

Chest Radiography

Lecture 7

Focal Chest Density

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FOCAL CHEST DENSITY

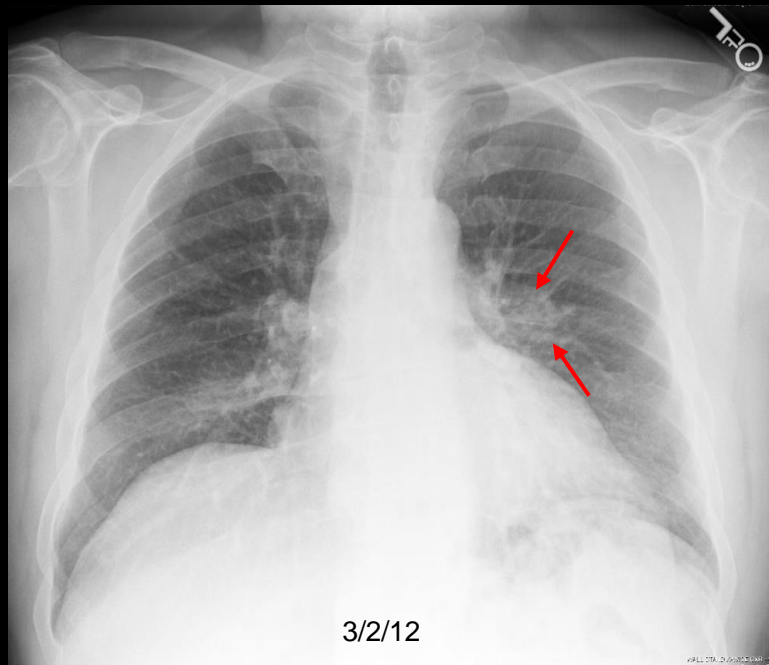
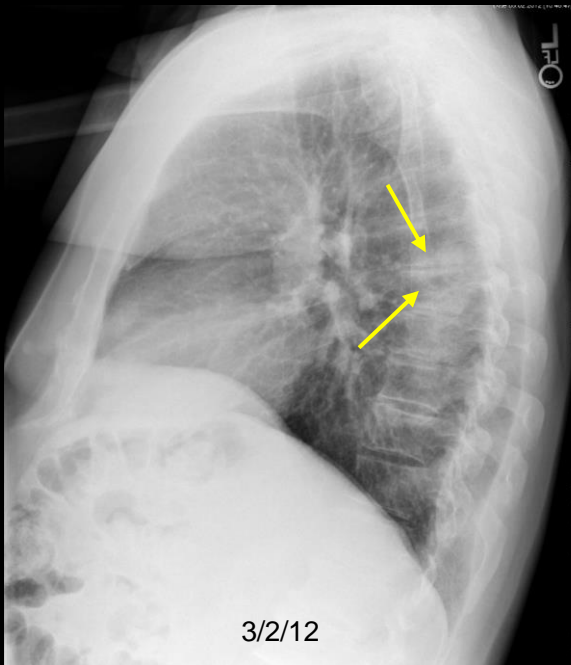
INDICATIONS: cough, dyspnea, malaise, chest pain.

FINDINGS: Focal chest density. It may be difficult or impossible to differentiate masses from consolidation (or a combination of mass and consolidation), or lung, mediastinal, or chest wall masses. In addition, in cases of obvious lung consolidation without clinical features of pneumonia, pulmonary infarction should be considered. Although textbooks often differentiate these entities (and while this may be a valuable academic exercise), if the finding is new and the patient does not have a known cause for the abnormality, virtually all these cases need evaluation with CT. Indeed, the category might well be called "Chest abnormality that needs further evaluation with a CT study".

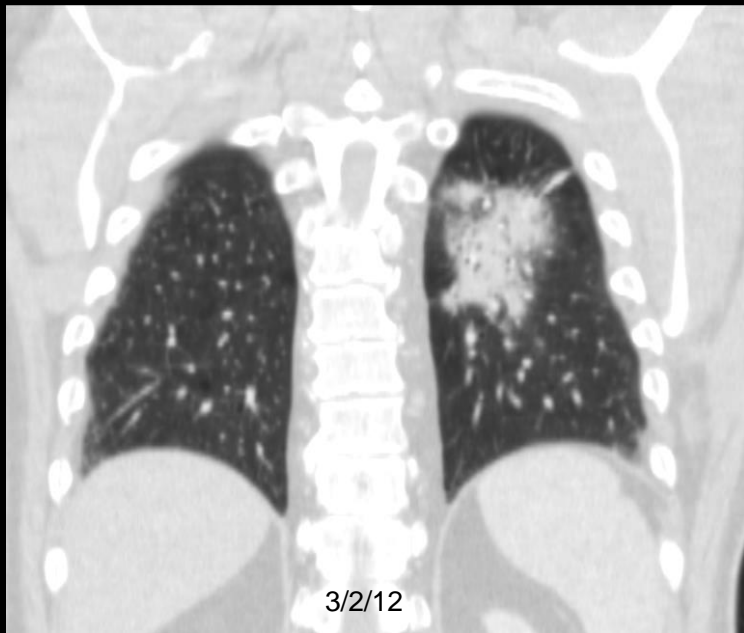
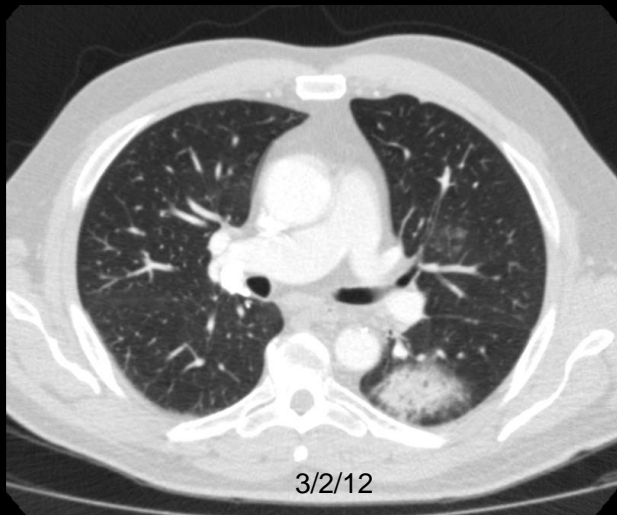
IMPRESSION: Describe density. Usually, recommend CT study for further evaluation.



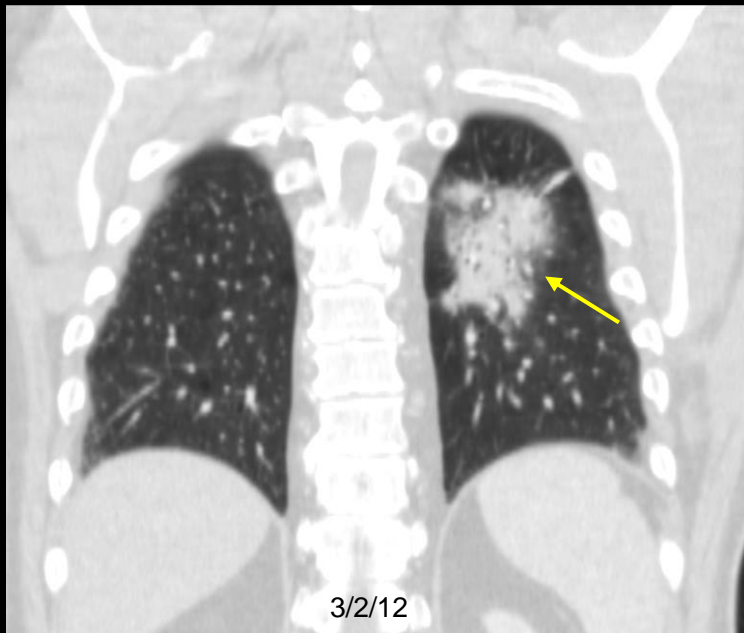
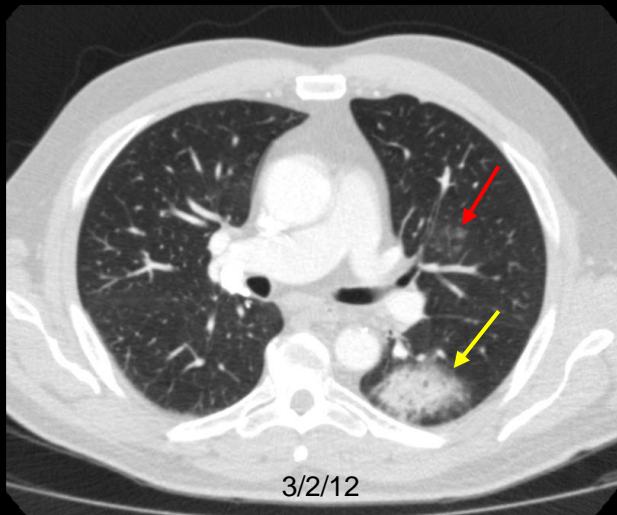
C990. 53 y/o man, smoker, with acute cough. There is focal density over the mid thoracic spine on the lateral which overlies the left hilum on the PA study.



C990. 53 y/o man, smoker, with acute cough. **There is focal density over the mid thoracic spine** on the lateral **which projects to the left of the left hilum** on the PA study. Note that there is a "hilum overlay sign" meaning that the hilum is well seen despite the presence of density, which implies that the lesion does not abut the hilum (which you know anyway because of the posterior location on the frontal exam). The lesion was of concern for malignancy given the clinical history, and a CT was recommended.



C990. 53 y/o man, smoker, with acute cough. CT study done the same day as the CR shows consolidation in the left lower lobe.



C990. 53 y/o man, smoker, with acute cough. CT study done the same day as the CR shows **consolidation in the left lower lobe (posterior to the left oblique fissure))**. An **additional focus of ground glass opacity** is present in the (more anterior) left upper lobe as well.



C990. 53 y/o man, smoker, with acute cough. Follow-up lateral exam shows complete clearing of focal density.



C990. 53 y/o man, smoker, with acute cough. Follow-up PA exam shows complete clearing of focal density.

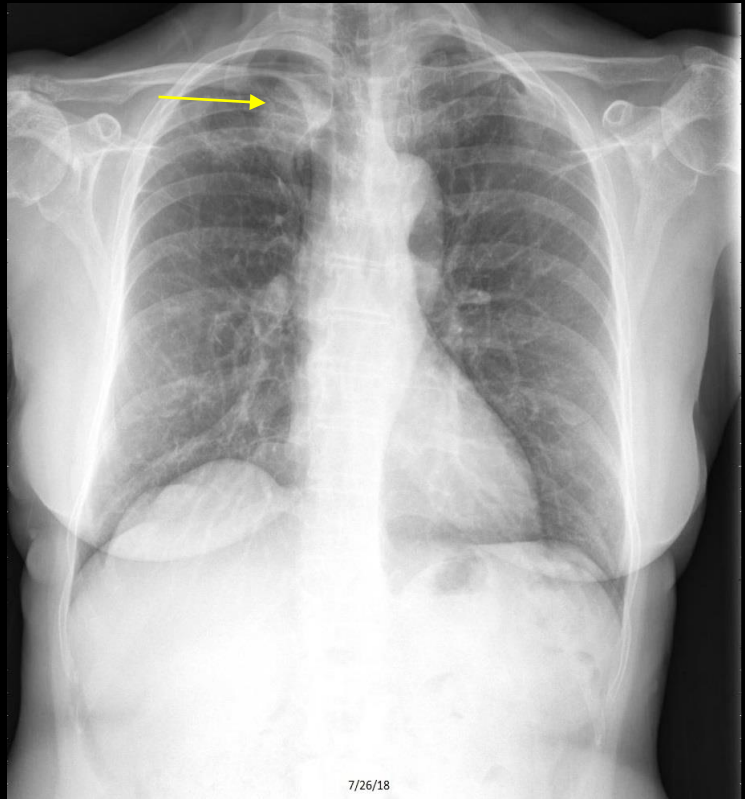
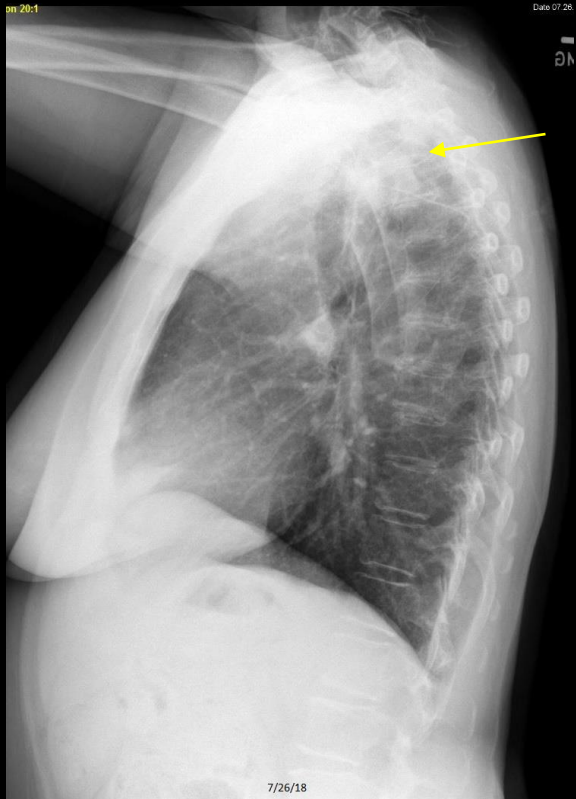
FOCAL CHEST DENSITY EXAMPLES

Example 1 of 10



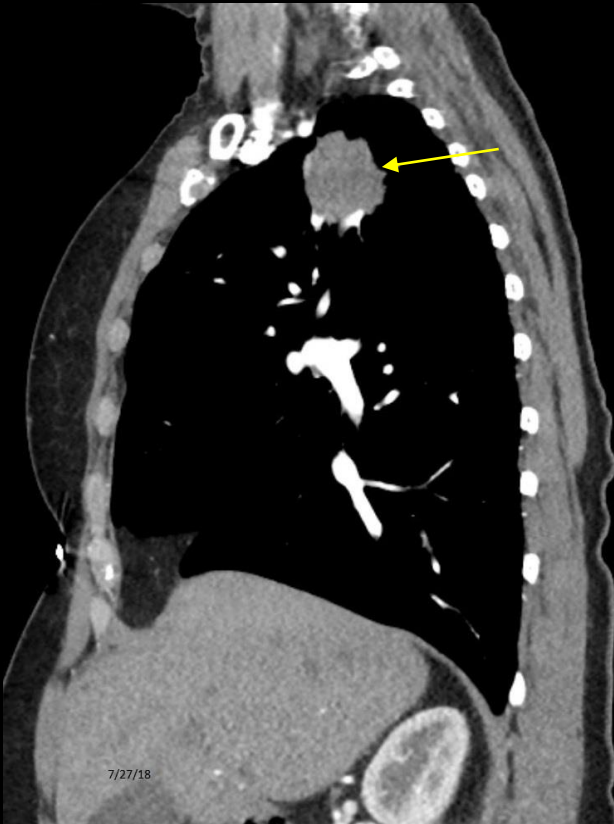
C110. 61 year old woman with shortness of breath. Focal density of the right upper lung.

