

Chest Radiography

Lecture 3

Pneumonia

Donald L. Renfrew, MD, FACR

www.foxvalleyradiology.com

PNEUMONIA

INDICATIONS: cough, dyspnea, fever, malaise, chest pain.

FINDINGS: consolidation, ground glass opacity, pleural effusion.

IMPRESSION: Diagnose if there is consolidation AND fever OR elevated WBC OR productive cough. If there are prior studies, judge as same, better, or worse.

COMMENT: Focal consolidation in the setting of acute chest pain without fever or elevated white count should be regarded as suspicious for pulmonary embolism with accompanying lung infarction. Focal consolidation in the setting of cough without fever or elevated white count should be regarded as suspicious for post-obstructive consolidation from endobronchial tumor. If there is doubt about whether consolidation on a chest x-ray represents pneumonia or some other process (pulmonary embolism, tumor, etc.) CT is usually the next step in evaluation.

UpToDate Points

"The presence of an infiltrate on plain chest radiograph is considered the gold standard for diagnosing pneumonia when clinical and microbiologic features are supportive."

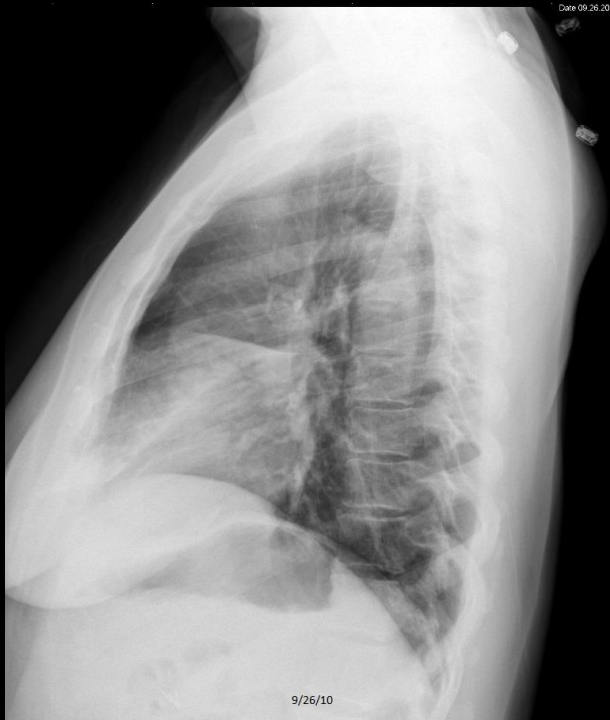
"A demonstrable infiltrate by chest radiograph or other imaging technique is required for the diagnosis of pneumonia."

"Radiologists cannot reliably differentiate bacterial from nonbacterial pneumonia [nor the various subtypes of either] on the basis of the radiographic appearance."

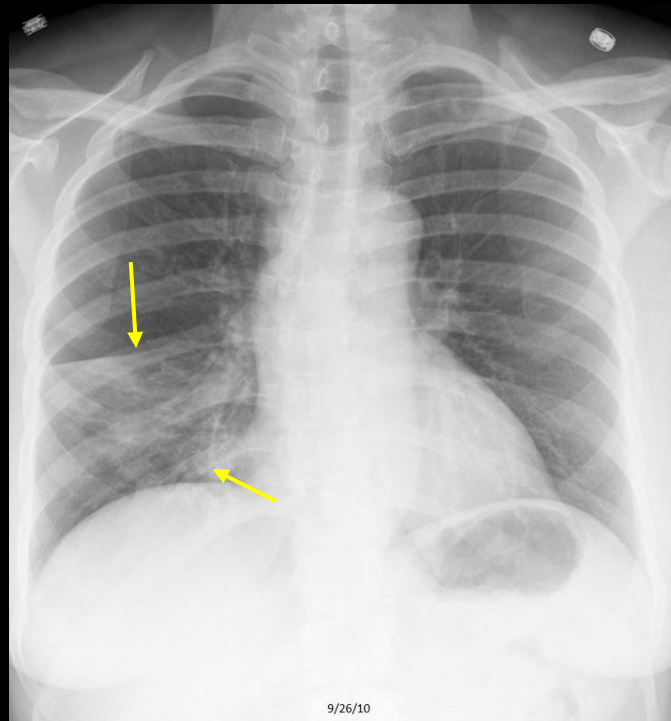
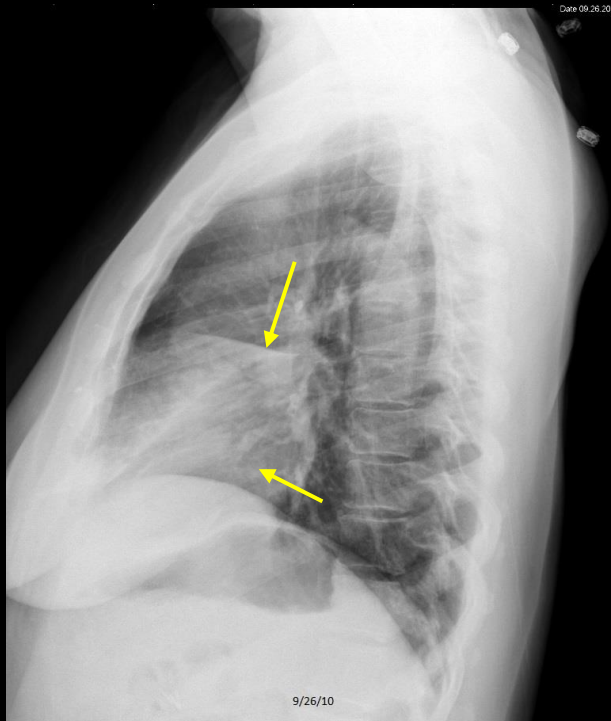
"If the clinical evaluation does not support pneumonia in a patient with an abnormal chest radiograph, other causes for the radiographic abnormalities must be considered, such as malignancy, hemorrhage, pulmonary edema, pulmonary embolism, and inflammation secondary to noninfectious causes."

"Volume depletion may produce an initially negative radiograph, which 'blossoms' into infiltrates following rehydration."

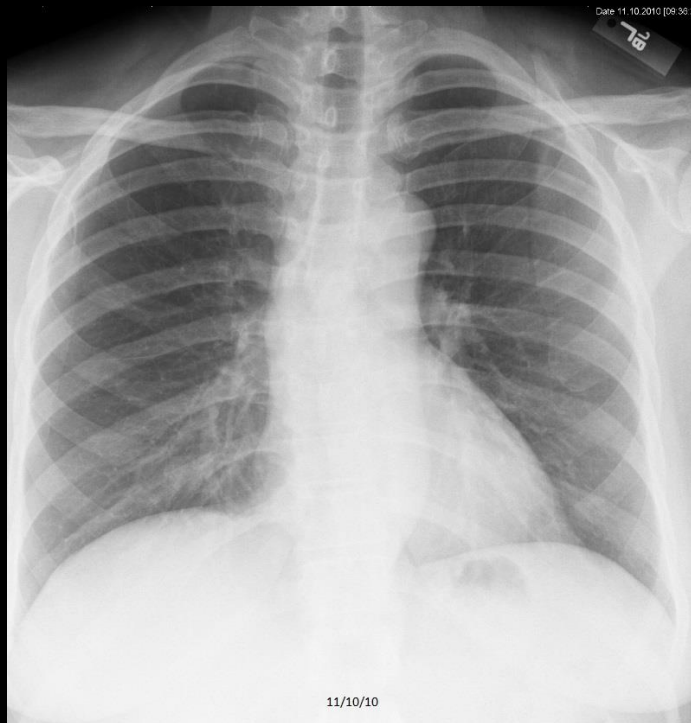
Bartlett JG. Diagnostic approach to community-acquired pneumonia in adults, UpToDate, accessed 3/26/20 (last updated 12/2/19).



C330. 53 y/o woman with acute cough and fever. There is opacity in the right middle lobe which ends at the minor fissure.



C330. 53 y/o woman with acute cough and fever. There is ground glass opacity in the right middle lobe which ends at the minor fissure.

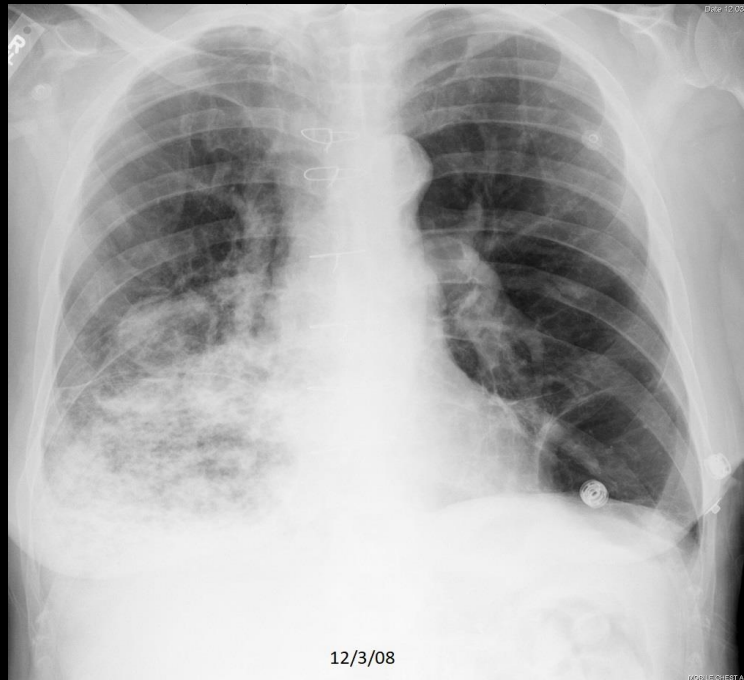


C330. 53 y/o woman with acute cough and fever. Subsequent film shows complete clearing of pneumonia.

PNEUMONIA

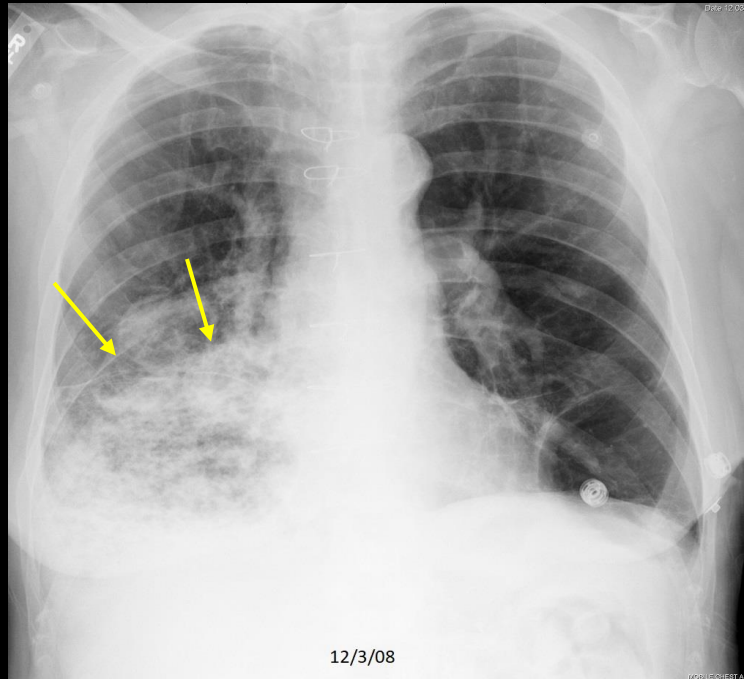
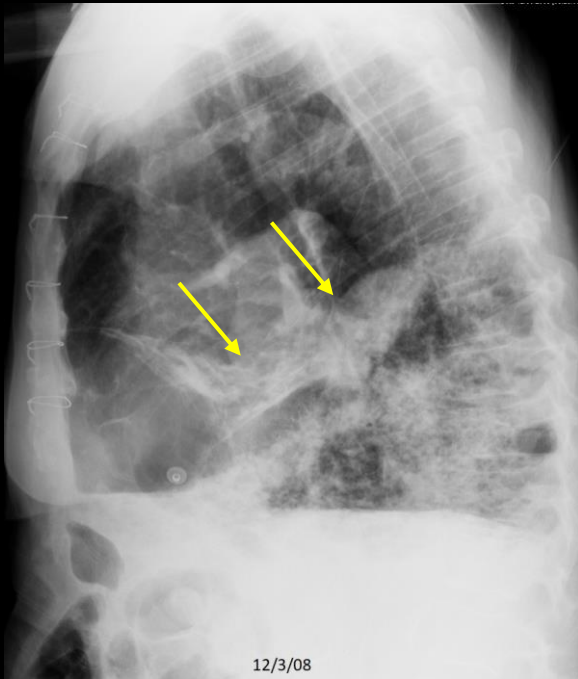
EXAMPLES

Example 1 of 10



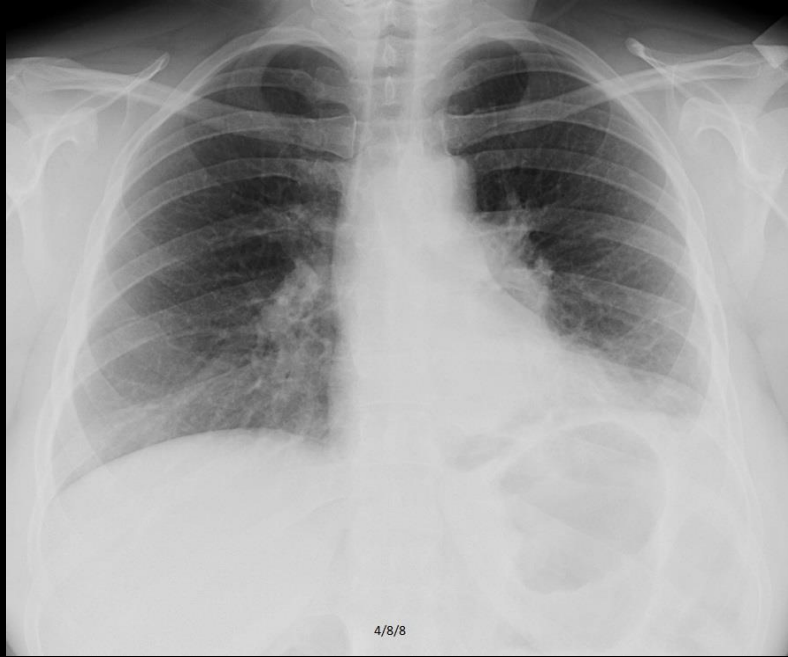
C144. 79 year old man with cough and fever. There is right lung opacity.

Example 1 of 10



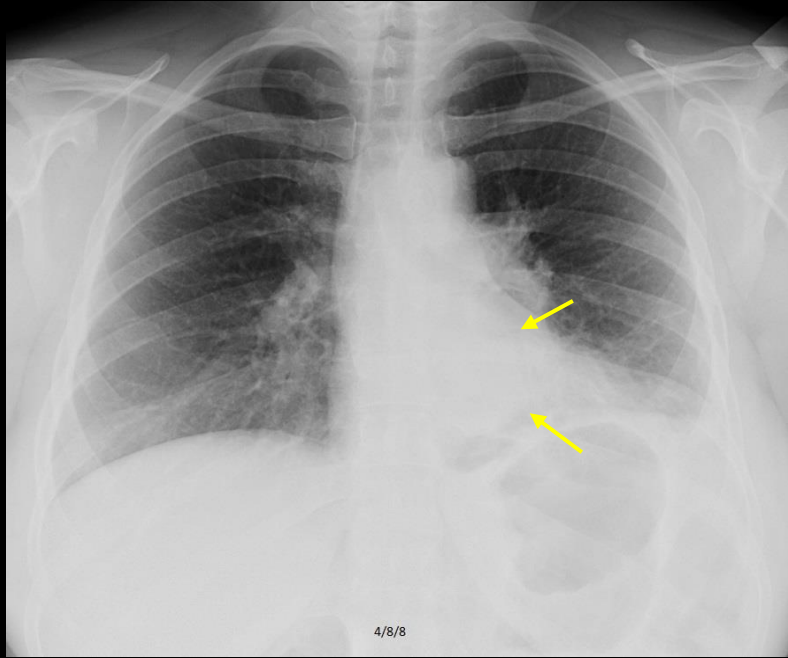
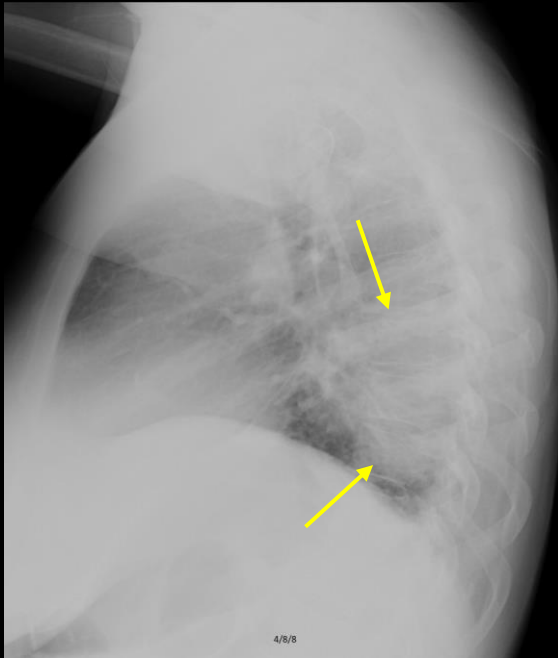
C144. 79 year old man with cough and fever. There is right lung opacity.

Example 2 of 10



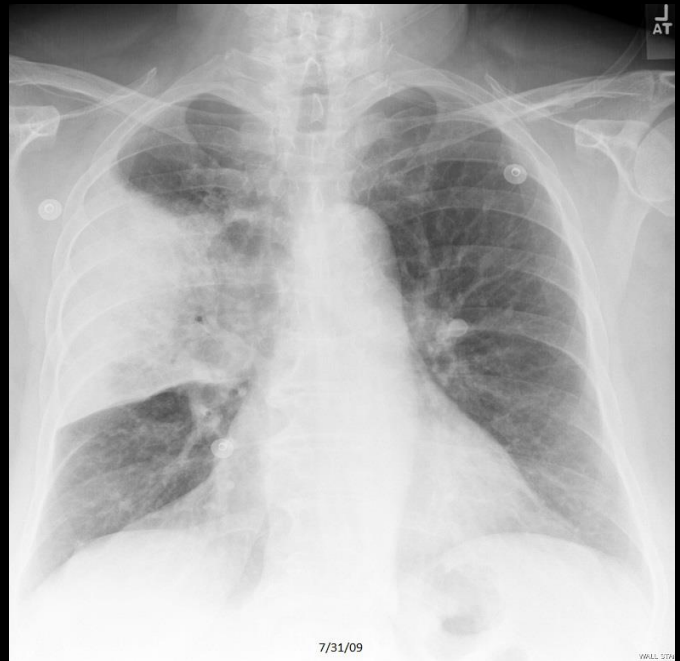
C174. 41 year old woman with cough, fever, and an elevated WBC count. There is left lung opacity best seen on the lateral study.

