

Fundamentals of CXR Interpretation

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CXR Interpretation

- Review anatomy of the chest.
- Evaluate how anatomy determines the appearance of pathology.
- Review common and interesting abnormalities of the chest.

Wilhelm Röntgen

- German physicist
- Discovered X-rays in 1895
- First Nobel Prize in physics in 1901



Wilhelm Röntgen

- First medical X-ray image: wife's hand



Early Chest Radiographs

- Early X-ray tubes weak
- Several minutes for exposure
- Heart and lungs blurred due to motion



Radiographics 1991; 11 : 325-332

Chest Fluoroscopy

- Cryptoscope – fluorescent screen
- Radiation source posterior to the patient.
- Operator looked at chest through a cryptoscope.



Radiographics 1991; 11 : 325-332

CXR Anatomy – PA view



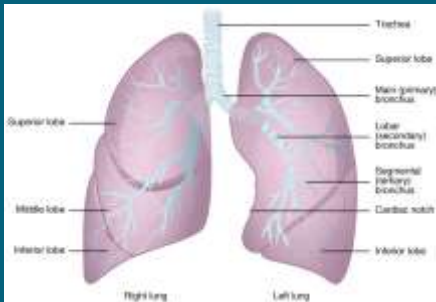
- Heart borders
- Aorta
- Pulmonary trunk
- Aorto-pulmonary window
- SVC
- Fissures

CXR Anatomy – lateral view



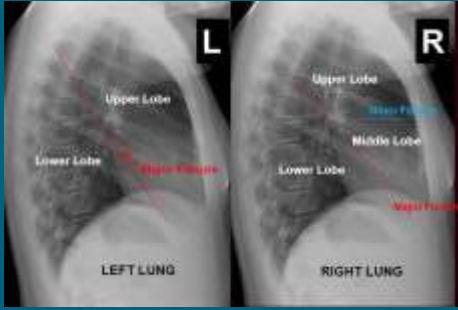
- Heart borders
- Spine
- Posterior costophrenic angles

CXR Anatomy – PA view

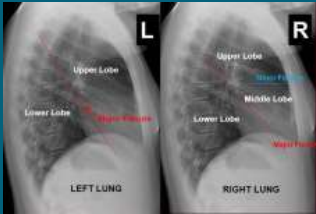


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CXR Anatomy – lateral view



CXR Anatomy – lateral view

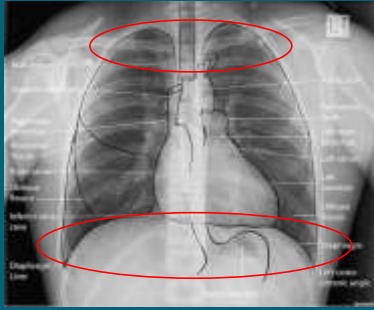


- Which lobes are next to the heart?
- Which lobes are next to the diaphragms?

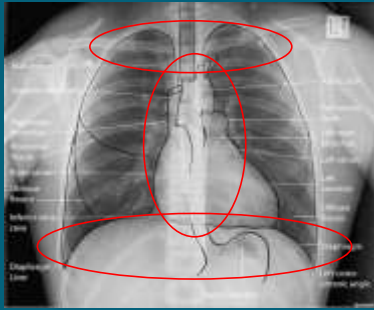
PA vs AP (portable) CXR



Blind spots on CXR

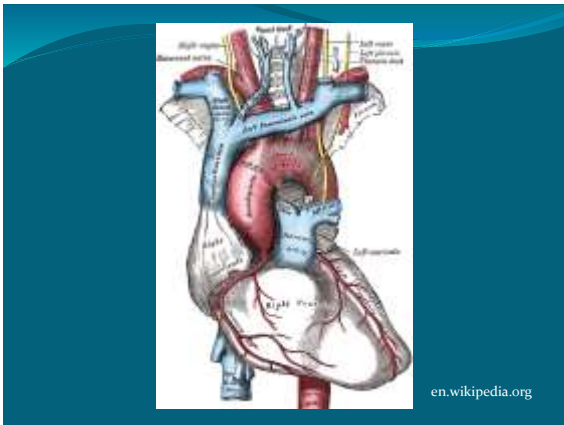


Keep an eye on the "I"