Example 1 of 10



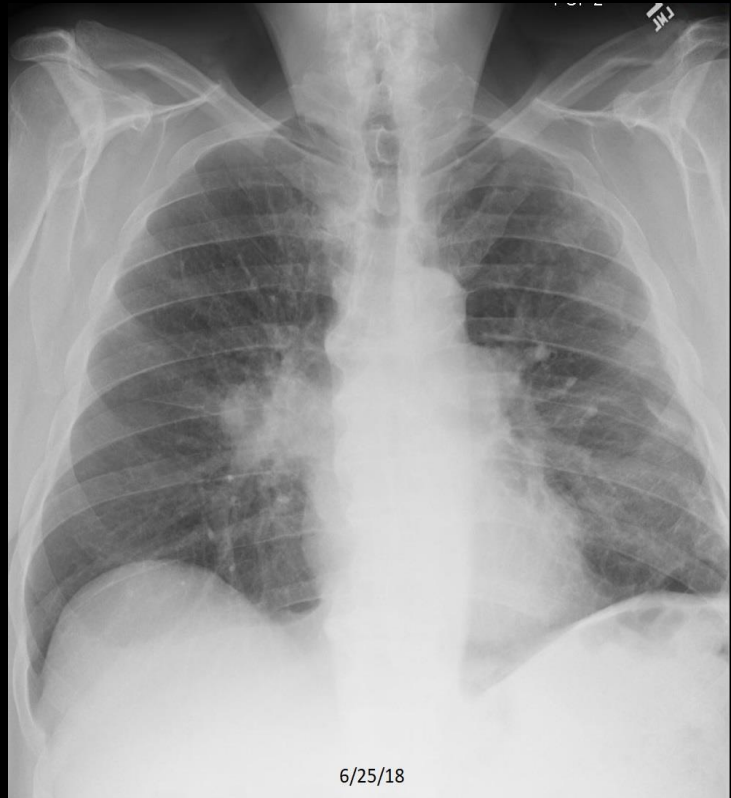
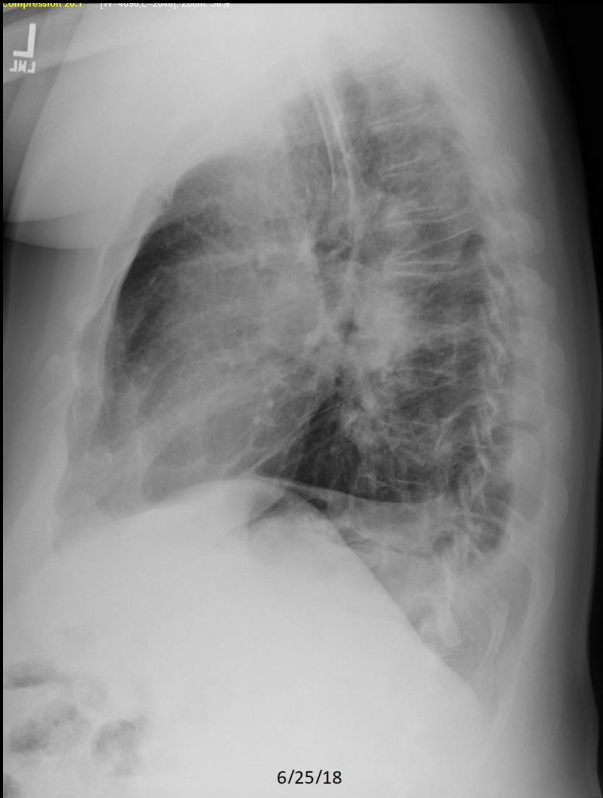
C110. 61 year old woman with shortness of breath. **Focal density of the right upper lung.** The lesion was felt most likely to represent a mass and CT was recommended..

Example 1 of 10



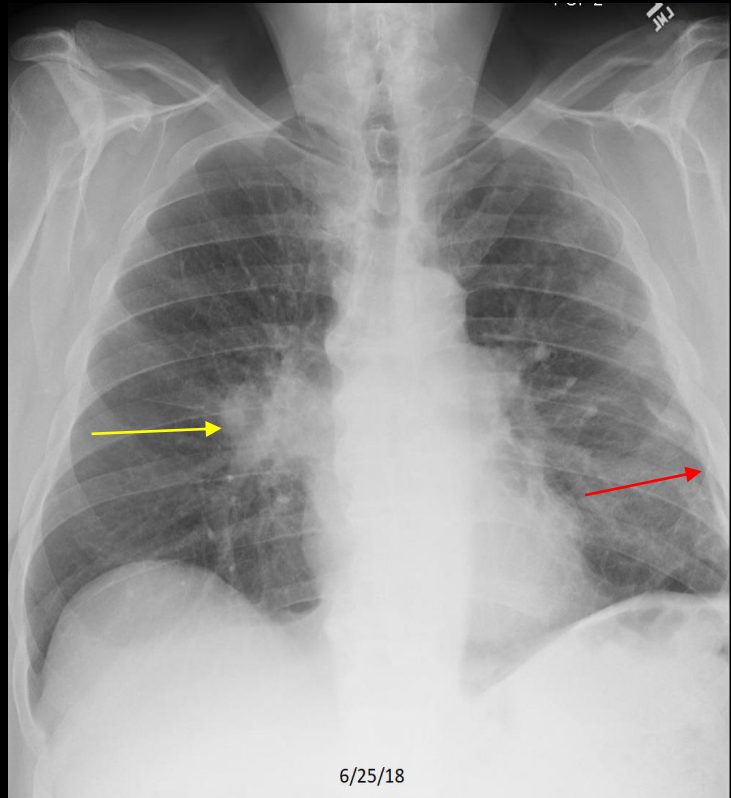
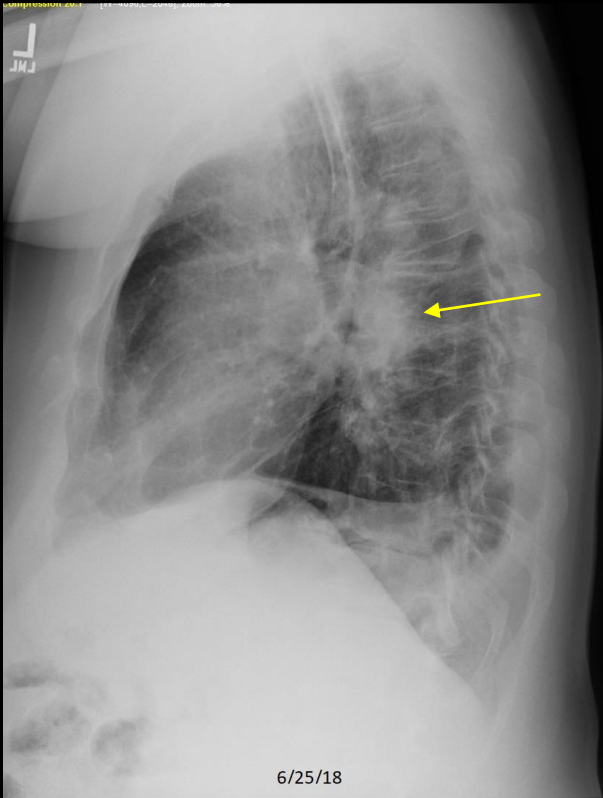
C110. 61 year old woman with shortness of breath. Focal density of the right upper lung on CR. **Chest CT confirms a mass.** Lung cancer.

Example 2 of 10



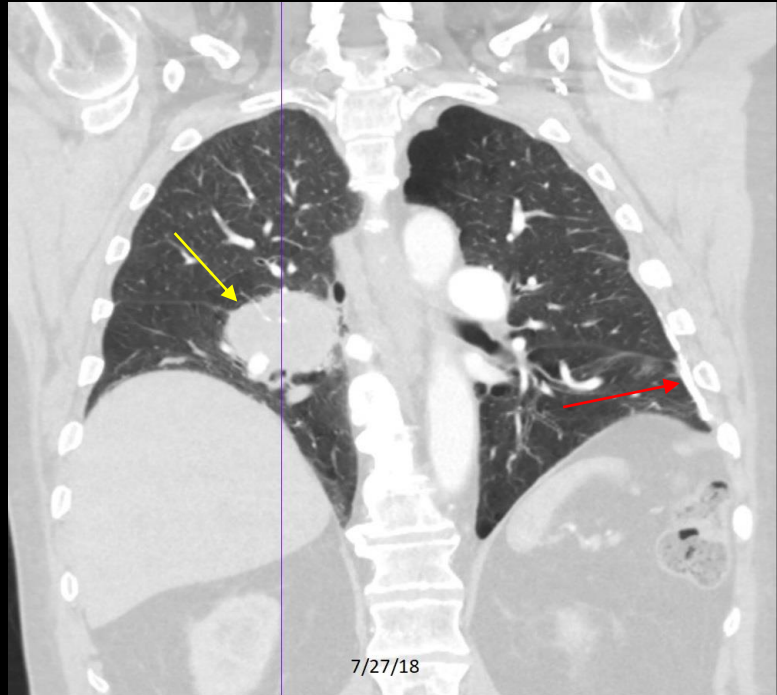
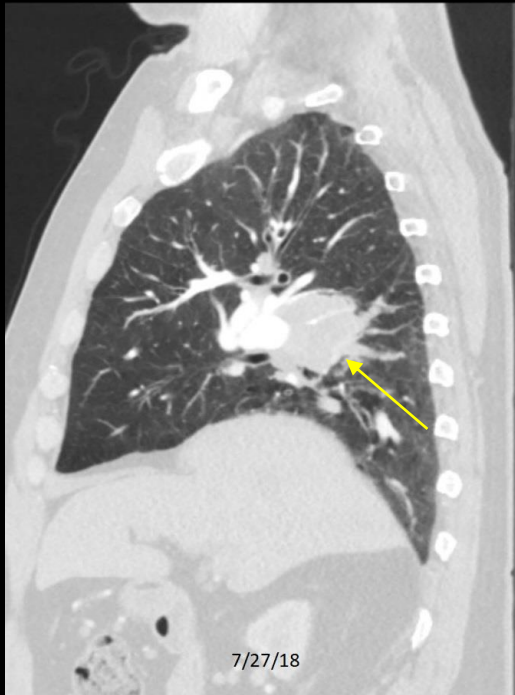
C118. 67 year old man with dyspnea and cough. Right lung density. Calcified pleural plaque.

Example 2 of 10



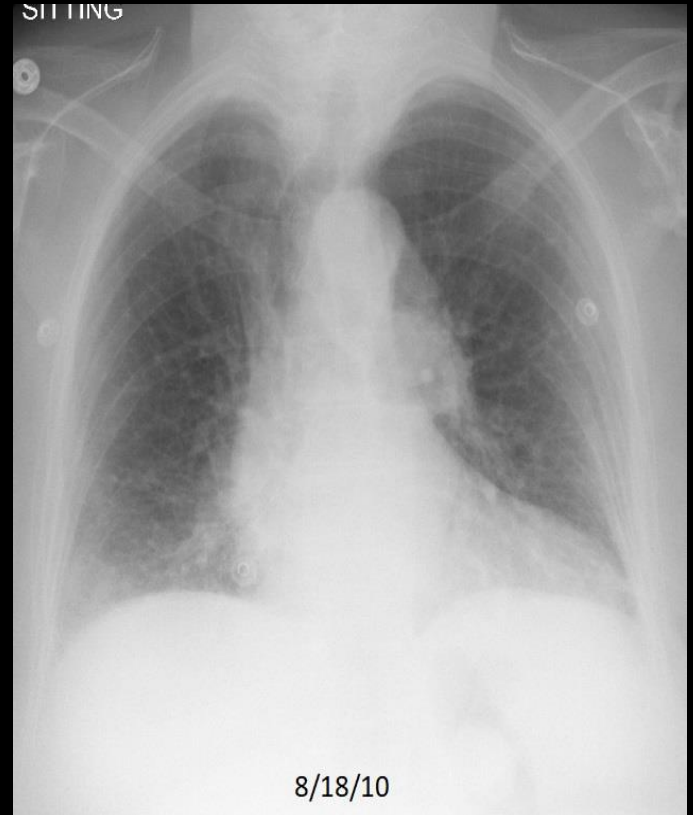
C118. 67 year old man with dyspnea and cough. **Right lung density.** **Calcified pleural plaque.** Right lung mass was suspected (along with calcified pleural plaque and scarring) and a CT was recommended.

Example 2 of 10



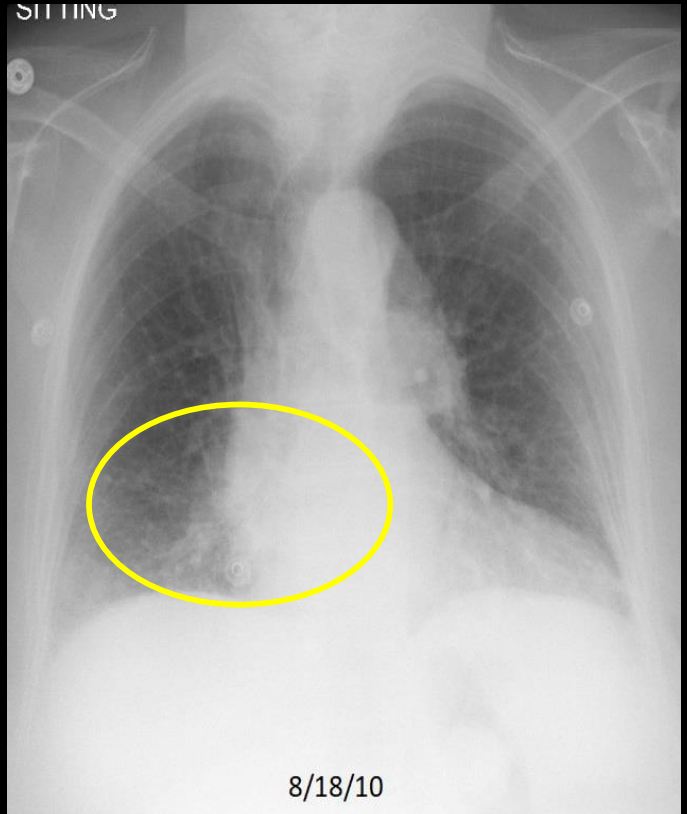
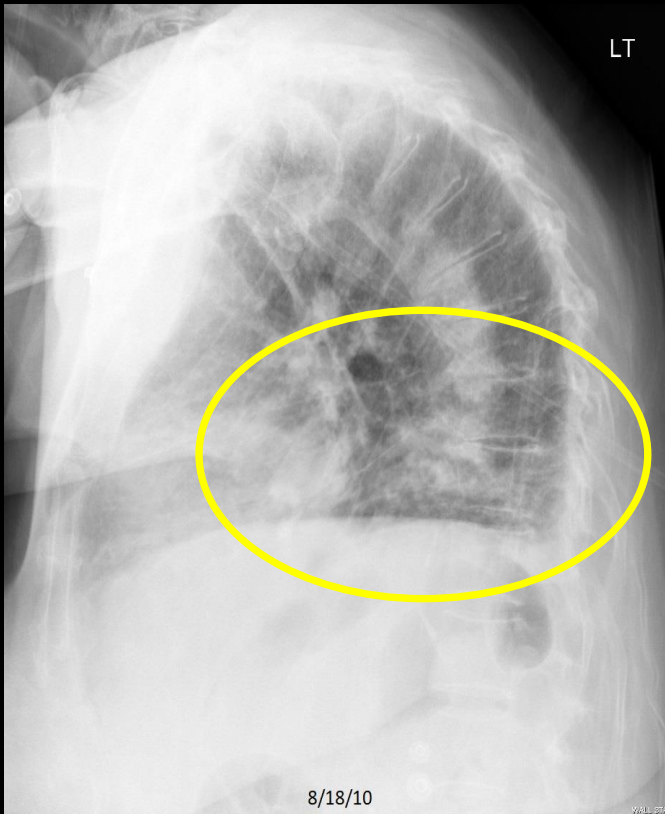
C118. 67 year old man with dyspnea and cough. CT shows a mass. There is also calcified pleural plaque. Lung cancer.

