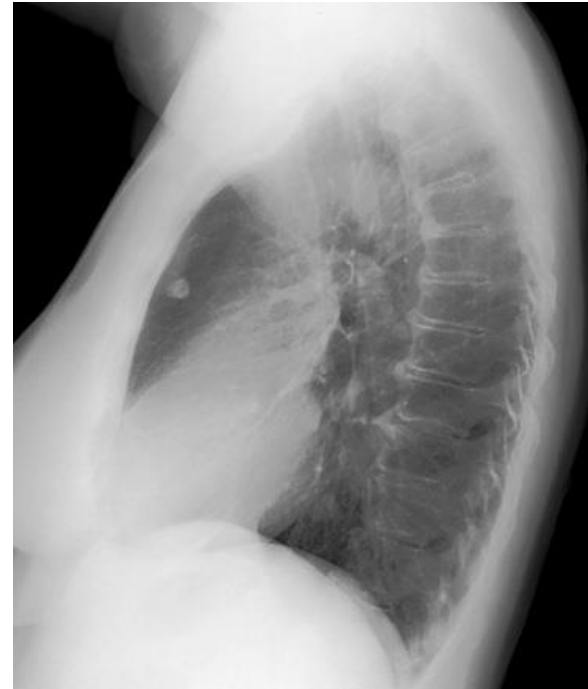
**Atelectasis  
= COLLAPSE**

# MASS Vs DIFFUSE INFILTRATION

- The basic diagnostic instance is to detect an abnormality.
- In both of the cases, there is an **abnormal opacity**.
- In each of the cases, there is an abnormal opacity in the left upper lobe.
- In the case ABOVE , the opacity would best be described as a **mass** because it **HAS EDGES well-defined 3-D STRUCTURE**
- The case BELOW has an opacity that is **poorly defined**. This is airspace disease such as **pneumonia**.

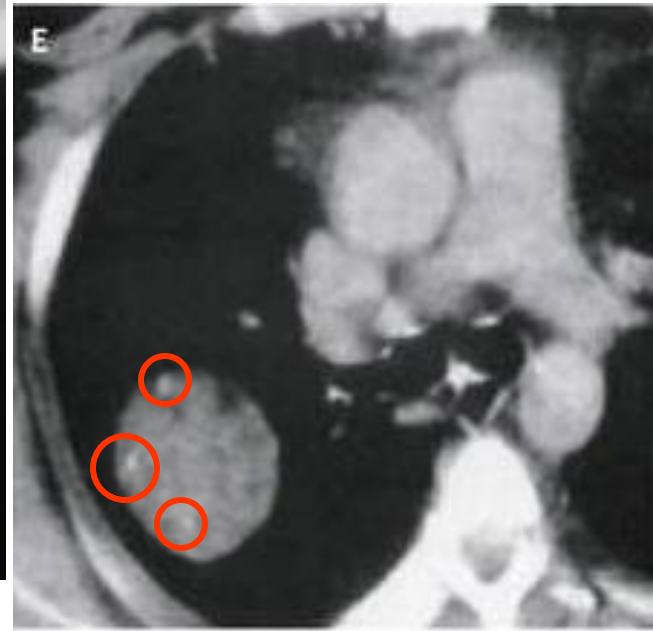
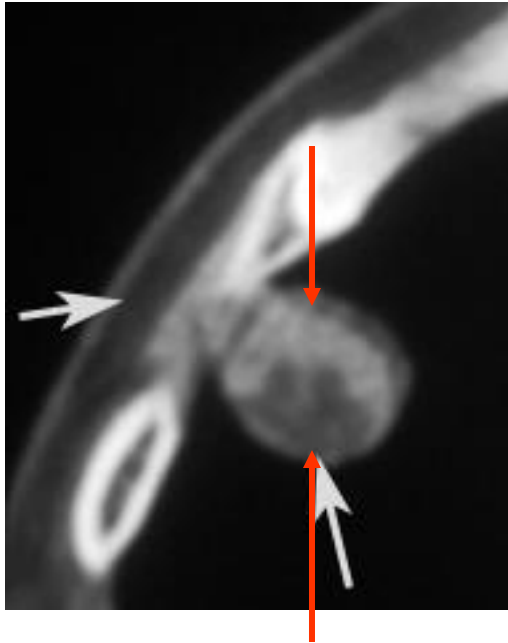
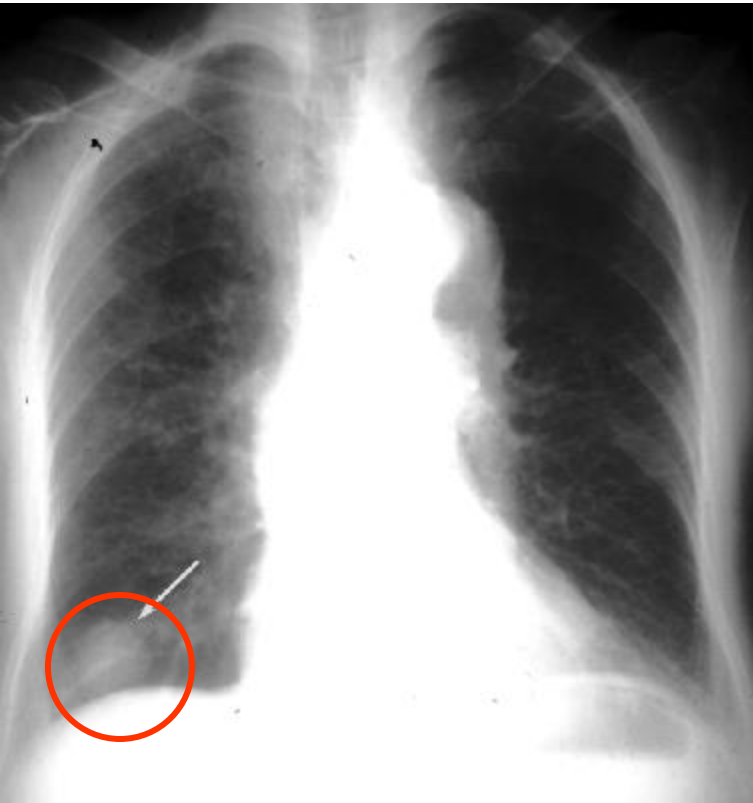


# solitary nodule in the lung

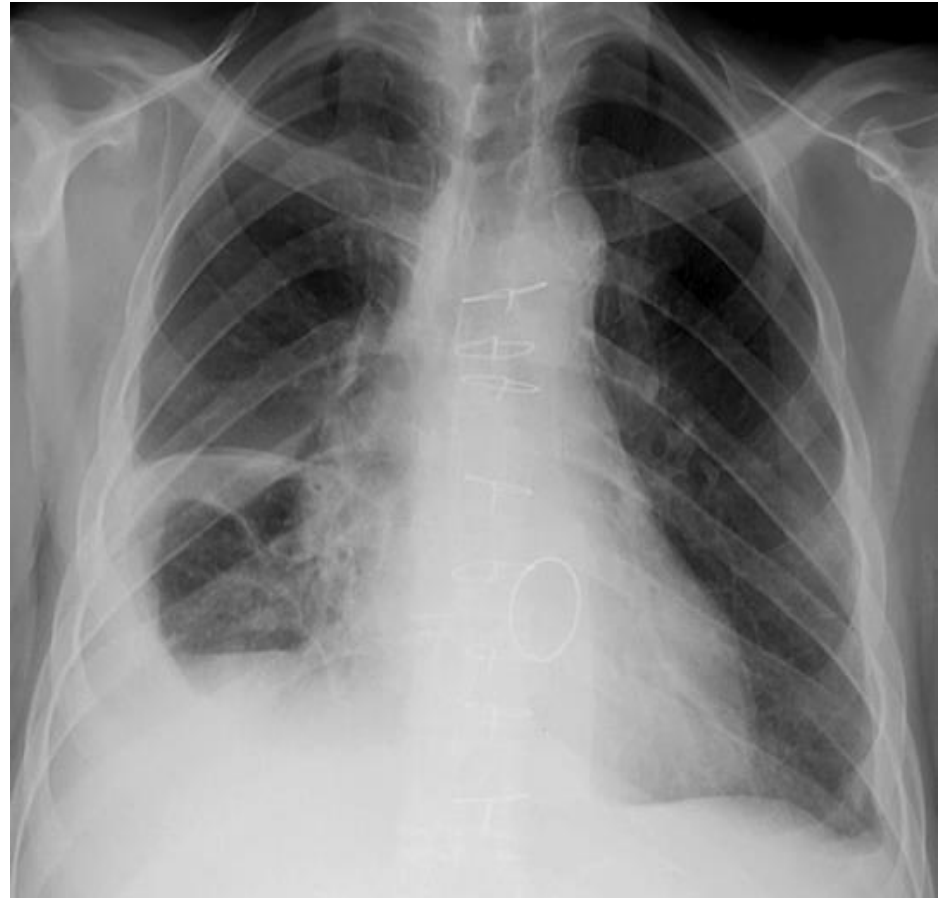
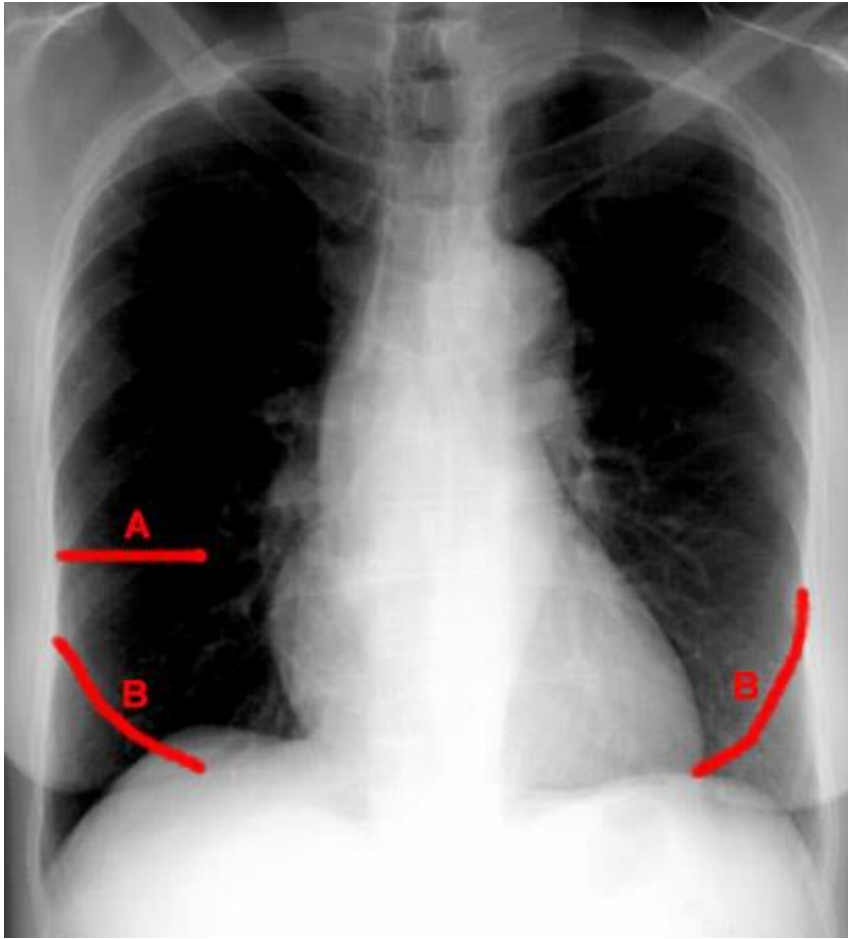


- A solitary nodule in the lung can be totally innocuous or potentially a fatal lung cancer. After detection the initial step in analysis is to compare the film with prior films if available. A nodule that is unchanged for two years is almost certainly benign. Be sure to evaluate for the presence of **multiple nodules** as this finding would change the differential entirely.
- If the nodule is indeterminate after considering old films and calcification, subsequent steps in the work-up include ordering a CT and a tissue biopsy.