Basic lines and tubes

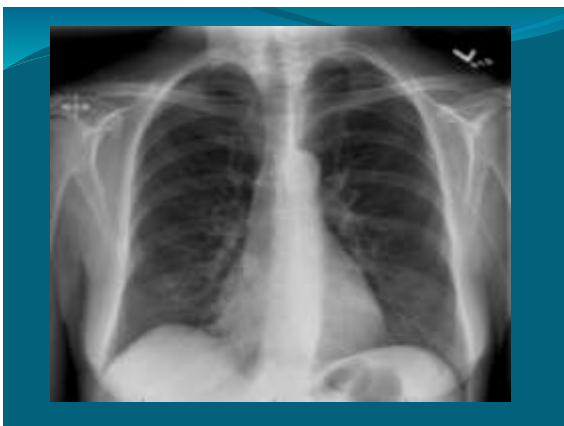






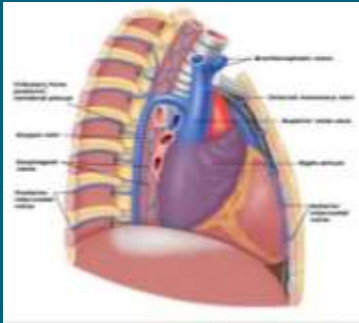






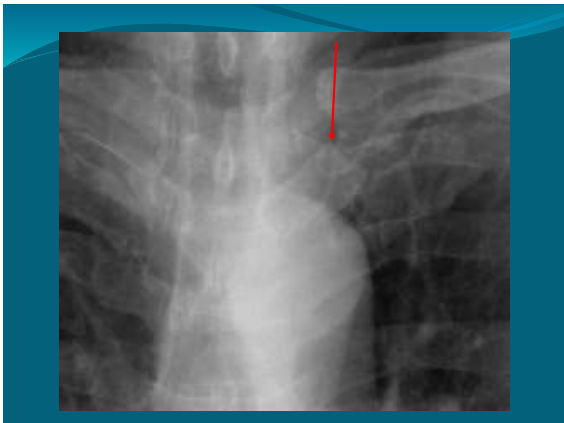


PICC tip in azygous vein



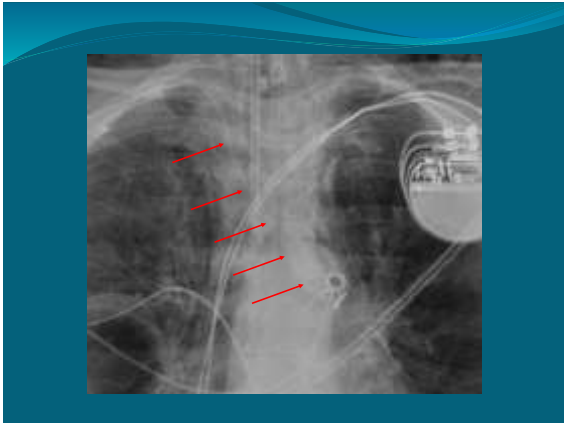
S/P PICC placement.
Line will not flush.