Example 3 of 10



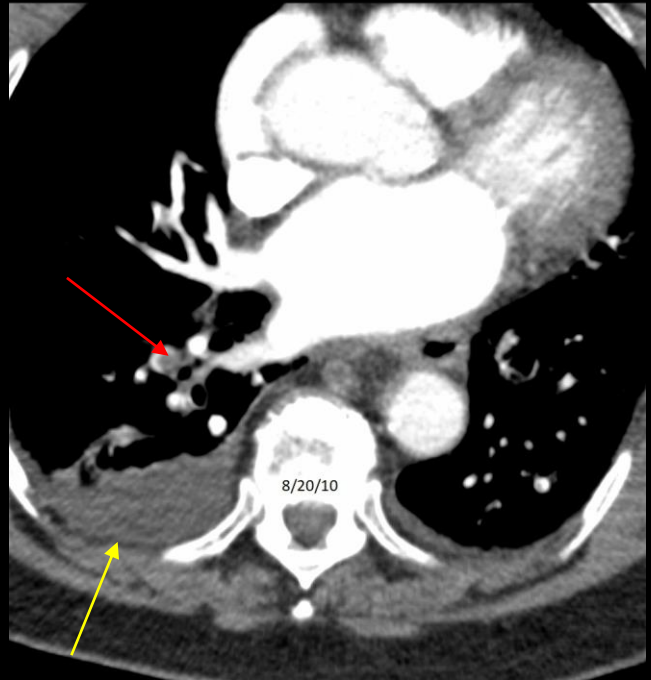
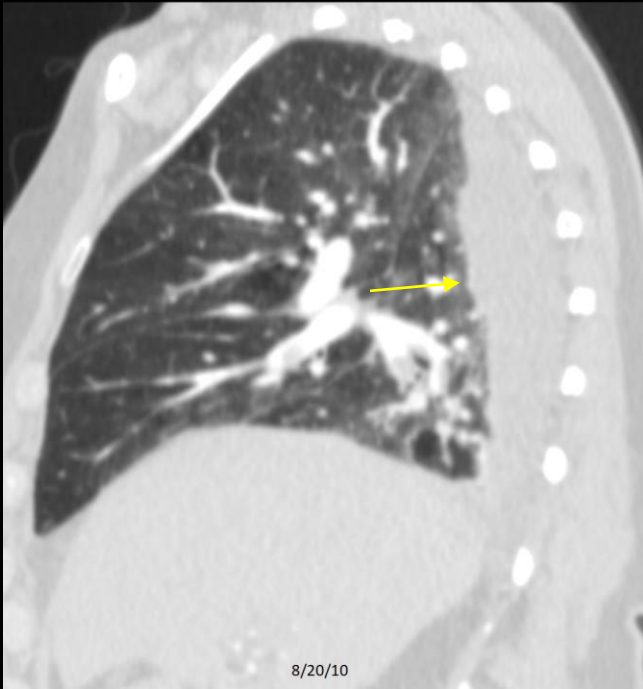
C121. 84 year old with acute pleuritic chest pain. Right lung density.

Example 3 of 10



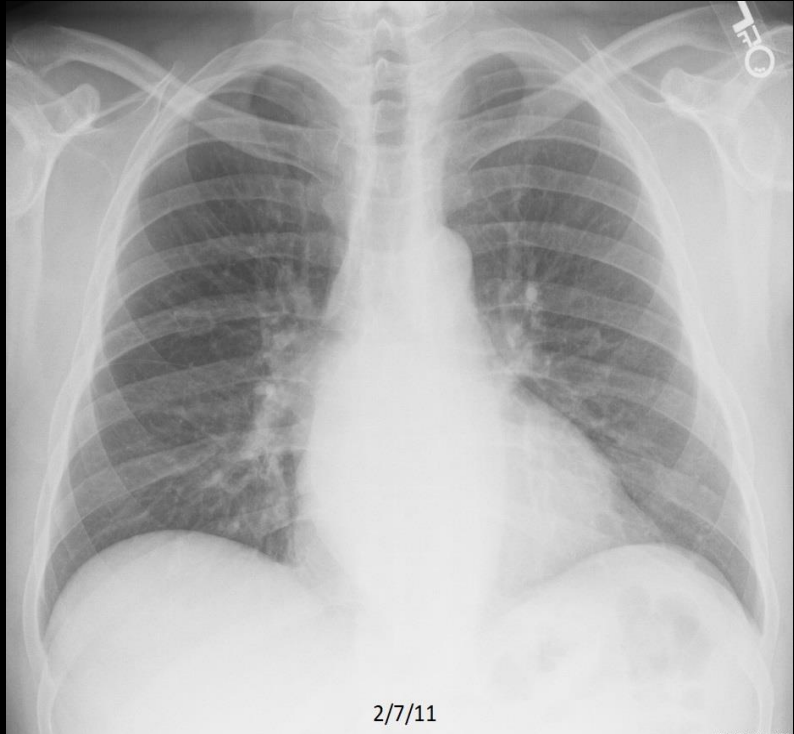
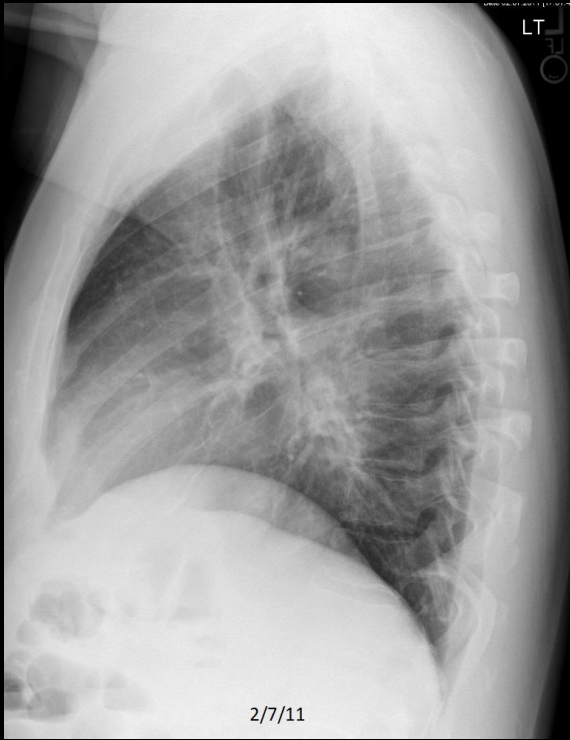
C121. 84 year old with acute pleuritic chest pain. Right lung density. Ill-defined density in the right lung base with likely blunted costophrenic angle.

Example 3 of 10



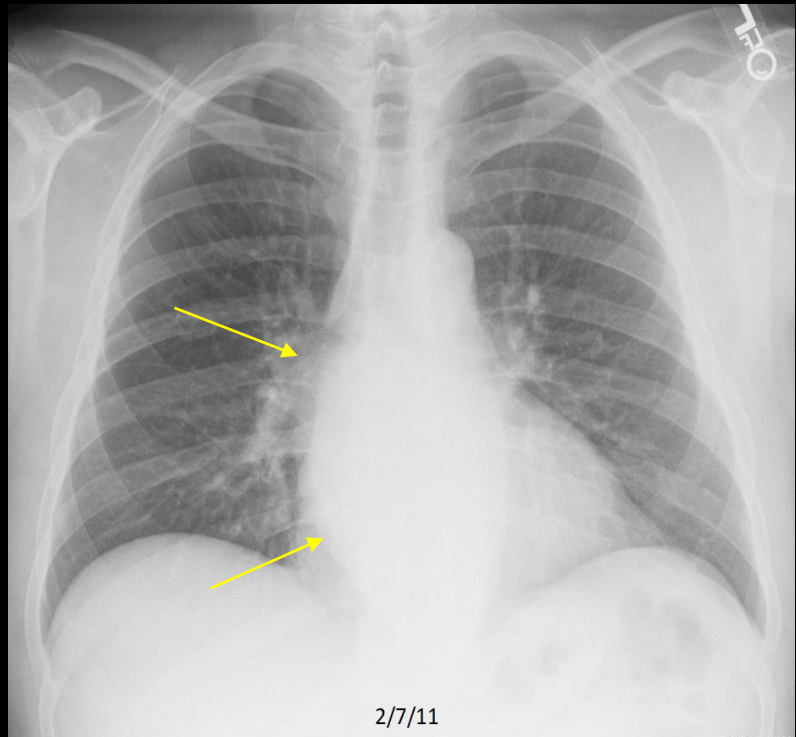
C121. 84 year old with acute pleuritic chest pain. Right lung density. CT shows pleural effusion and right lower lobe pulmonary embolism. The patient's D-dimer was negative.

Example 4 of 10



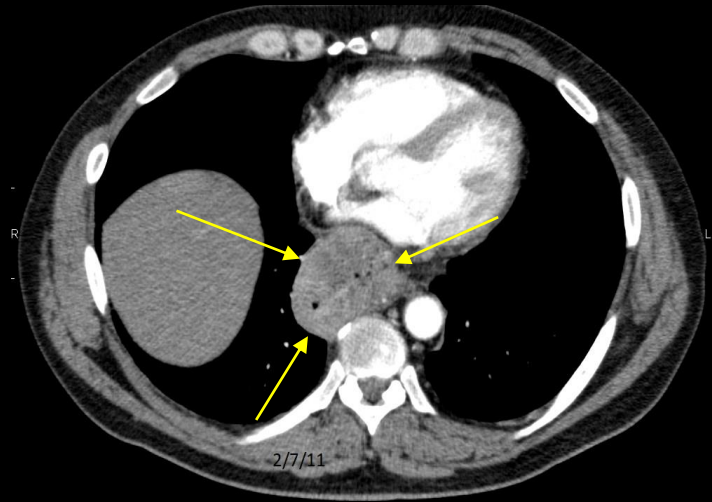
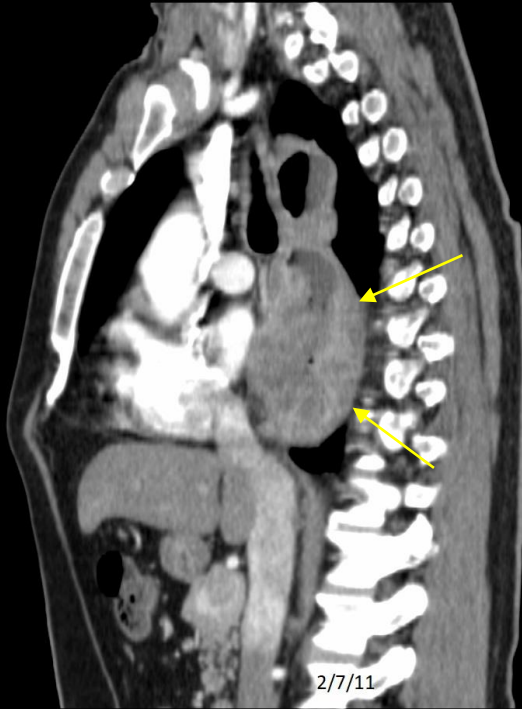
C124. 54 year old with chest pain. Mediastinal density.

Example 4 of 10



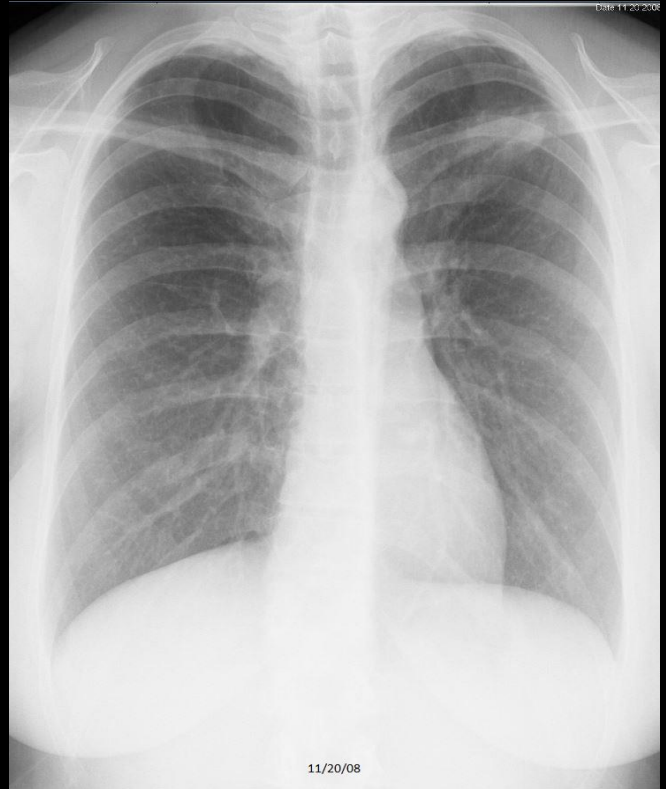
C124. 54 year old with chest pain. **Mediastinal density.**

Example 4 of 10



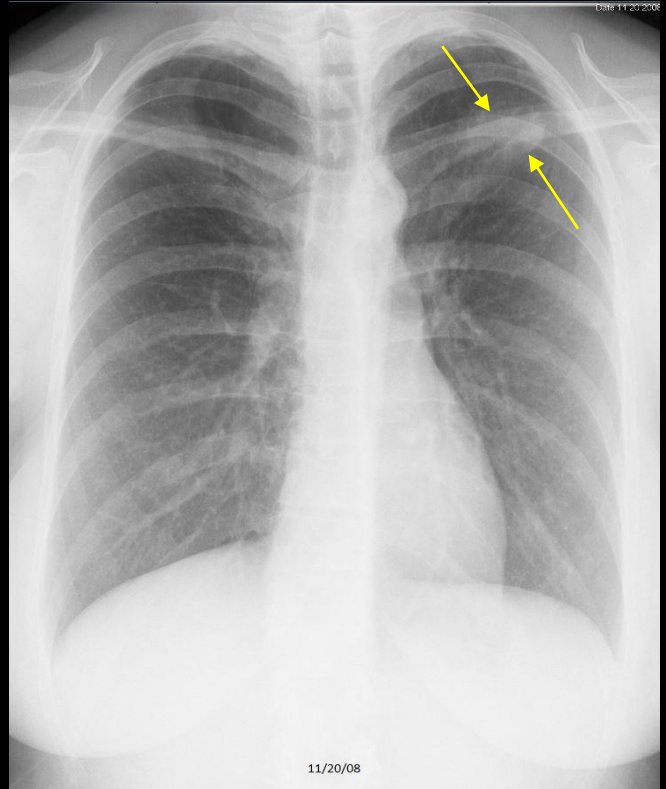
C124. 54 year old with chest pain. Mediastinal density. **Esophageal mass on chest CT.** Esophageal carcinoma.

Example 5 of 10



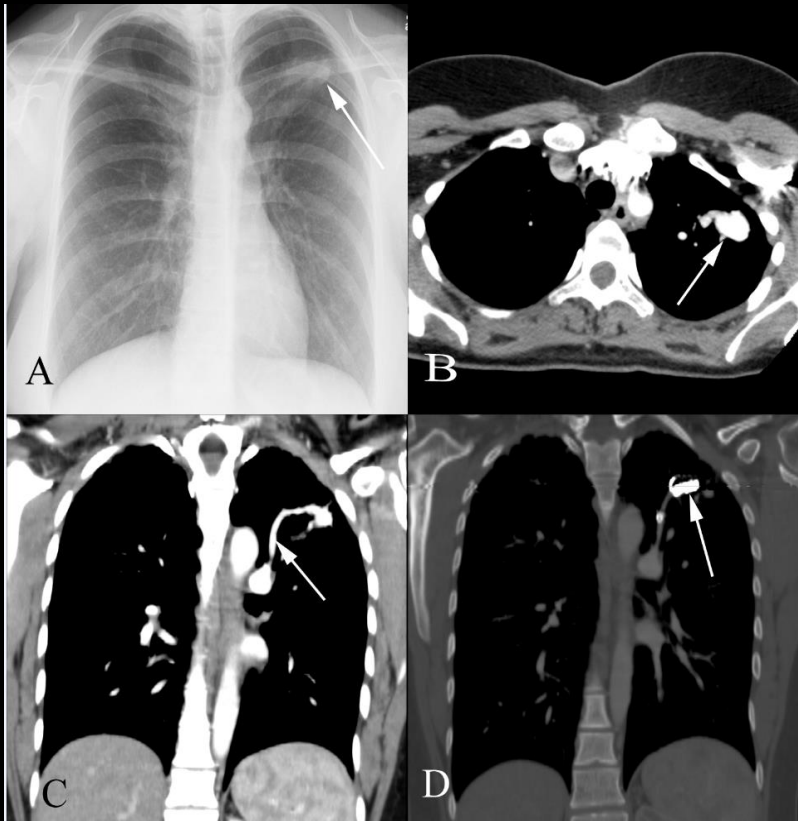
C129. 34 year old woman with chest pain. Left lung density.