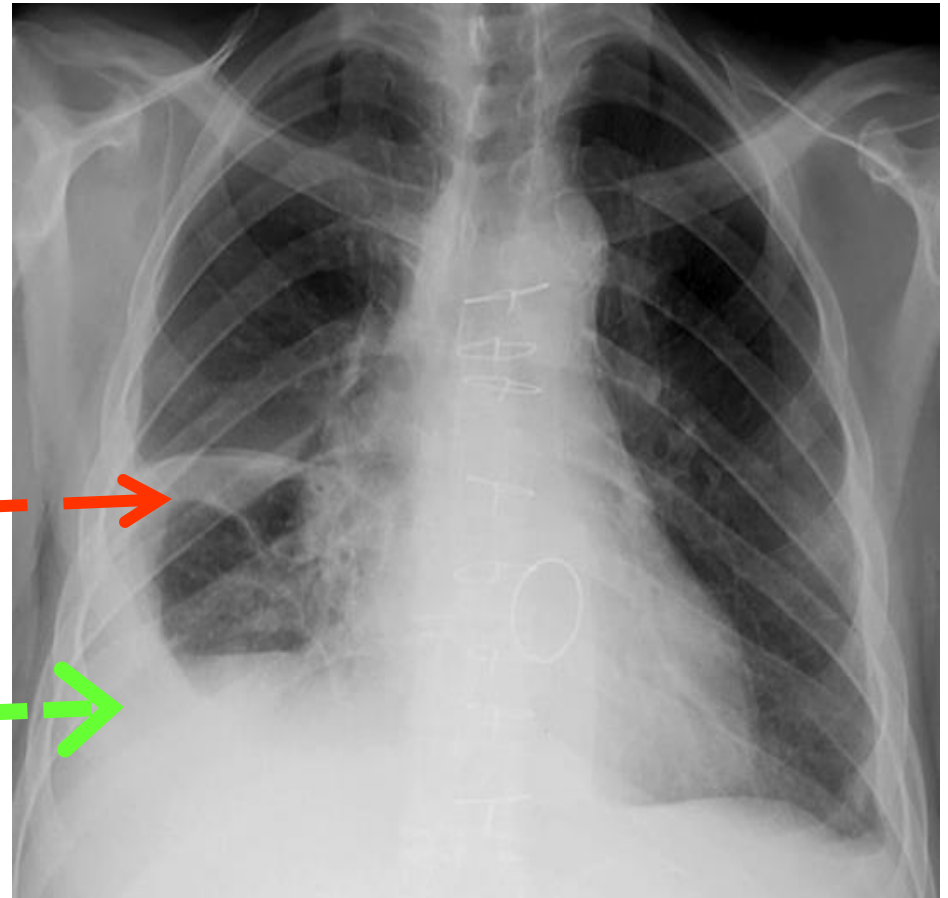
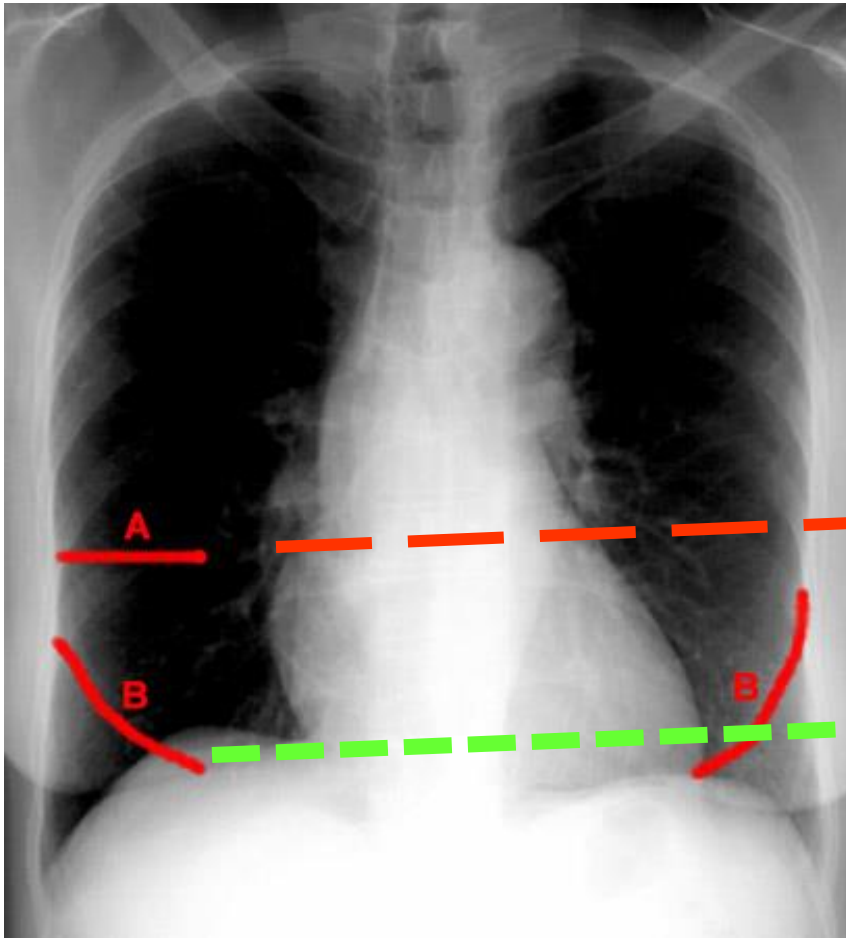
# MASS



# FISSURES



# FISSURES





# ***DEFINITIONS***

- **ATELECTASIS**

Loss of volume of lobe, segment or sub segment of the lung.

*Example collapse (lung)*

- **Consolidation**

Loss of air in lobe, segment or sub segment of the lung.

*Example= pneumonia (lobe)*

# Major differentiating factors between atelectasis and pneumonia

## Atelectasis

Volume **Loss**

Associated Ipsilateral Shift

Linear, Wedge-Shaped

Apex at Hilum

## Pneumonia

**Normal** or Increased Volume

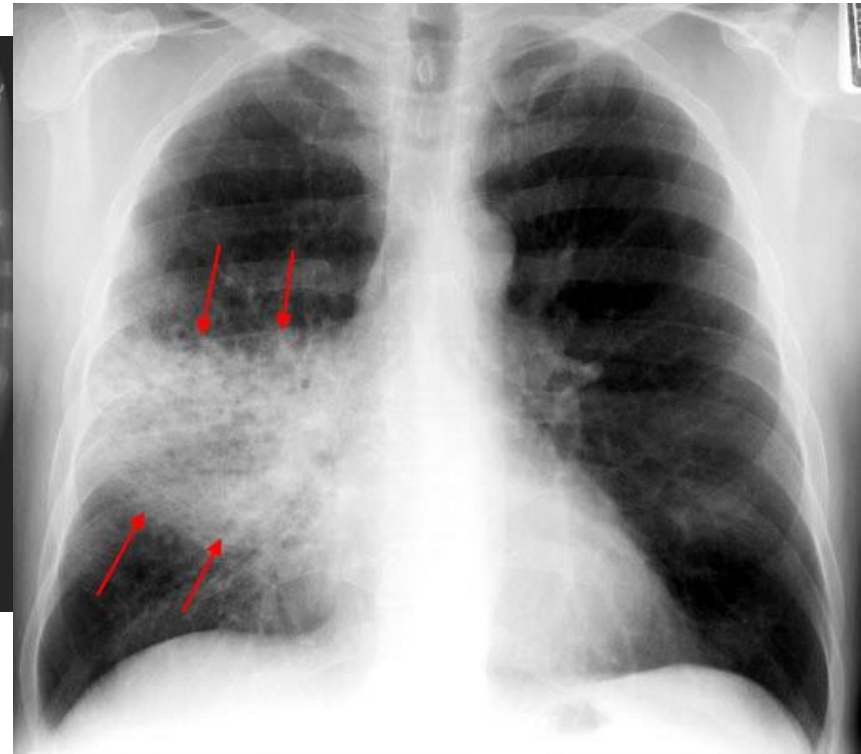
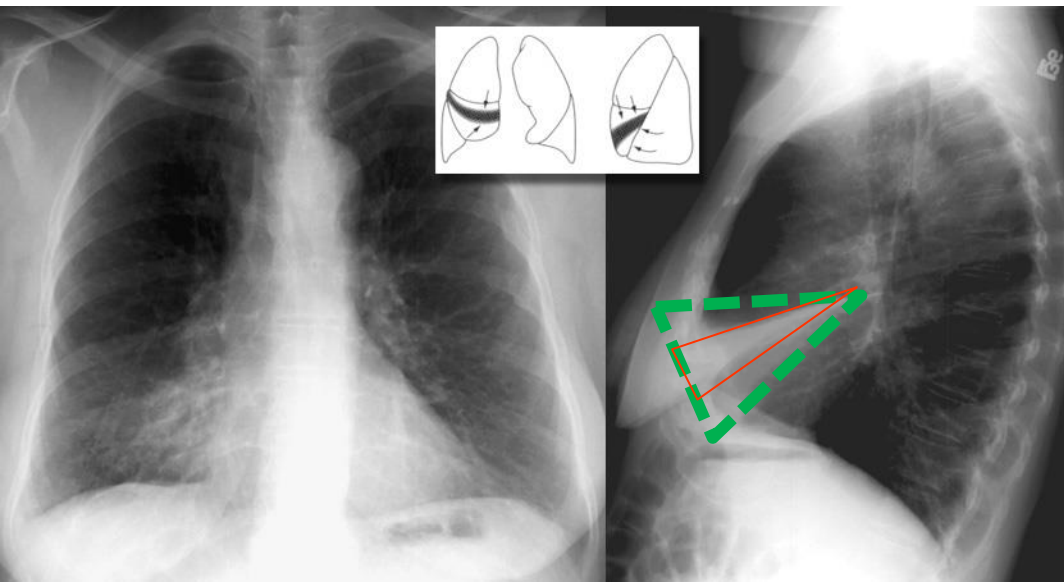
No Shift, or if Present Then Contralateral

Consolidation, Air Space Process

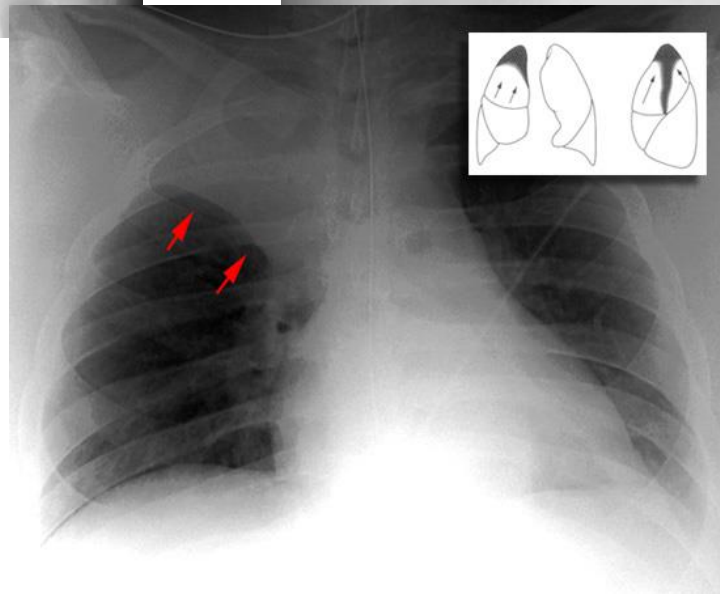
Not Centered at Hilum

Air bronchograms can occur in both.

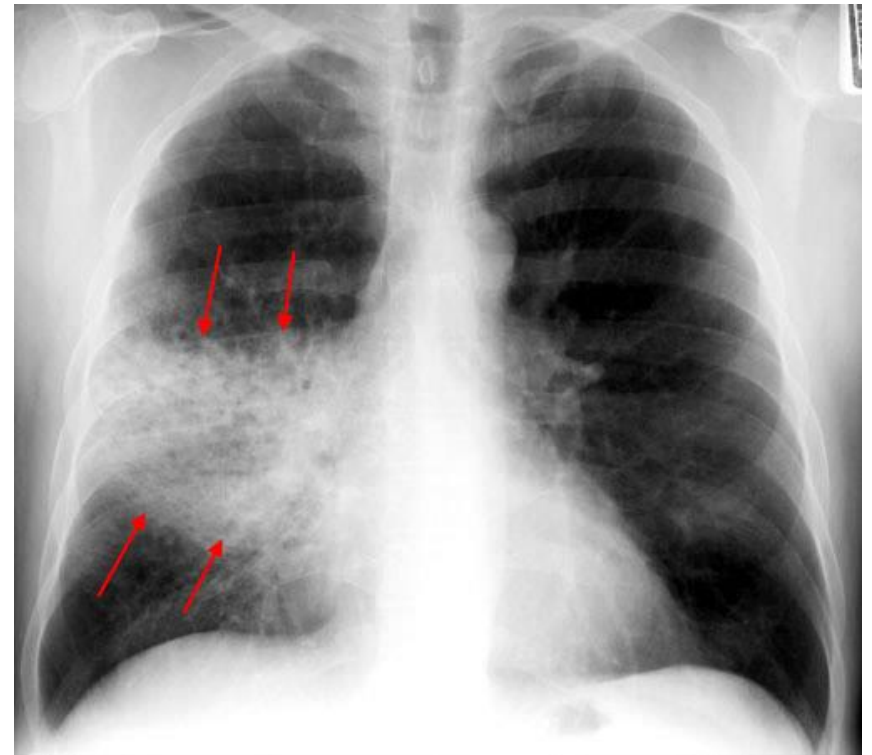
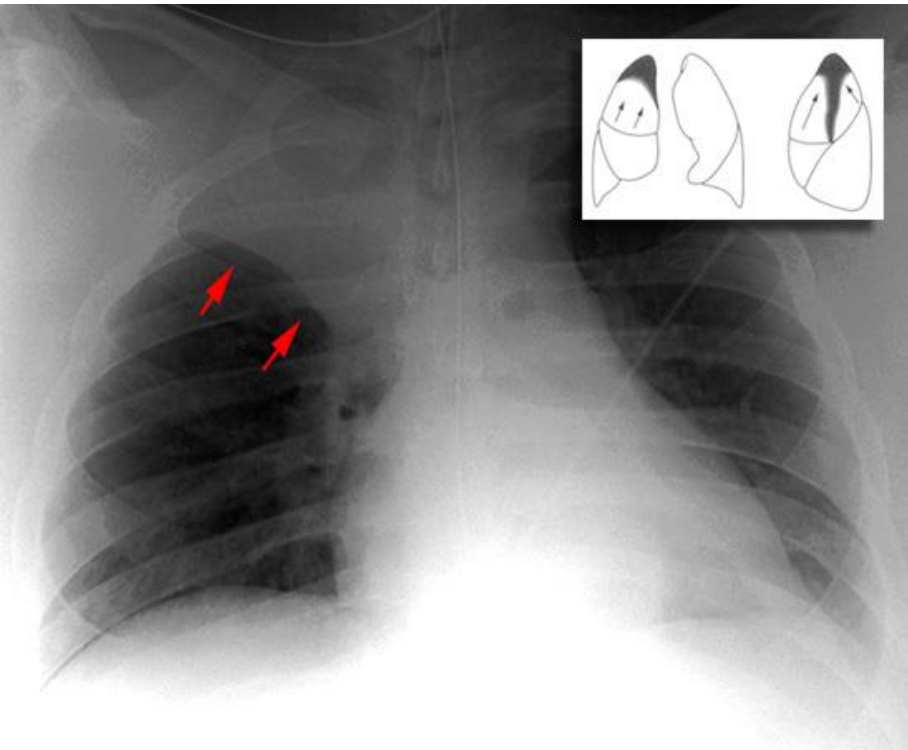
# ***ATELECTASIS VS PNEUMONIA***