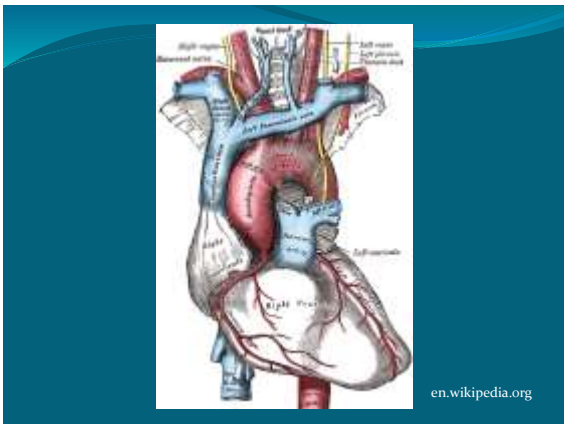




PICC looped in left brachiocephalic vein







en.wikipedia.org



Status post central line placement

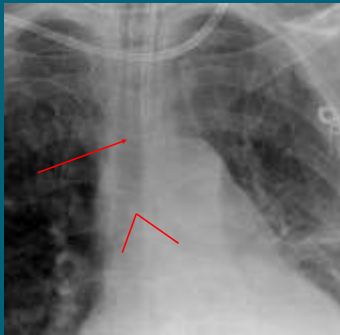


Endotracheal tube

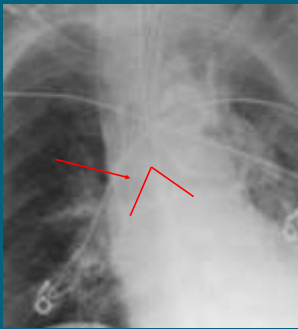
ICU CXR



ICU CXR



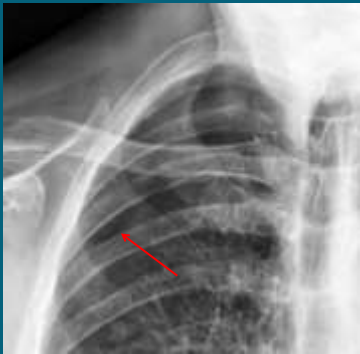




Pt status post bronchoscopy



Right pneumothorax



ICU patient



Large left PTX in intubated patient

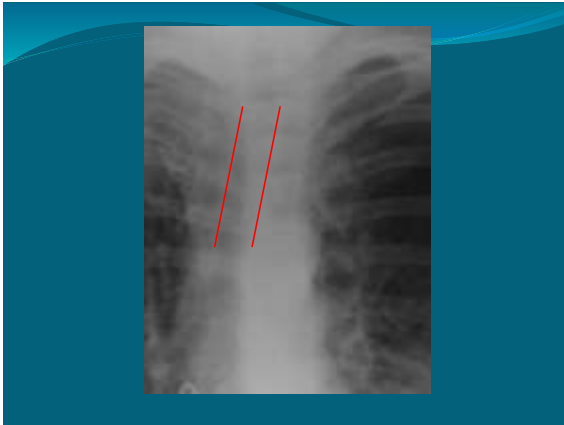




Pt with left-sided chest pain

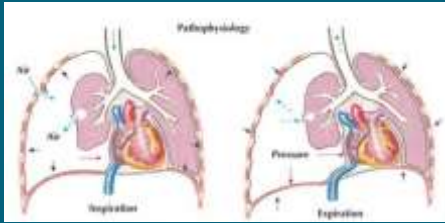






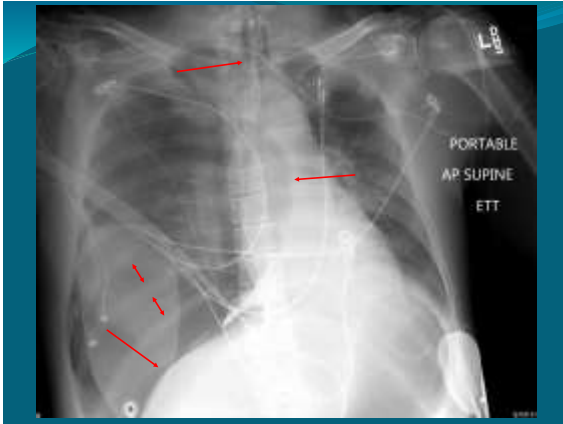
Left pneumothorax.
Subtle shift of trachea,
concerning for early tension
pneumothorax.

One-way valve



54 yo M ICU patient





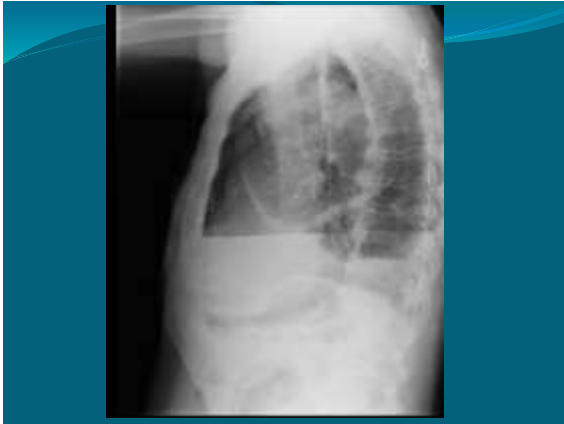
Tension pneumothorax
Emergent finding





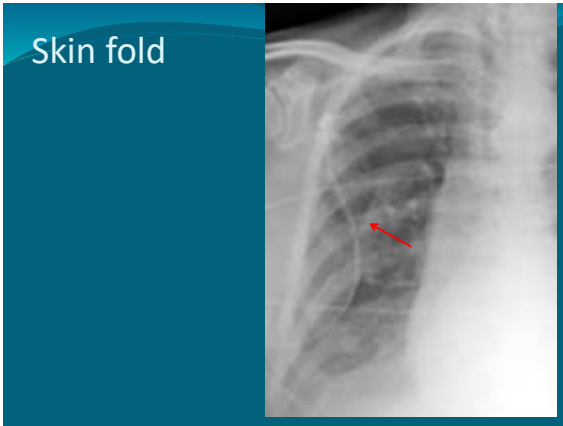
87 yo male with SOB

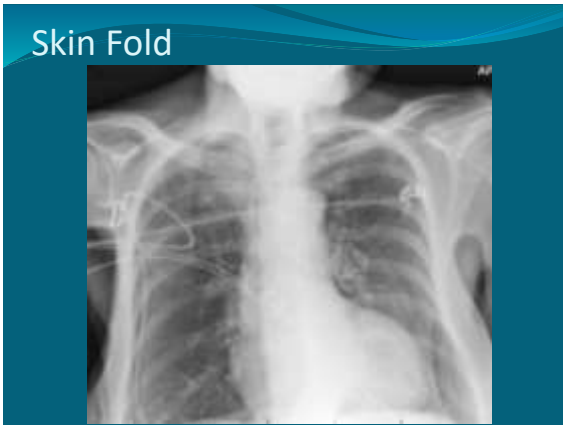


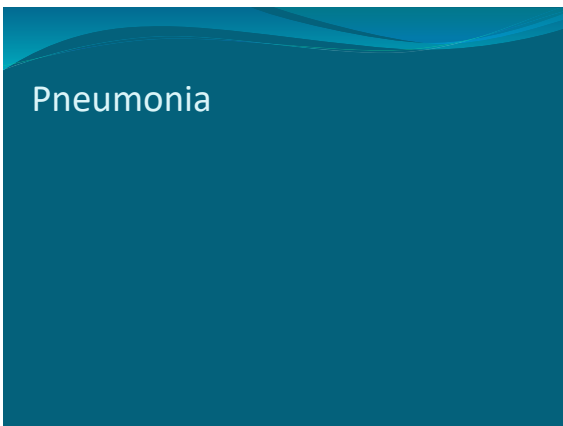


Hydropneumothorax









CXR Anatomy

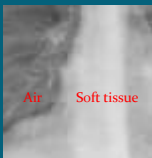


Silhouette sign

- Described by Dr. Ben Felson
- Actually “loss” of silhouette
- Outline of a structure in a radiograph is caused by difference in densities between the two structures.
- Helps determine if there is a lung abnormality and where it is located.