Example 5 of 10



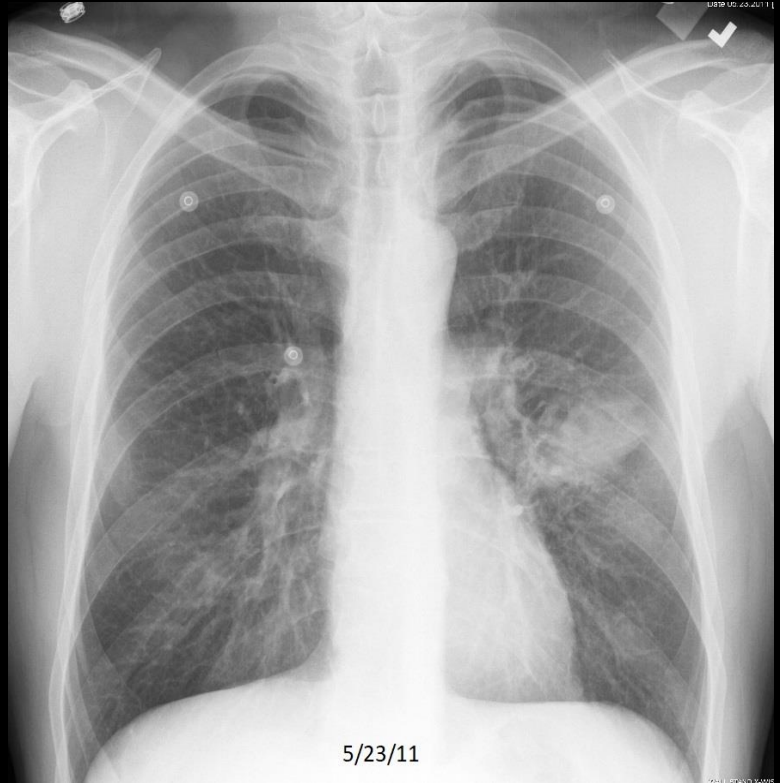
C129. 34 year old woman with chest pain. **Left lung density.**

Example 6 of 10



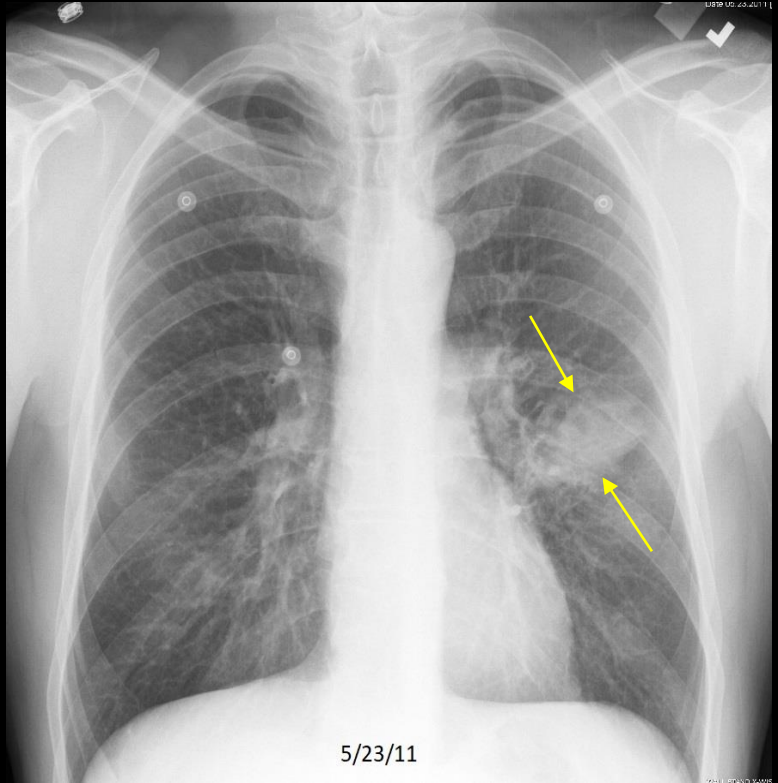
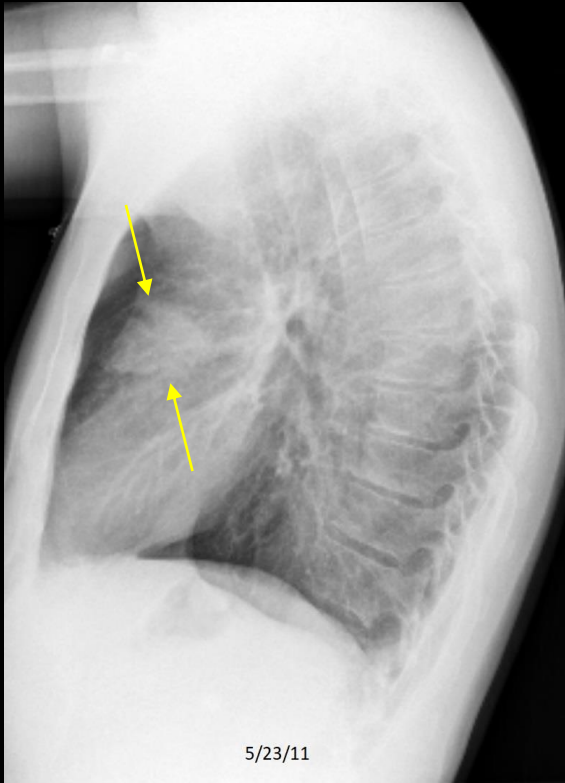
C129. 34 year old woman with chest pain. Left lung density. Patient with hereditary hemorrhagic telangiectasia (HHT) with a left upper lobe AVM, with a CT study showing the lesion before and after embolization (the density in D is a metallic coil).

Example 7 of 10



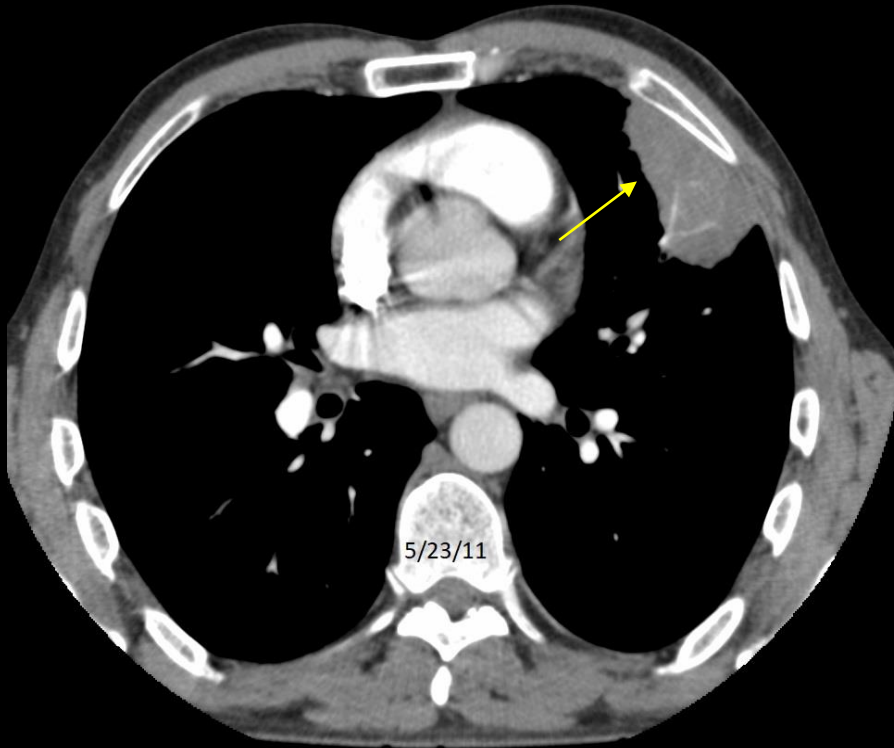
C138. 42 year old with left chest pain. Left lung density.

Example 7 of 10



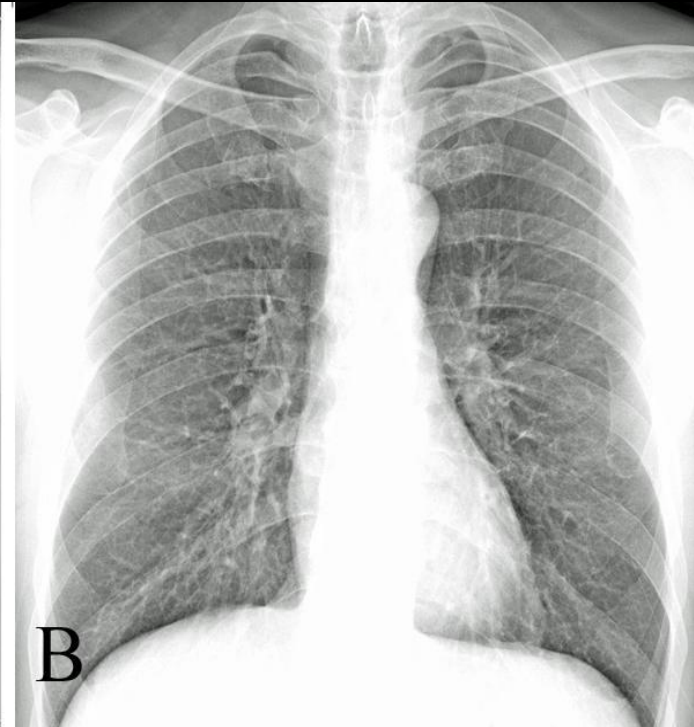
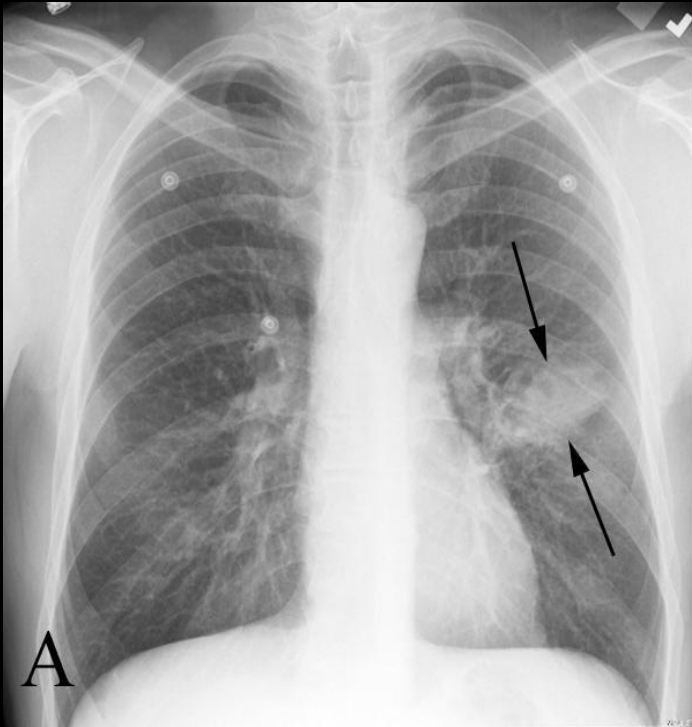
C138. 42 year old with left chest pain. Left lung density.

Example 7 of 10



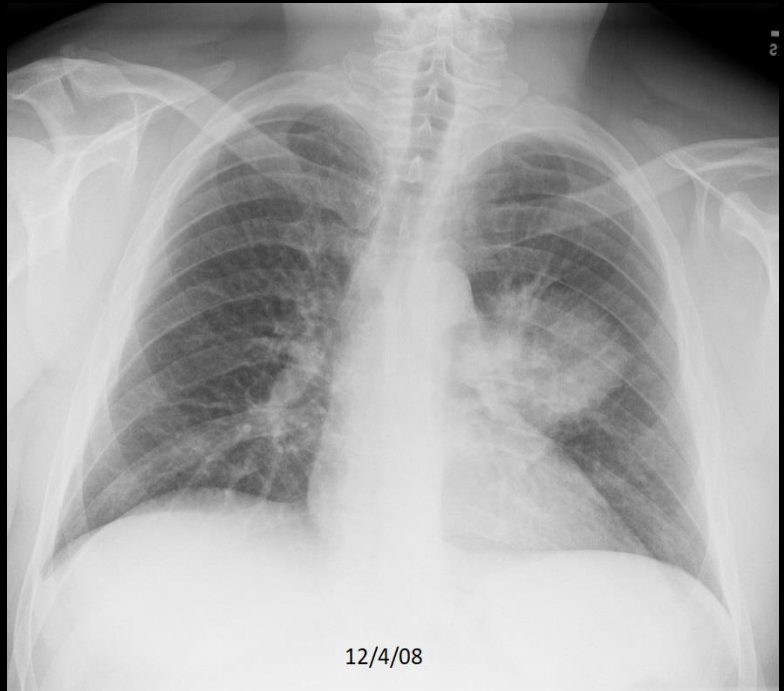
C138. 42 year old with left chest pain. Left lung density. CT confirms focal density. The lesion was felt most likely to represent consolidation from pneumonia and the patient was treated with antibiotics.

Example 7 of 10



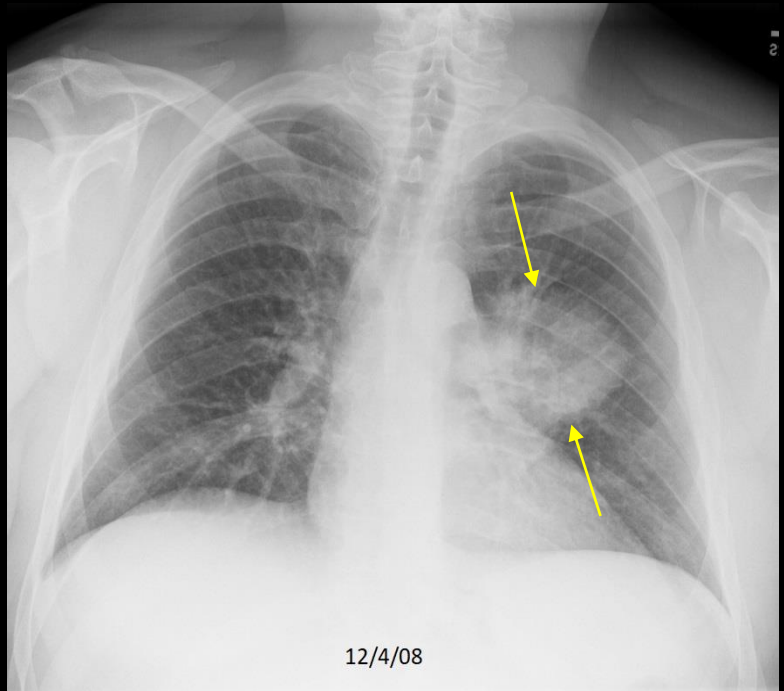
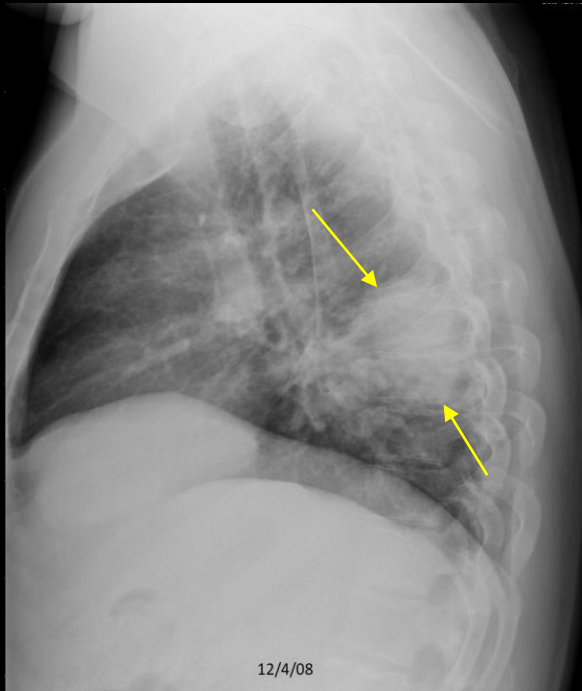
C138. 42 year old with left chest pain. Left lung density cleared following antibiotic treatment.