# PNEUMONIA Vs ATELECTASIS



# ATELECTASIS Vs PNEUMONIA



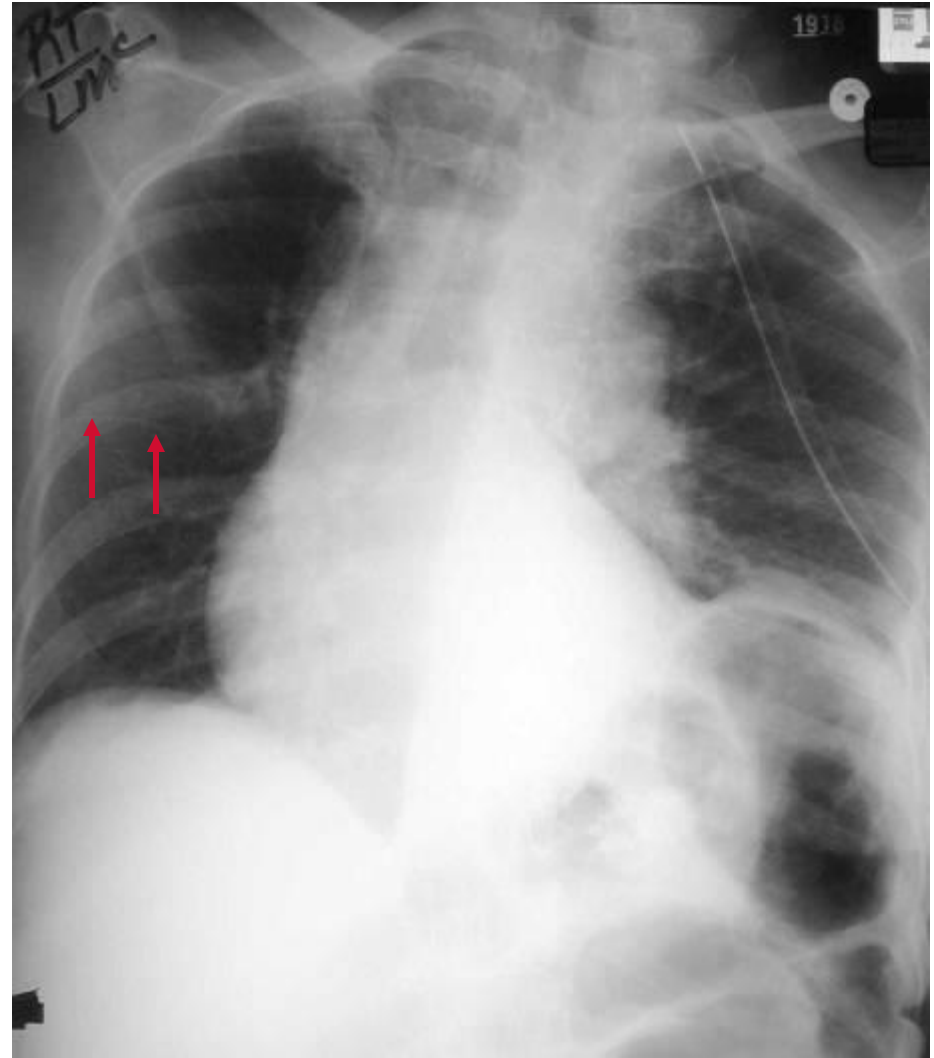
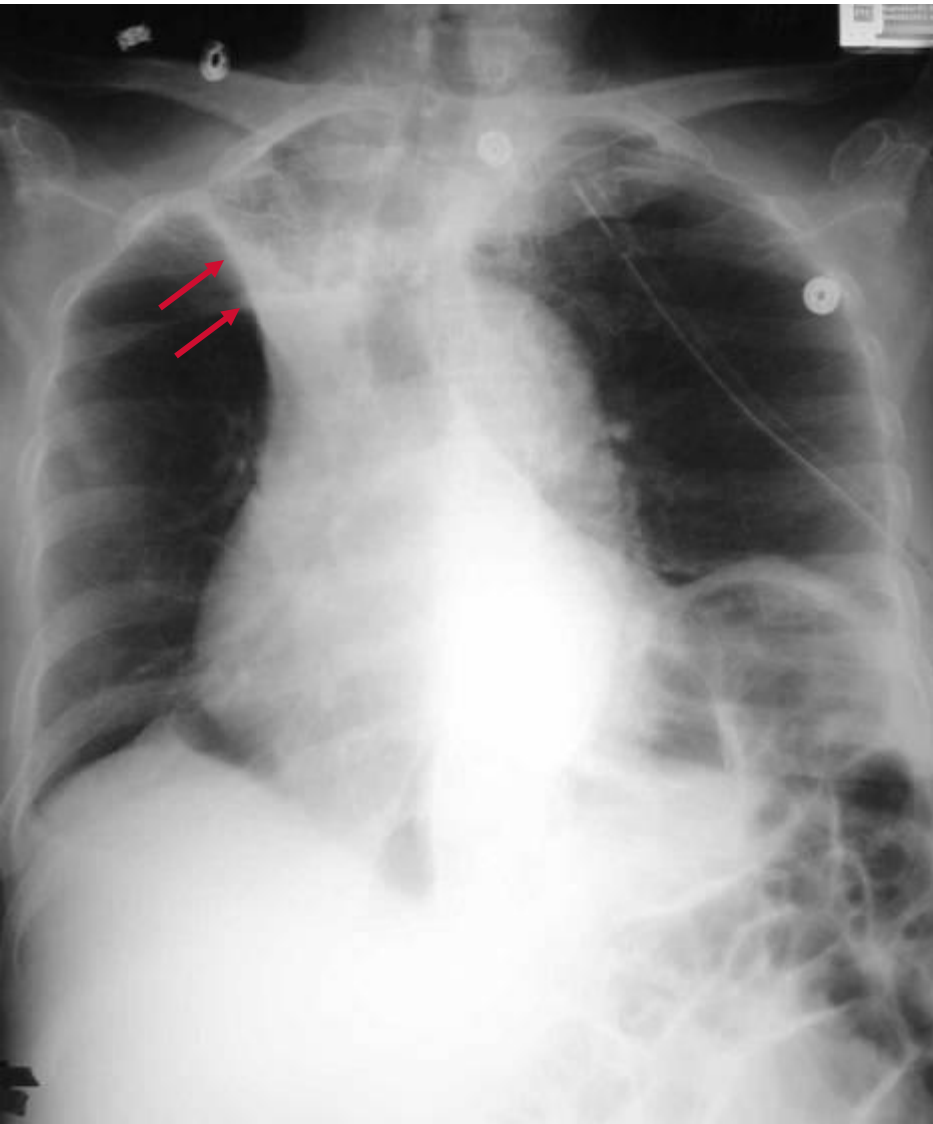
# Recognizing air space disease

- Alveolar spaces filled with...something.
- Radiologist's report:
  - “consolidation”
  - “air space opacity”
  - “fluffy density”
  - “infiltrate”
- Nonspecific:
  - Atelectasis, pneumonia, bleeding, edema, tumor

# Lobar Atelectasis

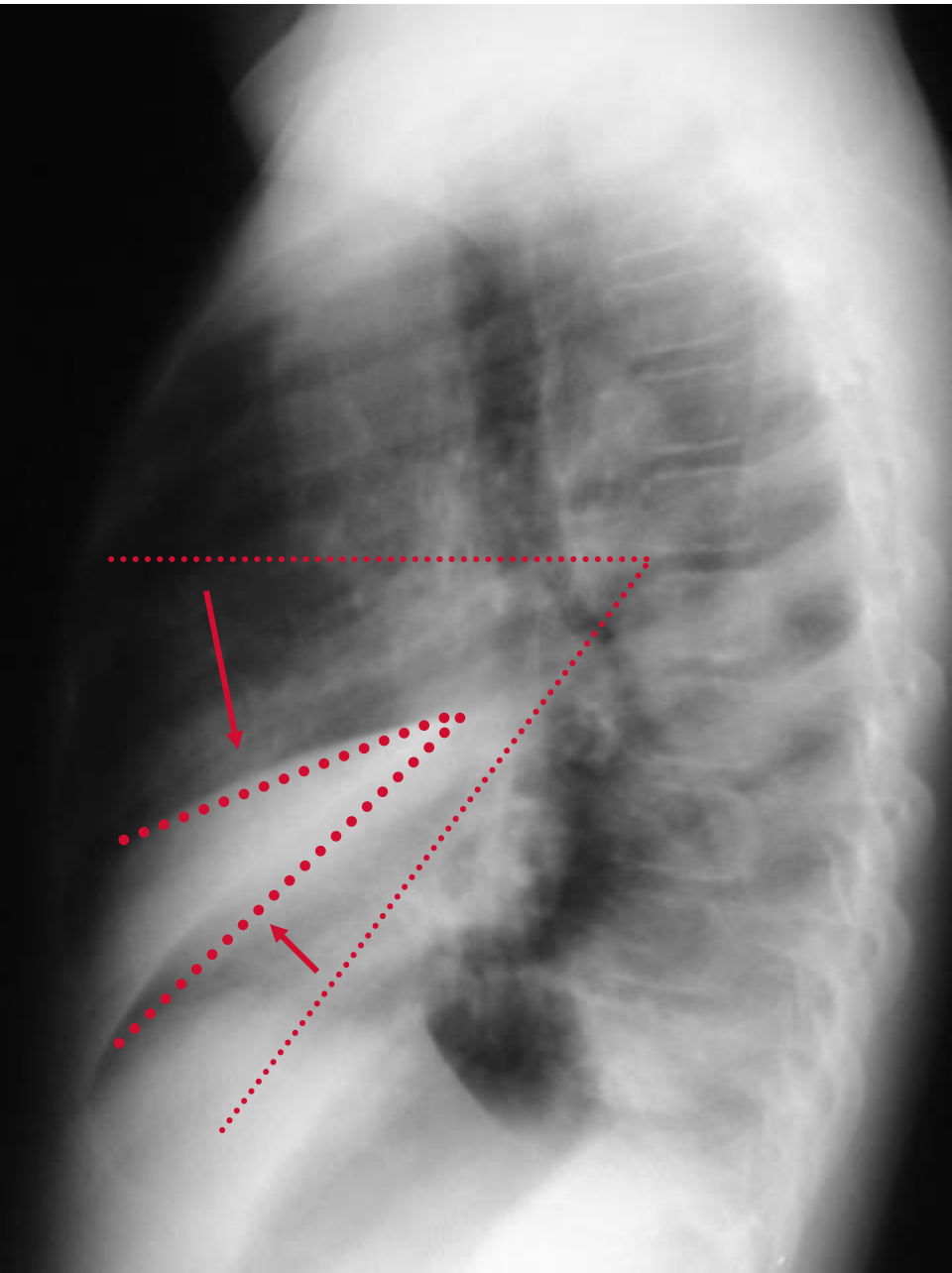
- Best sign – shift of a fissure
- Rapid development and clearance
- Air bronchograms if non-obstructive
- Secondary signs:
  - Mediastinal shift
  - Elevated diaphragm
  - Ribs closer together
  - Vague increased density