Example 2 of 10



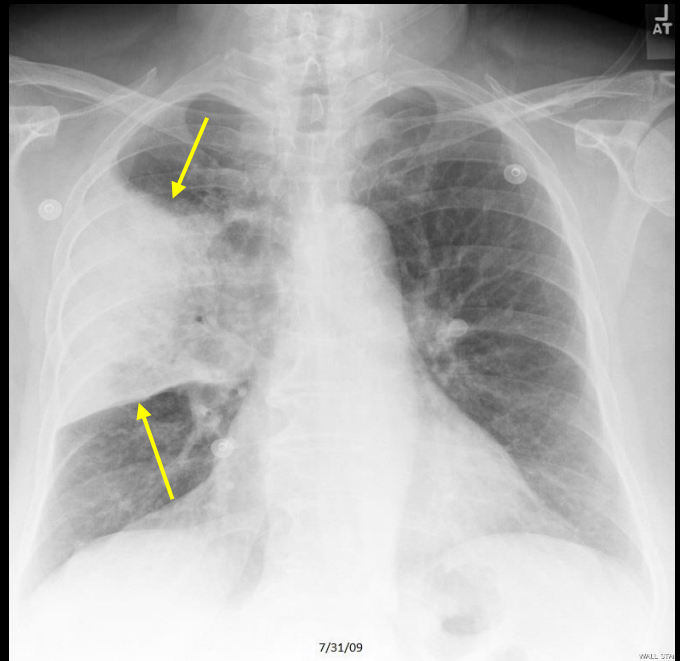
C174. 41 year old woman with cough, fever, and an elevated WBC count. There is left lung opacity best seen on the lateral study.

Example 3 of 10



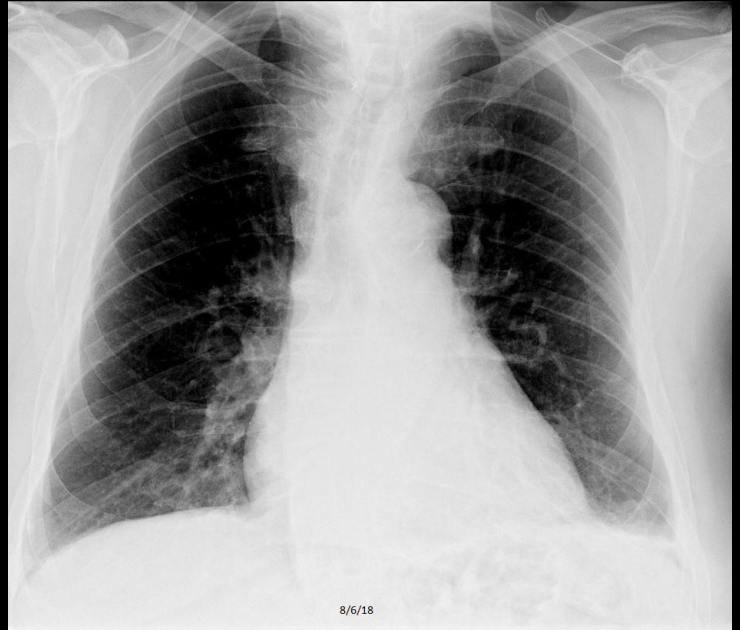
C175. 63 year old woman with cough and fever. There is right upper lobe opacity.

Example 3 of 10



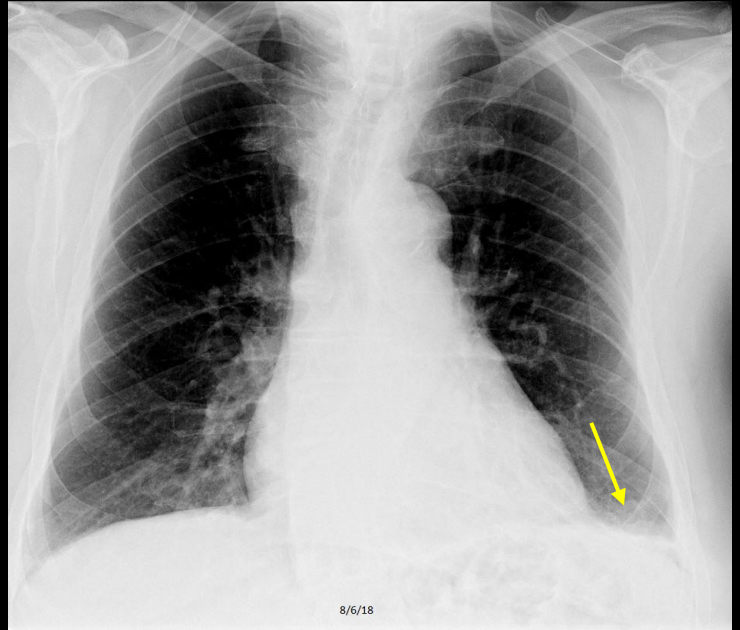
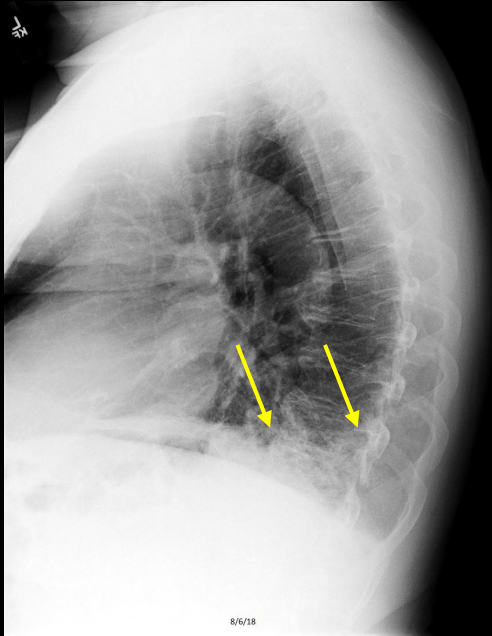
C175. 63 year old woman with cough and fever. **There is right upper lobe opacity.**

Example 4 of 10



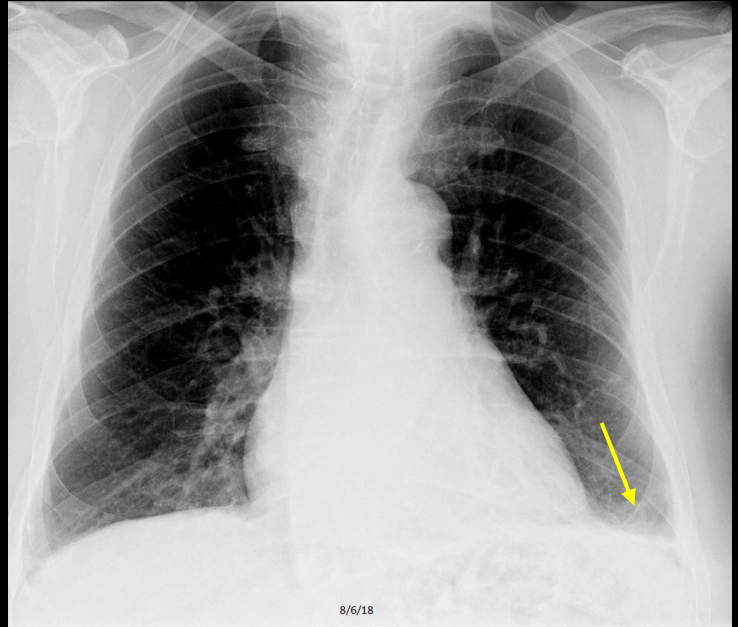
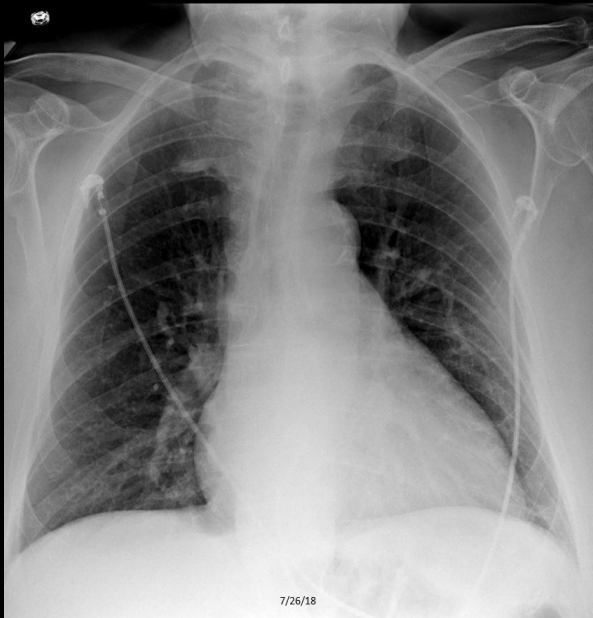
C176. 71 year old man with cough, crackles, and a syncopal episode. There is left lower lobe opacity, best appreciated on the lateral. There is also cardiomegaly.

Example 4 of 10



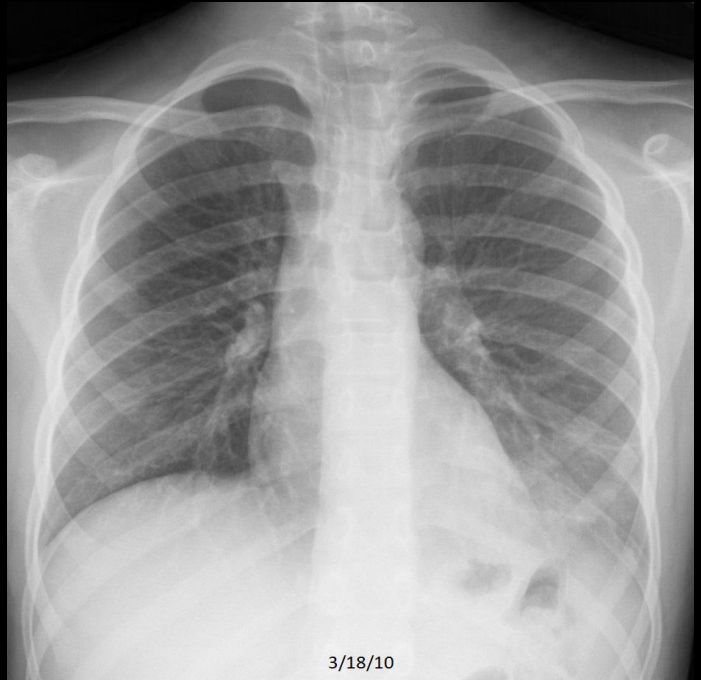
C176. 71 year old man with cough, crackles, and a syncopal episode. There is left lower lobe opacity, best appreciated on the lateral. There is also cardiomegaly.

Example 4 of 10



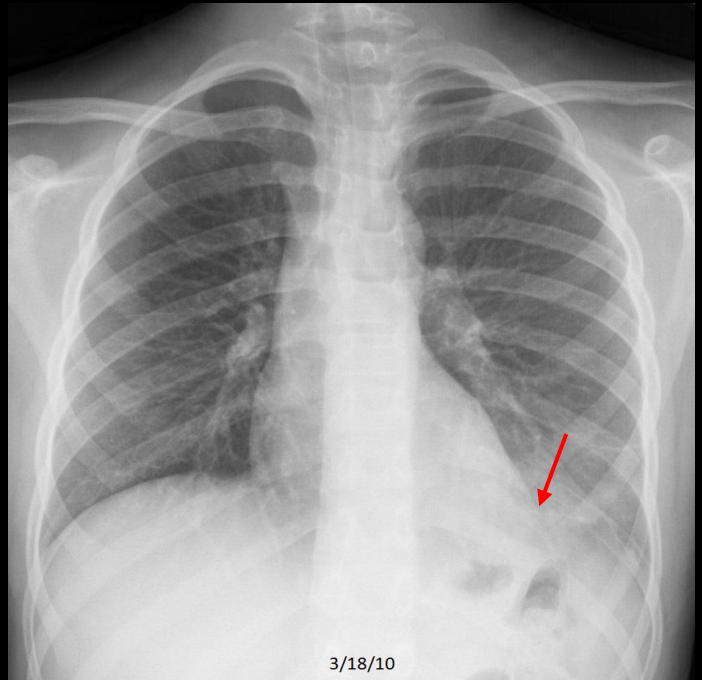
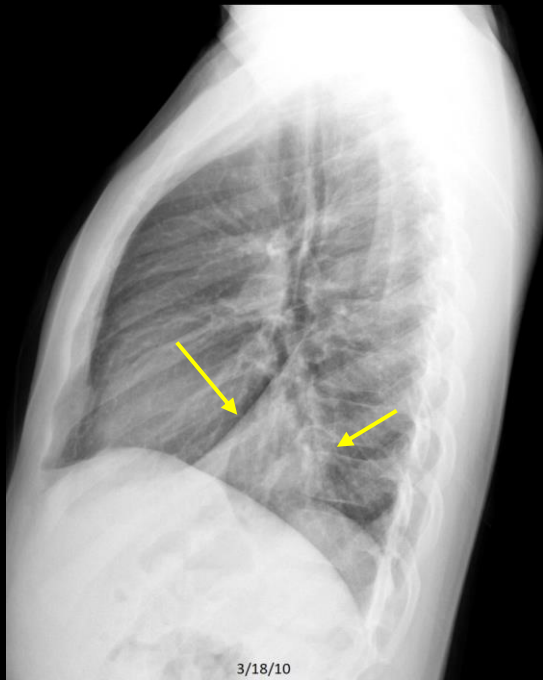
C176. 71 year old man with cough, crackles, and a syncopal episode. There is left lower lobe opacity, new from prior study. There is also cardiomegaly.

Example 5 of 10



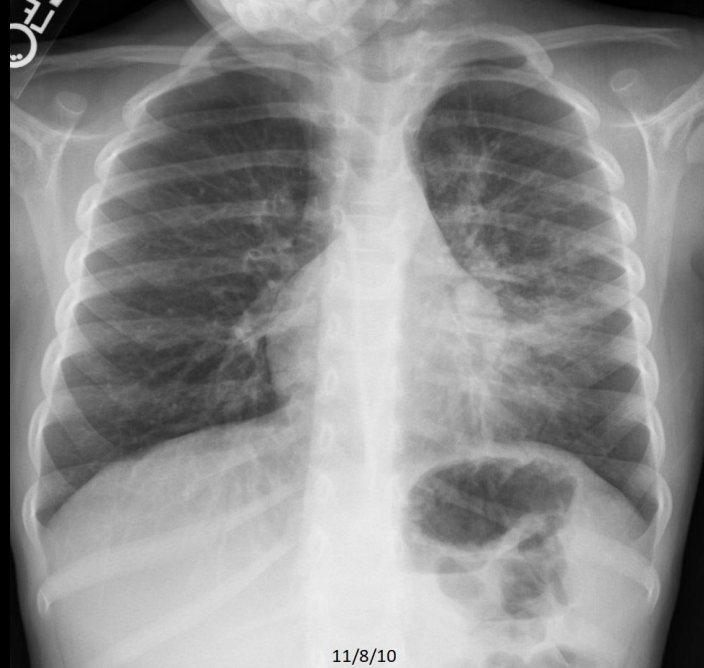
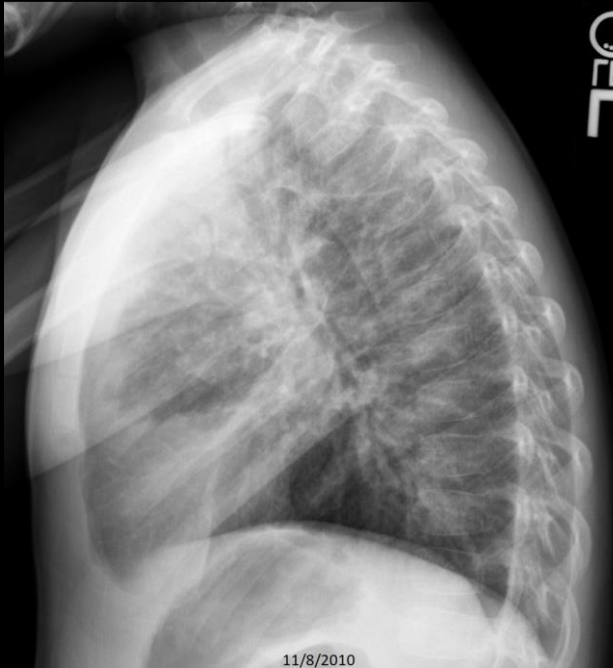
C198. 11 year old male with cough, fever, and emesis. There is left lower lobe opacity bordering the oblique fissure.

Example 5 of 10



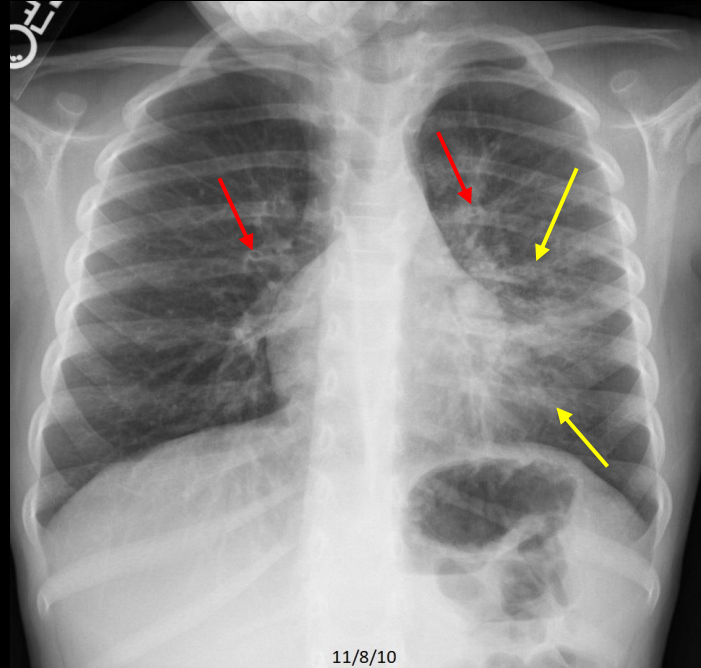
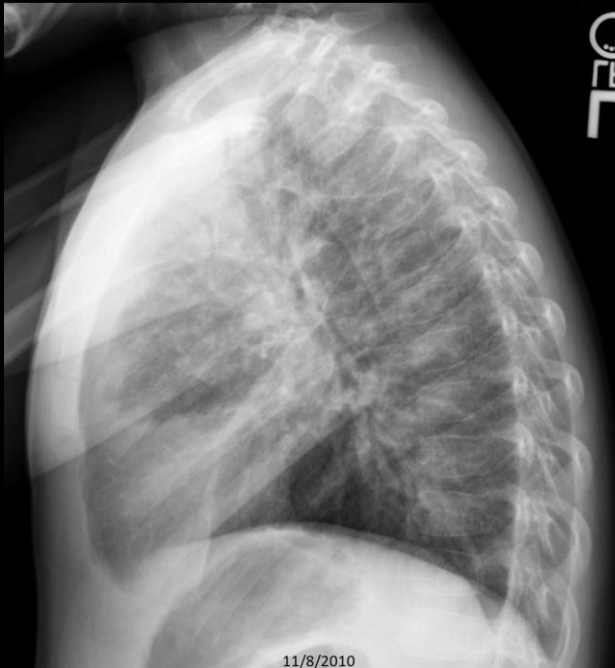
C198. 11 year old male with cough, fever, and emesis. There is left lower lobe opacity bordering the oblique fissure. Note loss of definition of the left hemidiaphragm.