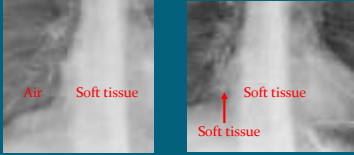
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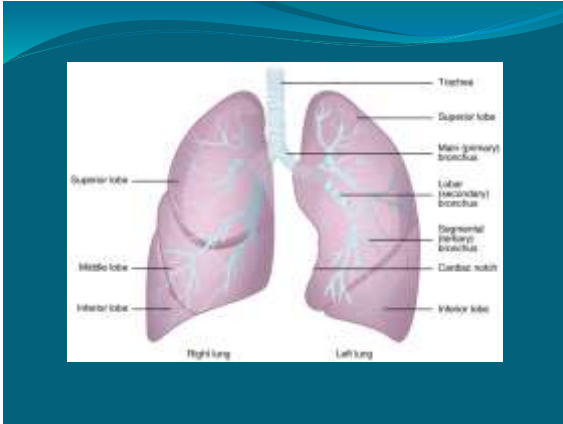
Silhouette sign

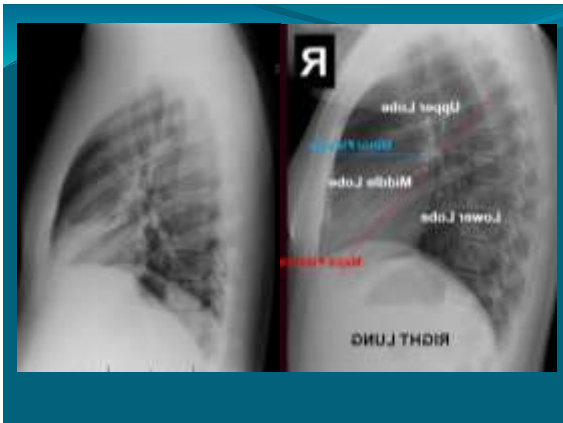
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- Actually “loss” of silhouette sign
- Outline of a structure in radiographs is caused by difference in densities between the two structures.



Fever and cough

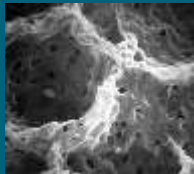






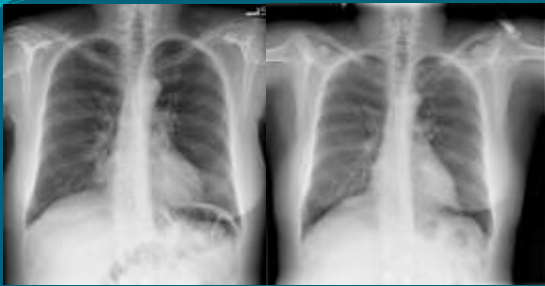
Pores of Kohn

- Small holes between alveoli
- Allows air, fluid, and bacteria to move between alveoli
- Flow stops at the pleura