# RUL Atx

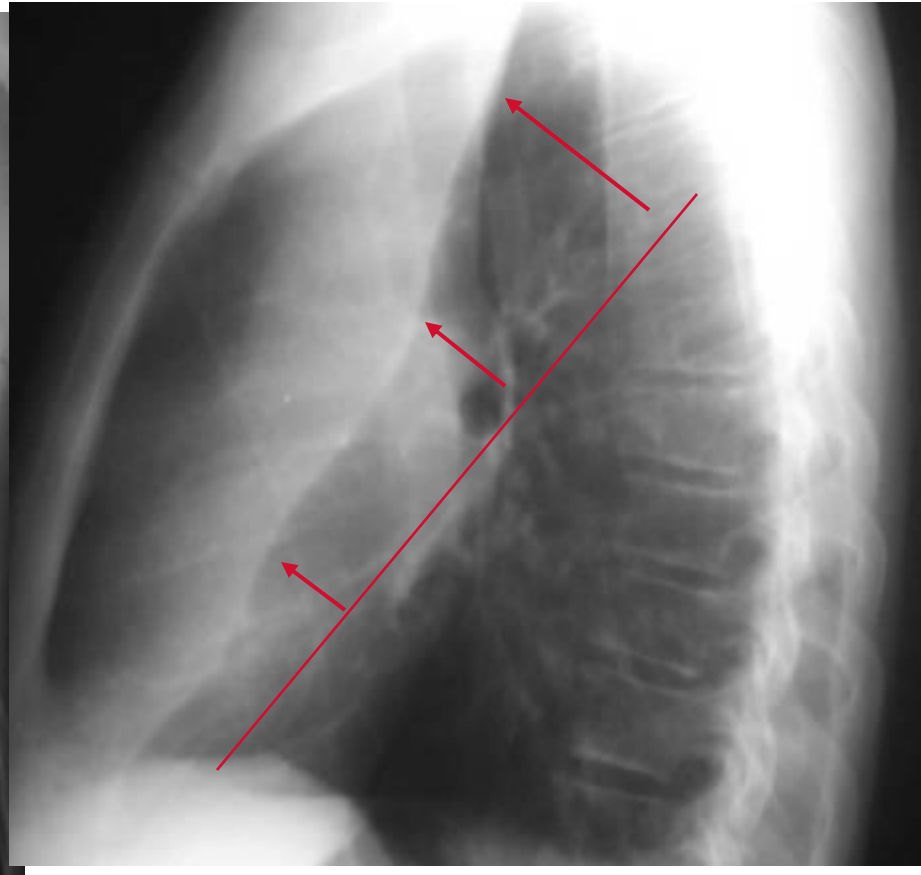




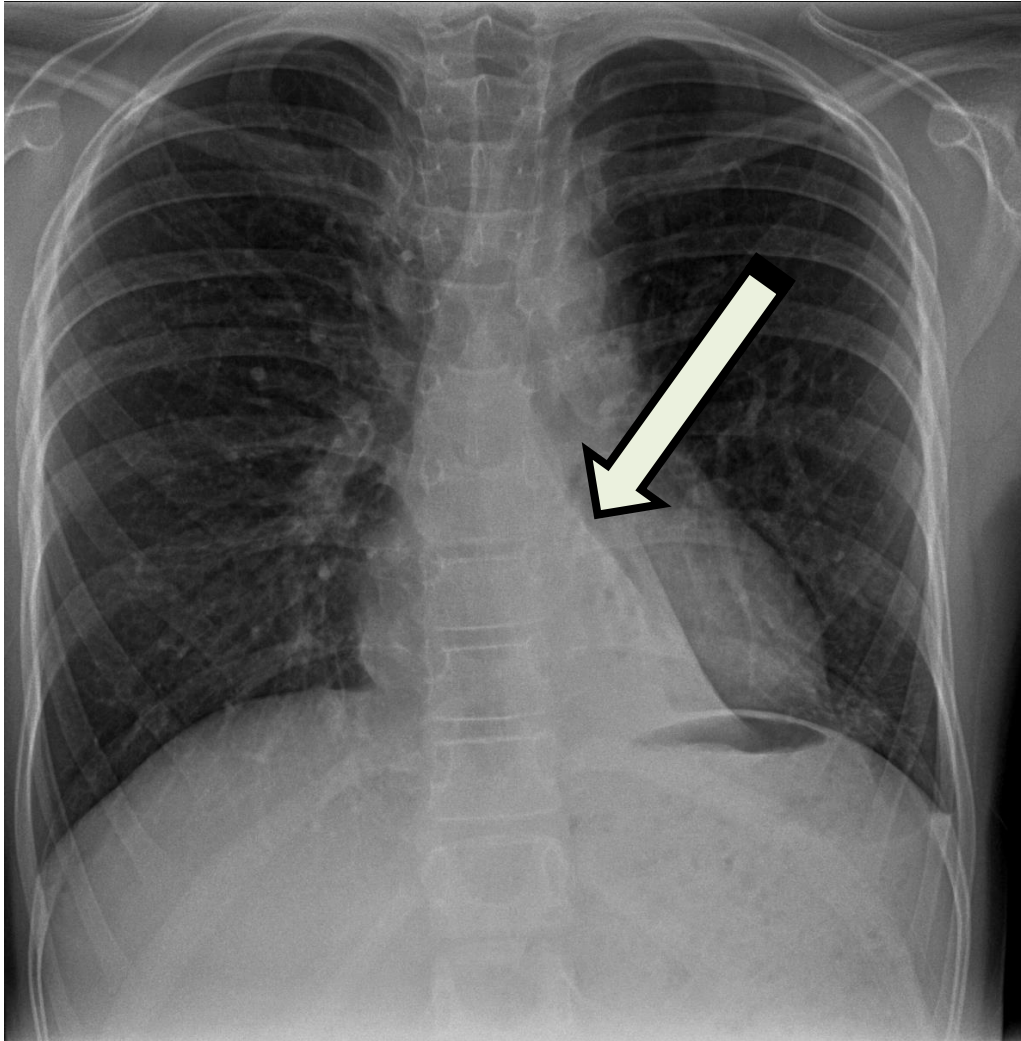
# RML Atx



# LUL Atx



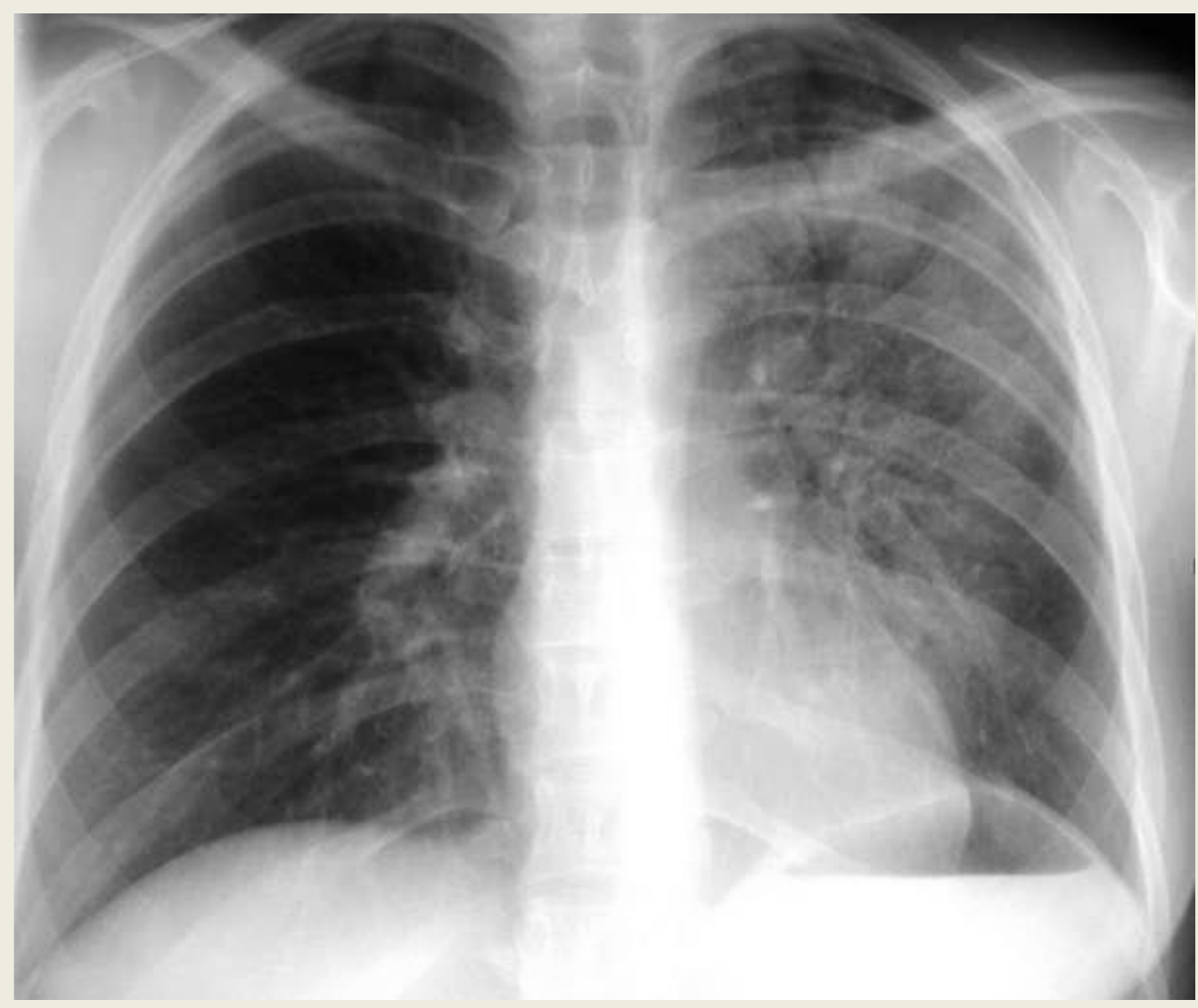
# LLL COLLAPSE



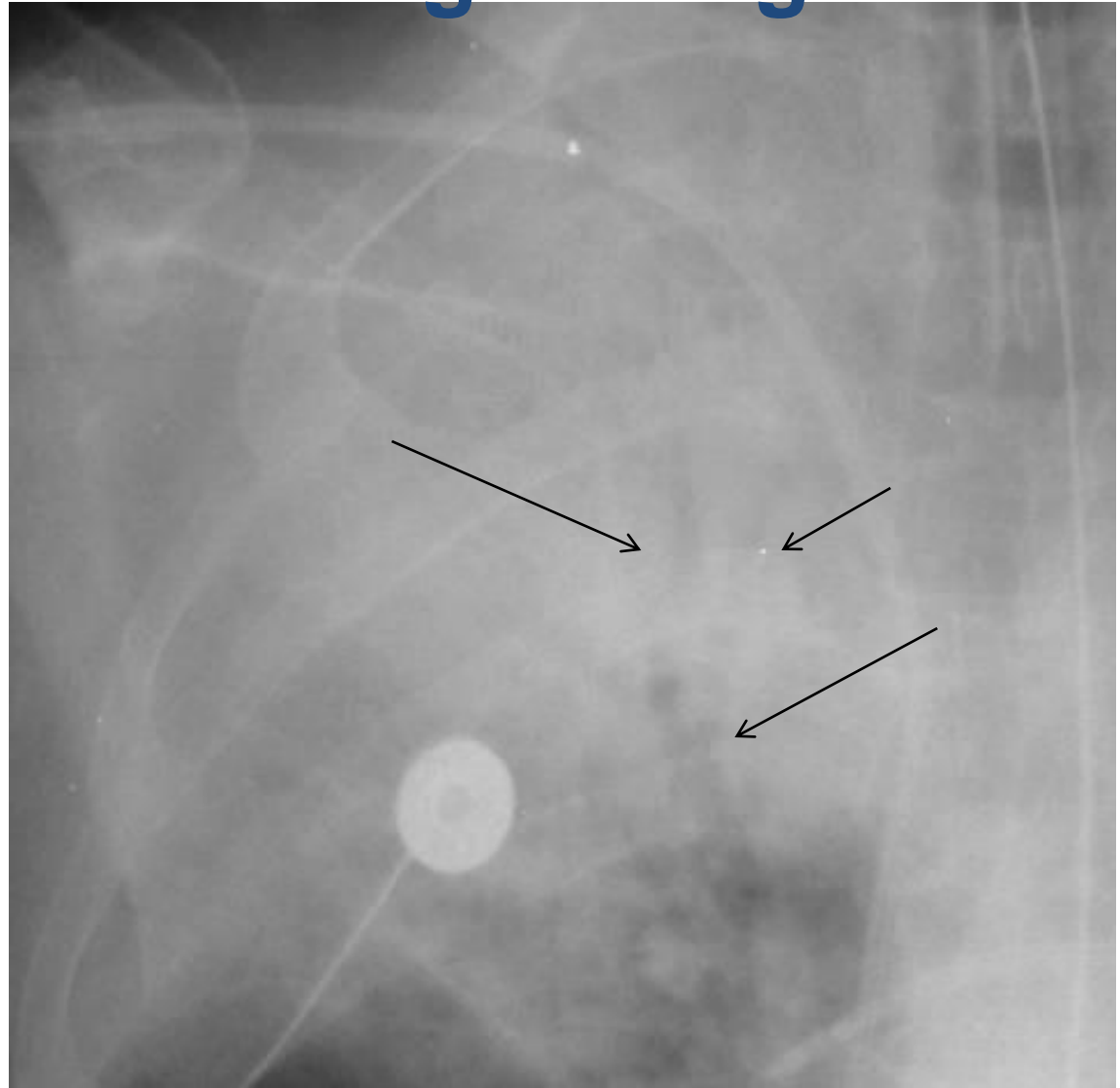
# Pneumonia

- Signs:
  - Air bronchogram
  - Silhouette - “positive” or “negative”
  - Dense hilum
  - “Spine” sign
- All are signs of any air space process
- Dx of pneumonia depends on appropriate clinical scenario.