Example 8 of 10



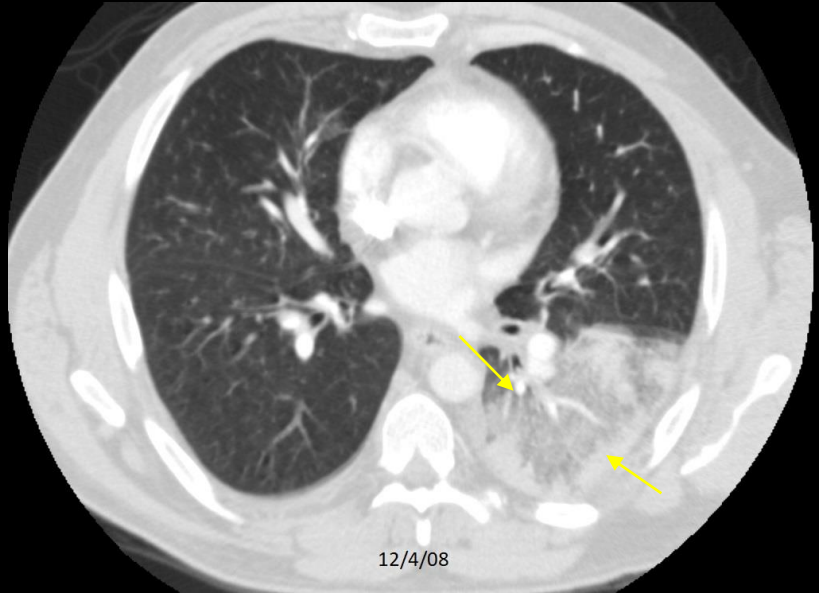
C139. 47 year old man with chest pain and productive cough. Left lung density.

Example 8 of 10



C139. 47 year old man with chest pain and productive cough. **Left lung density.**

Example 8 of 10



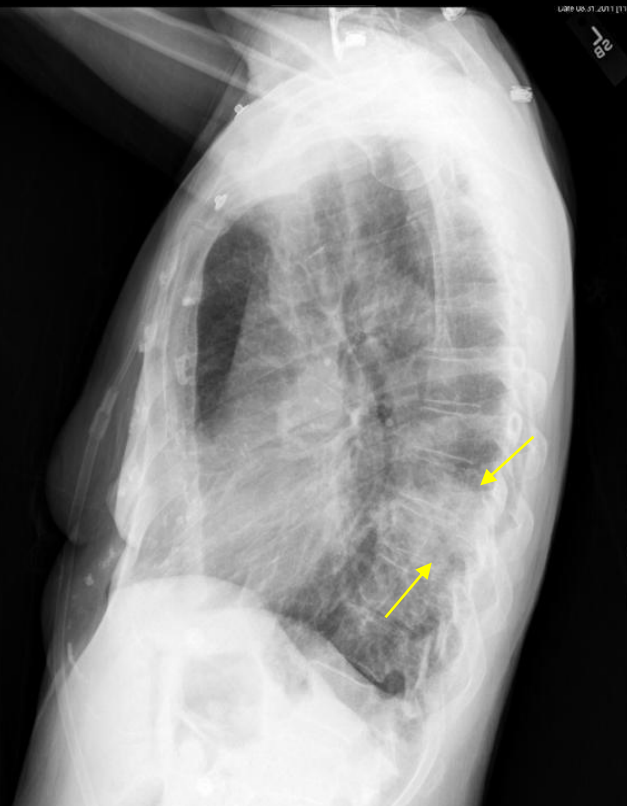
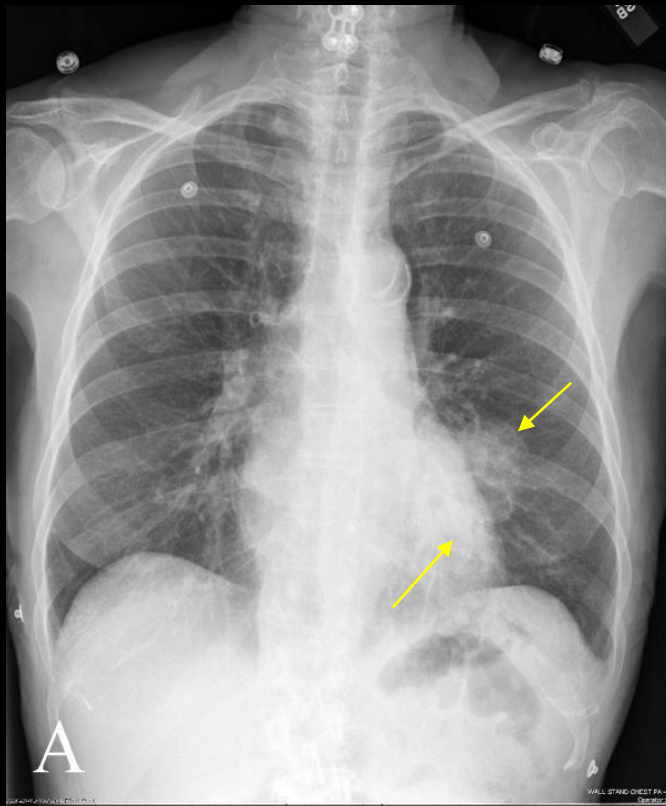
C139. 47 year old man with chest pain and productive cough. Left lung density. CT shows left lung consolidation and ground glass opacity. The abnormality cleared with antibiotic treatment.

Example 9 of 10



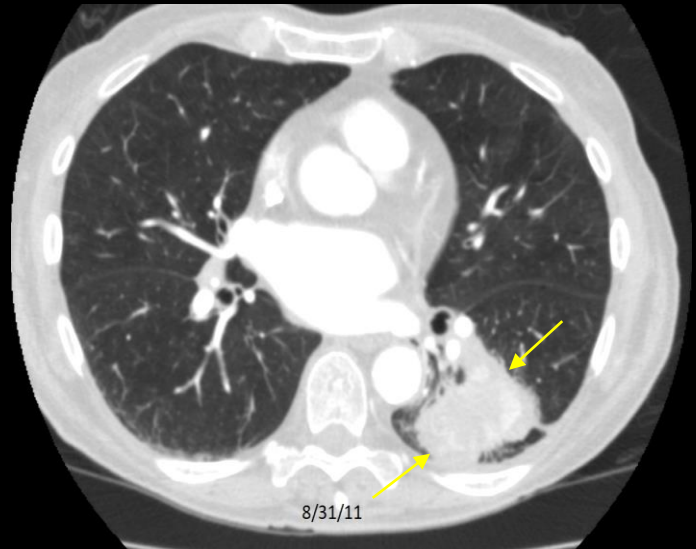
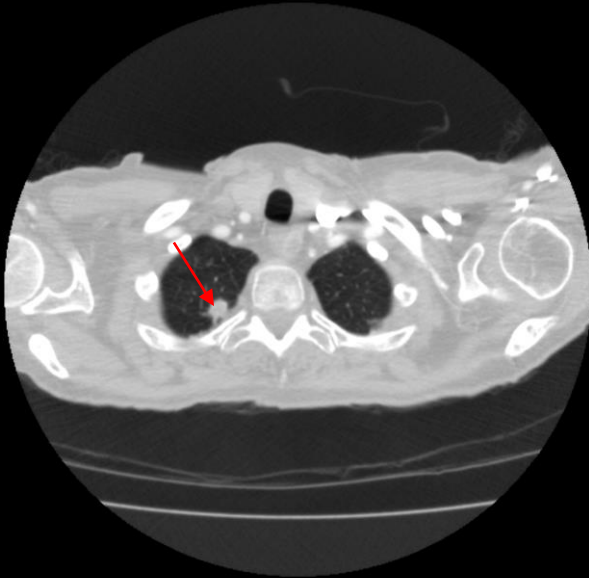
C141. 73 year old woman with chest pain. Left lung density. Pectus deformity, cervical fusion plate, and calcified aortic arch.

Example 9 of 10



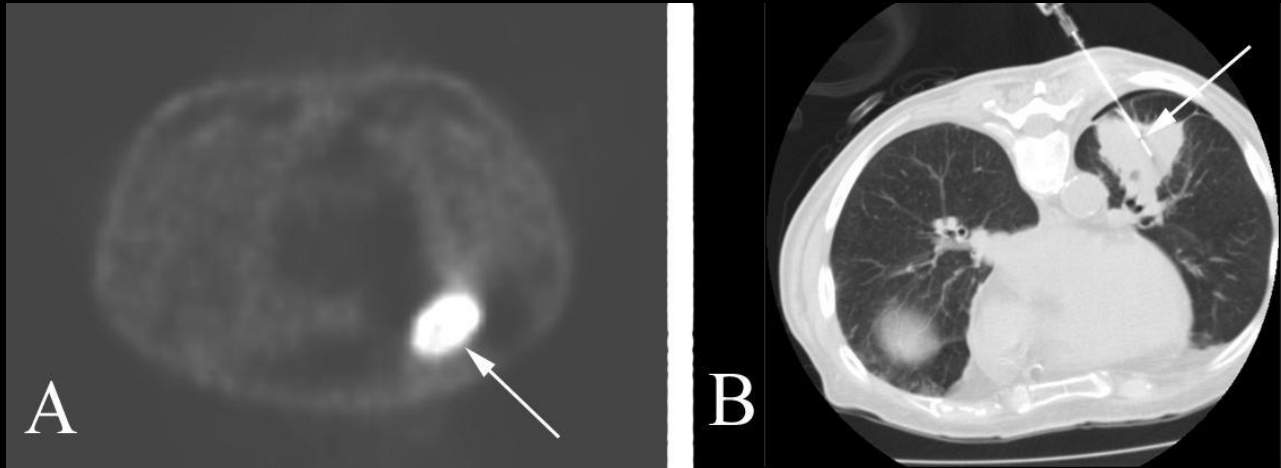
C141. 73 year old woman with chest pain. **Left lung density.** Pectus deformity, cervical fusion plate, and calcified aortic arch.

Example 10 of 10



C141. 73 year old woman with chest pain. Left lung density. CT shows the left lung mass and also a right apical lung nodule.

Example 10 of 10



C141. 73 year old woman with chest pain. Left lung density. PET shows hypermetabolism of the left lung mass. The right lung apical nodule was also hypermetabolic. Biopsy showed adenocarcinoma.

QUIZ

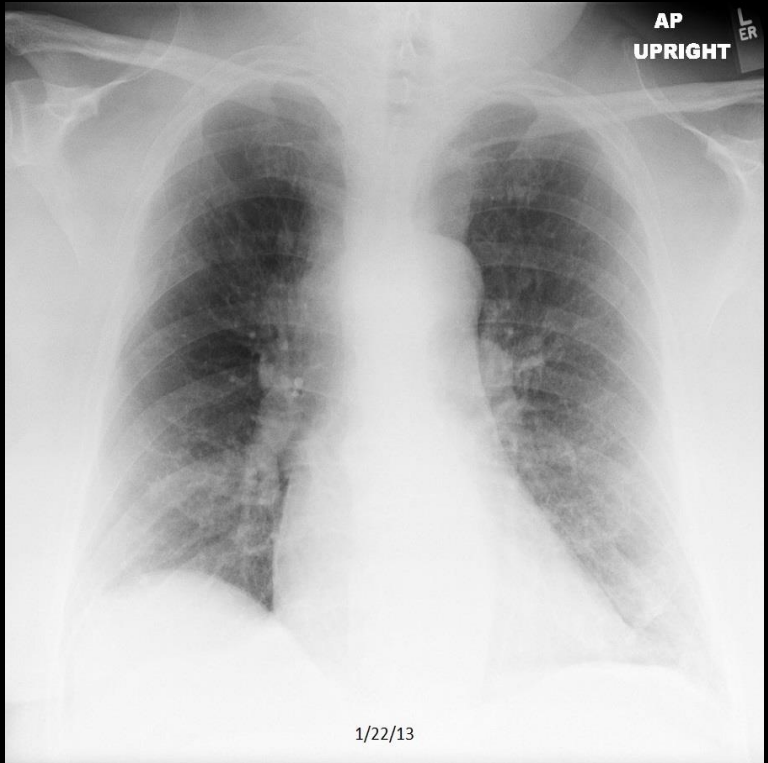
NORMAL VERSUS FOCAL LUNG DENSITY

Select which CXR shows Focal Lung Density
(a or b)

for the following 10 pairs of cases

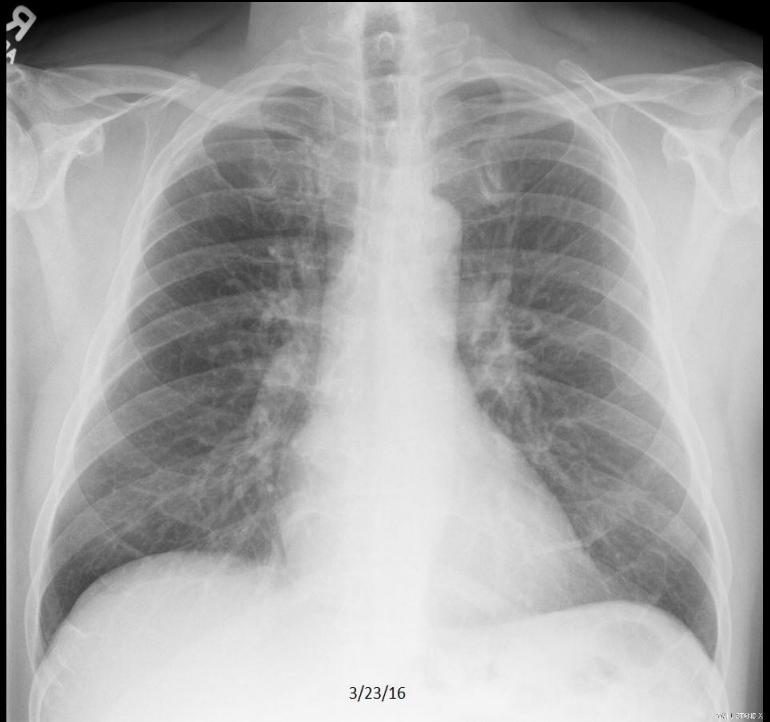
(two slides will be shown so that both the frontal and
lateral exam can be displayed for each case)

Quiz Case 1 of 10 - A



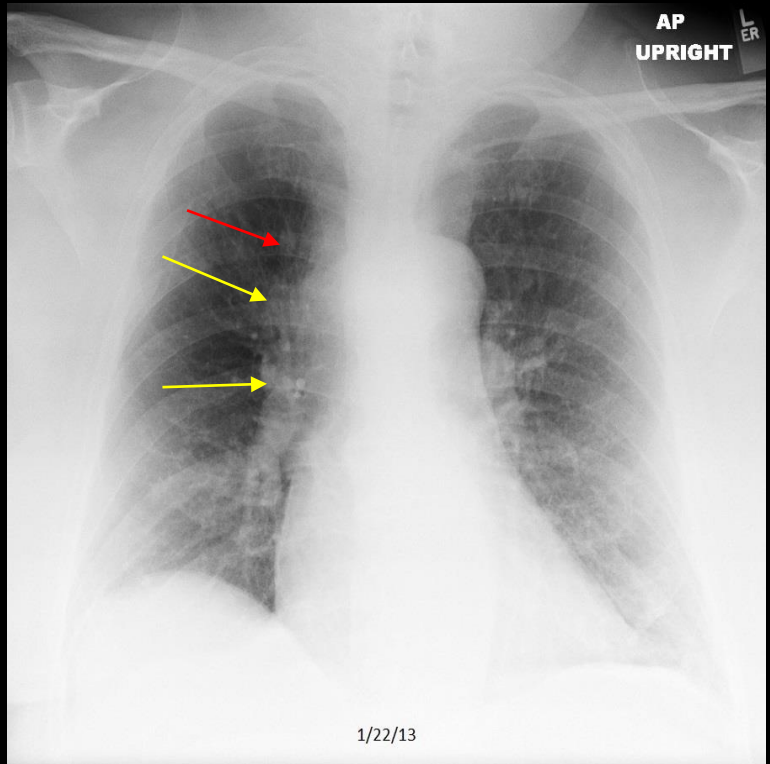
C142. 68 year old with chest pain.

Quiz Case 1 of 10 - B



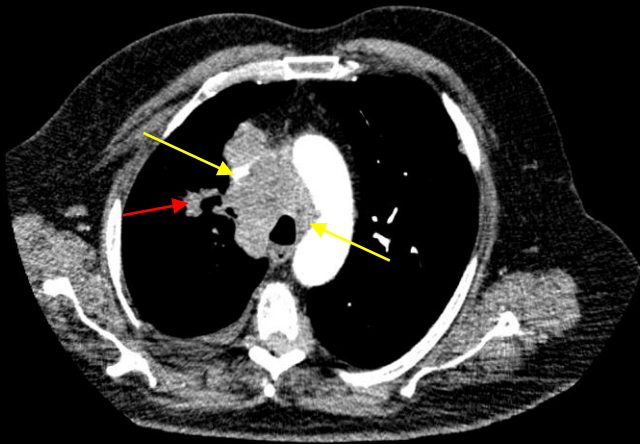
C236. 63 year old man with conversion of a TB skin test.