Example 6 of 10



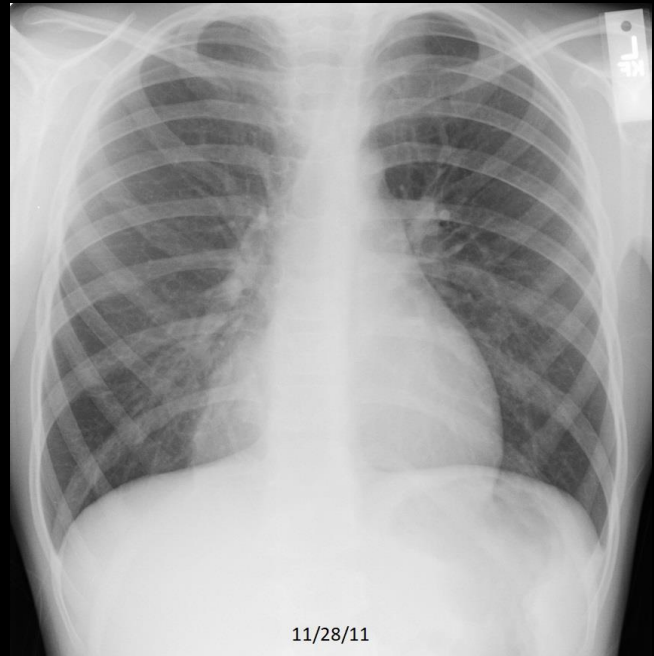
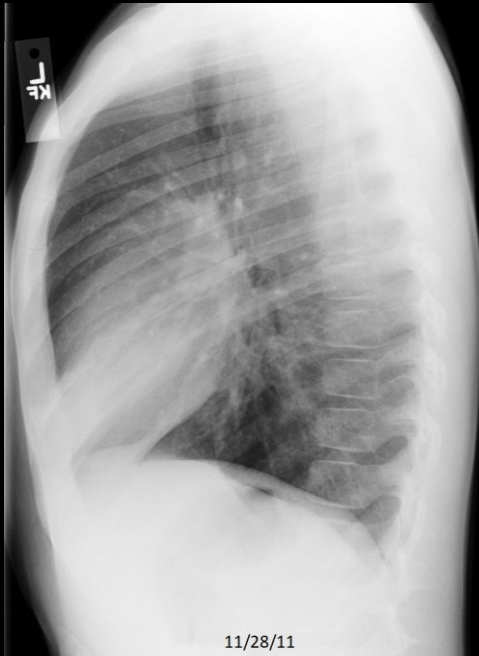
C200. 5 year old with cough and fever. There is left lung opacity and bilateral lung peribronchovascular cuffing.

Example 6 of 10

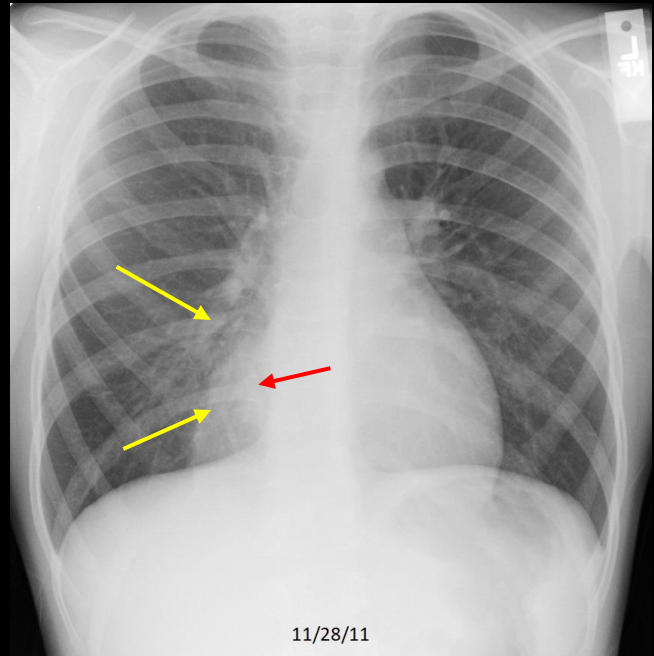
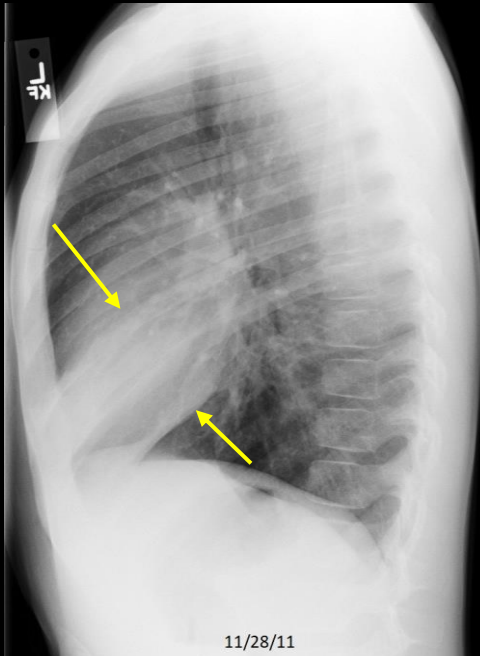


C200. 5 year old with cough and fever. There is **left lung opacity** and **bilateral lung peribronchovascular cuffing**.

Example 7 of 10



Example 7 of 10

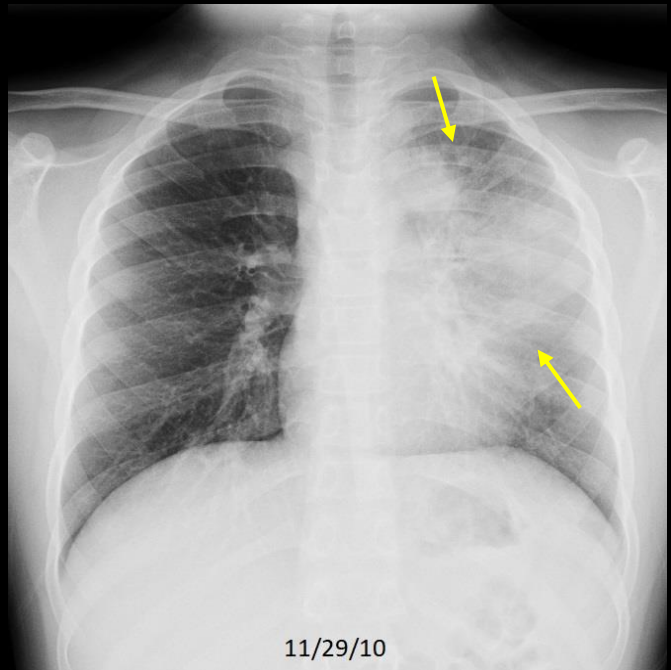
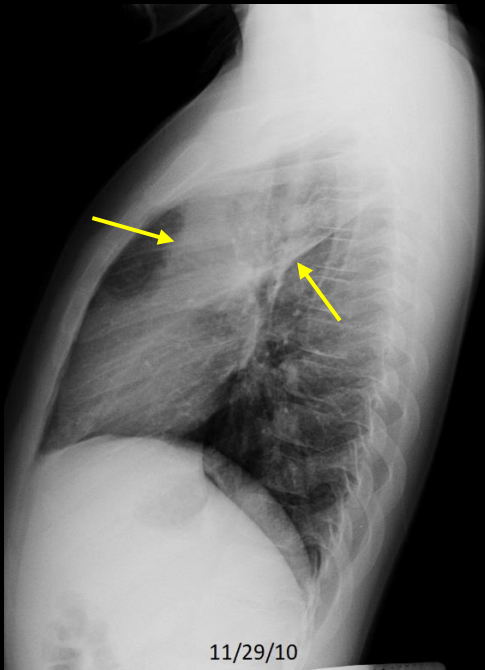


C199. 6 year old with cough and fever. There is **right middle lobe opacity**. Note **loss of definition of the right heart border**.

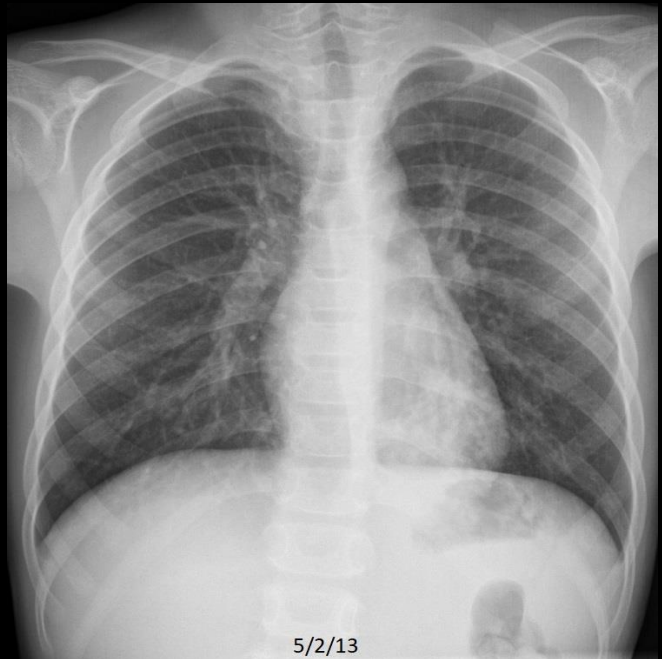
Example 8 of 10



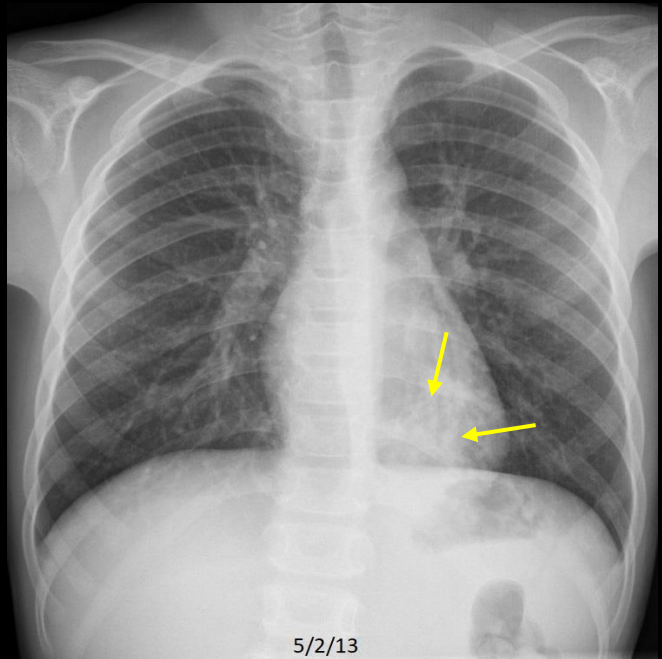
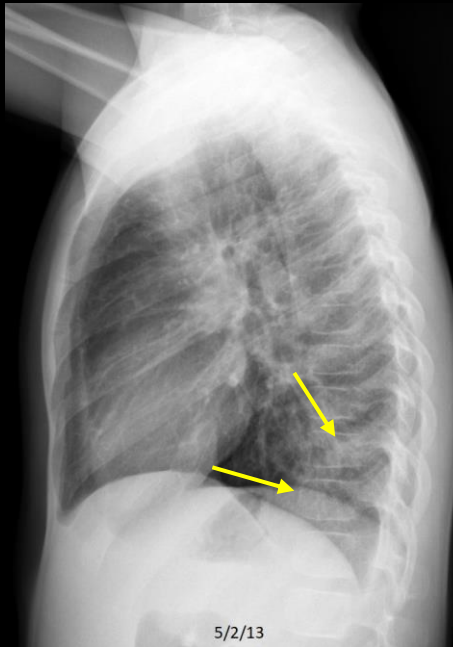
Example 8 of 10



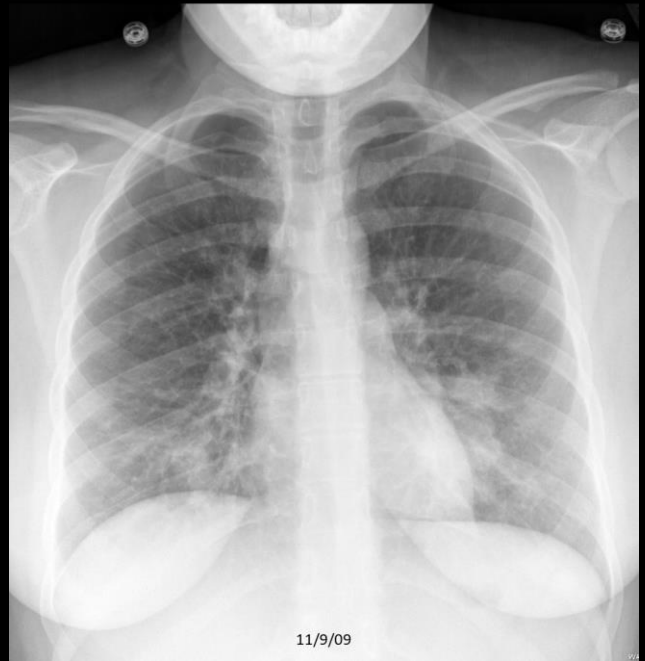
Example 9 of 10



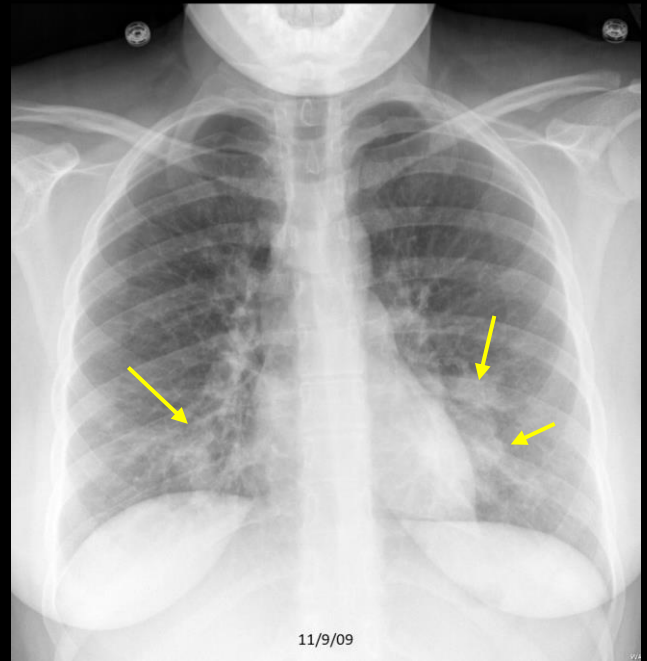
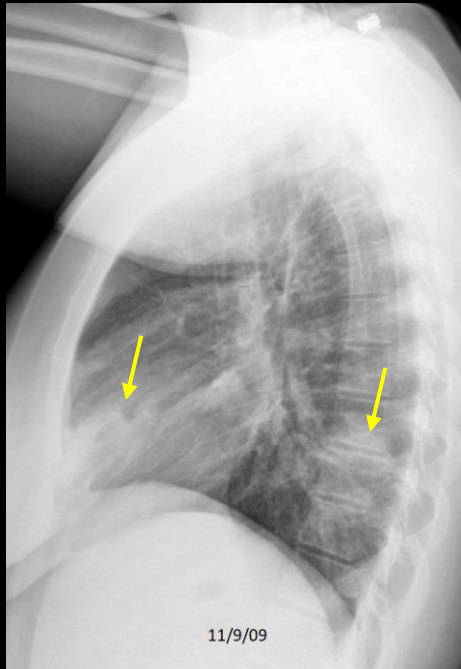
Example 9 of 10



Example 10 of 10



Example 10 of 10



QUIZ

NORMAL VERSUS PNEUMONIA

Select which CXR shows Pneumonia

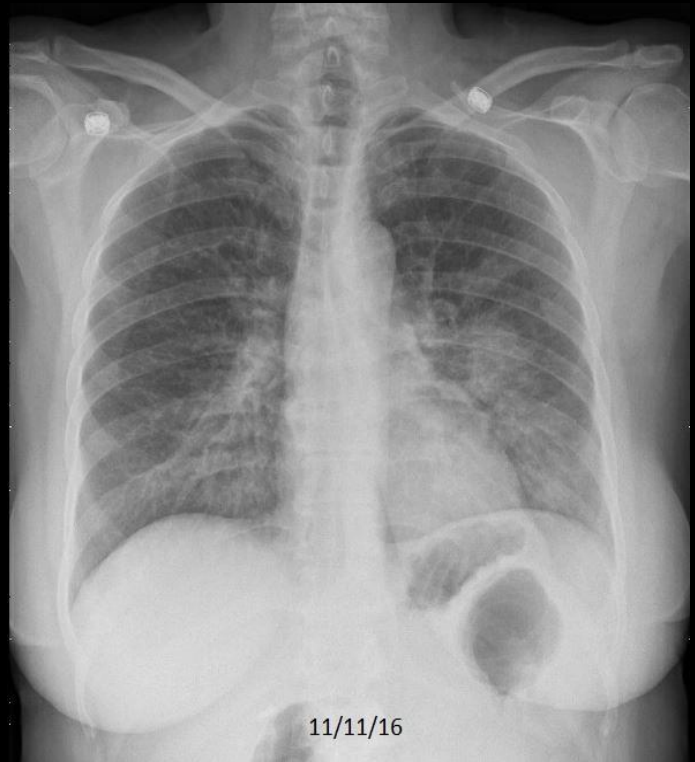
(a or b)

for the following 10 cases

Quiz Case 1 of 10



a.

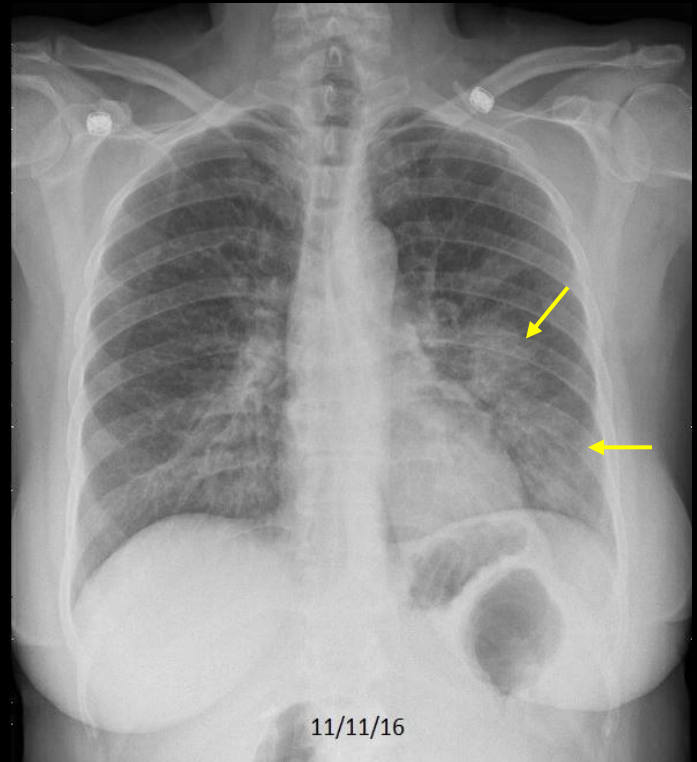


b.