# AIR-BRONCHOGRAM

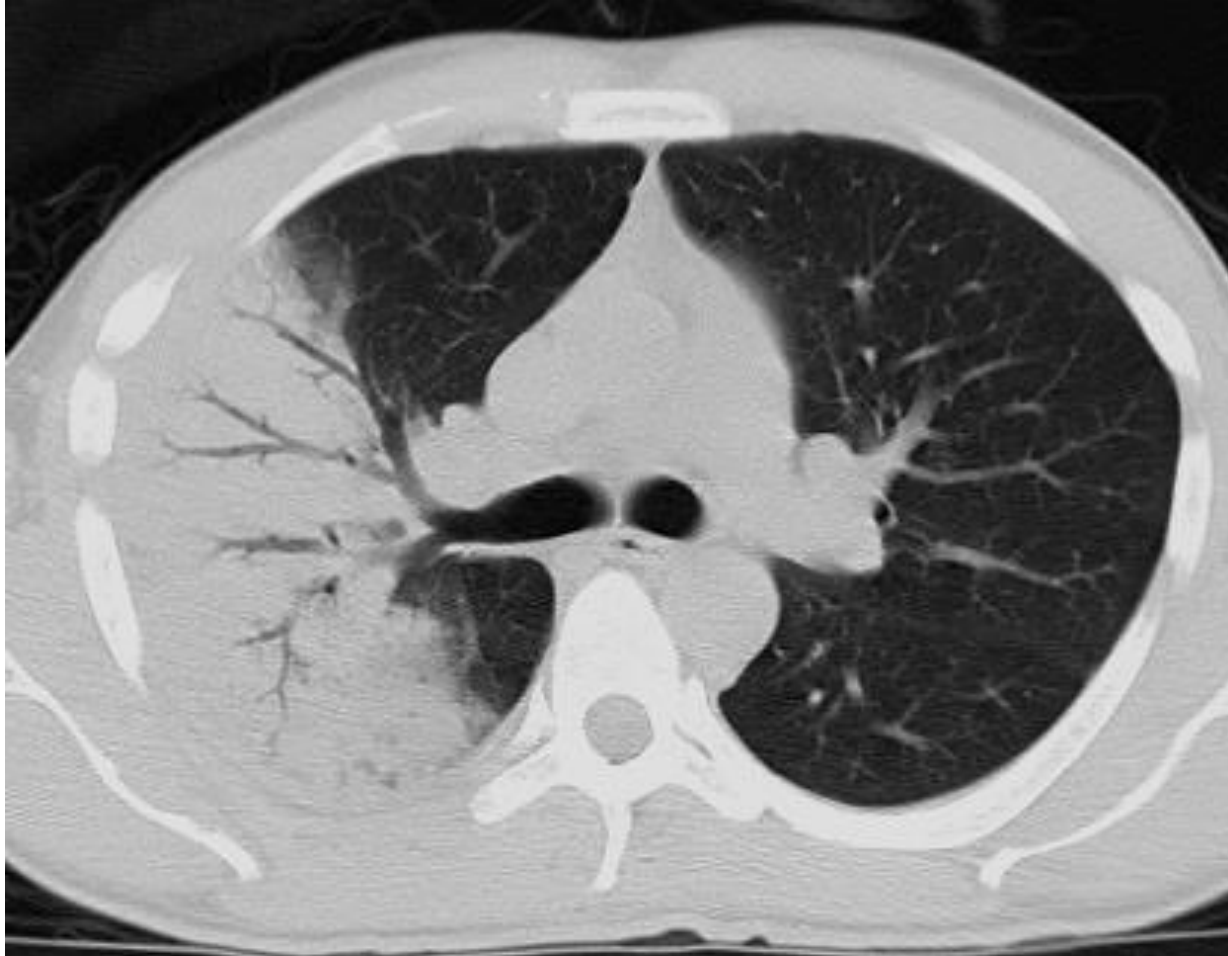


# Air bronchogram sign



**Pseudomonas  
pneumonia**

# Air bronchograms — CT



**Pneumonia**

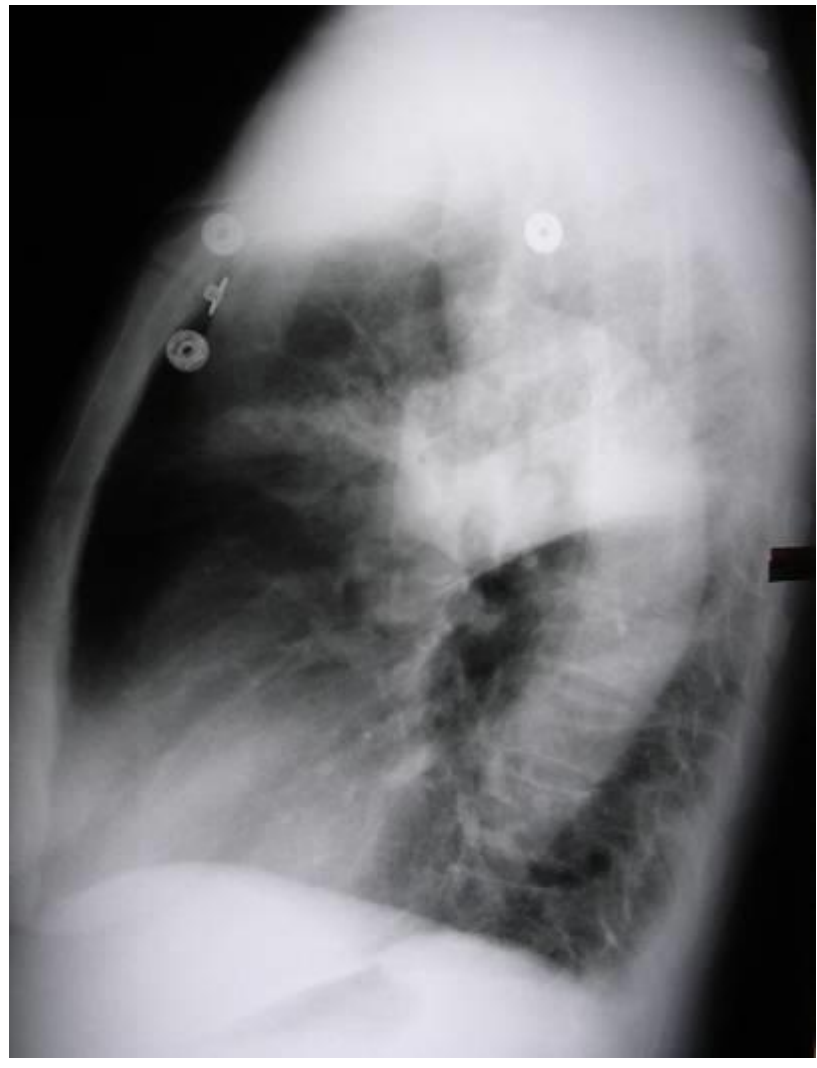


# Right middle lobe

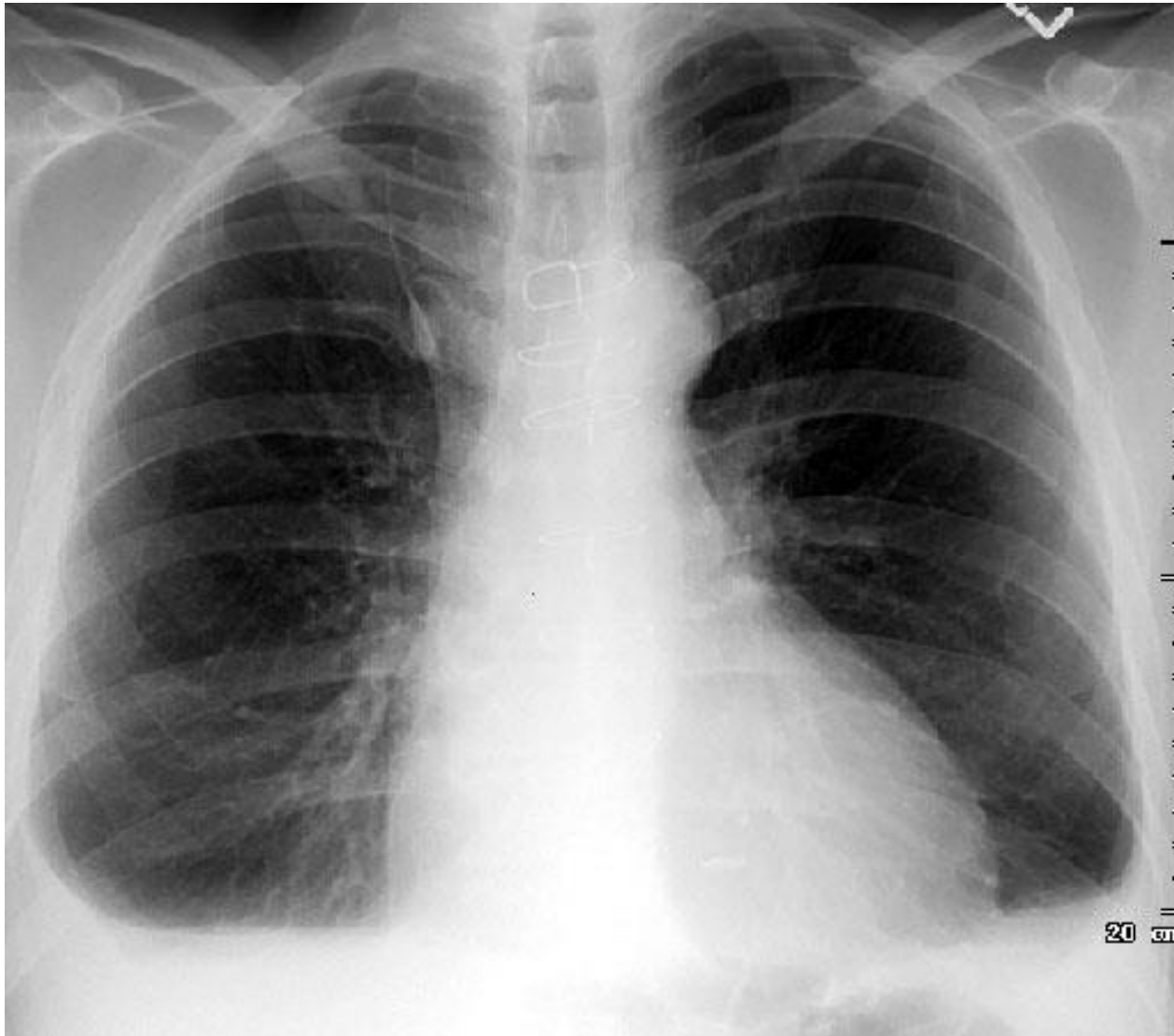




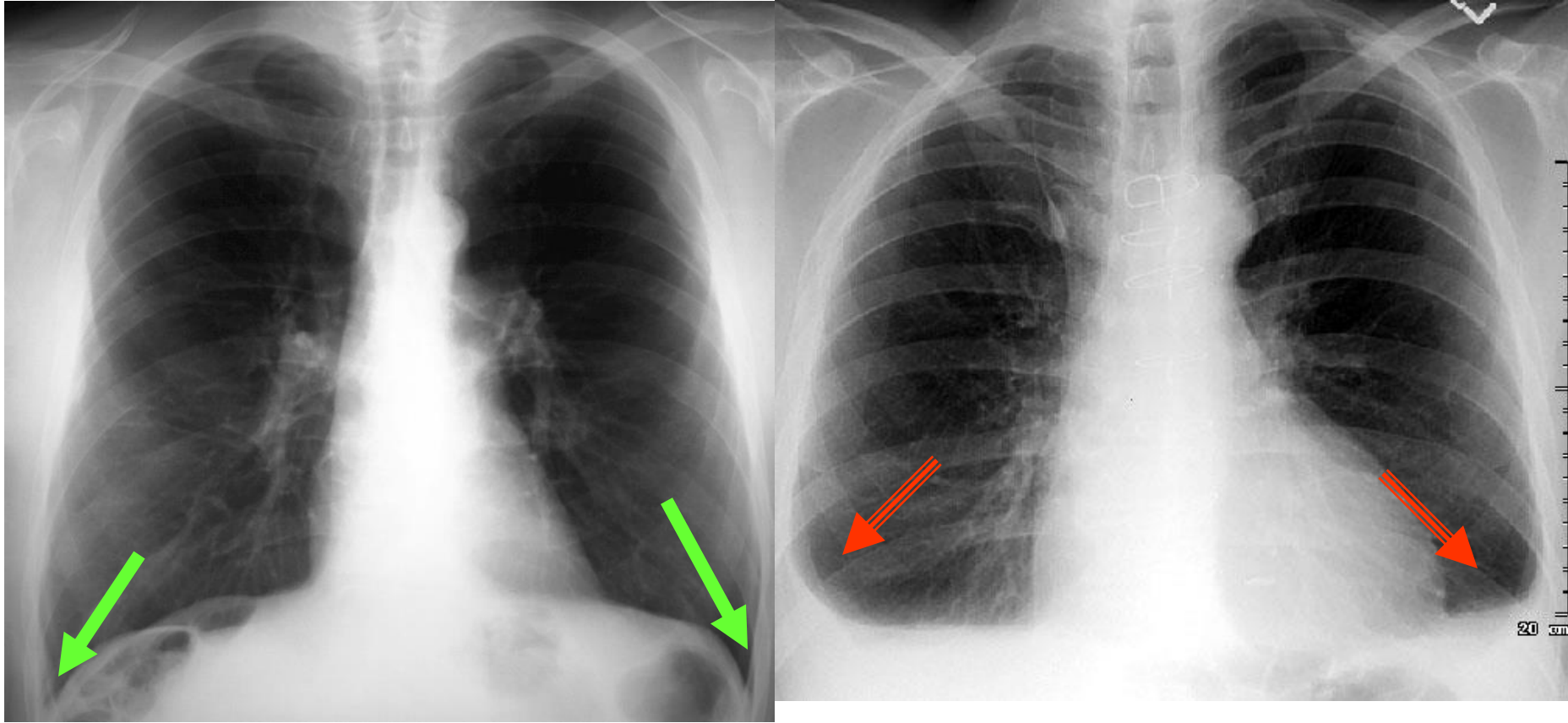
# Right upper lobe



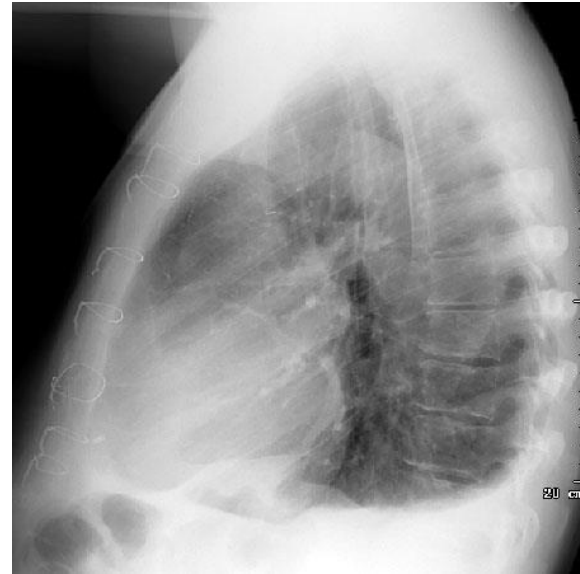
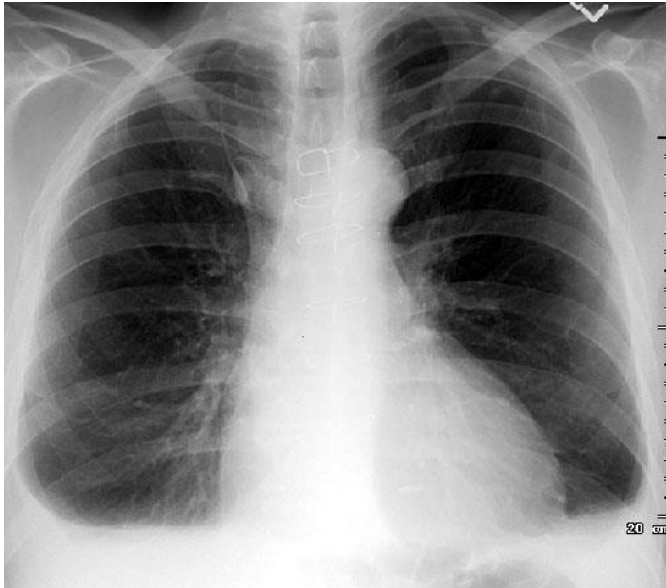
# PLEURAL EFFUSION