vet.uga.edu

Right middle lobe pneumonia



Prior study



Right middle lobe pneumonia

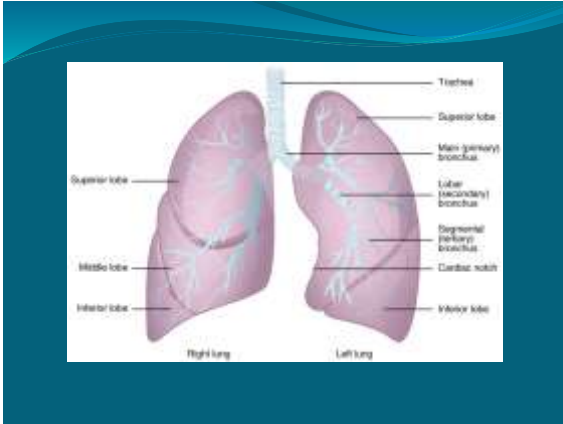




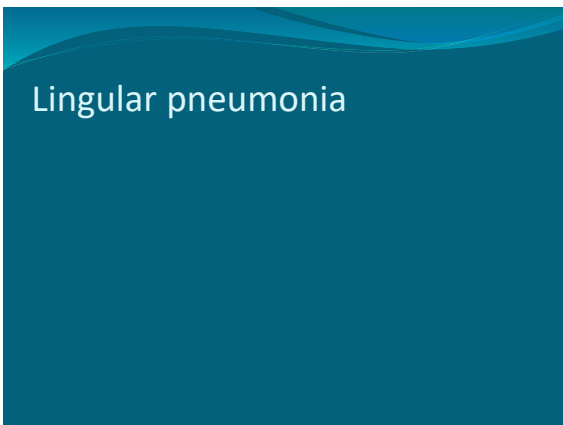
Right middle lobe pneumonia

27 yo F with cough and fever









44 yo female with fever

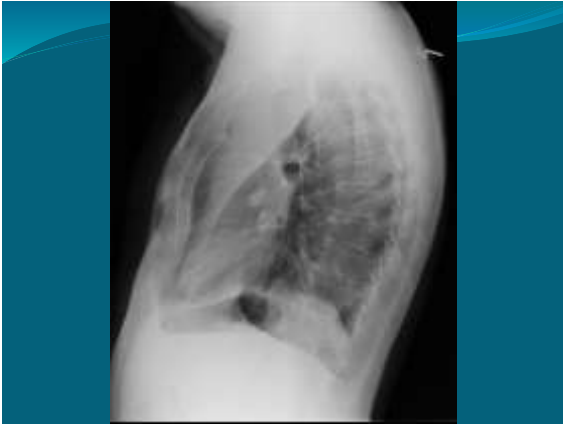




Lingular pneumonia

81 yo male with SOB



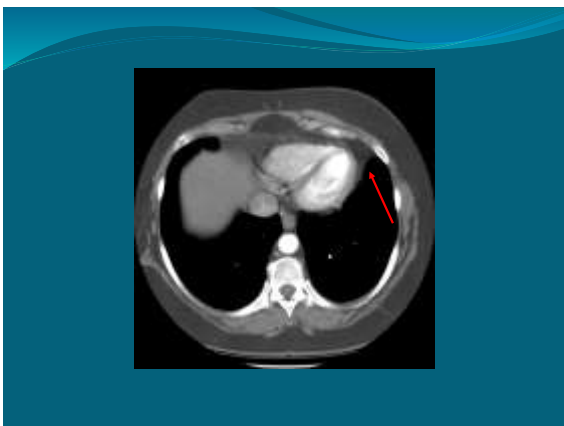


Left upper lobe consolidation and/or atelectasis





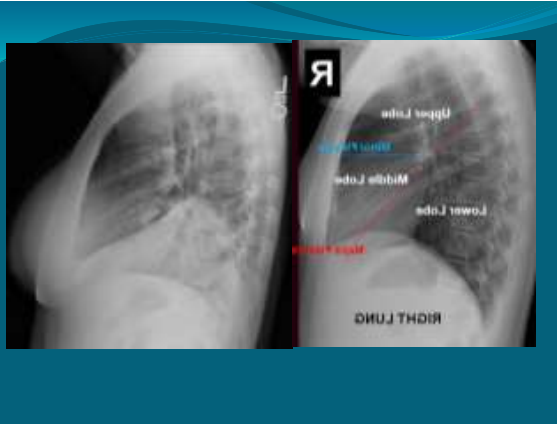




Fat pad mimicking lingular PNA

36 yo F with fever, cough

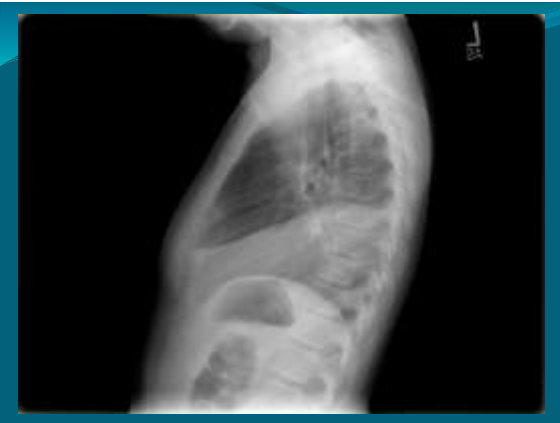




Right lower lobe pneumonia

11 yo SOB





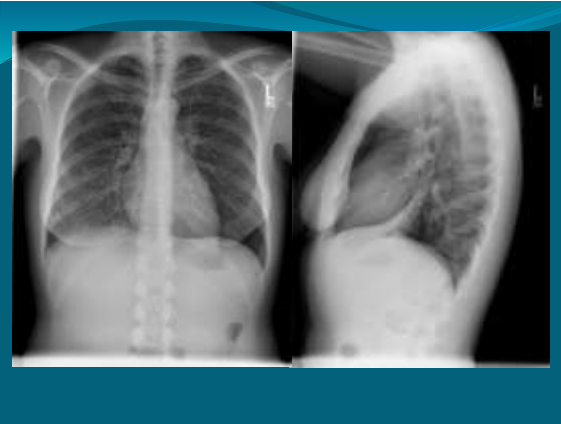
Right lower lobe pneumonia

41 yo F with fever and cough





Prior Study



Right lower lobe pneumonia

54 F with cough, fever





Right upper lobe pneumonia

18 yo M with cough





Left lower lobe pneumonia

55 yo with cough and fever





Left lower lobe pneumonia
(obscured on PA view)