Quiz Case 1 of 10



a. normal

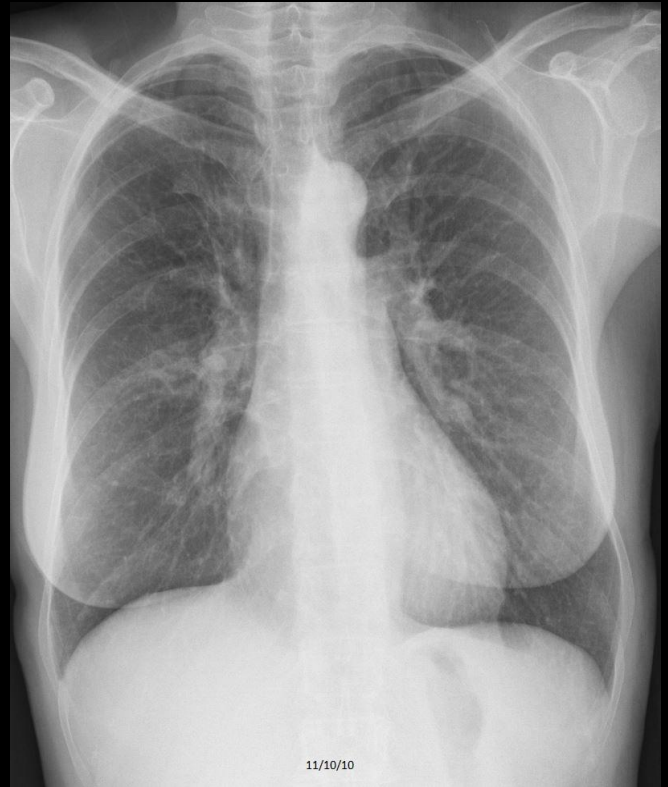


b. pneumonia

Quiz Case 2 of 10

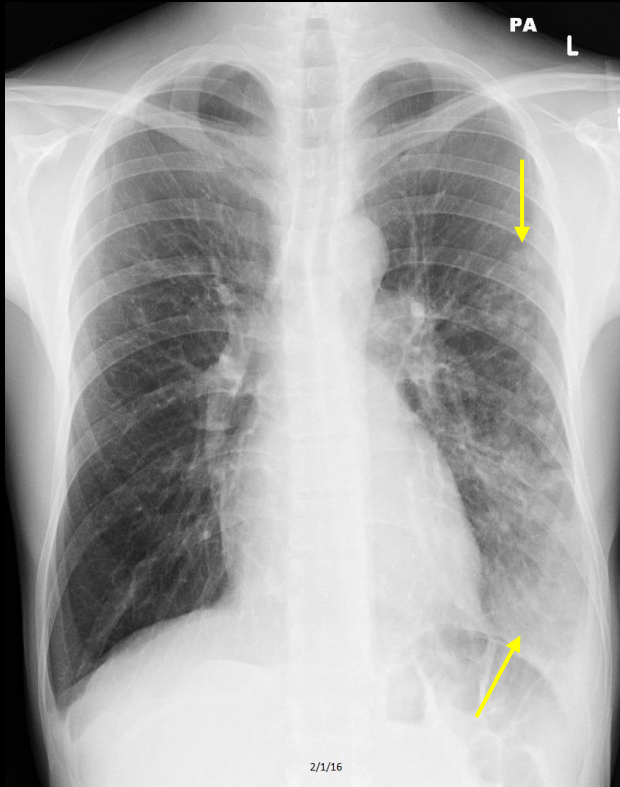


a.

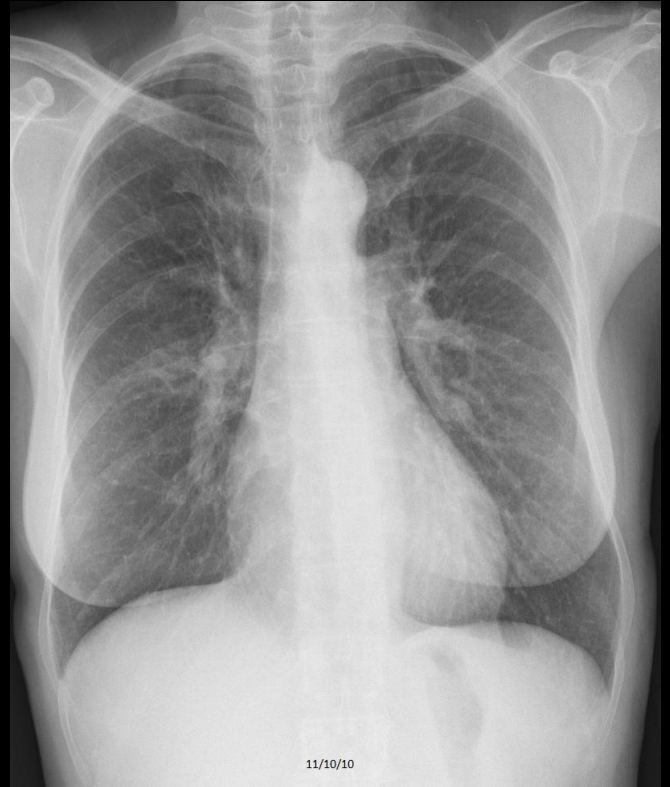


b.

Quiz Case 2 of 10



a. pneumonia



b. normal

Quiz Case 3 of 10

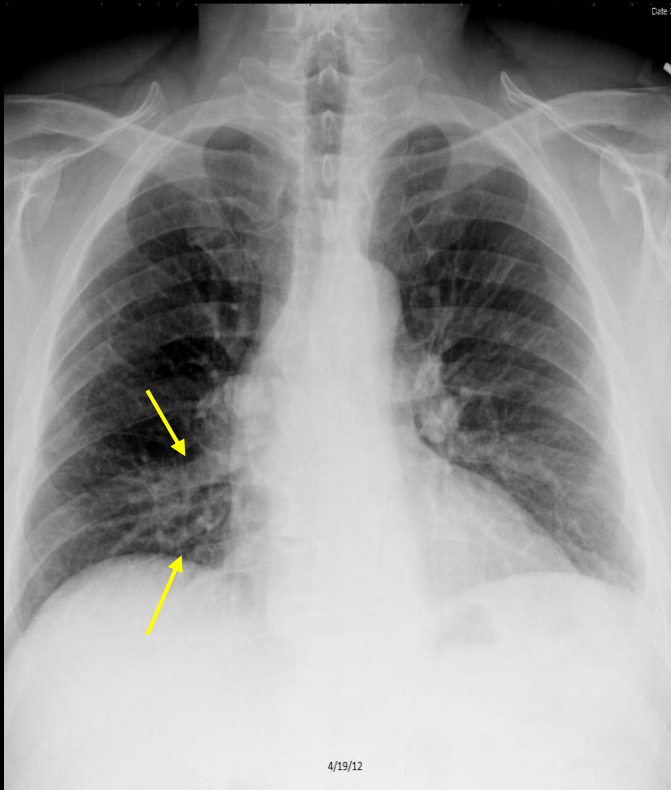


a.



b.

Quiz Case 3 of 10

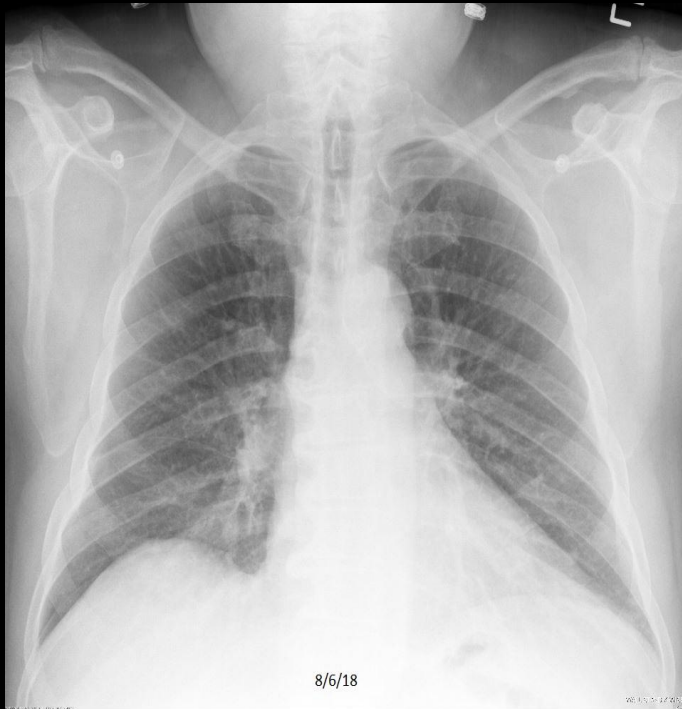


a. pneumonia

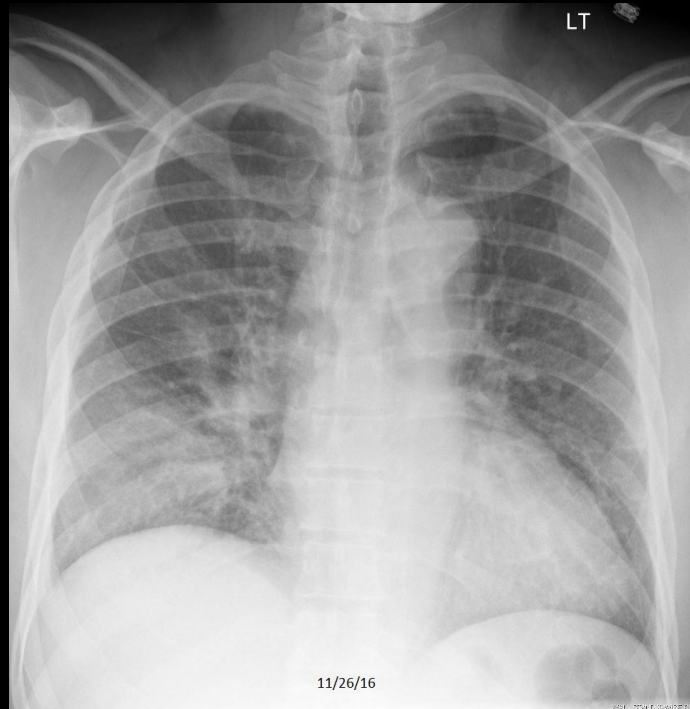


b. normal

Quiz Case 4 of 10

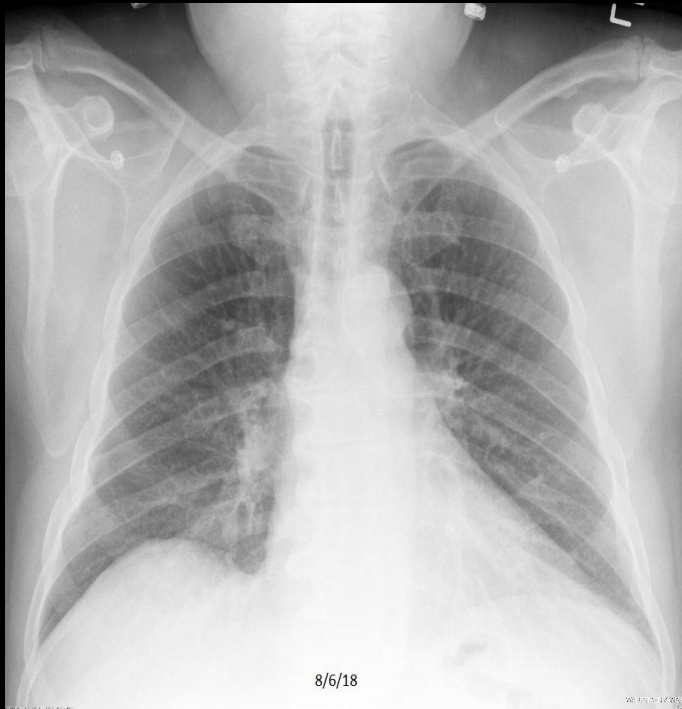


a.

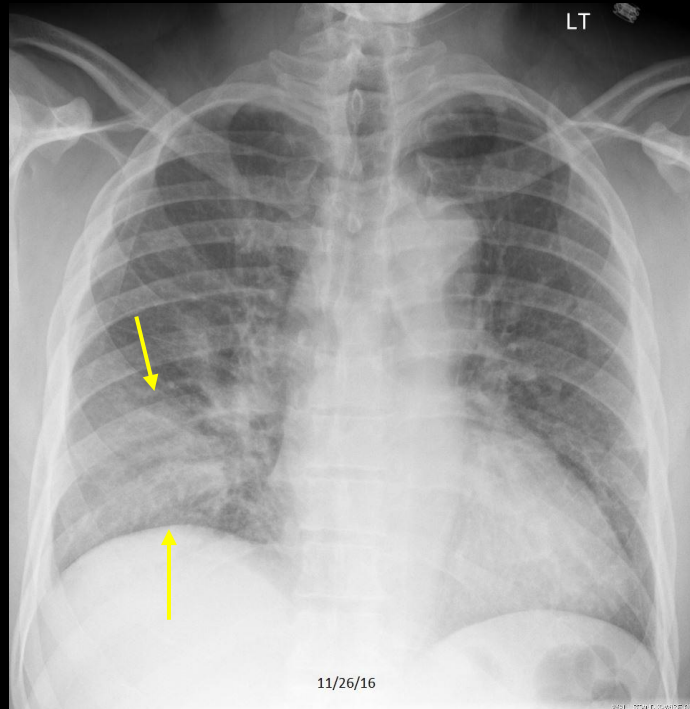


b.

Quiz Case 4 of 10

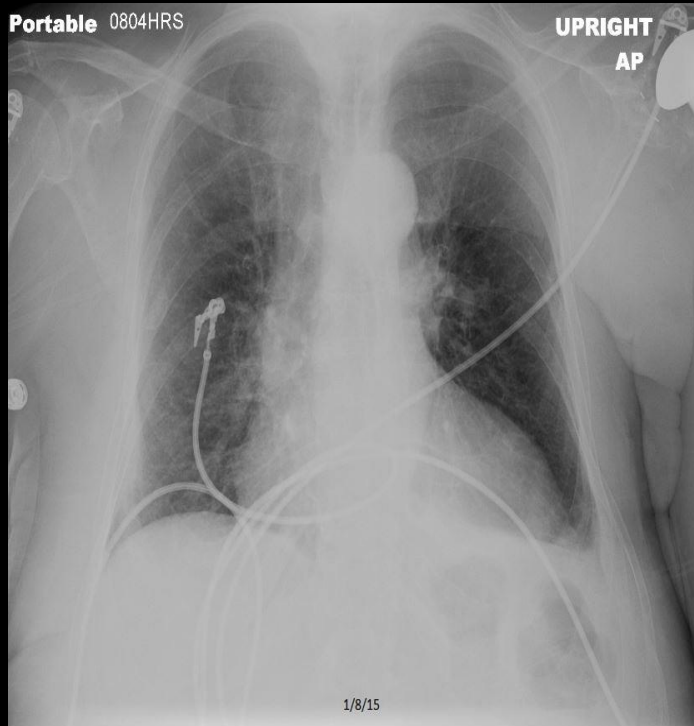


a. normal



b. pneumonia

Quiz Case 5 of 10

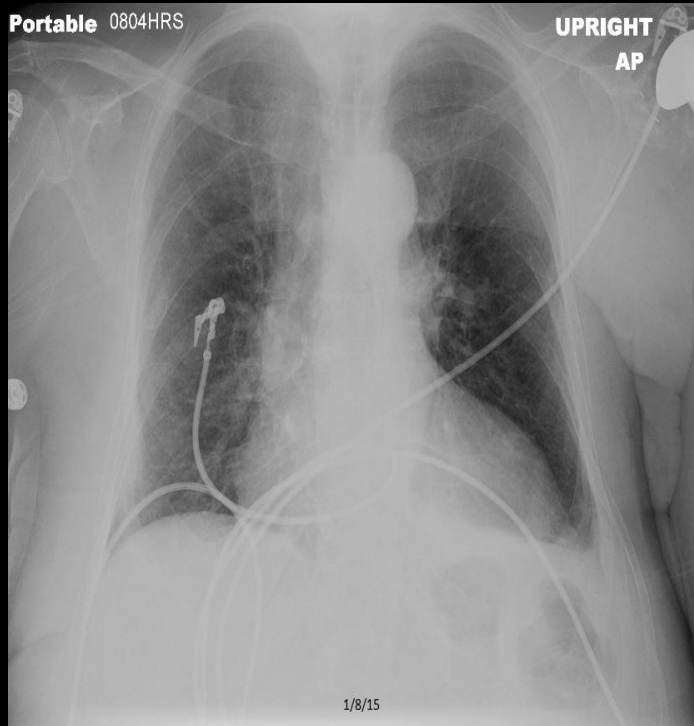


a.

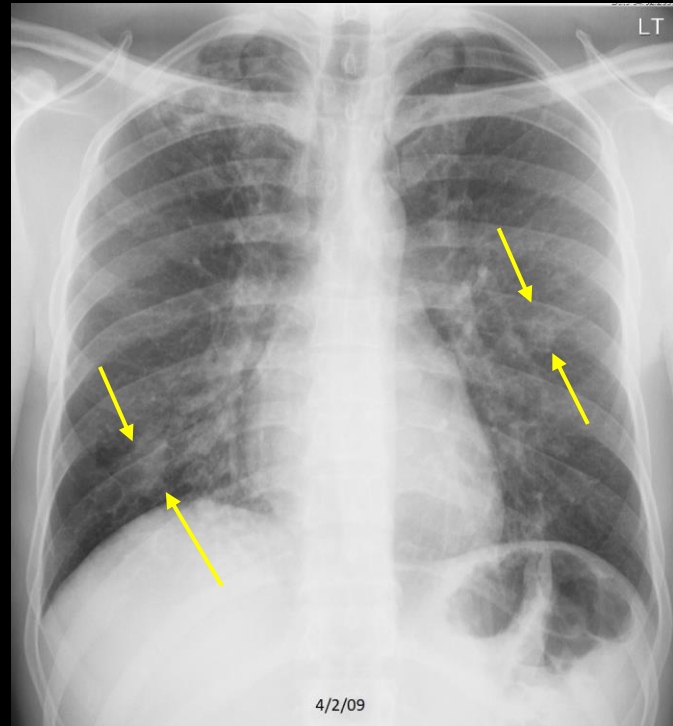


b.

Quiz Case 5 of 10



a. normal

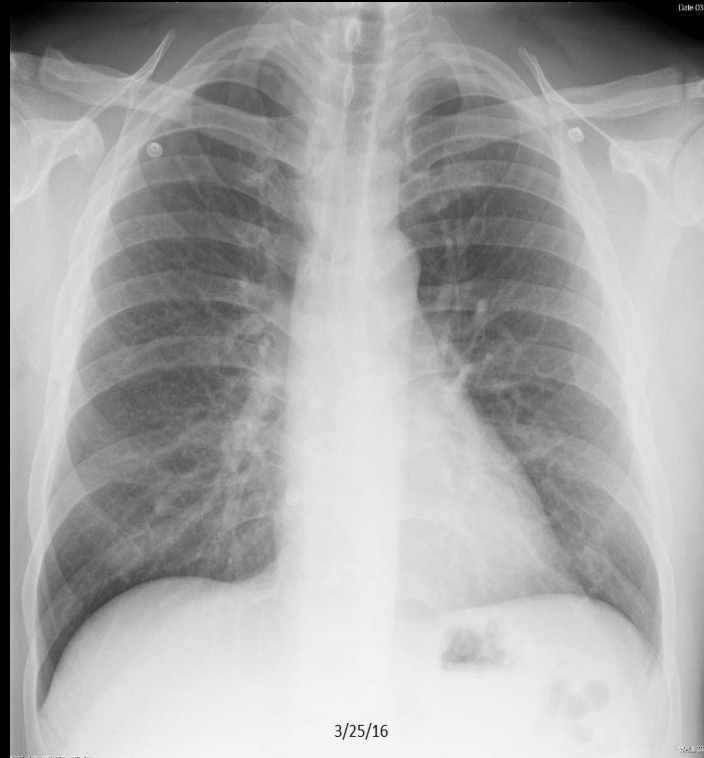


b. pneumonia

Quiz Case 6 of 10

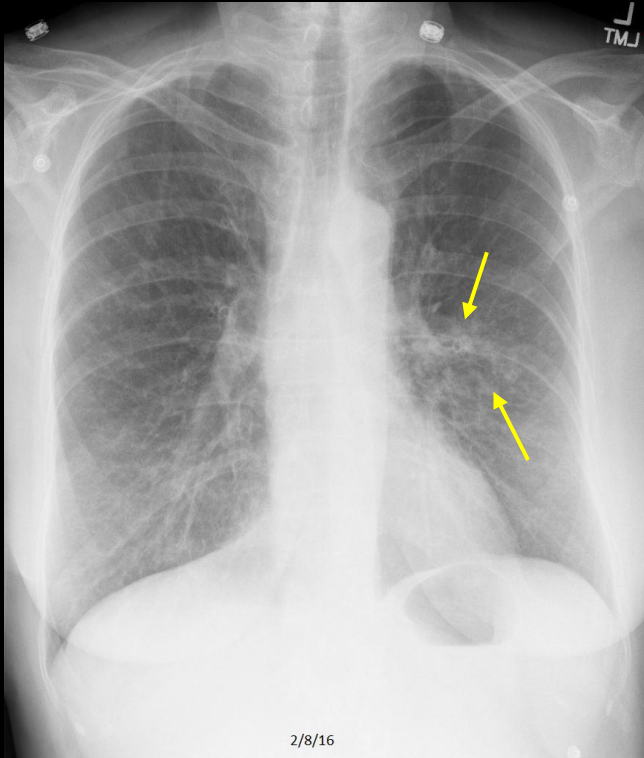


a.