# COMPARE COSTO-PHRENIC ANGLES

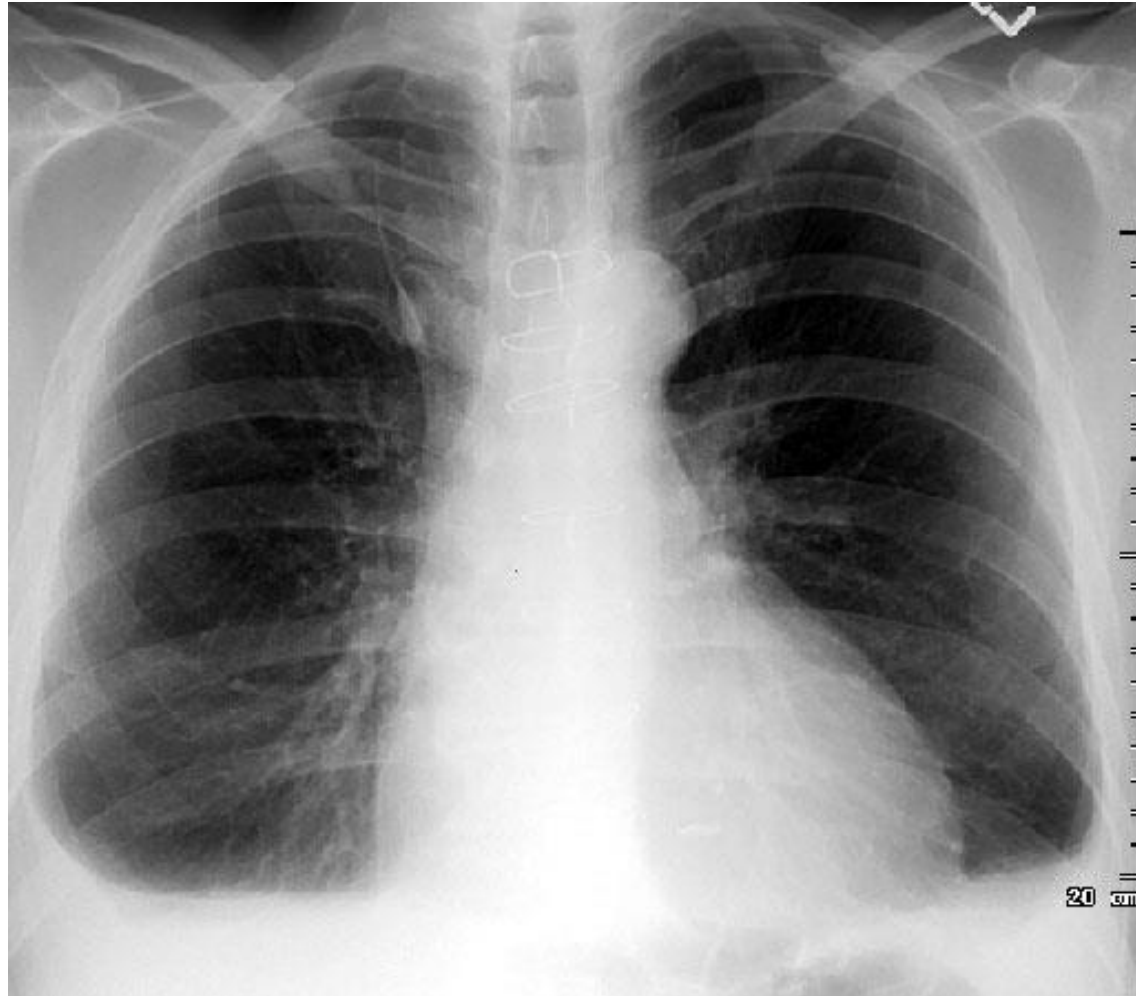


# PLEURAL EFFUSION

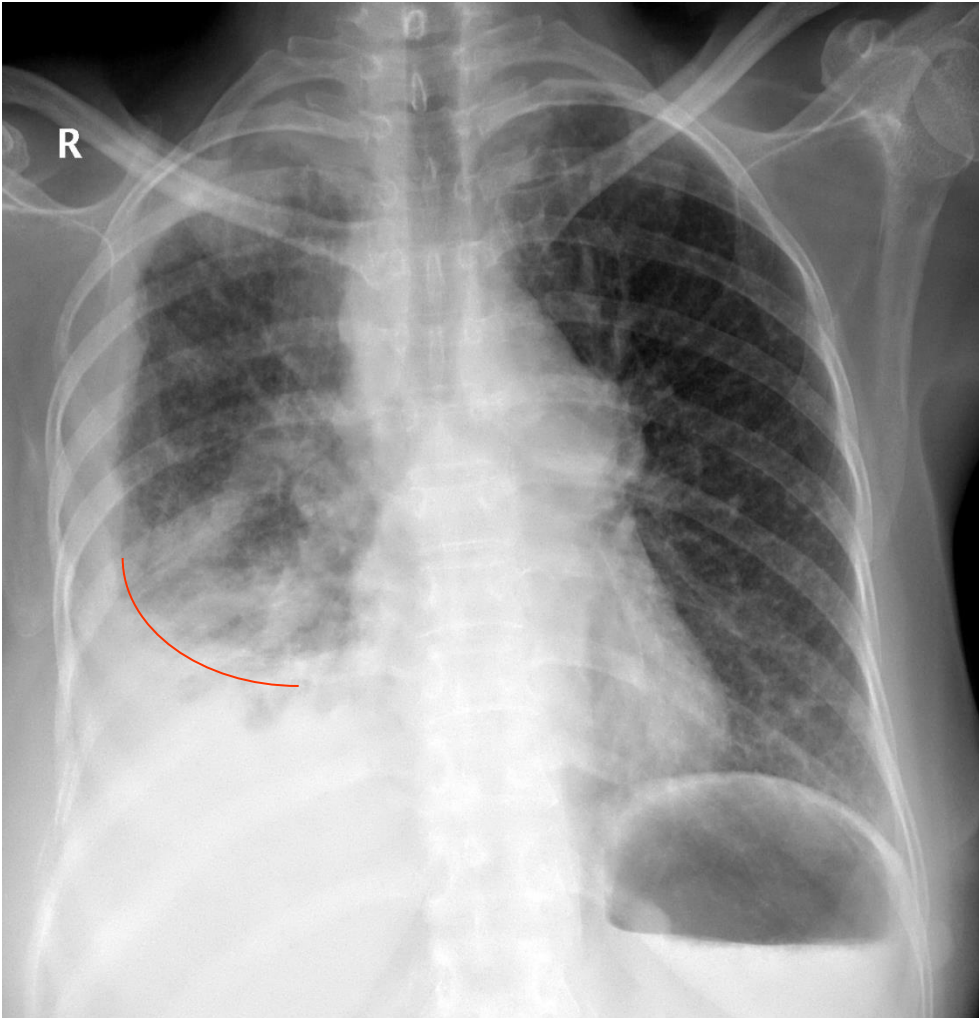


- On an upright film, an effusion will cause blunting on the lateral and if large enough, the posterior costophrenic sulci. Sometimes a depression of the involved diaphragm will occur. A large effusion can lead to a mediastinal shift away from the effusion and opacity the hemithorax. Approximately 200 ml of fluid are needed to detect an effusion in the frontal film vs. approximately 75ml for the lateral. Larger effusions, especially if unilateral, are more likely to be caused by malignancy than smaller ones.

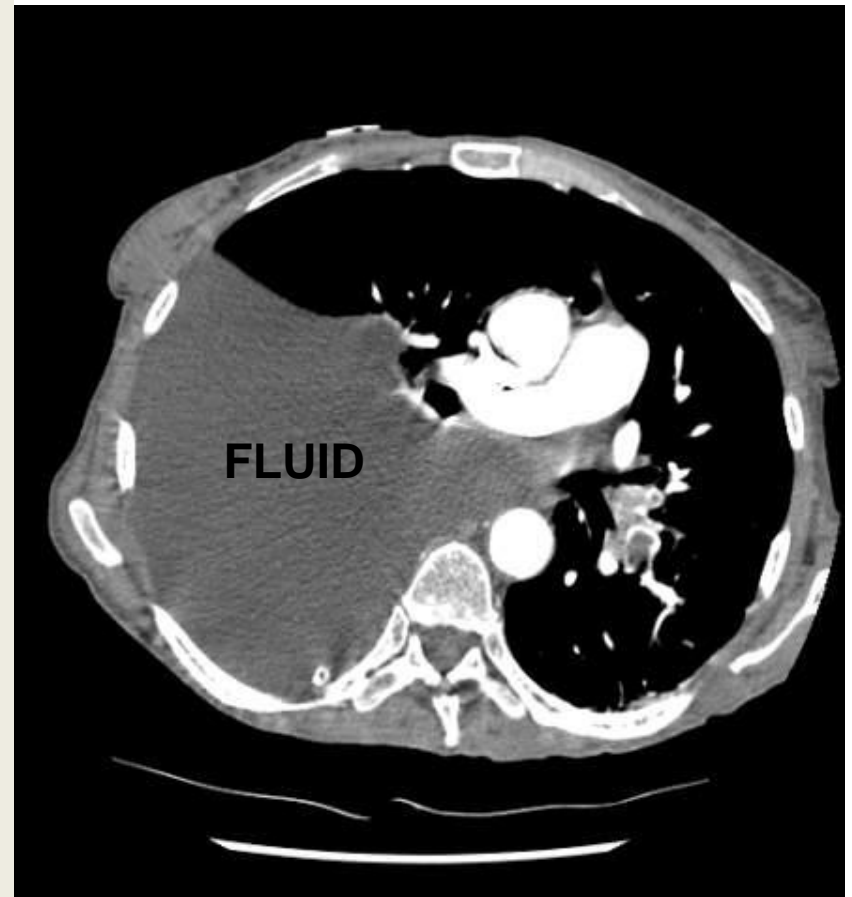
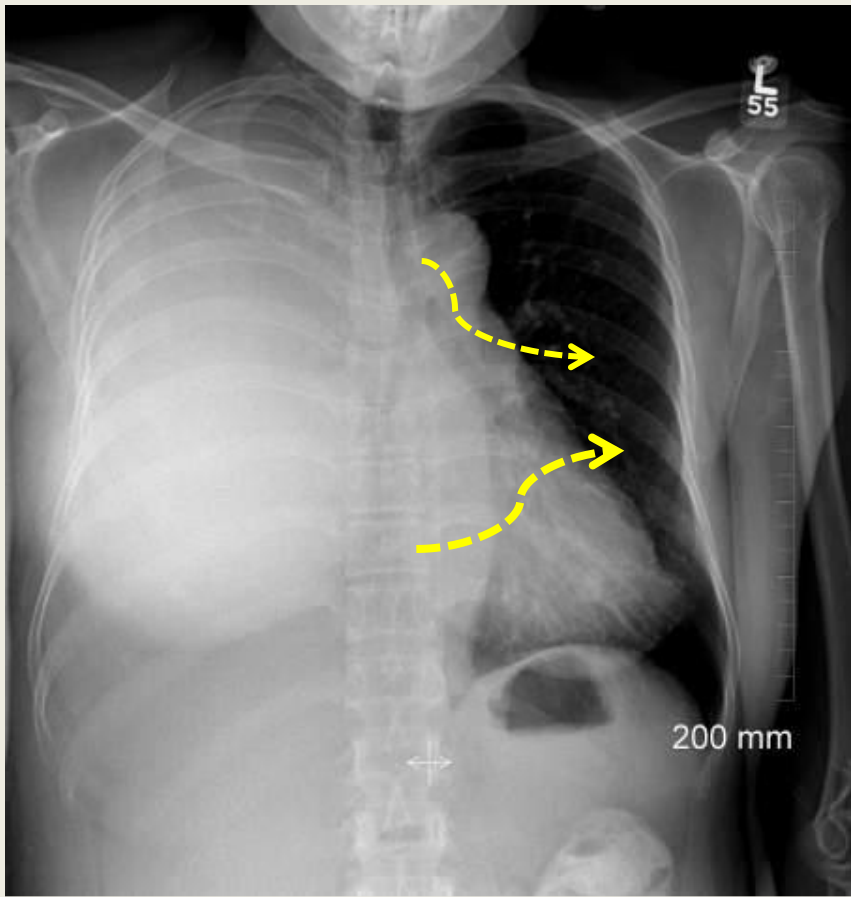
# BLUNTED C/P ANGLE BOTH SIDES



# PLEURAL EFFUSION



# LARGE PLEURAL EFFUSION

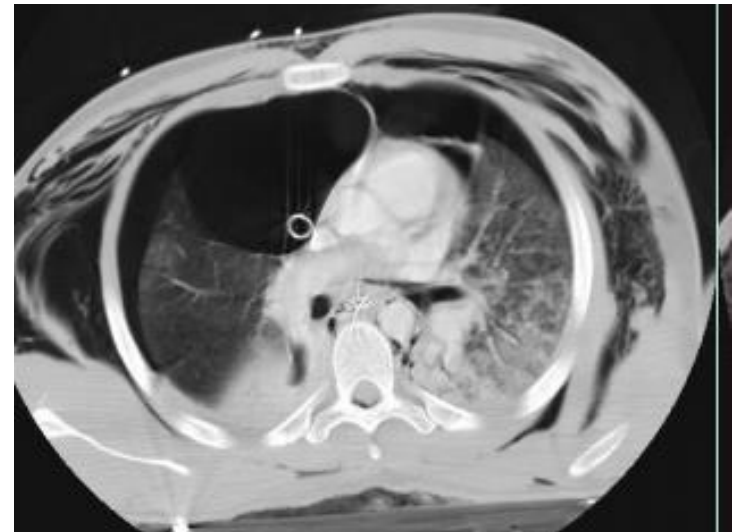
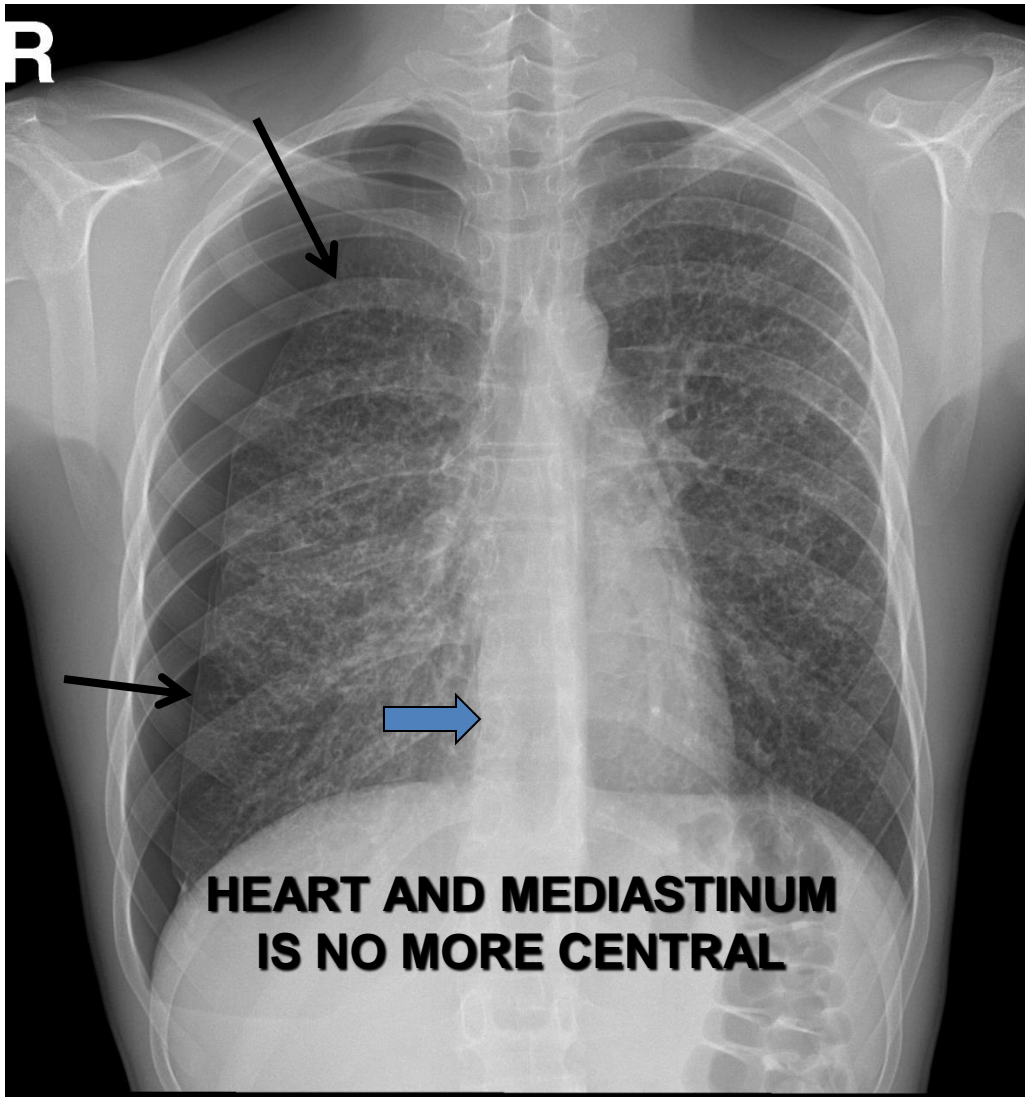




# PNEUMOTHORAX

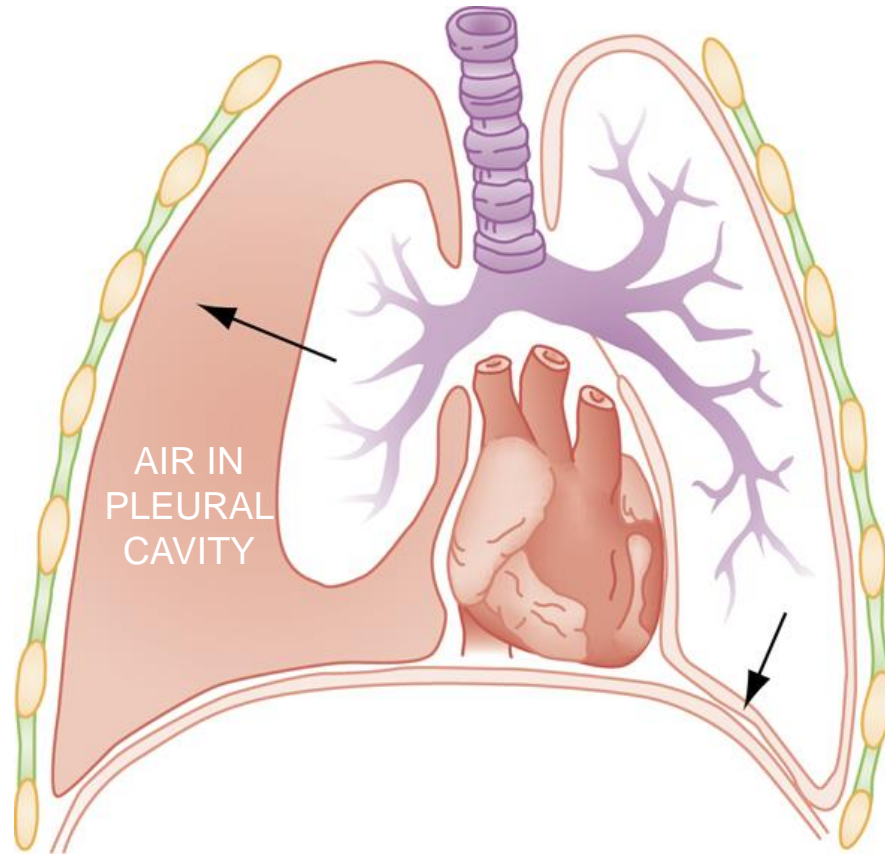
A pneumothorax is defined as air inside the thoracic cavity but outside the lung.