Quiz Case 1 of 10 – A shows a focal lung density



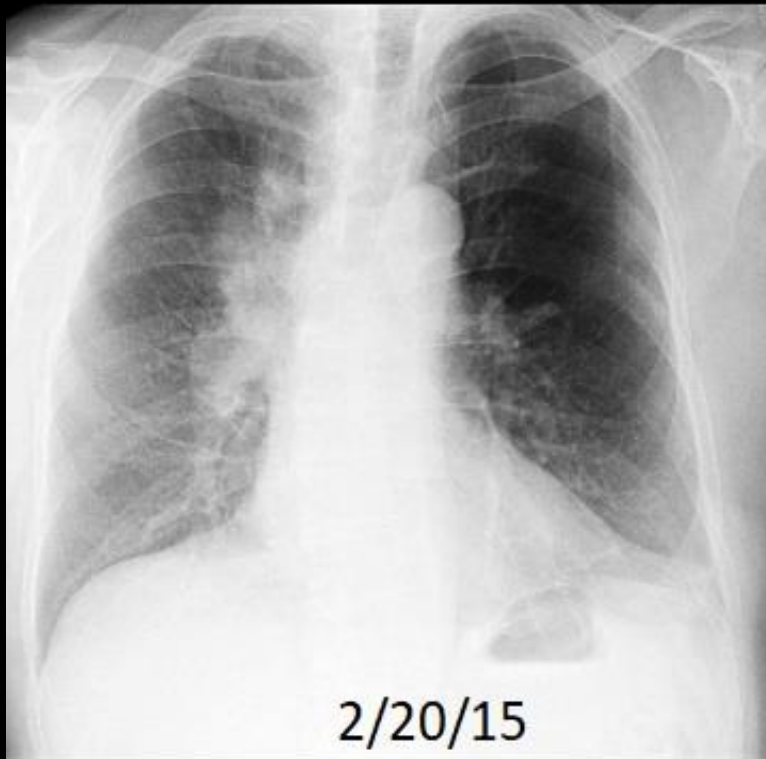
C142. 68 year old with chest pain. Right hilar mass and lung nodule.

Quiz Case 1 of 10 – A shows a focal lung density

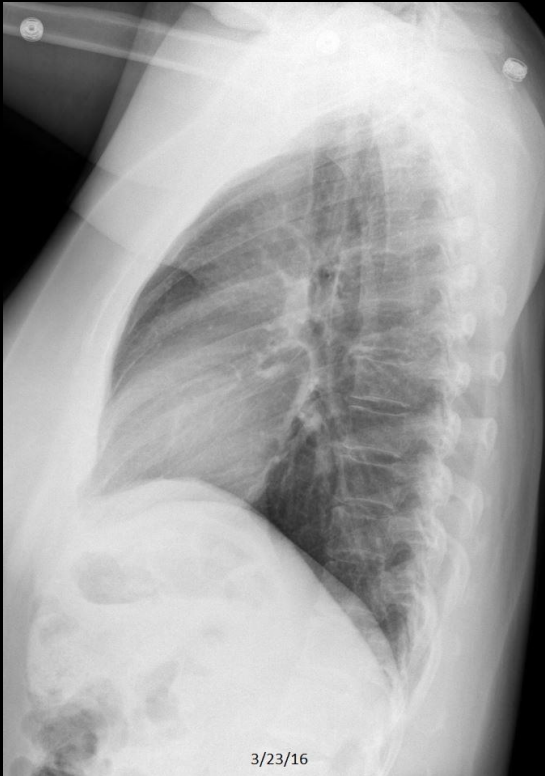


C142. 68 year old with chest pain. Right hilar mass. CT shows **hilar mass** and **lung nodule**. Patient also had liver lesions. Small cell carcinoma.

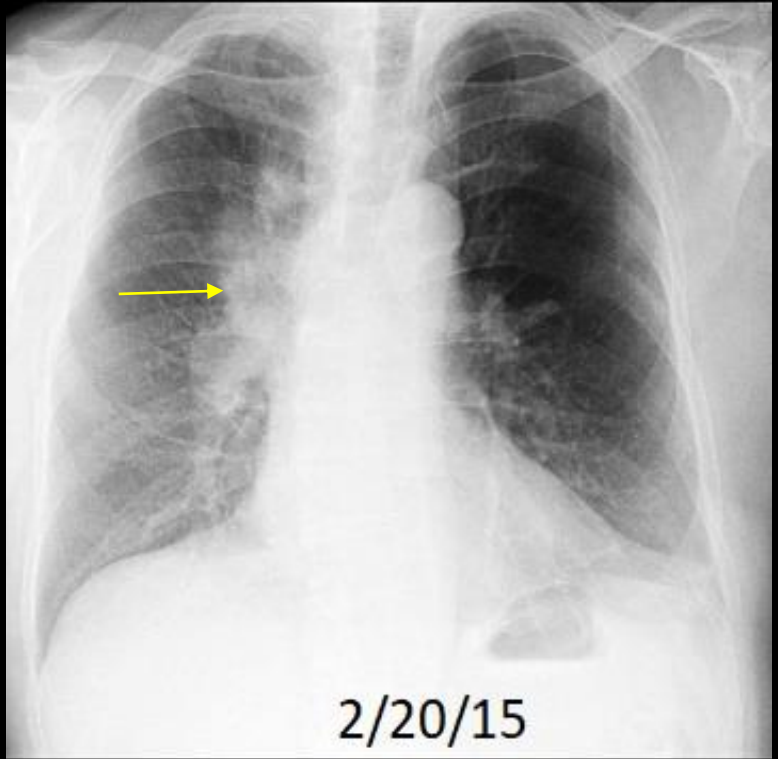
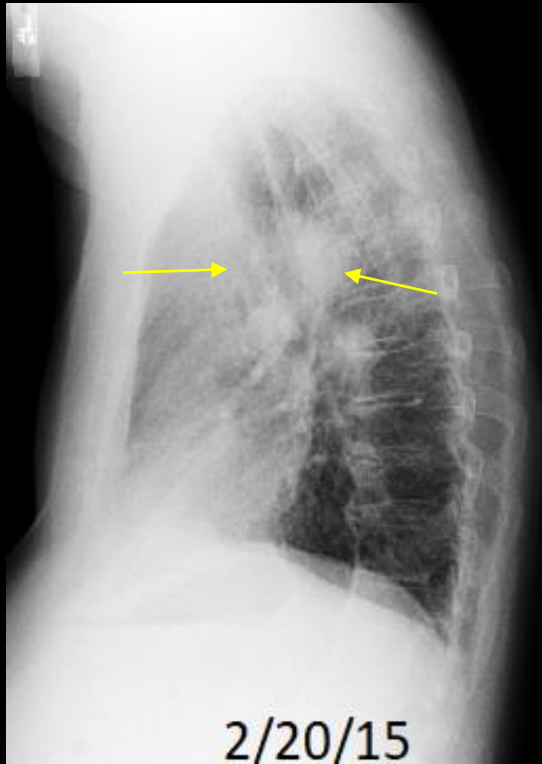
Quiz Case 2 of 10 – A



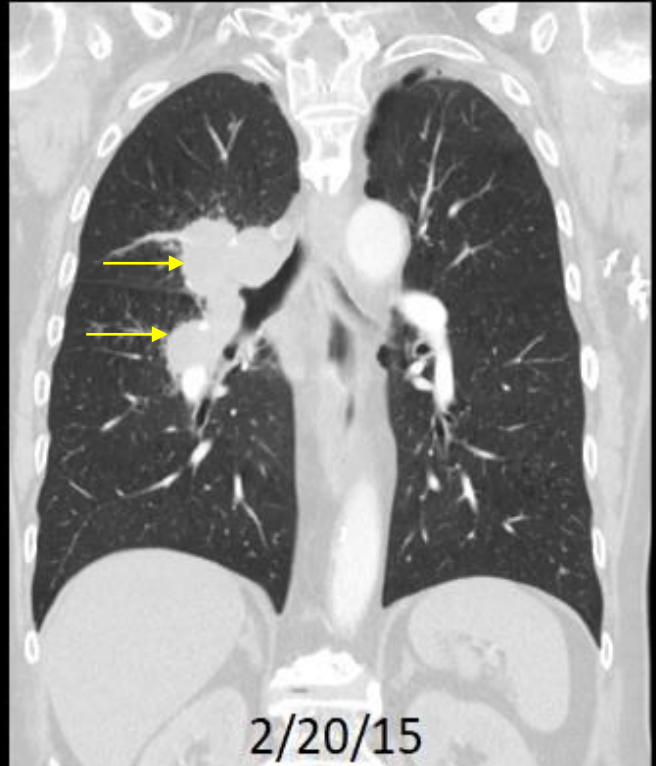
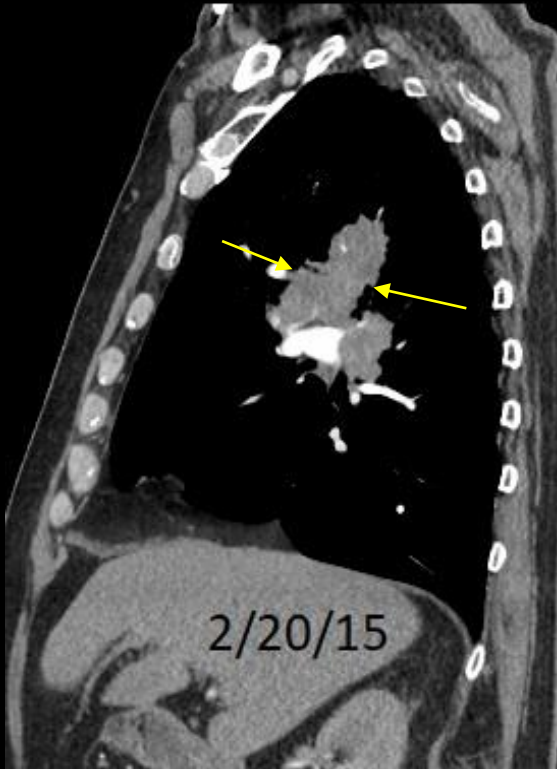
Quiz Case 2 of 10 – B



Quiz Case 2 of 10 – B shows a focal lung density

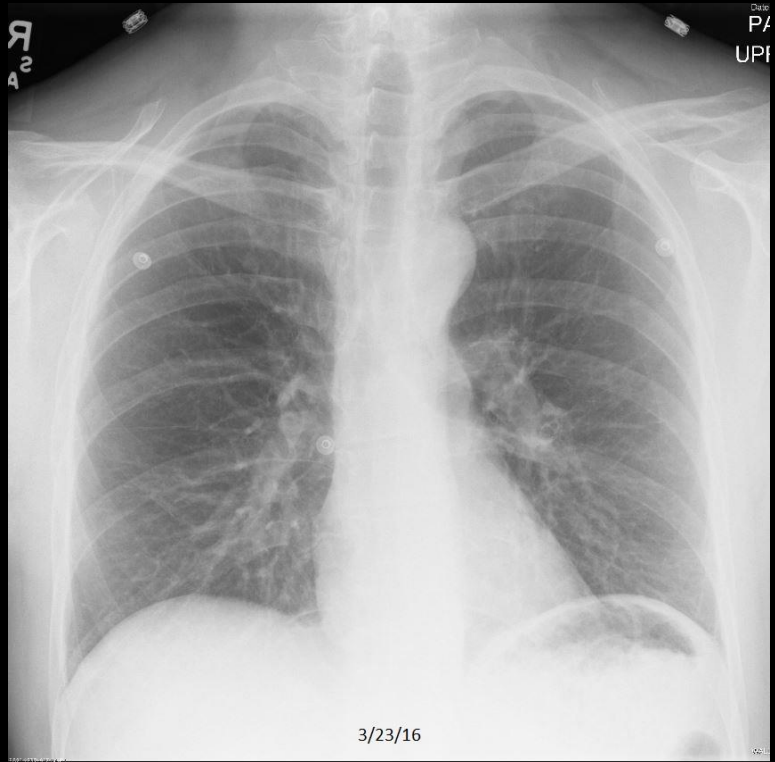


Quiz Case 2 of 10 – B shows a focal lung density

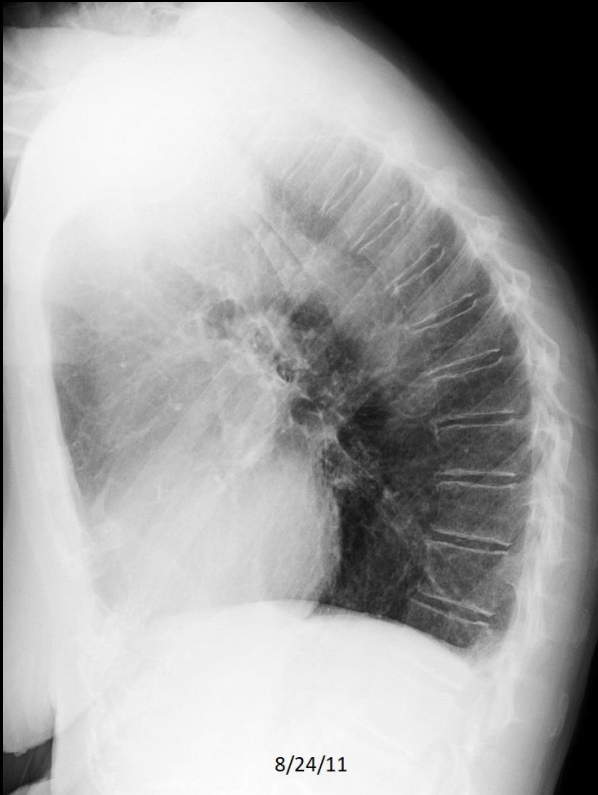


C143. 76 year old man with chest pain. CT confirms a **right hilar mass**. Lung cancer with metastases to hilar lymph nodes.