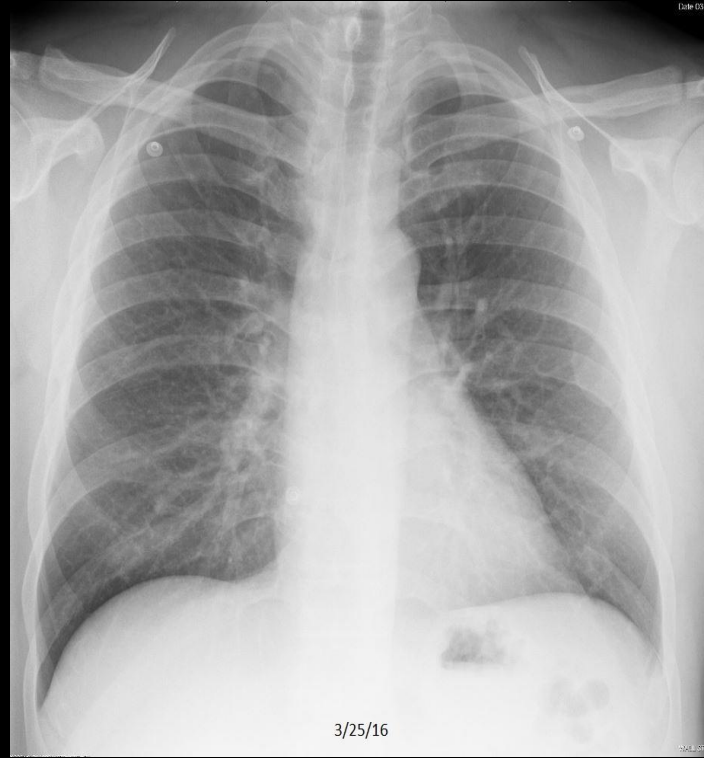


b.

Quiz Case 6 of 10



a. pneumonia

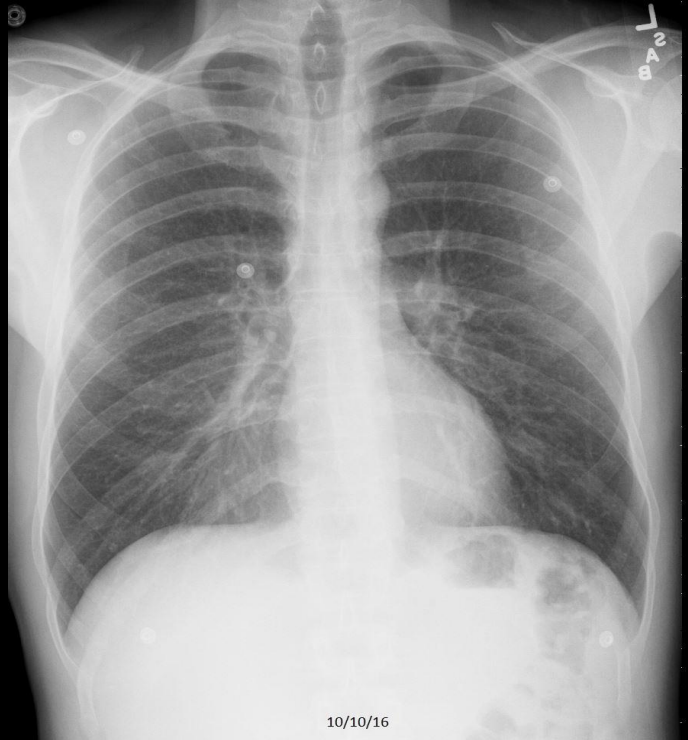


b. normal

Quiz Case 7 of 10

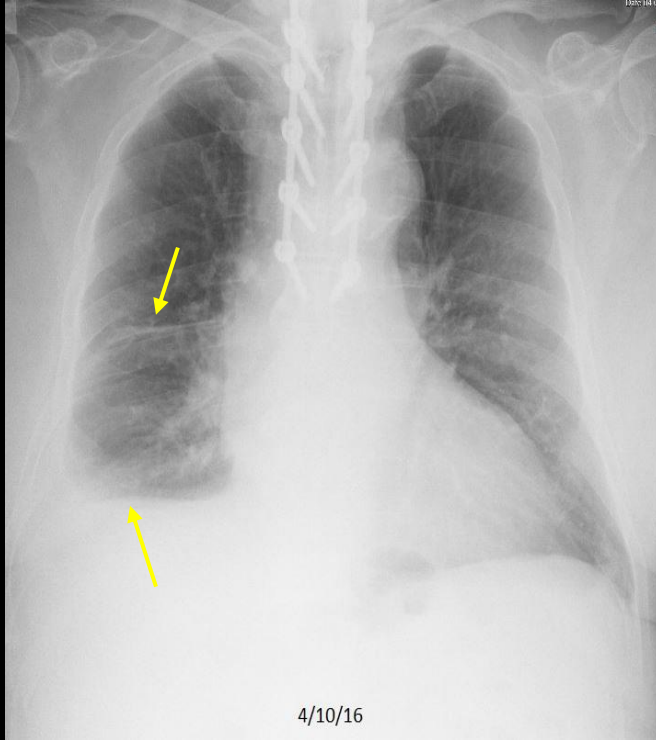


a.

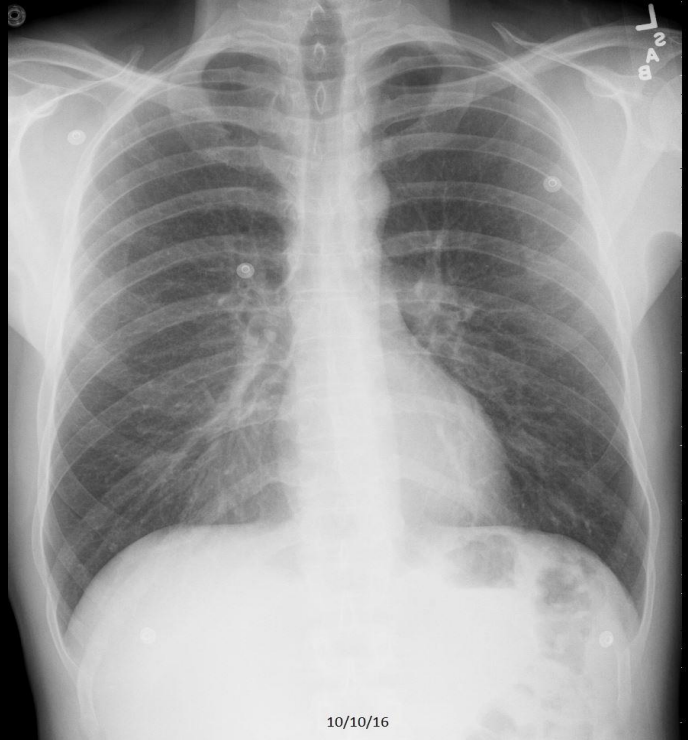


b.

Quiz Case 7 of 10

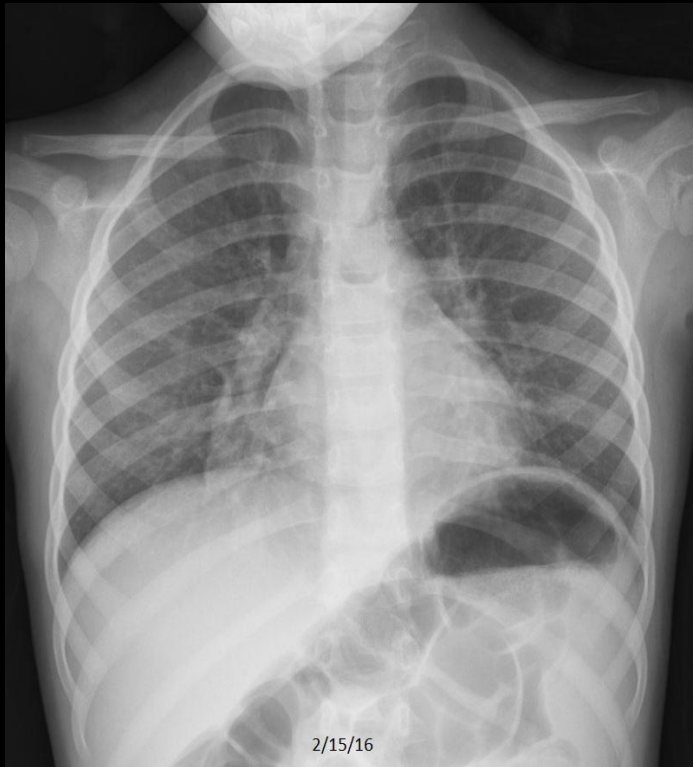


a. pneumonia

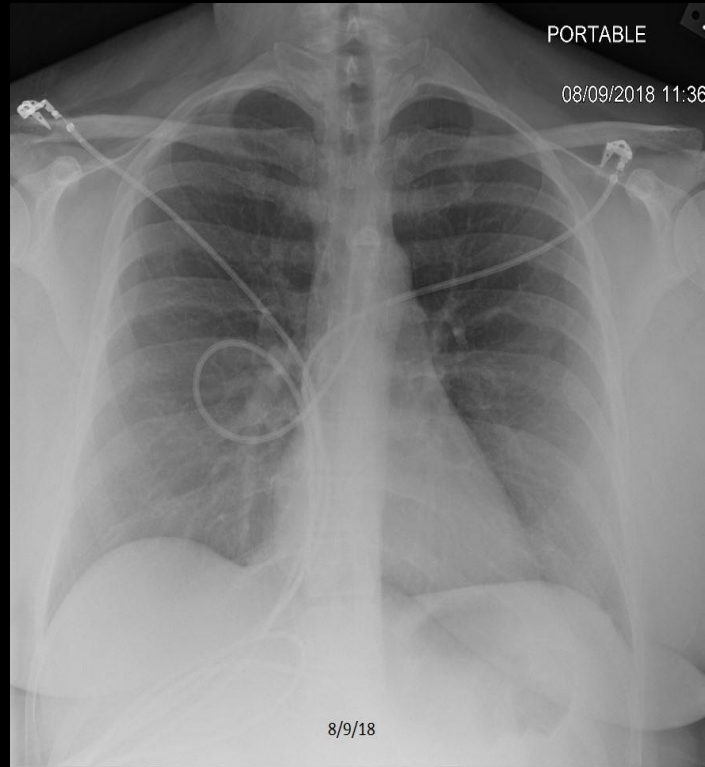


b. normal

Quiz Case 8 of 10

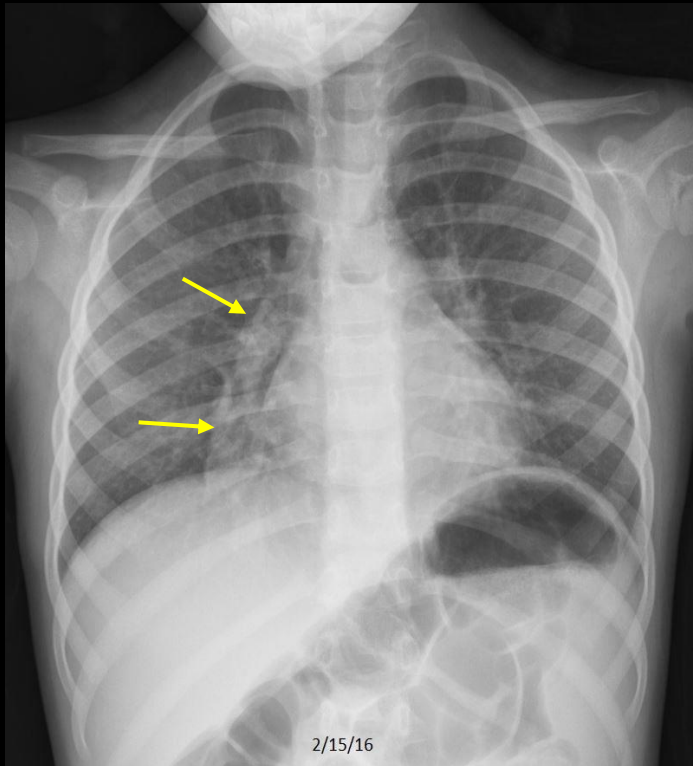


a.

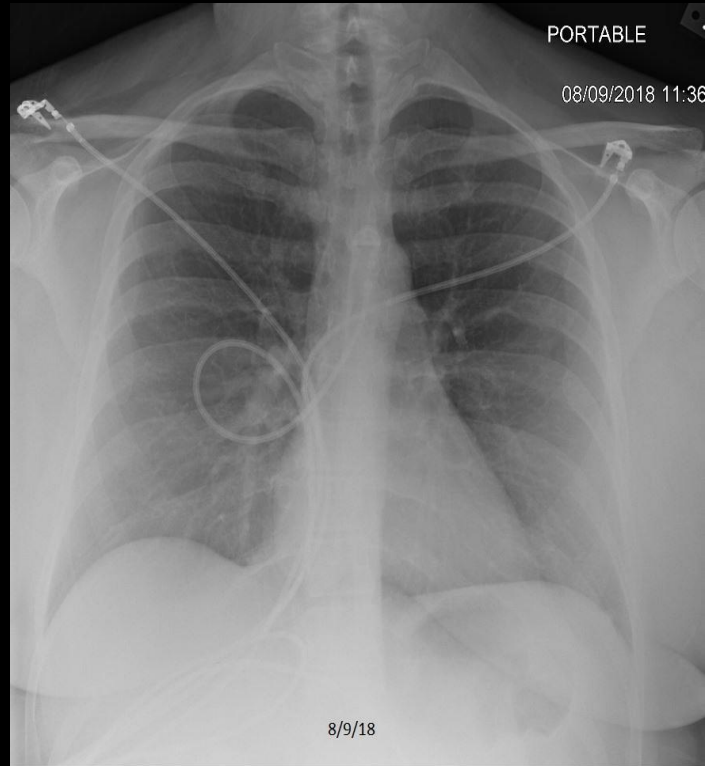


b.

Quiz Case 8 of 10

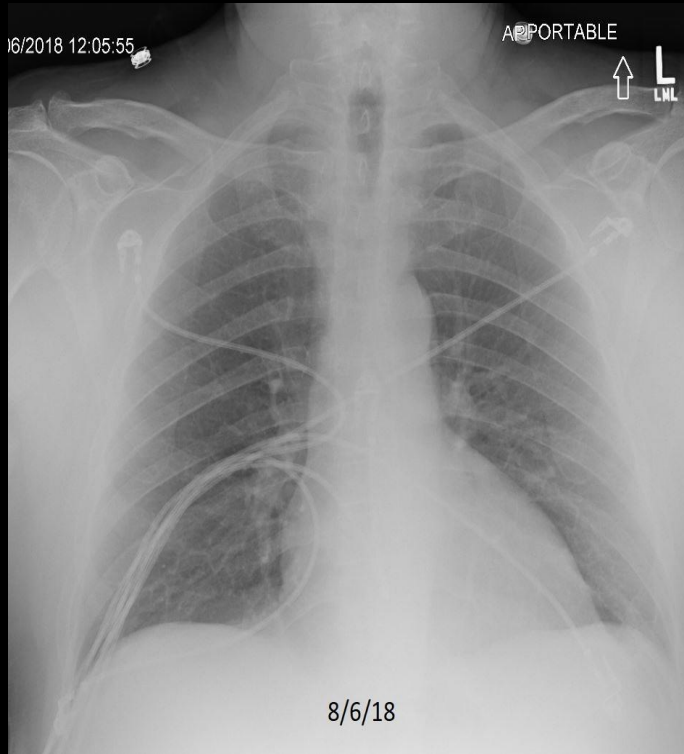


a. pneumonia

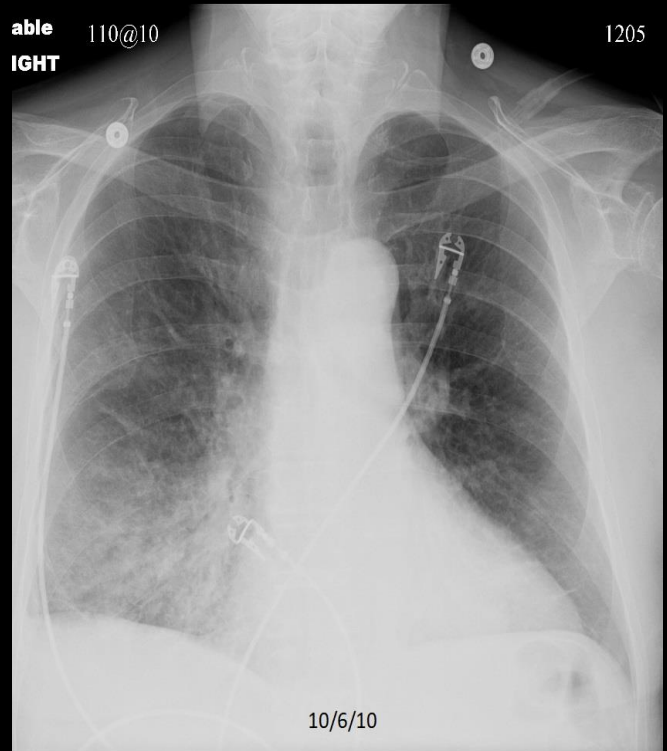


b. normal

Quiz Case 9 of 10

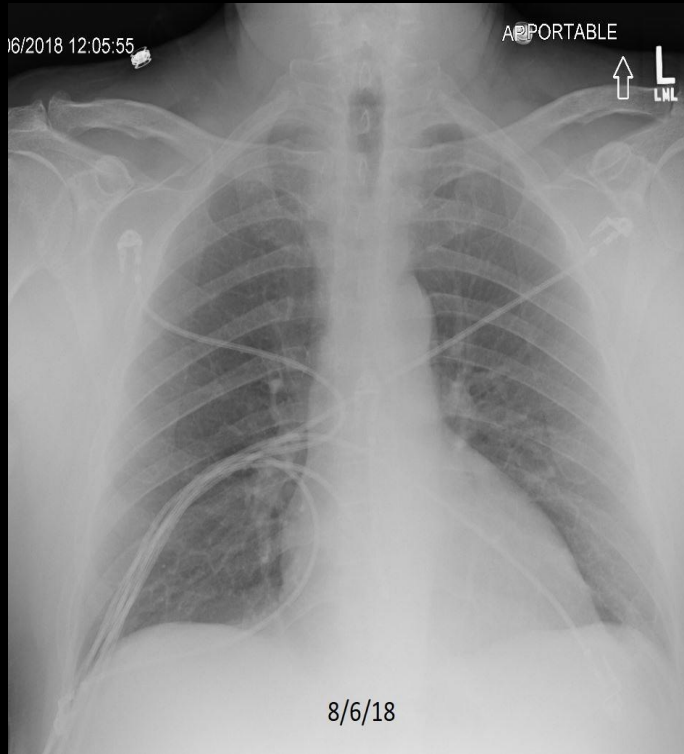


a.