30 yo F with asthma

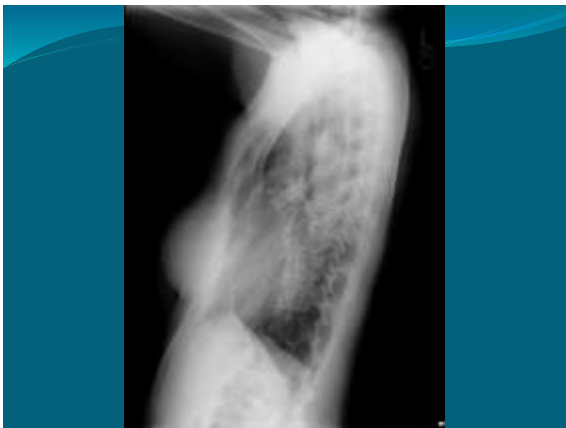




Artifact caused by overlying soft tissue density

Patient with chest pain





Pectus excavatum simulating
right middle lobe pneumonia

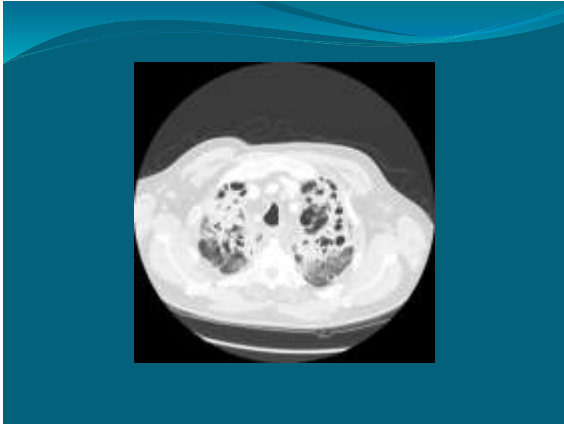
79 you female, cough for 3 weeks



Tuberculosis

66 yo male with weight loss





Tuberculosis

86 M with cough, known PNA

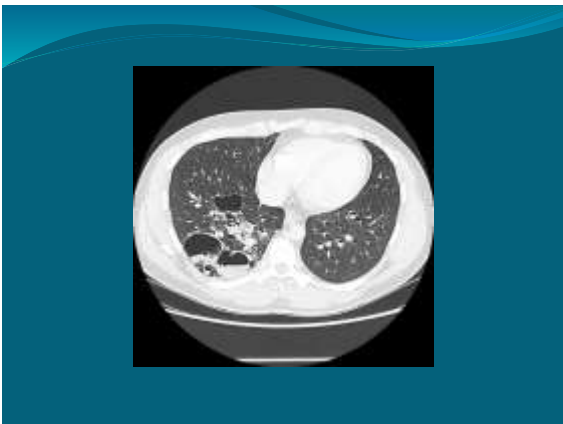




DDX:
Abscess
Cavitary neoplasm

21 yo M with congenital abnormality



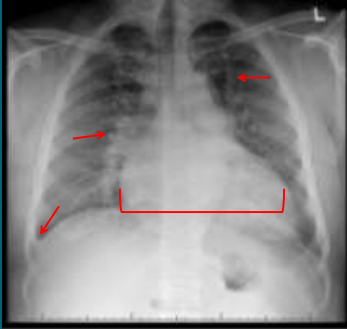


Infected sequestration

Patient with SOB



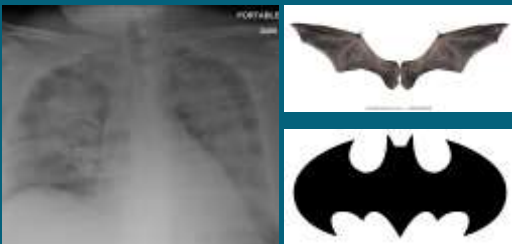
Congestive Heart Failure





Post treatment

Batwing Sign



Pt with abdominal pain



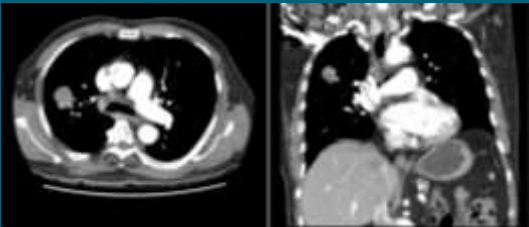
Lymphoma



Pt with abdominal pain



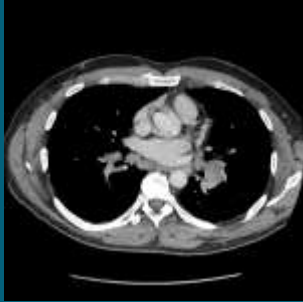
Lung cancer



46 yo F with chest pain



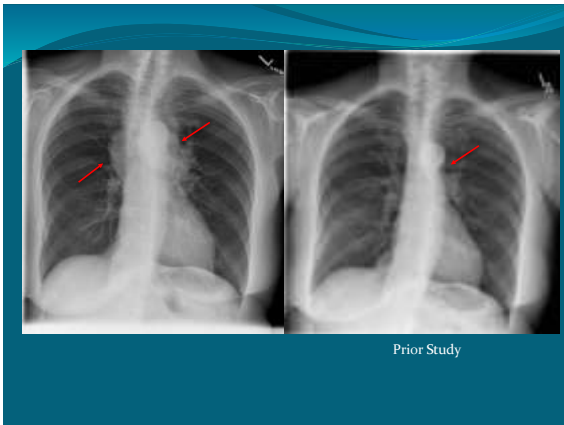




Lymphadenopathy (Sarcoidosis)

80 yo F with history of lung cancer



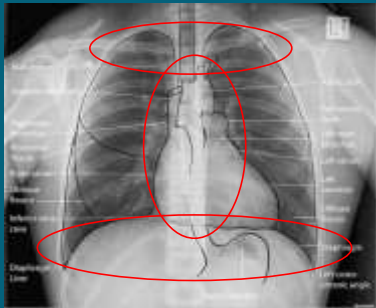


Lymphadenopathy (lung cancer)

64 yo M with chronic cough



Eye on the "I"