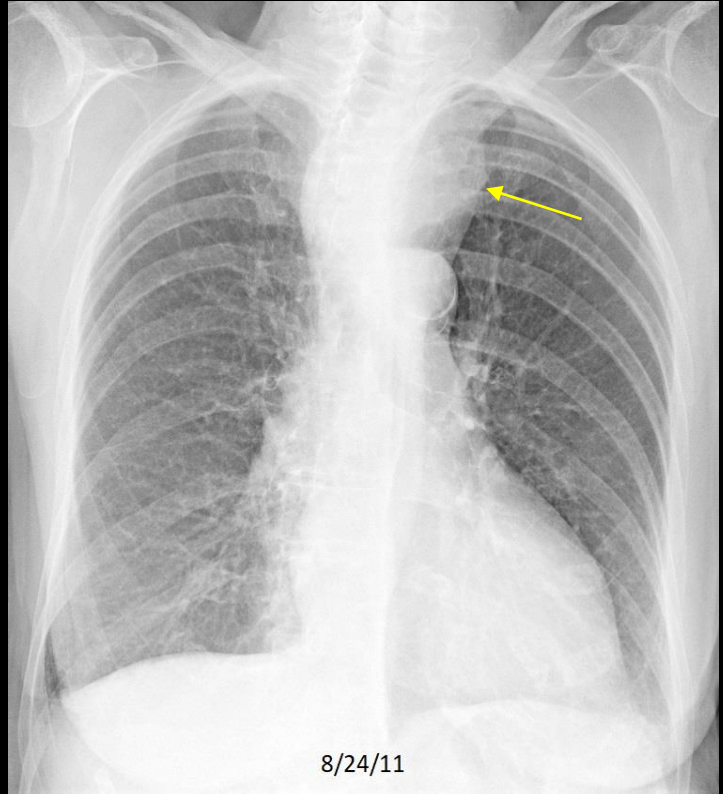
Quiz Case 3 of 10 – A



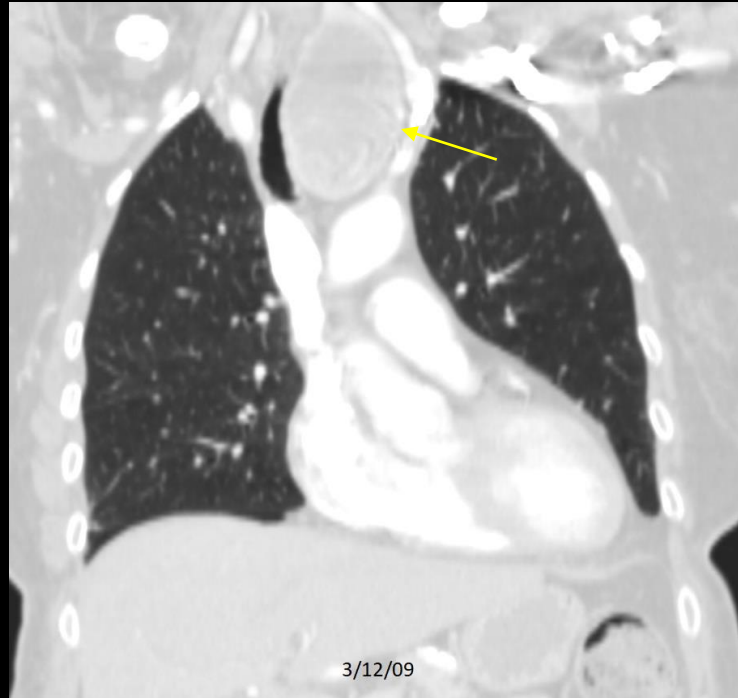
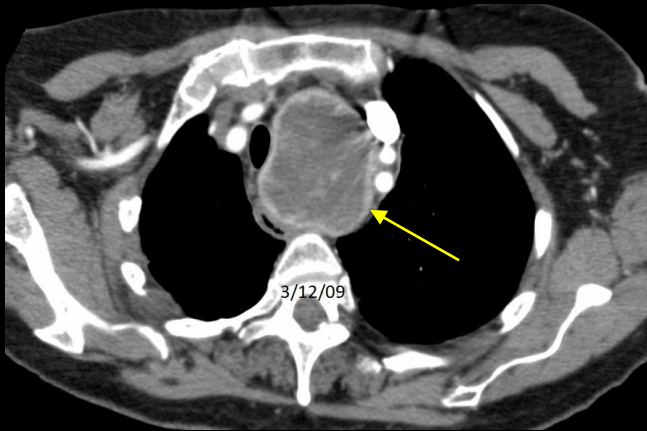
Quiz Case 3 of 10 – B



Quiz Case 3 of 10 – B shows a focal lung density

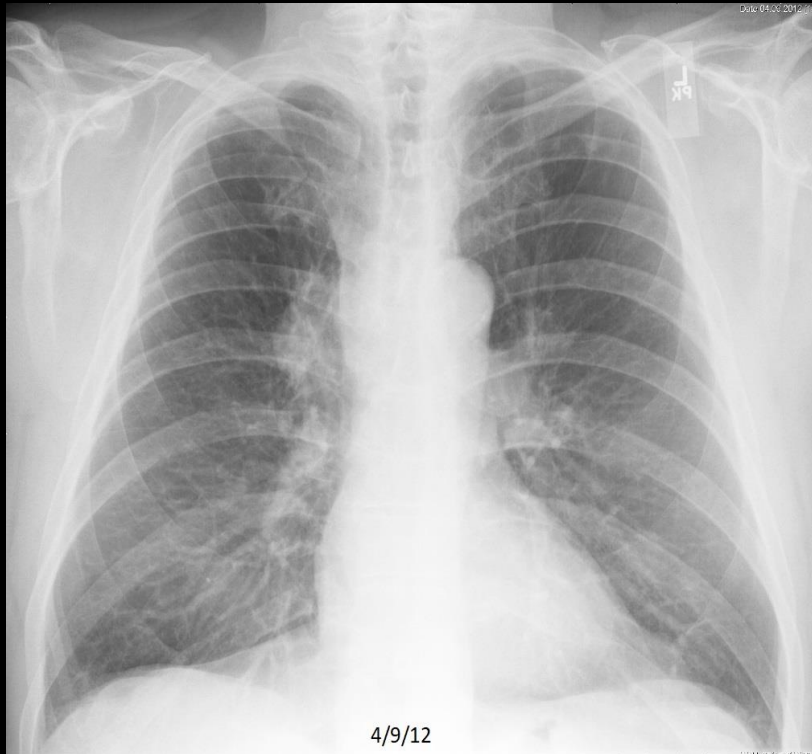


Quiz Case 3 of 10 – shows a focal lung density



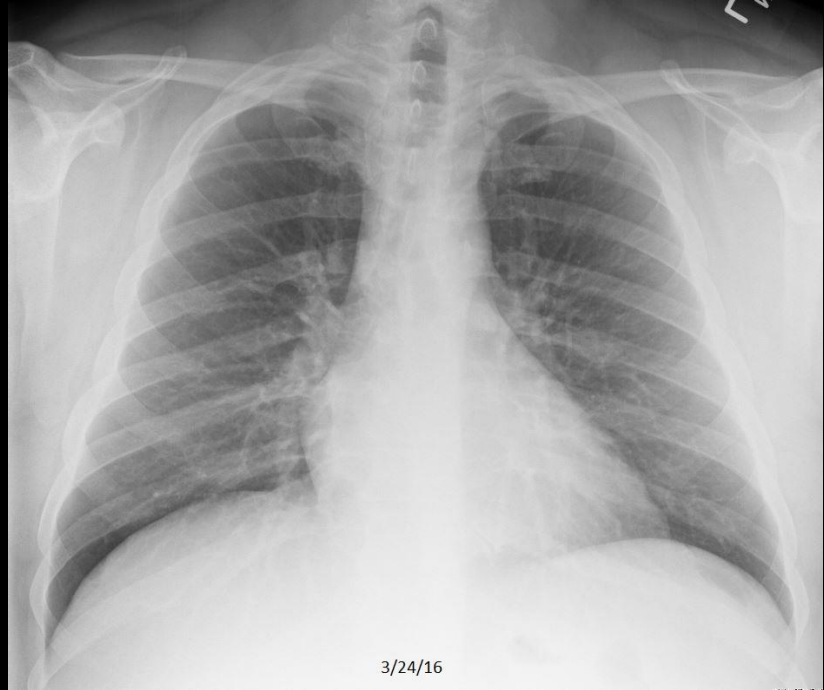
C149. 90 year old woman with cough. Superior mediastinal mass. **CT demonstrates goiter.** The term “focal chest density” would probably better describe this scenario, and goiter was suspected on the basis of the chest radiograph but the CT was done to confirm this suspicion.

Quiz Case 4 of 10 – A

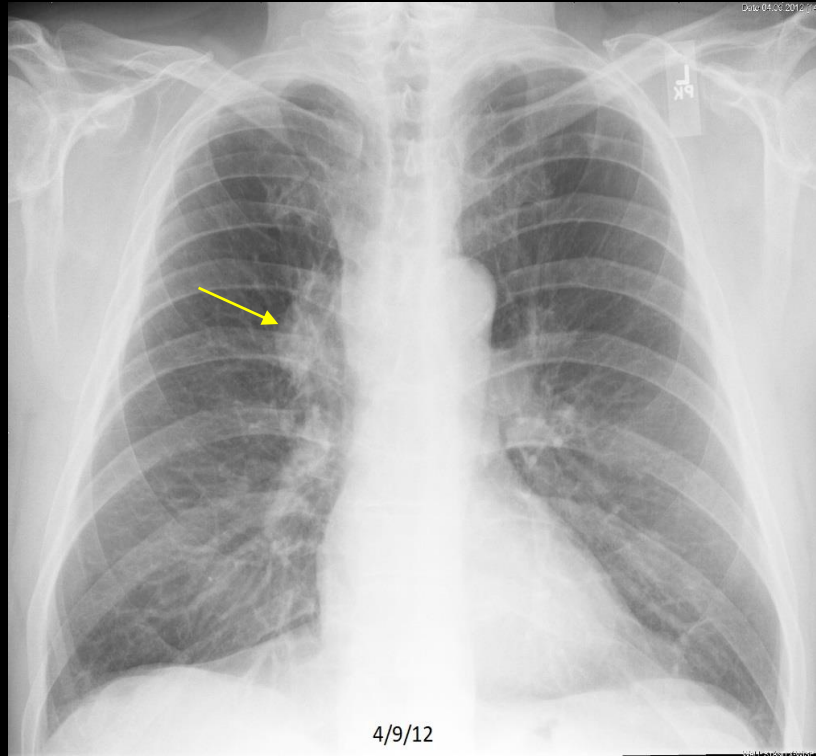
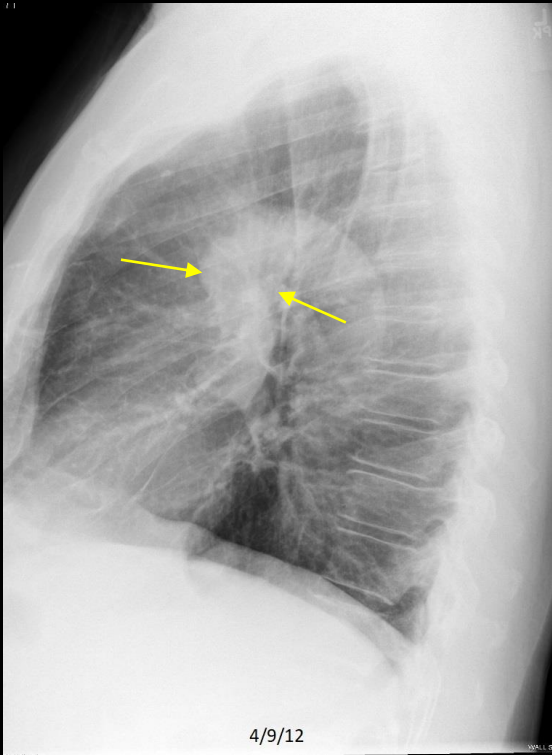


C151. 72 year old former smoker with a cough.

Quiz Case 4 of 10 – B

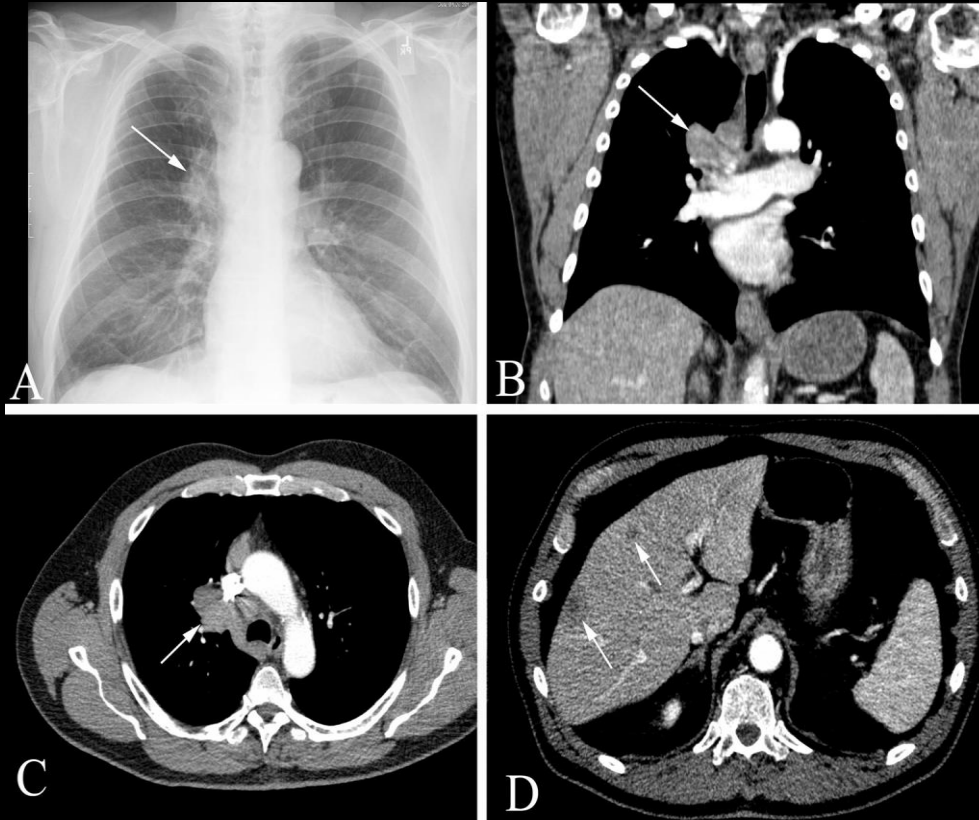


Quiz Case 4 of 10 – A shows a focal lung density



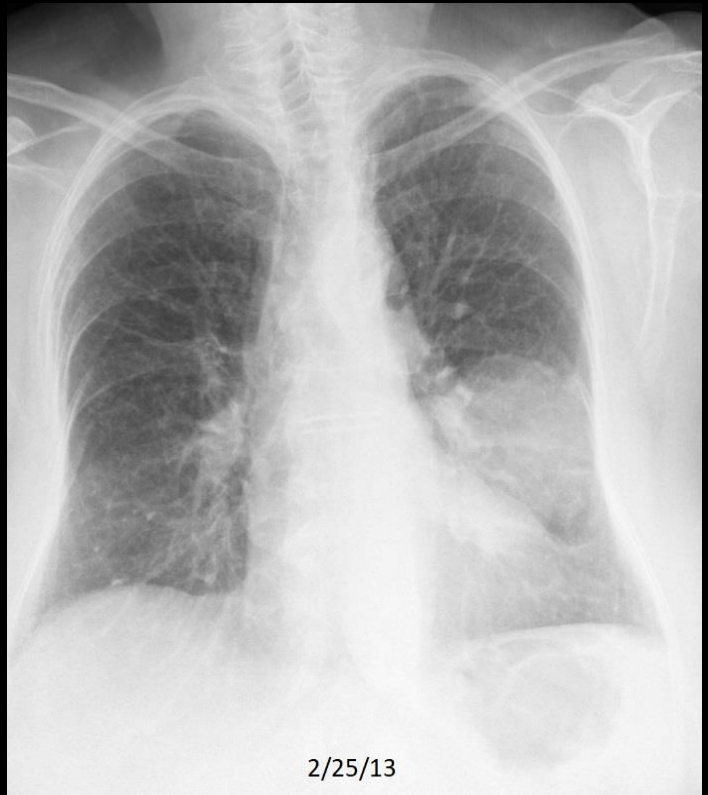
C151. 72 year old former smoker with a cough. **Right hilar mass.**

Quiz Case 4 of 10 – A shows a focal lung density



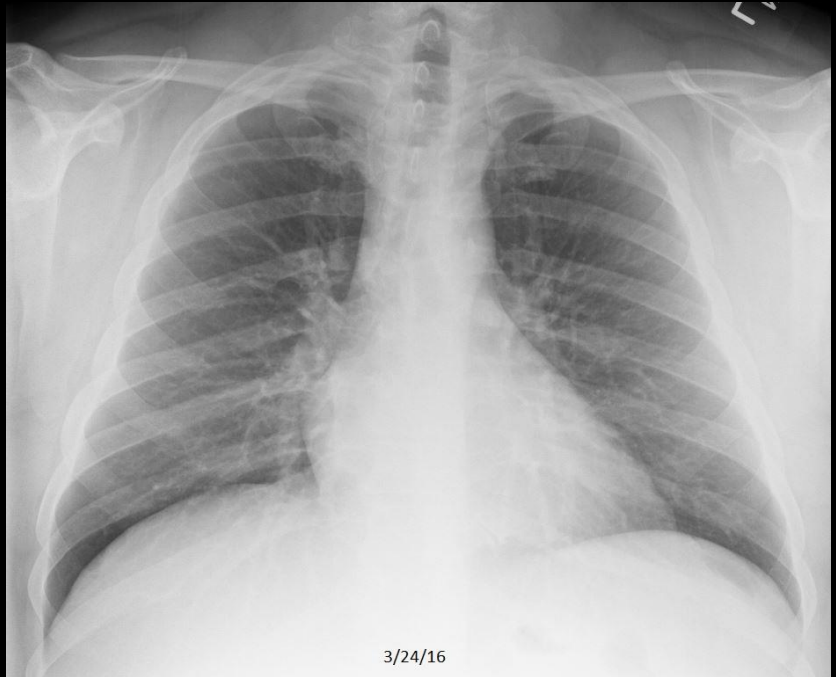
C151. 72 year old former smoker with a cough. Right hilar mass. CT shows hilar lymphadenopathy and liver mets from small cell lung cancer.