A spontaneous pneumothorax is one that occurs without an obvious inciting incident.

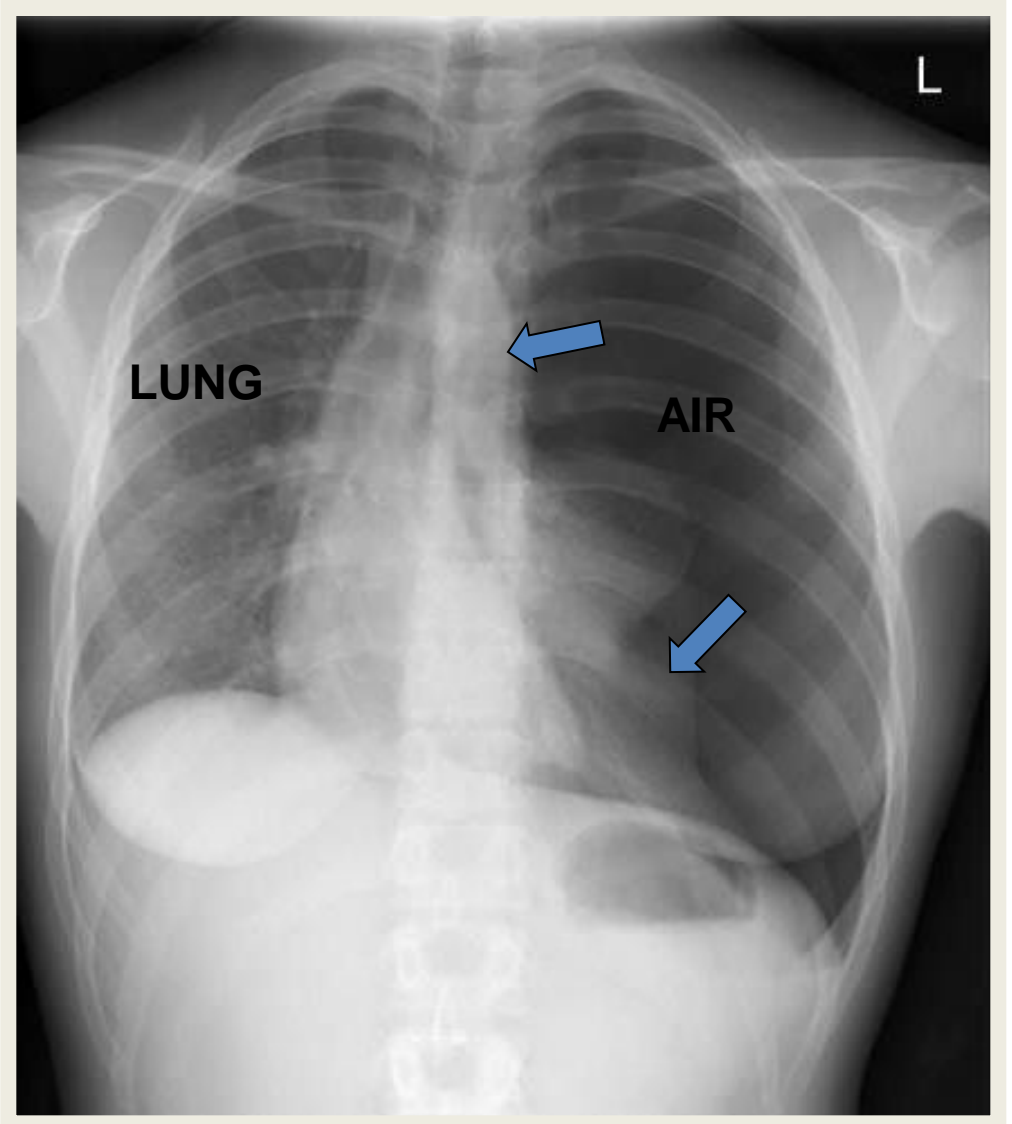




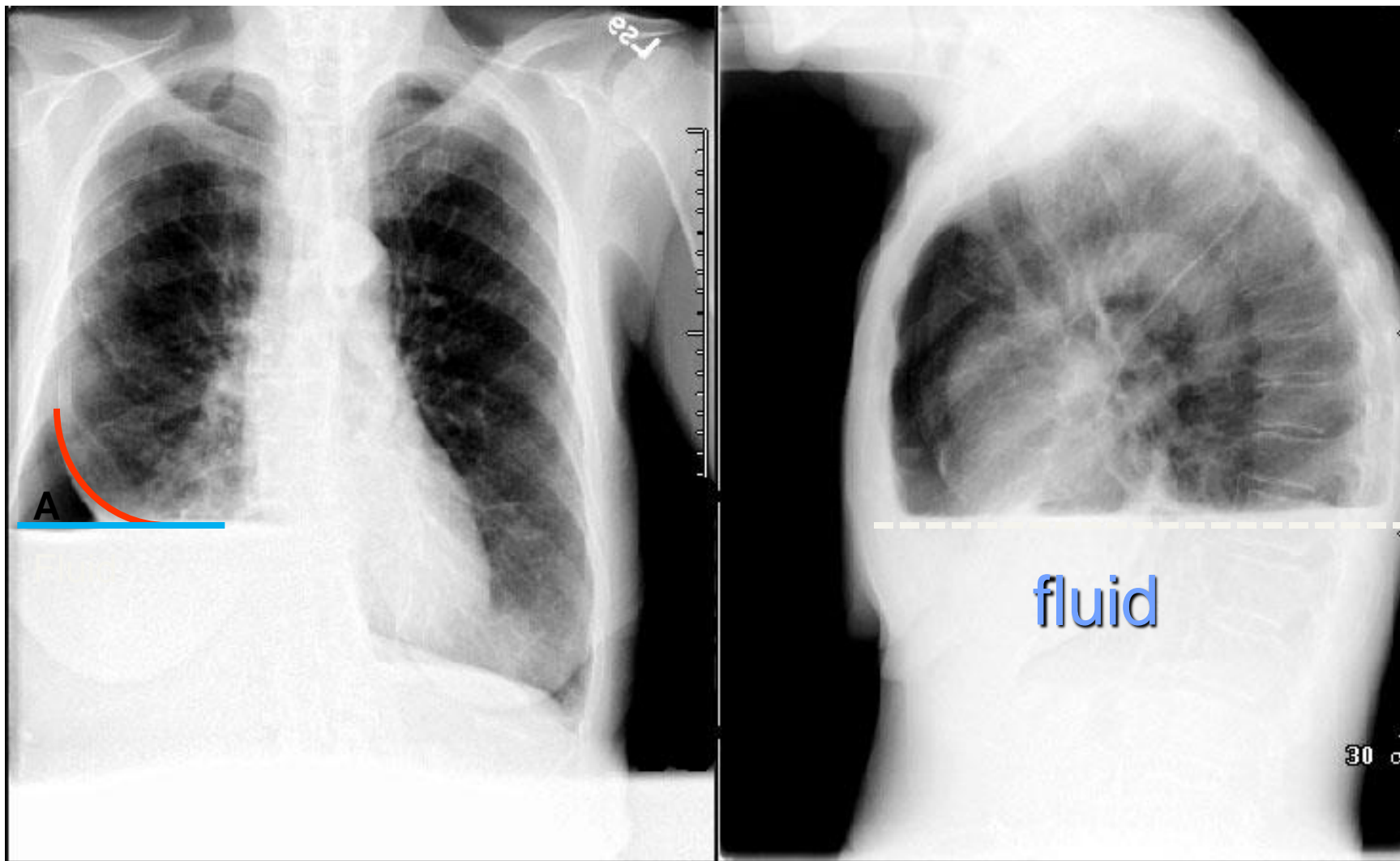
# PNEUMOTHORAX

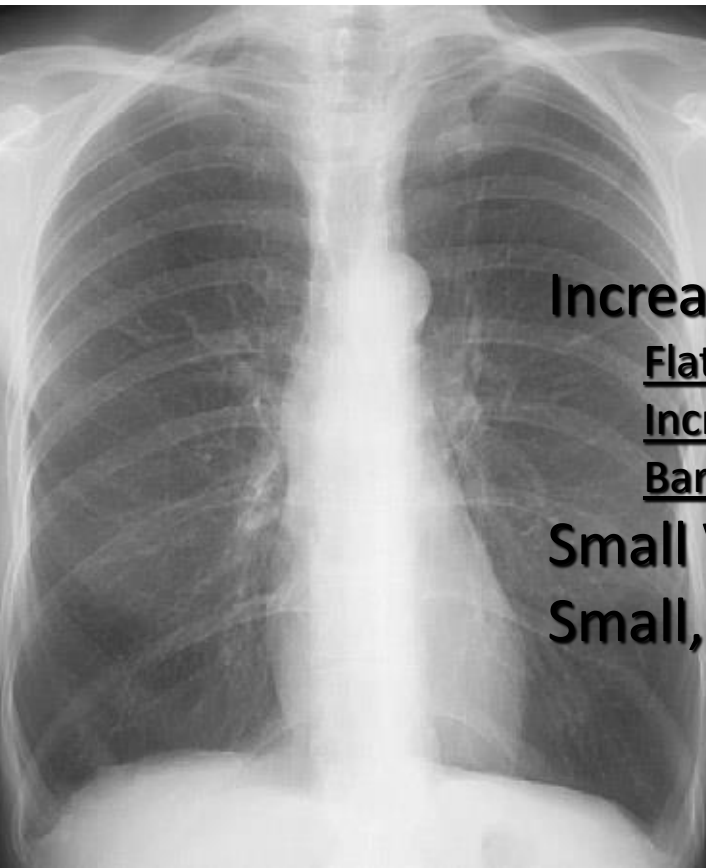


# PNEUMOTHORAX



# Hydro-pneumo-thorax





## EMPHYSEMA

**Increased Lung Volume**

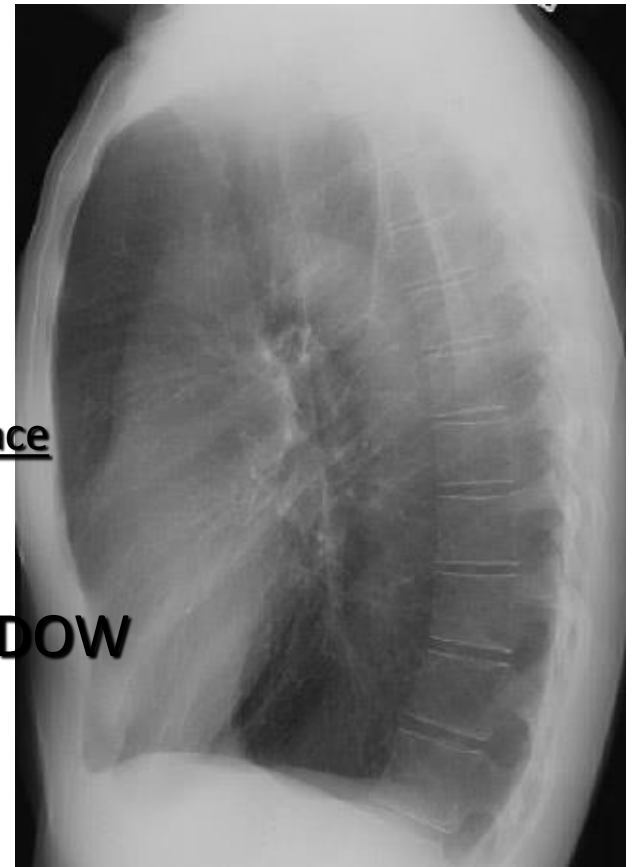
Flattened Diaphragms

Increase in Retrosternal Airspace

Barrel chest

**Small Vessels**

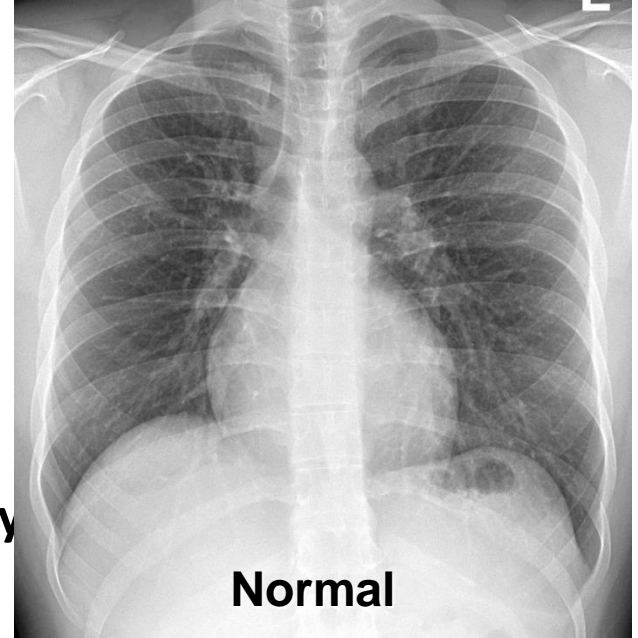
**Small, narrow cardiac SHADOW**



- Emphysema is **loss of elastic recoil of the lung** with destruction of pulmonary capillary bed and alveolar septa. It is caused most often by cigarette smoking and less commonly by alpha-1 antitrypsin deficiency.