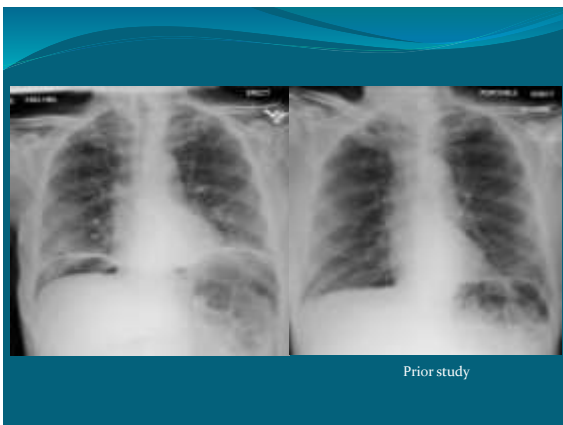




Abnormal density in
right lung apex

79 yo male with recent abdominal surgery



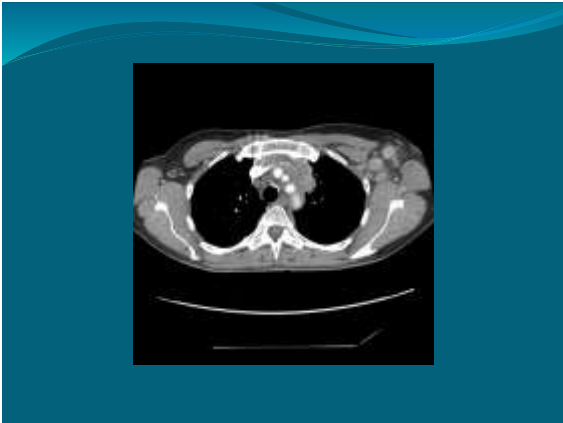


Intra-abdominal free air from recent surgery

52 yo F with axillary mass



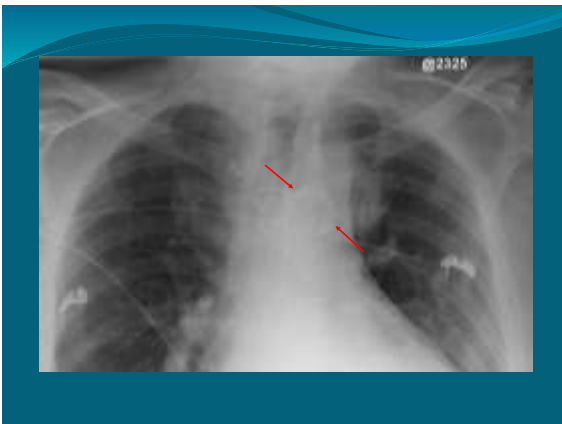


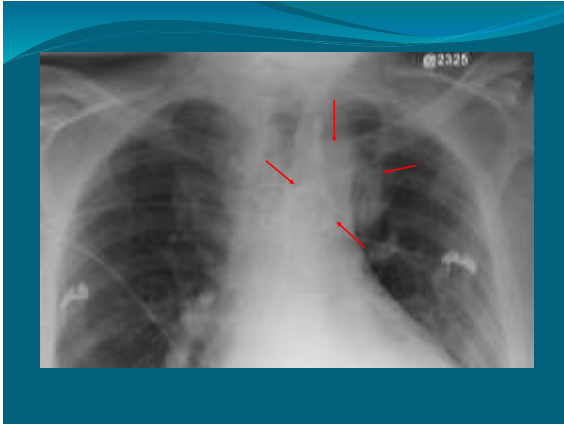


Lymphoma

69 yo M





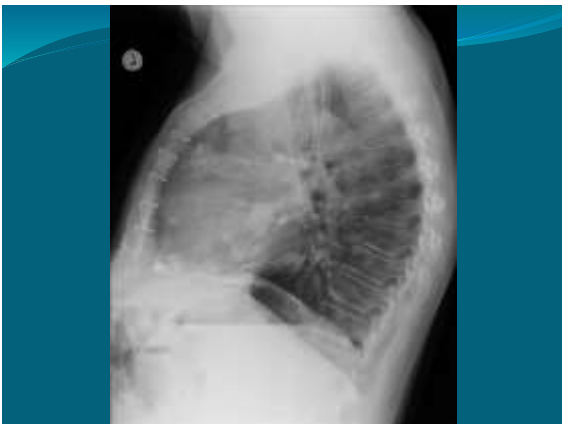




Aortic aneurysm

75 yo male with cough





Pericardial calcification

58 yo male with positive PPD





Findings c/w known history of ankylosing spondylitis

88 yo F, no history provided



1 week later



Right shoulder dislocation