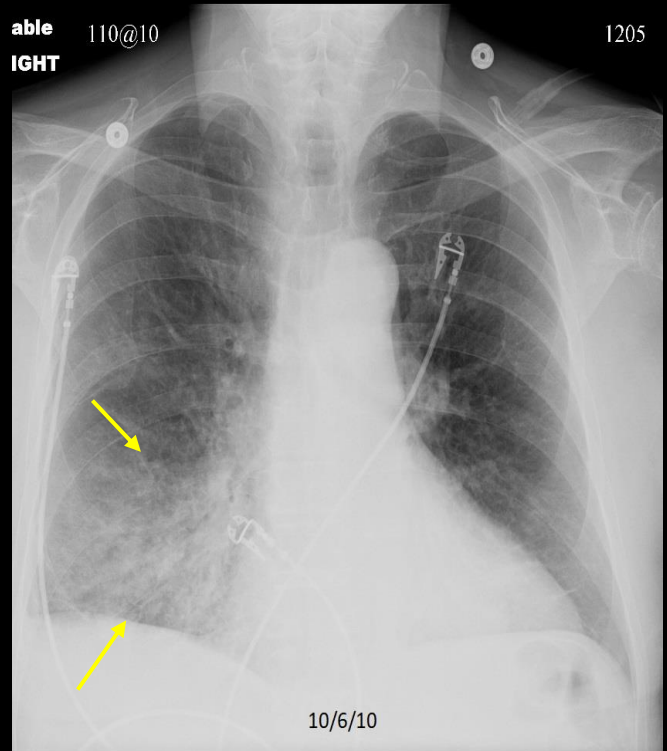


b.

Quiz Case 9 of 10



a. normal

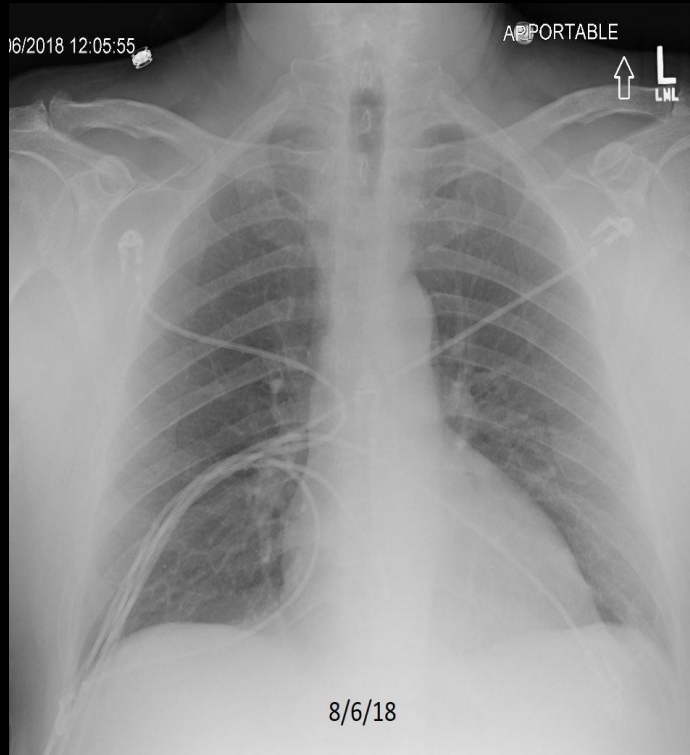


b. pneumonia

Quiz Case 10 of 10

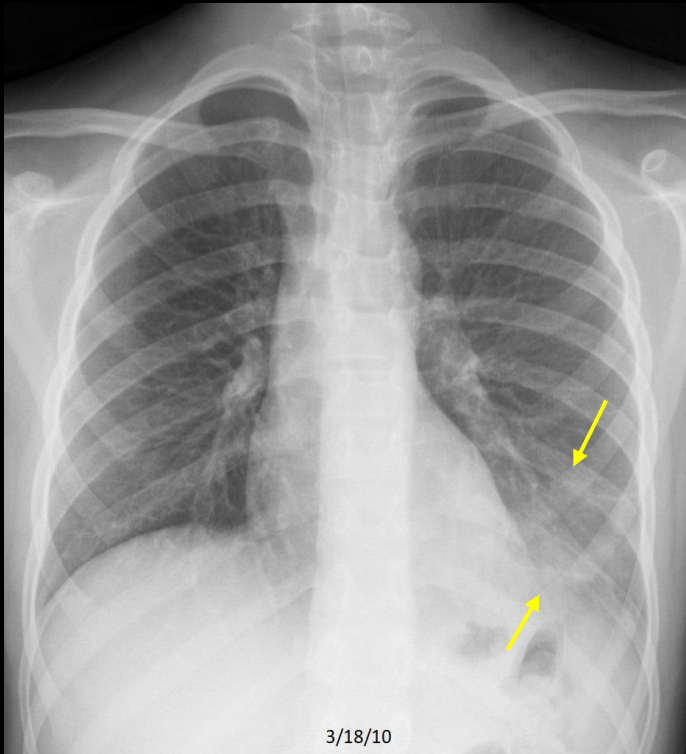


a.

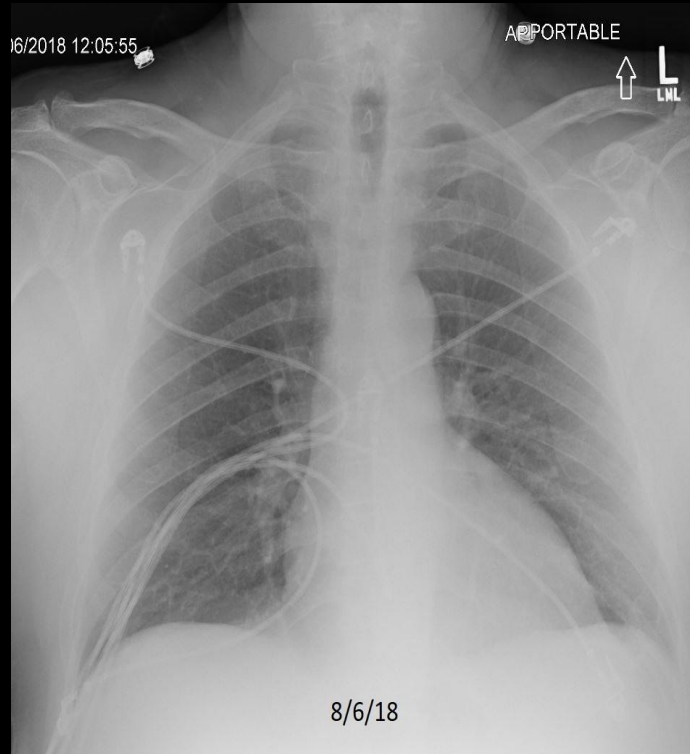


b.

Quiz Case 10 of 10



a. pneumonia



b. normal

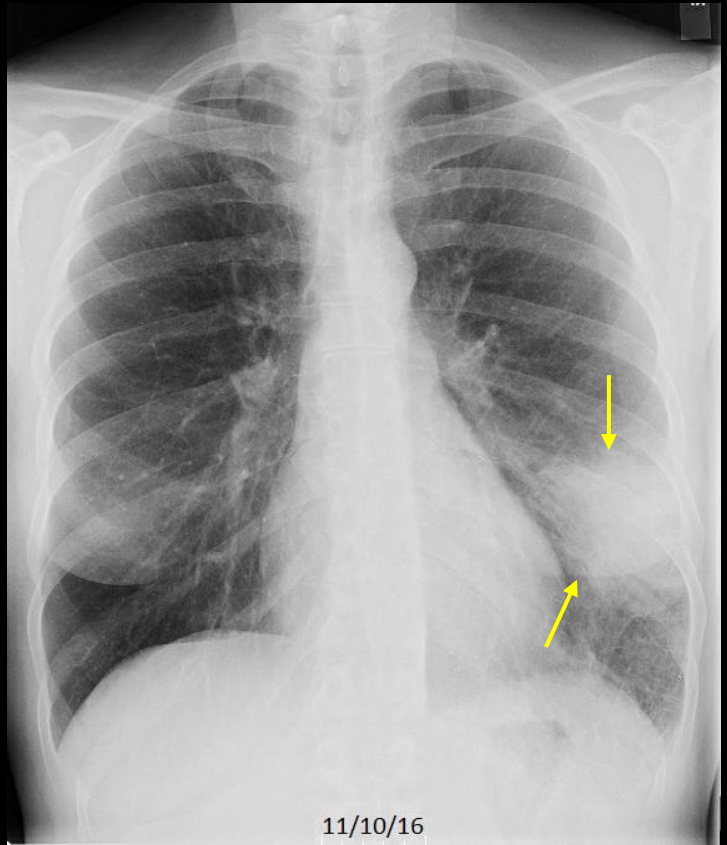
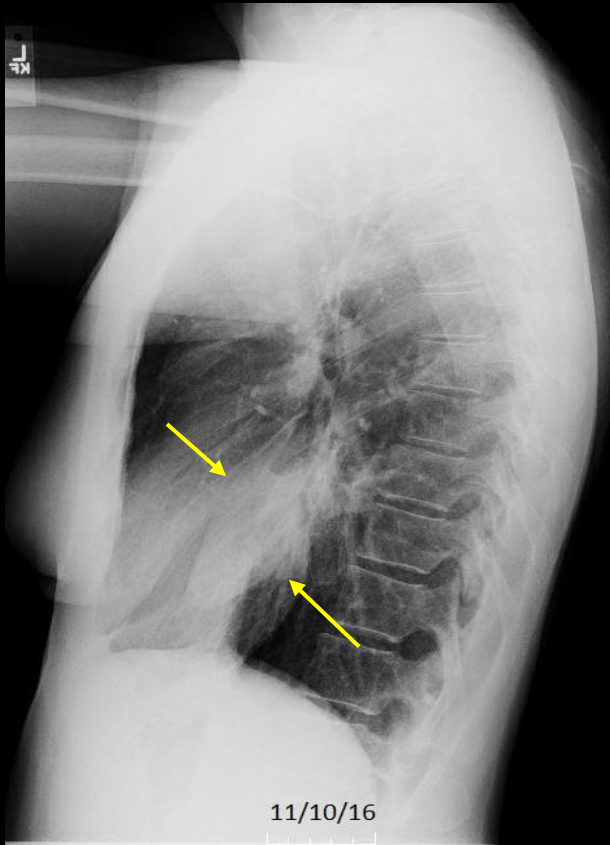
Review Quiz

**Identify Each CXR as:
Normal, CHF, or Pneumonia**

Review Quiz Case 1 of 15: Normal, CHF, or Pneumonia?

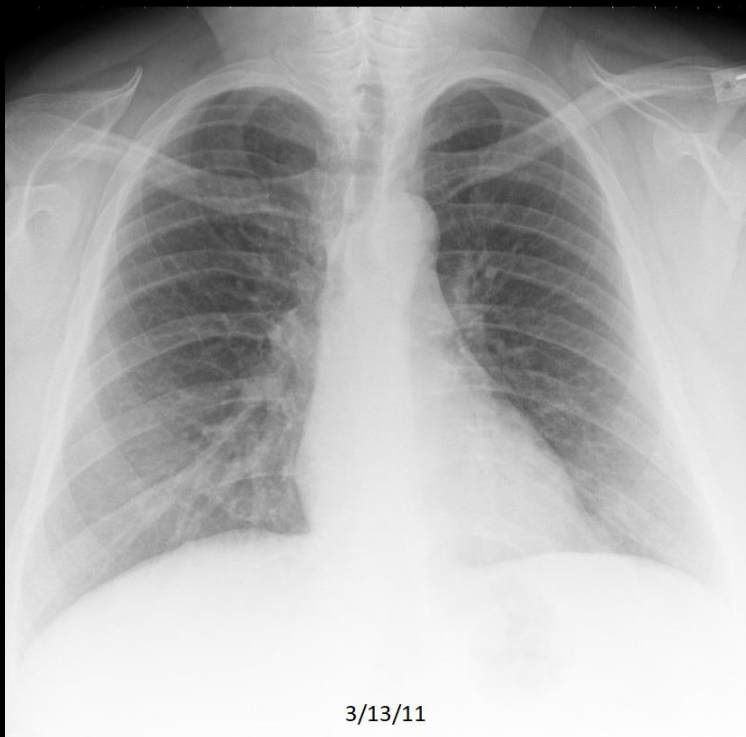
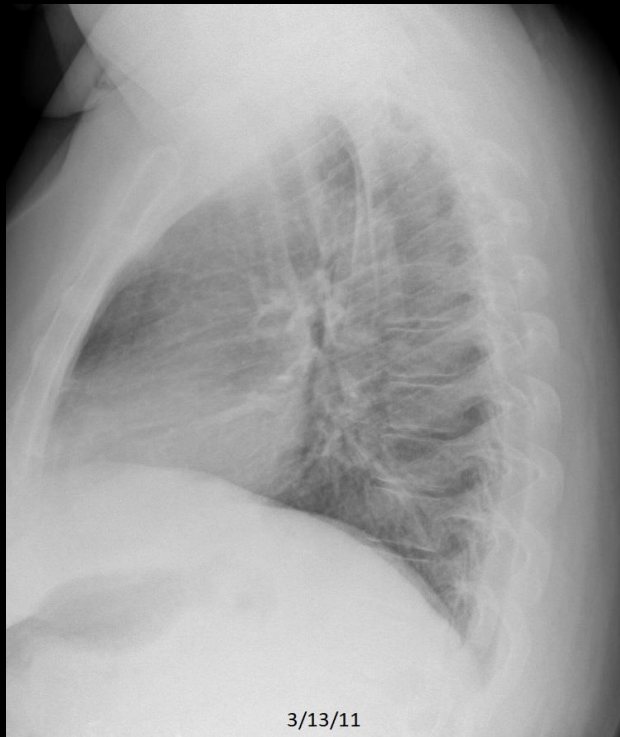


Review Quiz Case 1 of 15: Pneumonia.

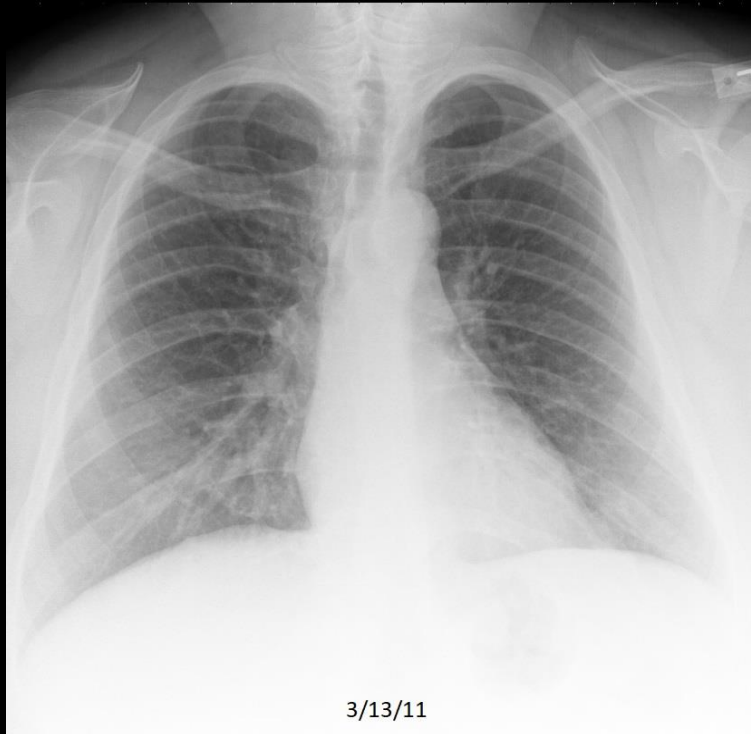
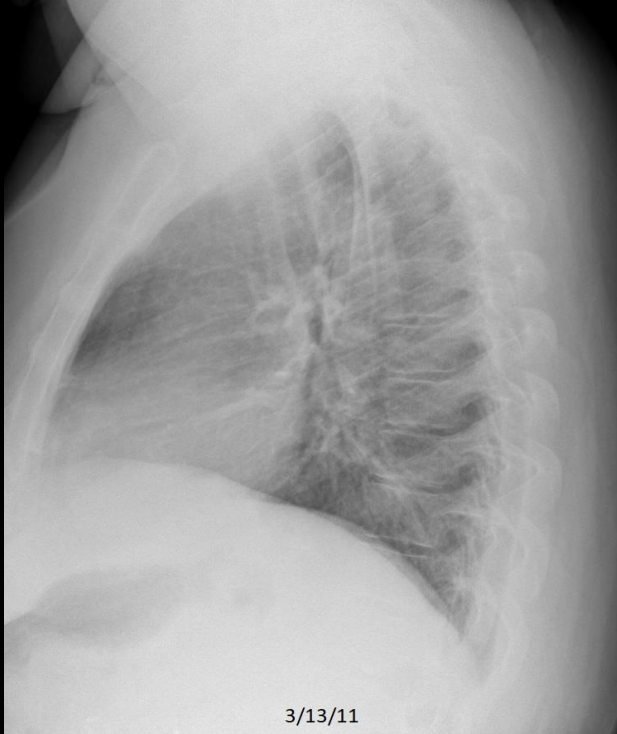


C268. 53 year old woman with cough, fever, and dyspnea. There is opacity of the left lung.

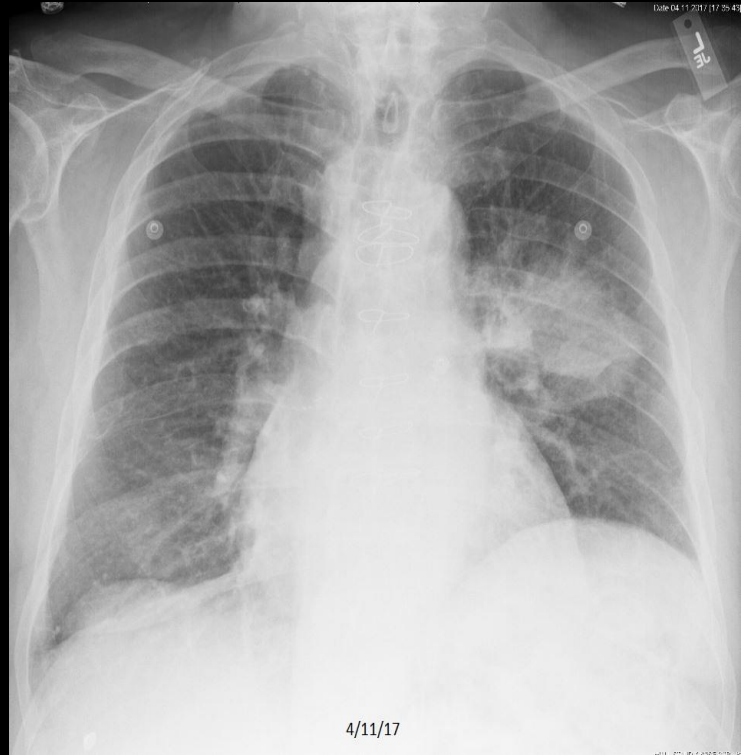
Review Quiz Case 2 of 15: Normal, CHF, or Pneumonia?



Review Quiz Case 2 of 15: Normal.