EMPHYSEMA



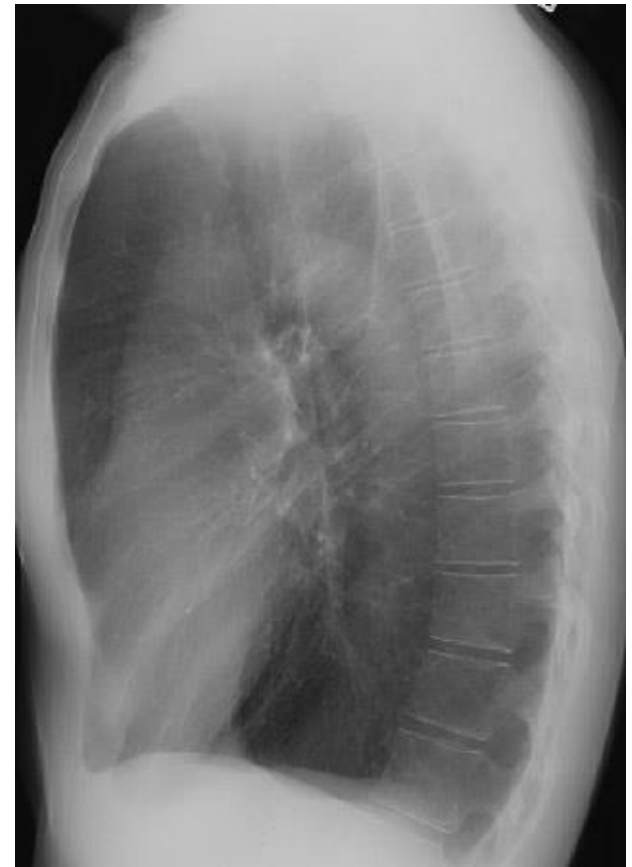
Normal

- **Emphysema is commonly seen on CXR as diffuse hyperinflation with flattening of diaphragms, increased retrosternal space, bullae (lucent, air-containing spaces that have no vessels that are not perfused)**





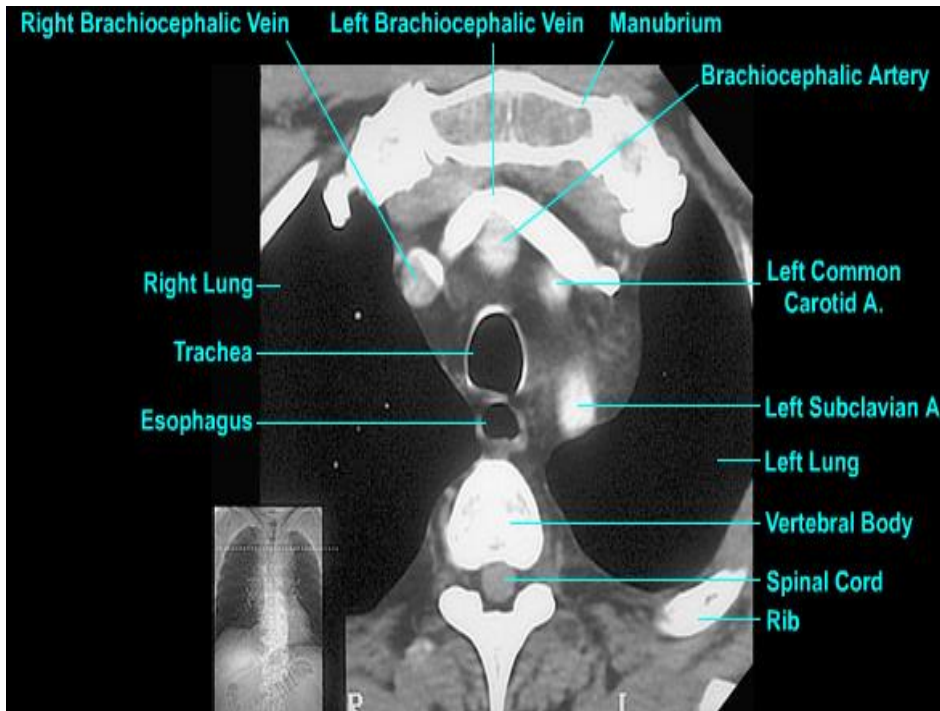
## EMPHYSEMA



- **Emphysema is commonly seen on CXR as diffuse hyperinflation with flattening of diaphragms, increased retrosternal space, bullae (lucent, air-containing spaces that have no vessels that are not perfused) and enlargement of PA/RV (secondary to chronic hypoxia) an entity also known as cor pulmonale. Hyperinflation and bullae are the best radiographic predictors of emphysema.**

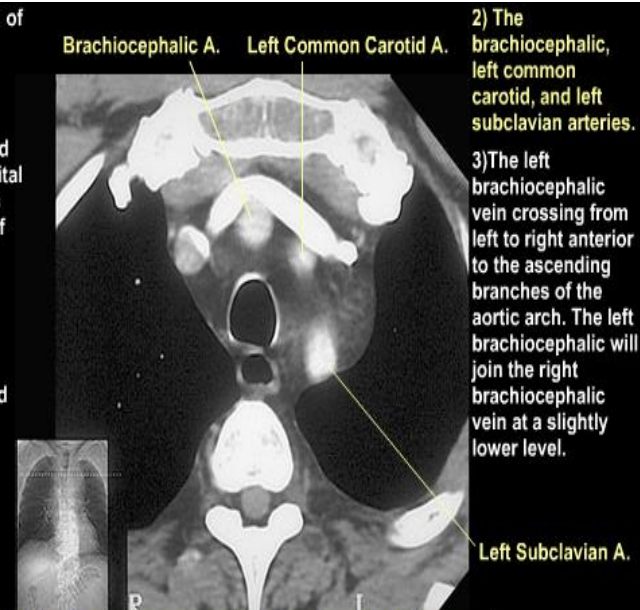


# CT anatomy



Thoracic CT scan #1 of 7 in series from the same patient (radiographs #12 - #18). Intravascular contrast was injected into the left antecubital vein of the arm. This CT lies at the level of the superior mediastinum. Note:

1) The esophagus positioned directly anterior to the vertebral column and the trachea directly in front of the esophagus.



2) The brachiocephalic, left common carotid, and left subclavian arteries.

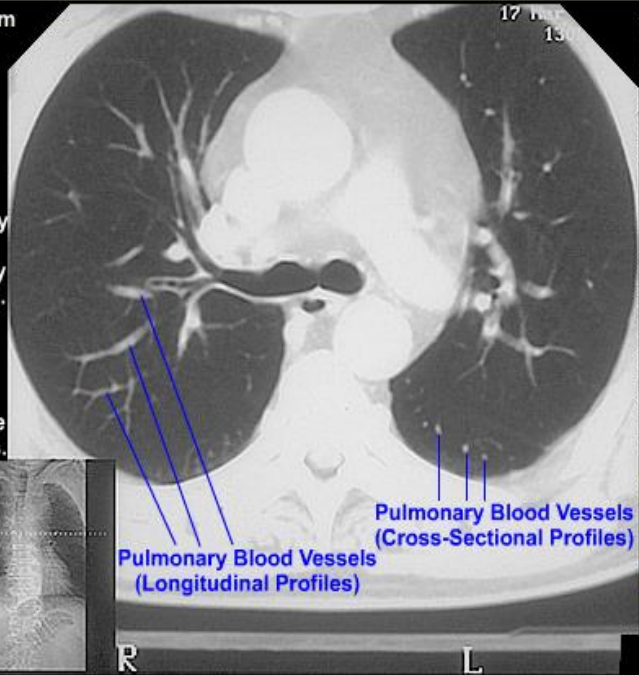
3) The left brachiocephalic vein crossing from left to right anterior to the ascending branches of the aortic arch. The left brachiocephalic will join the right brachiocephalic vein at a slightly lower level.

The three arteries are ascending from the more inferior arch of the aorta. Note their positions from anterior to the trachea (brachiocephalic artery) to left of the esophagus (left subclavian artery), reflecting the position of the aortic arch at a lower level (see CT scan #2 of the sequence).

# CT

CT scan #1 of 2 from the same patient; level of the bifurcation of the trachea. The radiographic technique emphasizes pulmonary anatomy at the expense of soft tissue anatomy in the mediastinum. Bronchi are identified by their air-filled lumens, pulmonary blood vessels have dense blood-filled lumens.

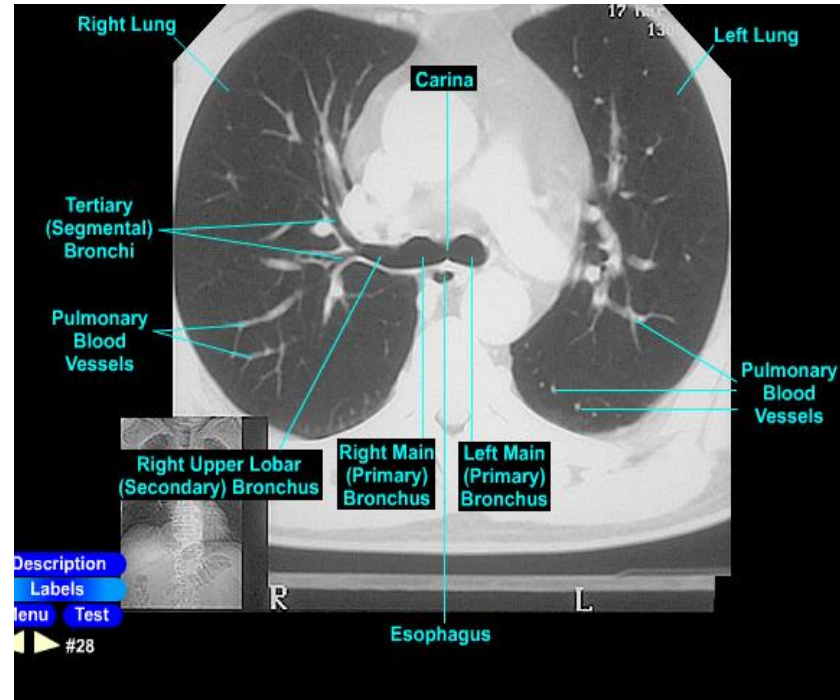
Note:



1) The carina (a tracheal cartilage) at the bifurcation of the trachea into left and right main (primary) bronchi.

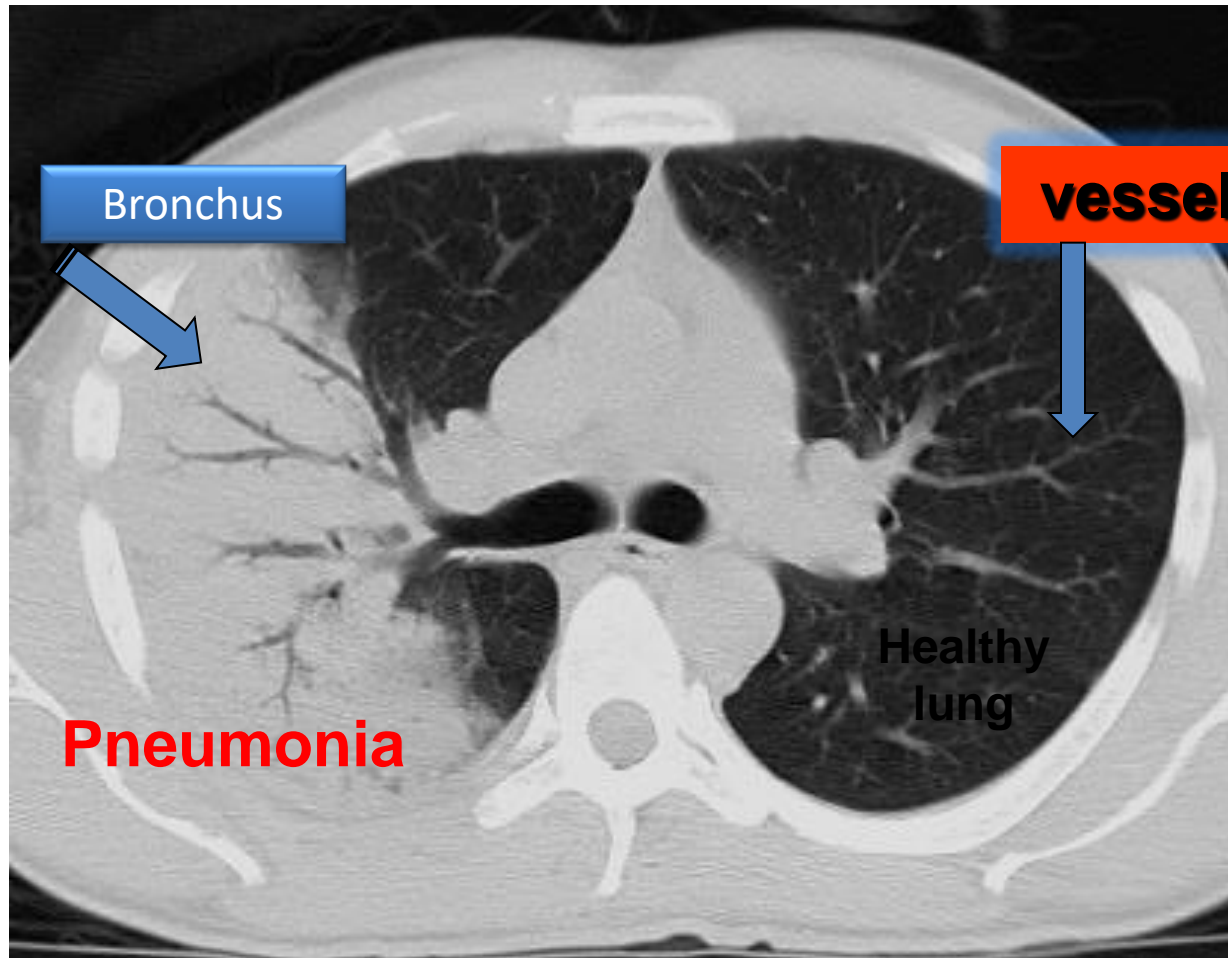
2) The right upper lobar (secondary) bronchus and its subsequent branching into tertiary bronchi.

3) Various profiles of pulmonary blood vessels.





# Air bronchograms — CT



# Air bronchograms — CT