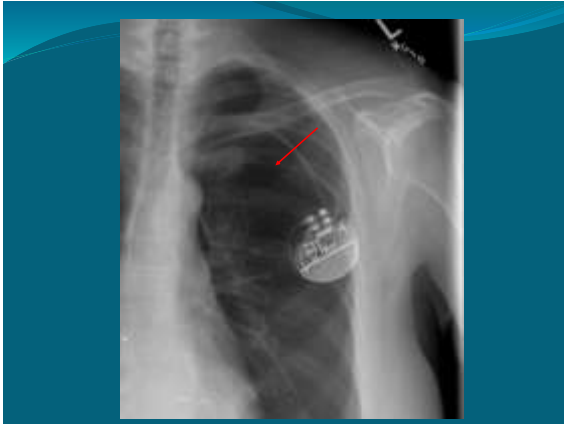
48 M with chest pain



Left shoulder dislocation

70 yo F status post pacemaker placement



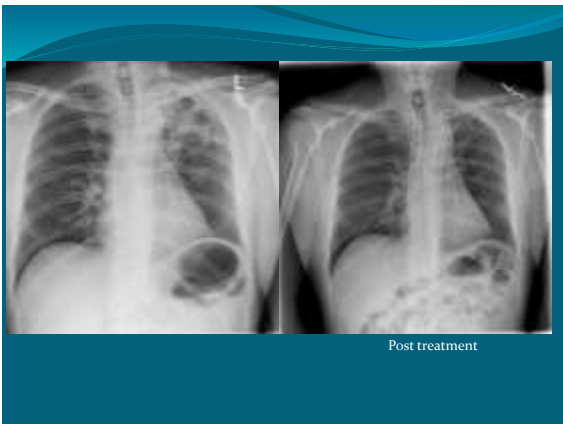


Left pneumothorax

62 yo M with dry cough for 1 year



Tuberculosis



Post treatment

89 yo M with history of TB



83 yo M with SOB



82 yo F with SOB



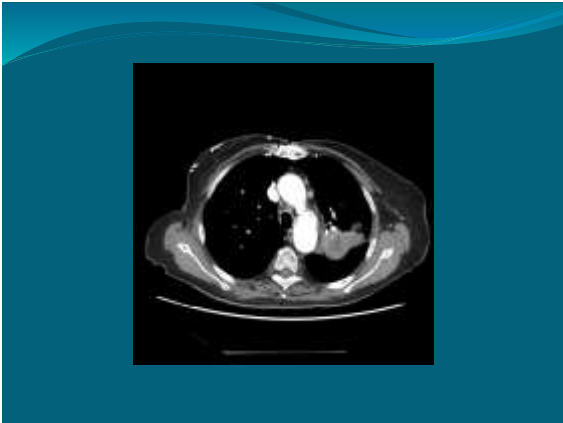
Tuberculosis patients treated with collapse lung therapy

- Goal is to deprive the tuberculosis from the oxygen needed to survive

84 yo M with cough with occasional blood

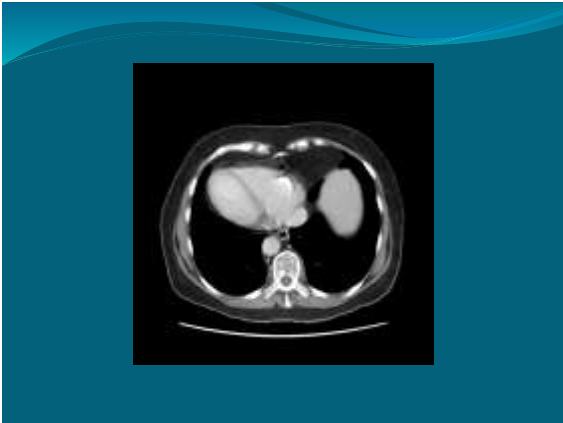






Lung cancer





Known history of situs inversus