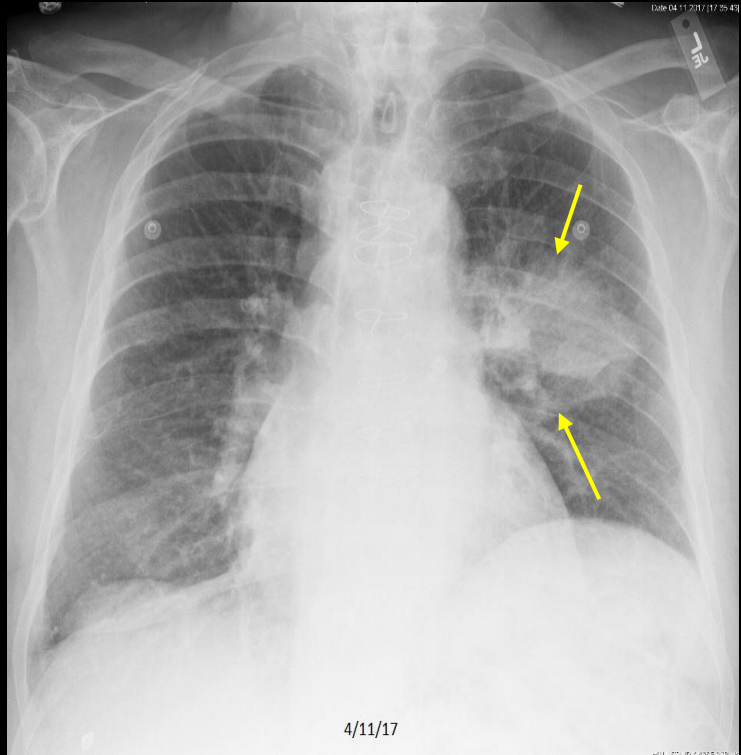
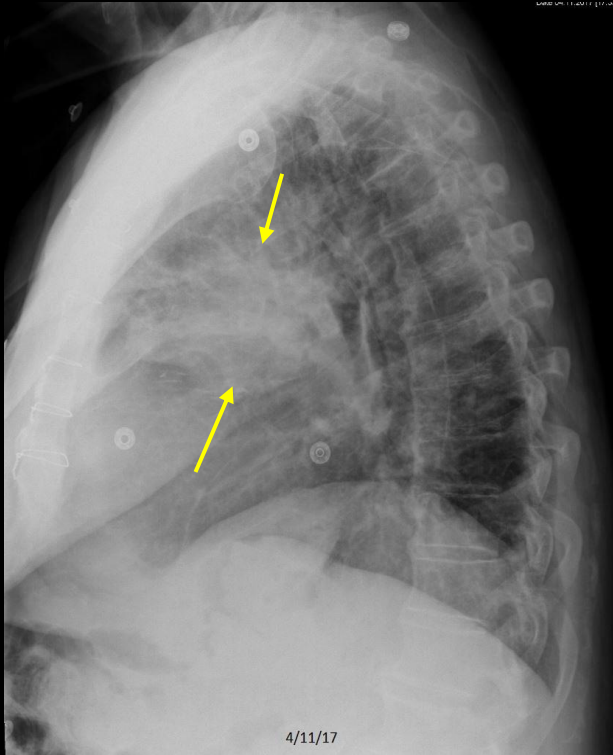


Review Quiz Case 3 of 15: Normal, CHF, or Pneumonia?



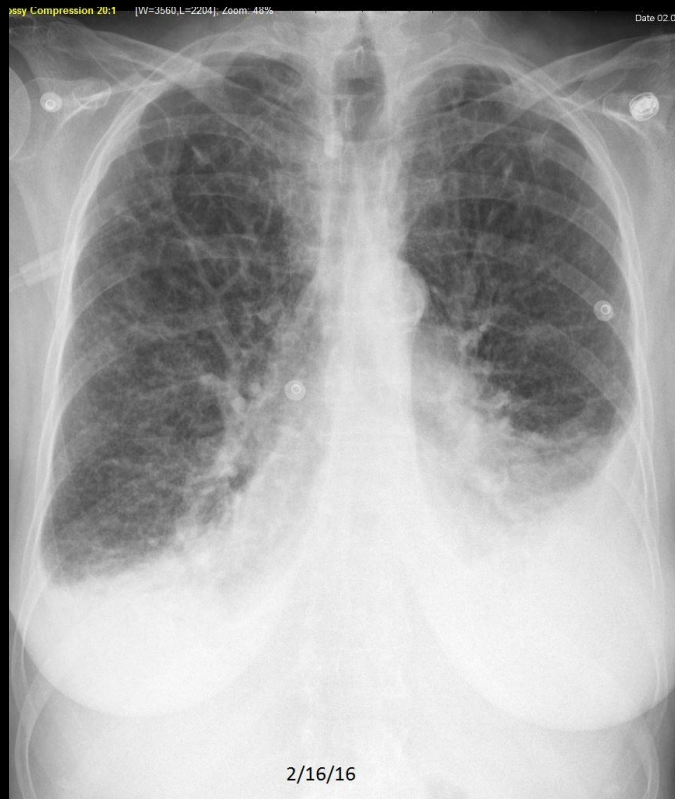
C404. 65 year old man with chest pain, cough, and fever.

Review Quiz Case 3 of 15: Pneumonia.

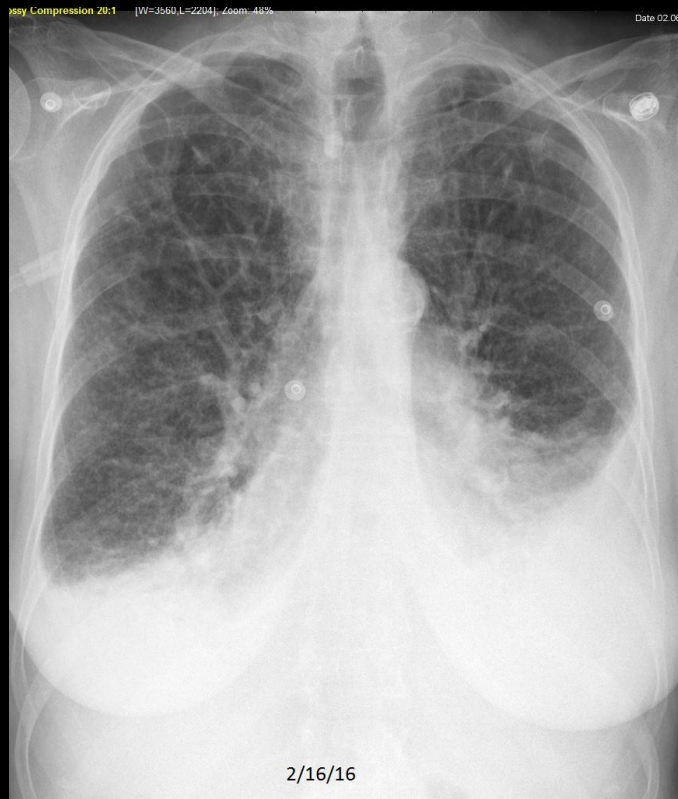


C404. 65 year old man with chest pain, cough, and fever. There is opacity in the left lung.

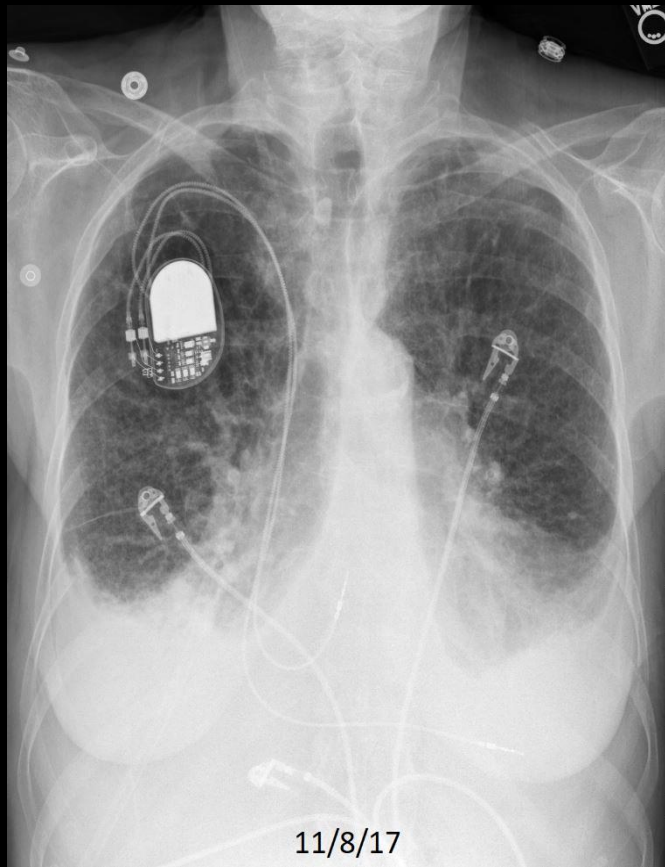
Review Quiz Case 4 of 15: Normal, CHF, or Pneumonia?



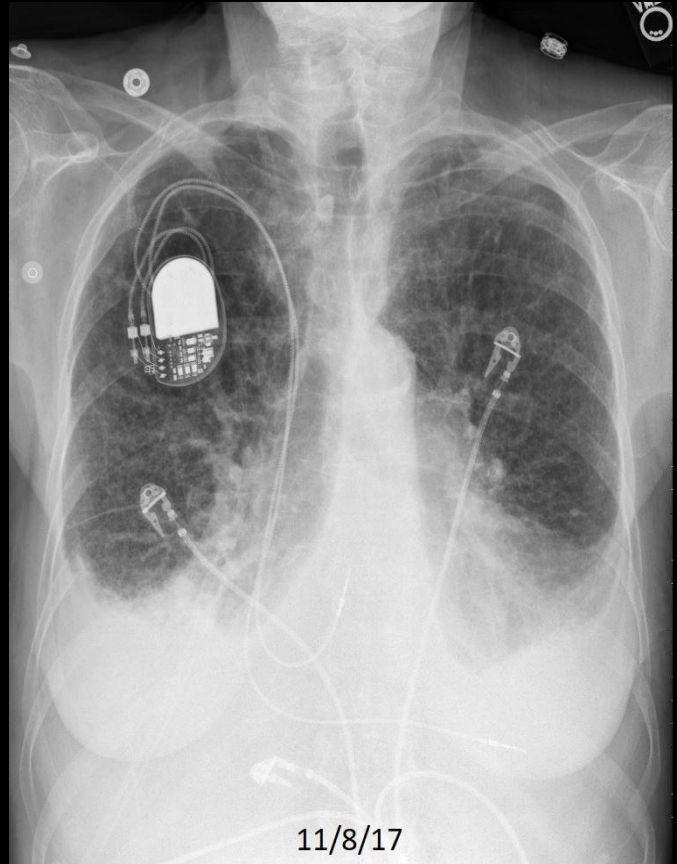
Review Quiz Case 4 of 15: CHF.



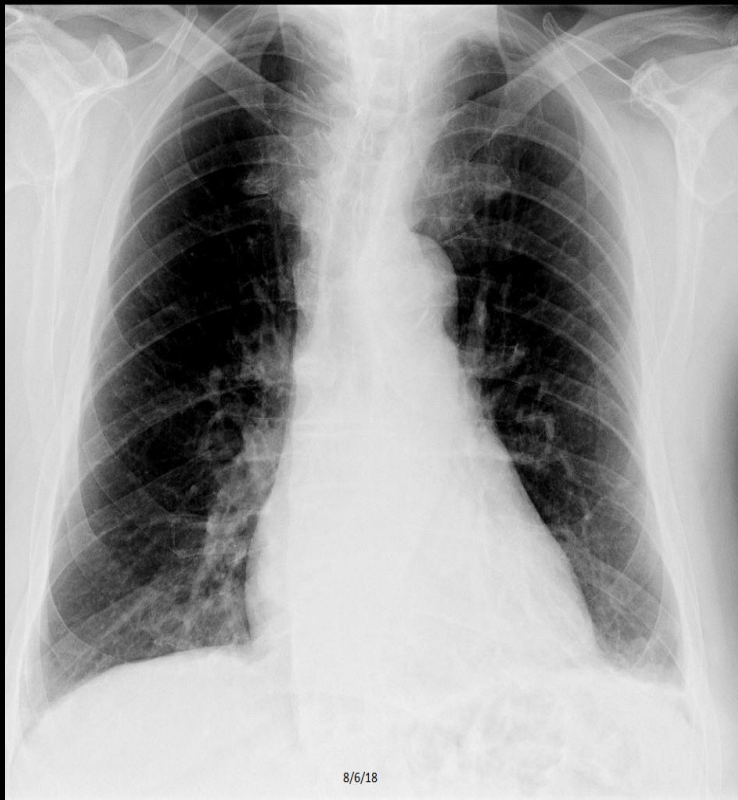
Review Quiz Case 5 of 15: Normal, CHF, or Pneumonia?



Review Quiz Case 5 of 15: CHF.

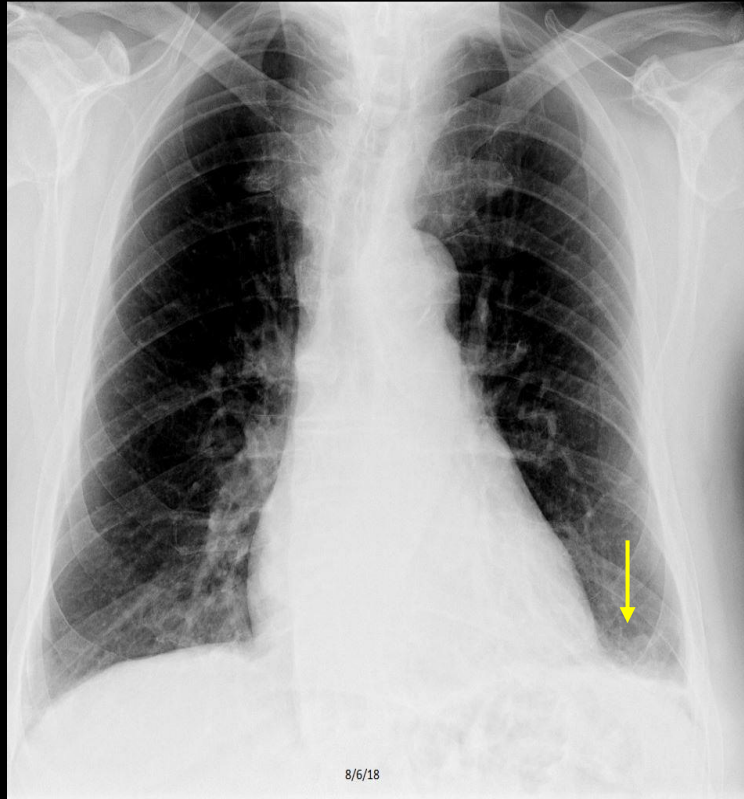
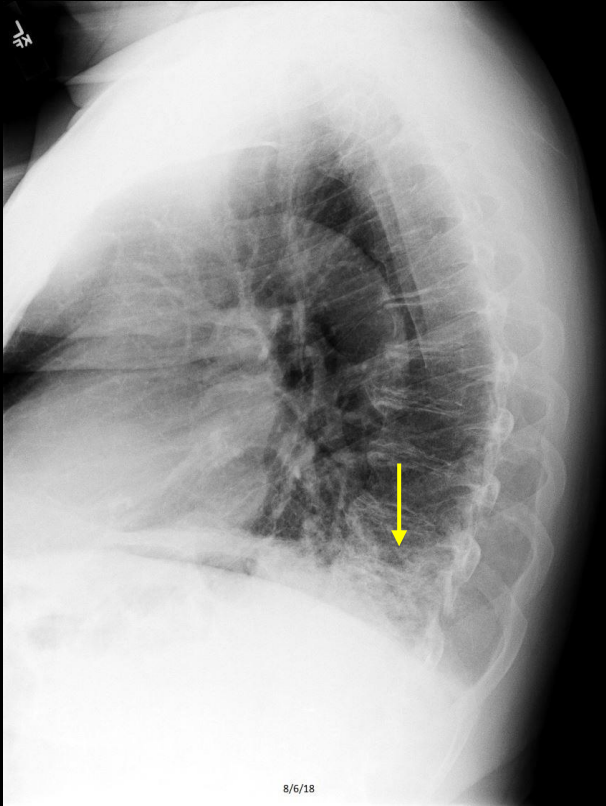


Review Quiz Case 6 of 15: Normal, CHF, or Pneumonia?



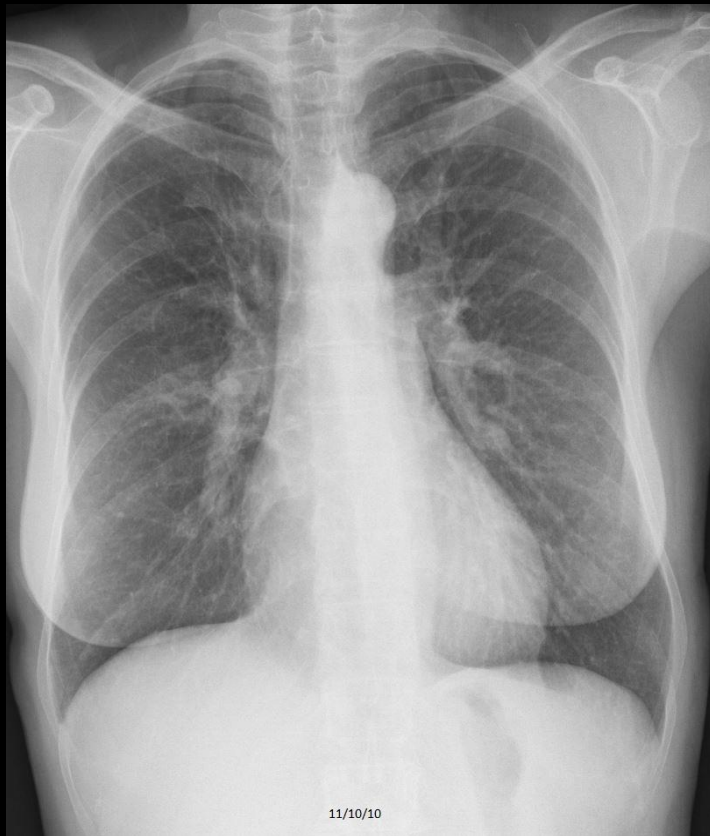
C176. 71 year old man with cough, crackles, and a syncopal episode.

Review Quiz Case 6 of 15: Pneumonia.



C176. 71 year old man with cough, crackles, and a syncopal episode. There is left lower lobe opacity, best appreciated on the lateral. There is also cardiomegaly.

Review Quiz Case 7 of 15: Normal, CHF, or Pneumonia?



Review Quiz Case 7 of 15: Normal.



Review Quiz Case 8 of 15: Normal, CHF, or Pneumonia?



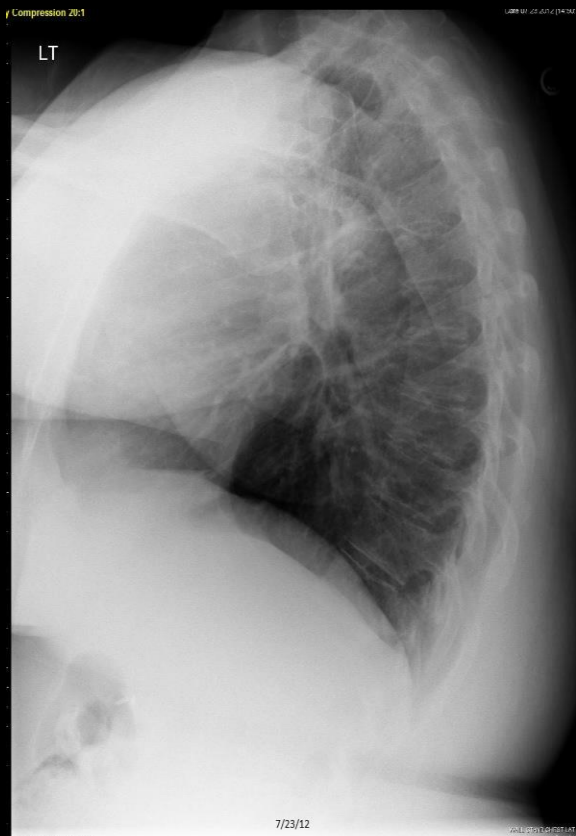
Review Quiz Case 8 of 15: Normal.



Review Quiz Case 9 of 15: Normal, CHF, or Pneumonia?

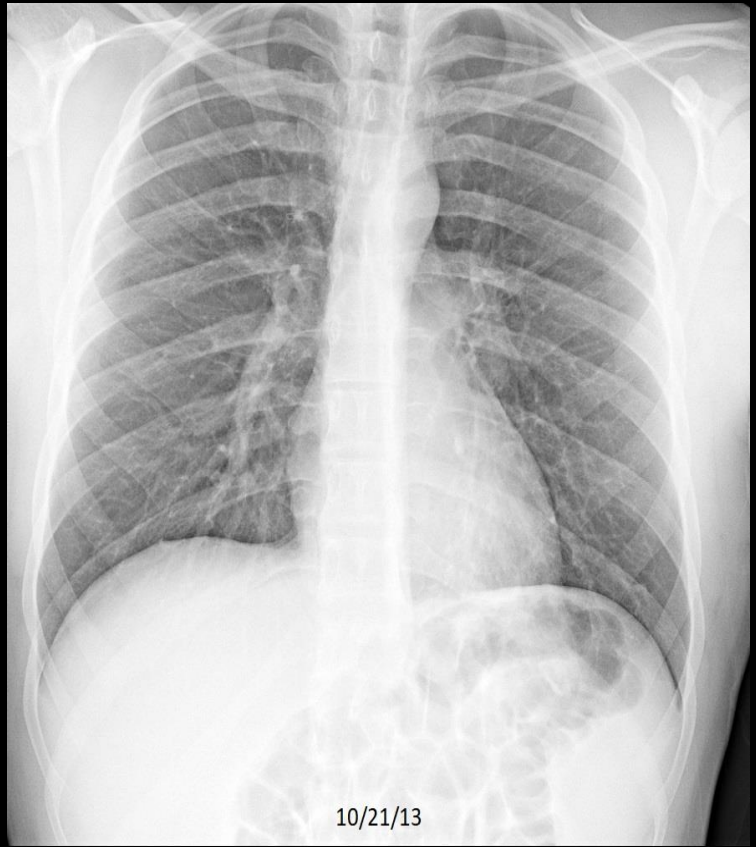


Review Quiz Case 9 of 15: Normal.

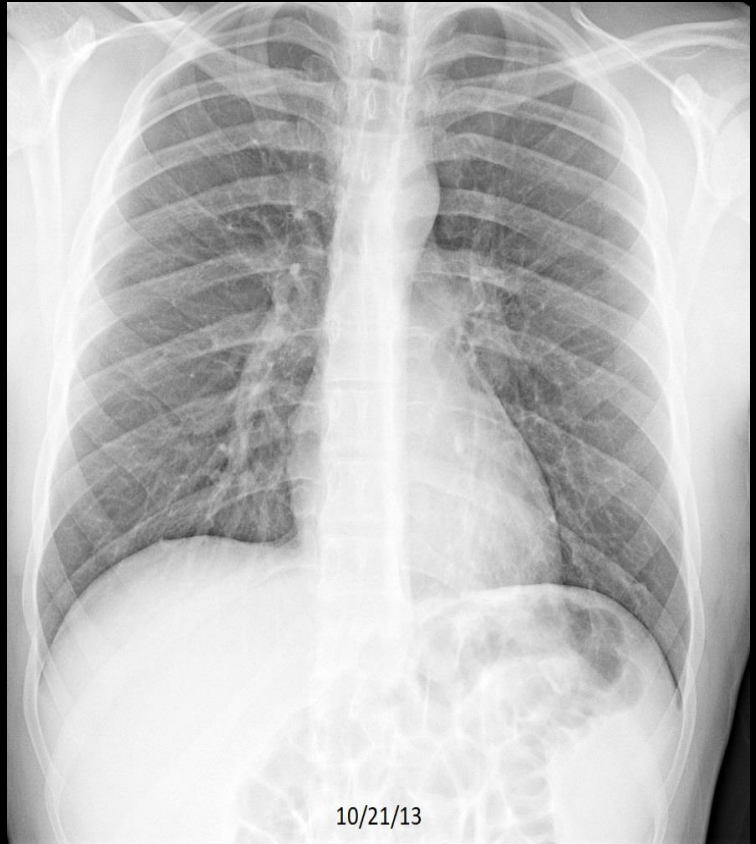
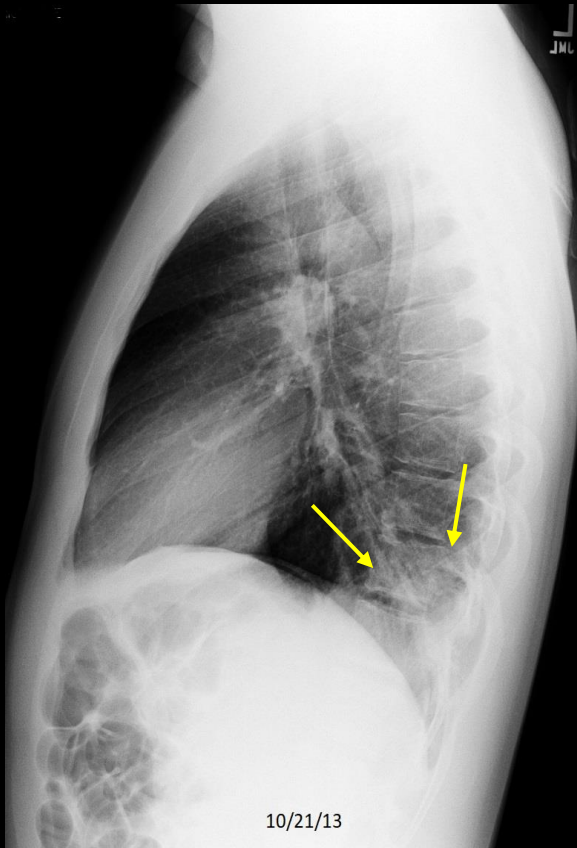


C130. 43 year old woman with chest pain.

Review Quiz Case 10 of 15: Normal, CHF, or Pneumonia?



Review Quiz Case 10 of 15: Pneumonia.



C665. 18 year old man with cough and fever. There is opacity seen only on the lateral examination.

Review Quiz Case 11 of 15: Normal, CHF, or Pneumonia?



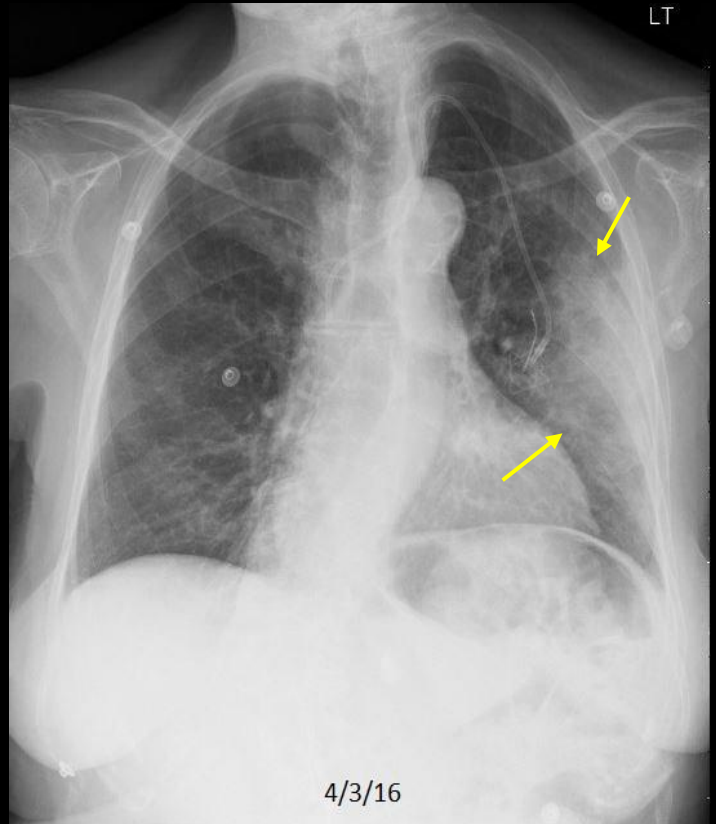
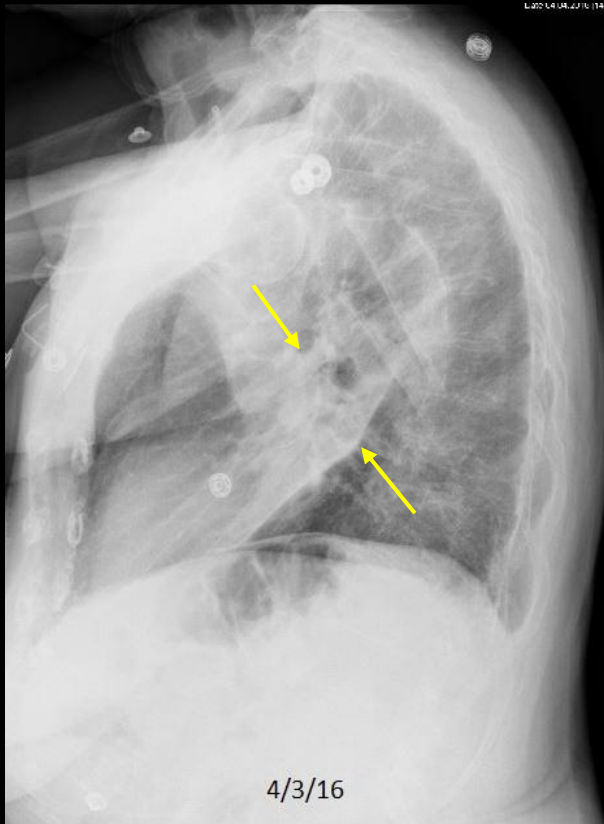
Review Quiz Case 11 of 15: CHF.



Review Quiz Case 12 of 15: Normal, CHF, or Pneumonia?



Review Quiz Case 12 of 15: Pneumonia.



Review Quiz Case 13 of 15: Normal, CHF, or Pneumonia?



Review Quiz Case 13 of 15: Normal.



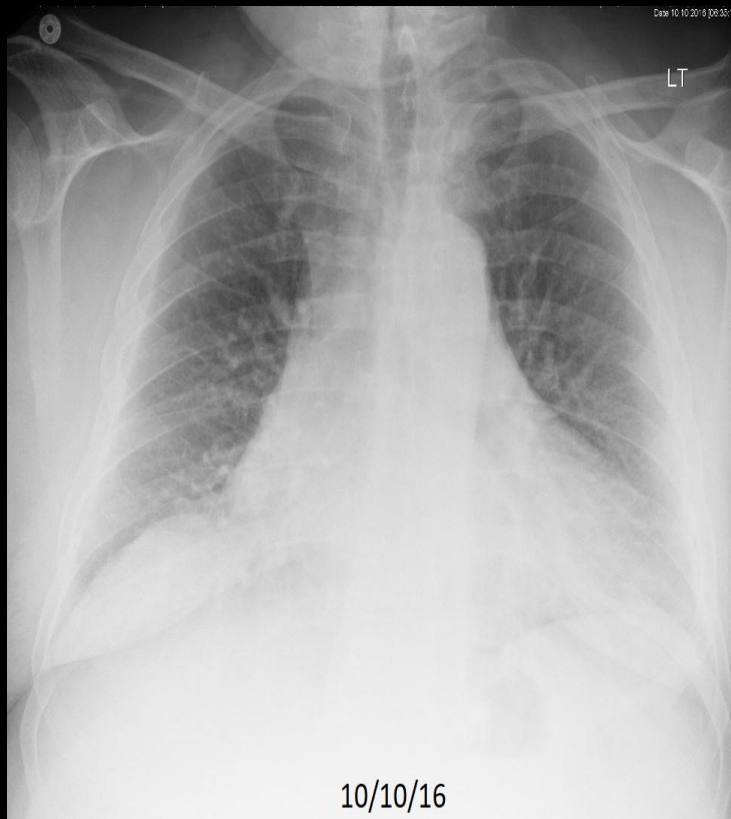
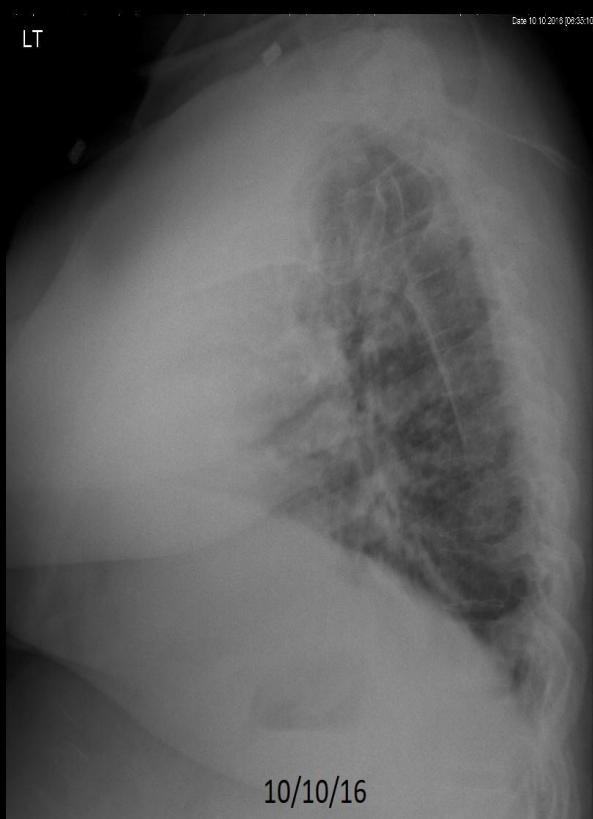
Review Quiz Case 14 of 15: Normal, CHF, or Pneumonia?



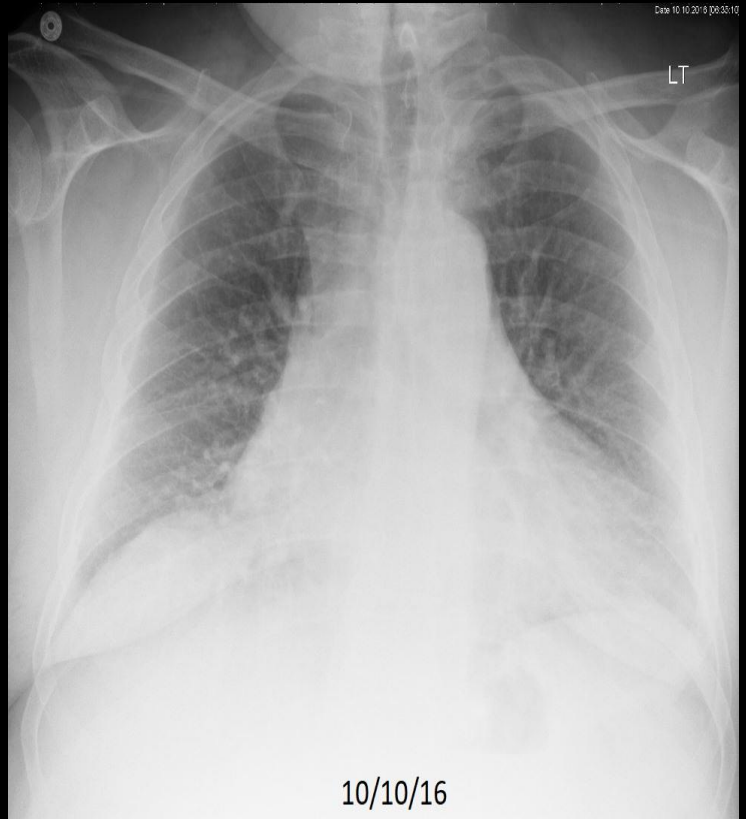
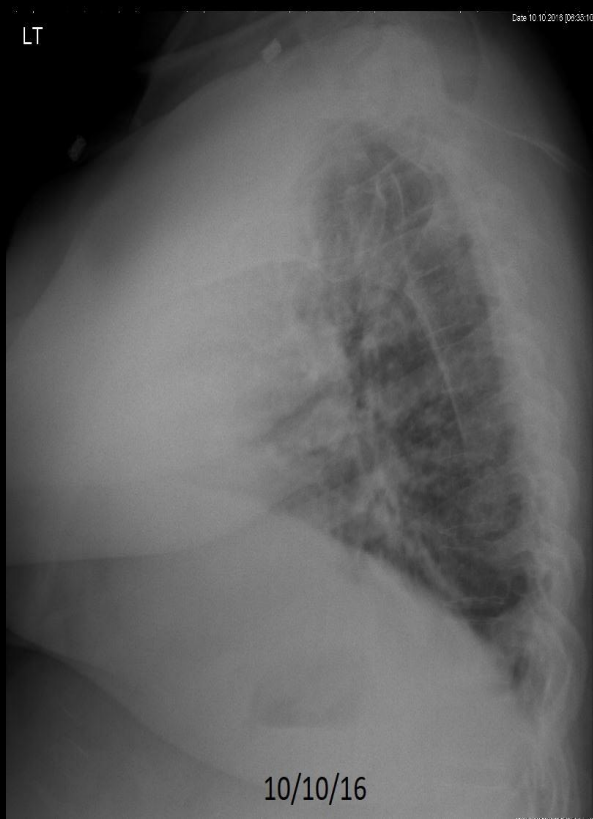
Review Quiz Case 14 of 15: CHF.



Review Quiz Case 15 of 15: Normal, CHF, or Pneumonia?



Review Quiz Case 15 of 15: CHF.



RECAPITULATION

PNEUMONIA

INDICATIONS: cough, dyspnea, fever, malaise, chest pain.

FINDINGS: consolidation, ground glass opacity, pleural effusion.

IMPRESSION: Diagnose if there is consolidation AND fever OR elevated WBC OR productive cough. If there are prior studies, judge as same, better, or worse.

COMMENT: Focal consolidation in the setting of acute chest pain without fever or elevated white count should be regarded as suspicious for pulmonary embolism with accompanying lung infarction. Focal consolidation in the setting of cough without fever or elevated white count should be regarded as suspicious for post-obstructive consolidation from endobronchial tumor. If there is doubt about whether consolidation on a chest x-ray represents pneumonia or some other process (pulmonary embolism, tumor, etc.) CT is usually the next step in evaluation.

UpToDate Points

"The presence of an infiltrate on plain chest radiograph is considered the gold standard for diagnosing pneumonia when clinical and microbiologic features are supportive."

"A demonstrable infiltrate by chest radiograph or other imaging technique is required for the diagnosis of pneumonia."

"Radiologists cannot reliably differentiate bacterial from nonbacterial pneumonia [nor the various subtypes of either] on the basis of the radiographic appearance."

"If the clinical evaluation does not support pneumonia in a patient with an abnormal chest radiograph, other causes for the radiographic abnormalities must be considered, such as malignancy, hemorrhage, pulmonary edema, pulmonary embolism, and inflammation secondary to noninfectious causes."

"Volume depletion may produce an initially negative radiograph, which 'blossoms' into infiltrates following rehydration."

Bartlett JG. Diagnostic approach to community-acquired pneumonia in adults, UpToDate, accessed 3/26/20 (last updated 12/2/19).

Chest Radiography
End of Lecture 3
Pneumonia

Go to Lecture 4
Emphysema