Quiz Case 5 of 10 – A

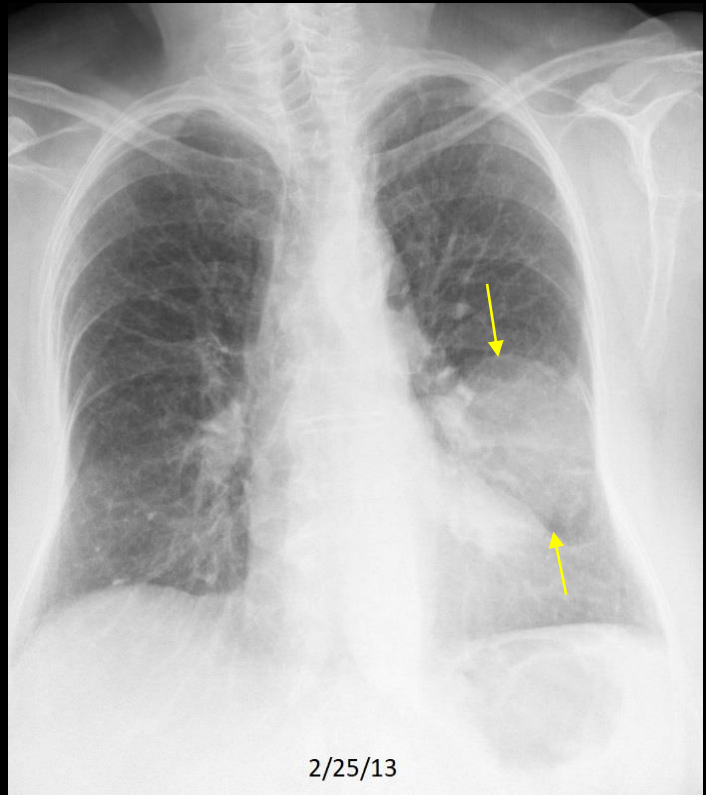
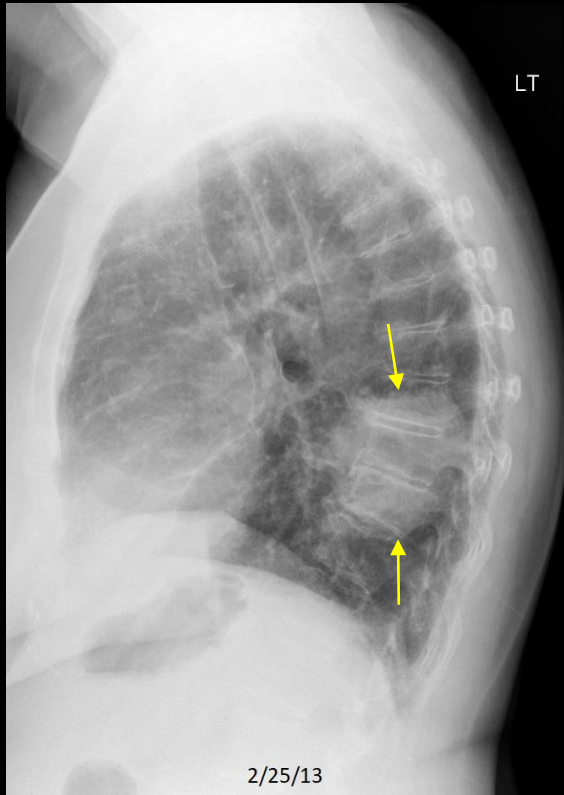


C153. 74 year old woman with a cough.

Quiz Case 5 of 10 – B



Quiz Case 5 of 10 – A shows a focal lung density



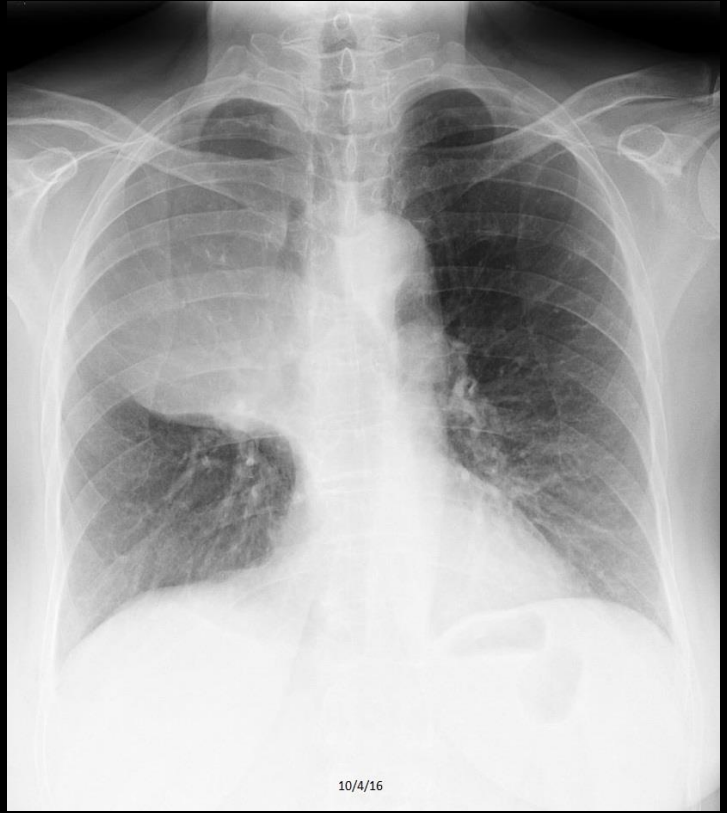
C153. 74 year old woman with a cough. **Left lung mass.** Squamous cell carcinoma.

Quiz Case 6 of 10 – A



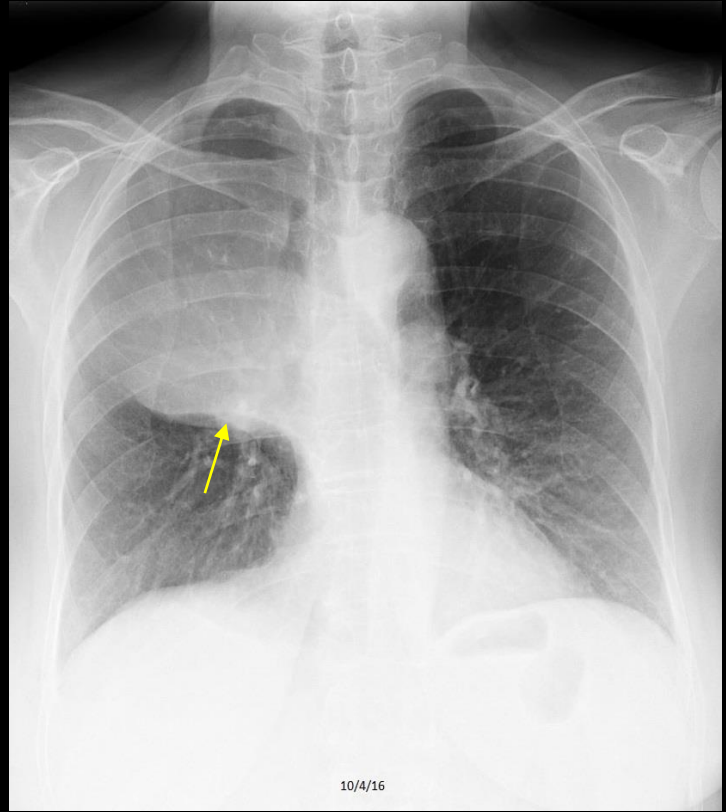
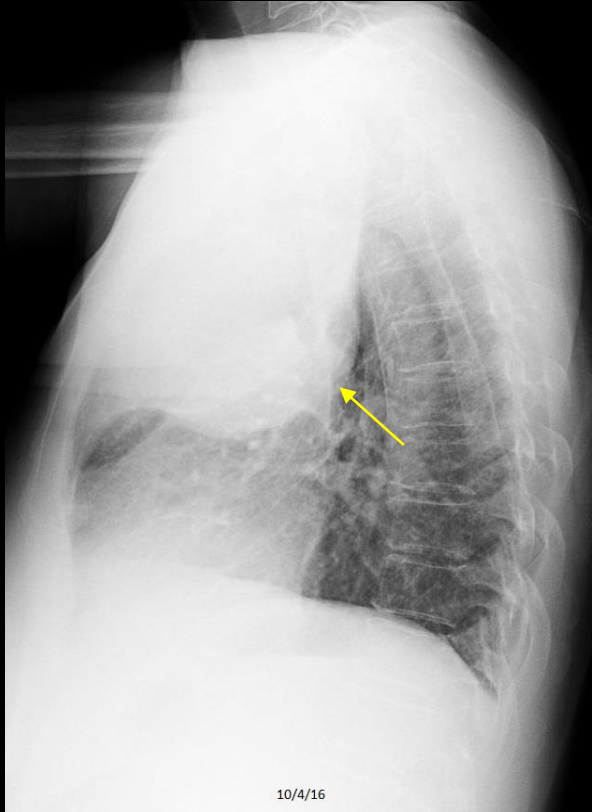
C250. 49 year old with chest pain.

Quiz Case 6 of 10 – B



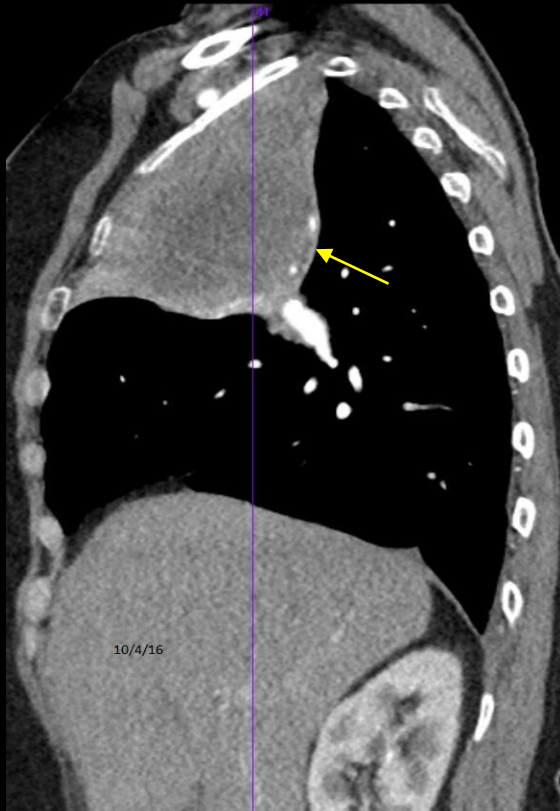
C161. 70 year old woman with cough, chest pain, and ronchi.

Quiz Case 6 of 10 – B shows a focal lung density



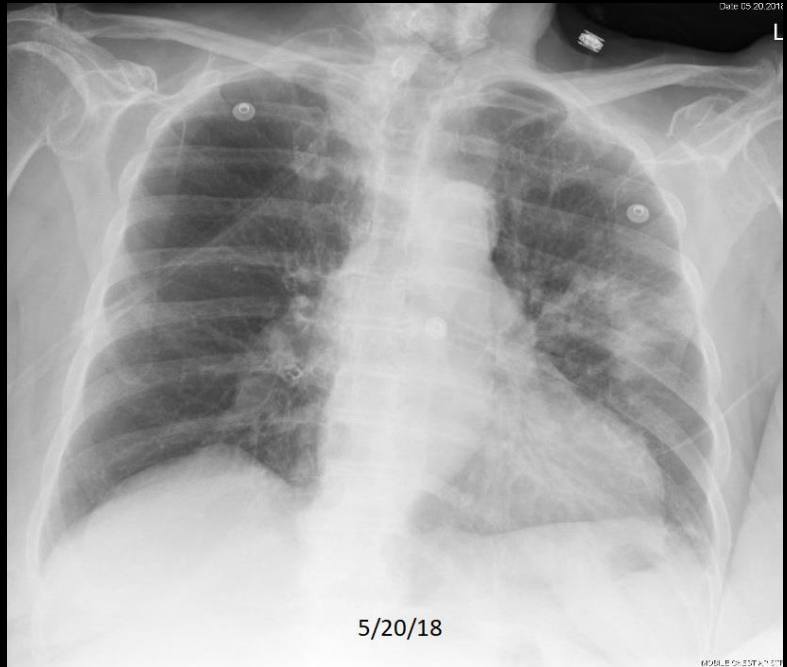
C161. 70 year old woman with cough, chest pain, and ronchi. **Right lung density.**

Quiz Case 6 of 10 – B shows a focal lung density



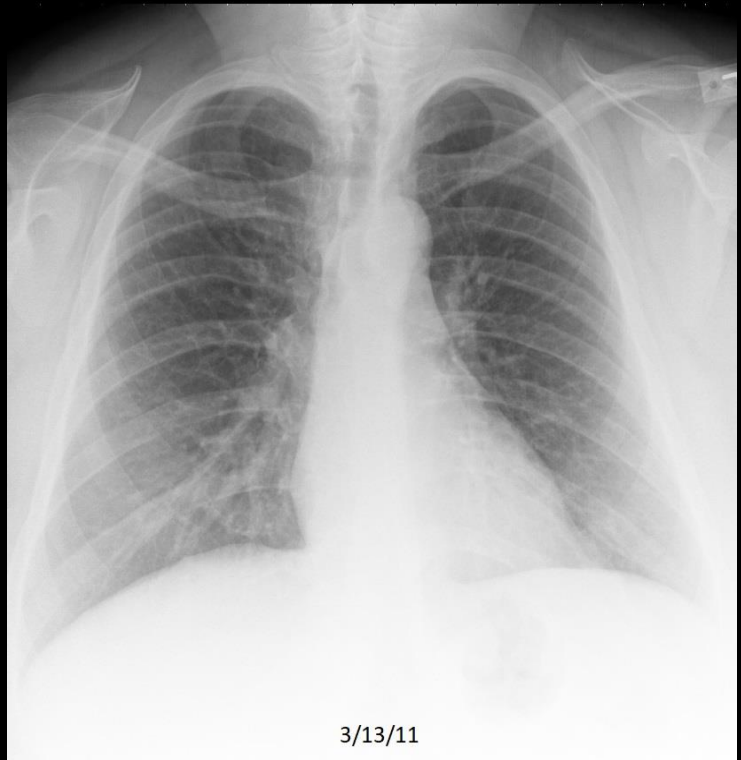
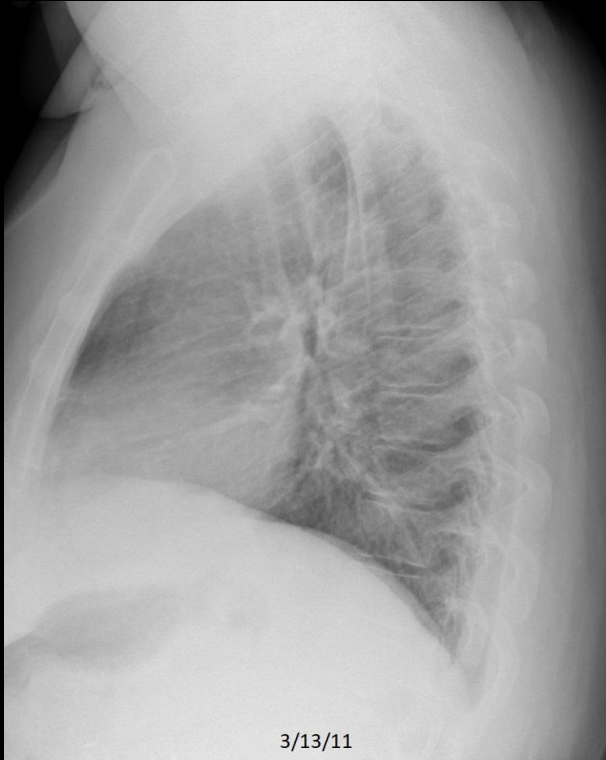
C161. 70 year old woman with cough, chest pain, and ronchi. **Right lung mass.** Lung cancer with post-obstructive collapse ("Golden S-sign").

Quiz Case 7 of 10 – A

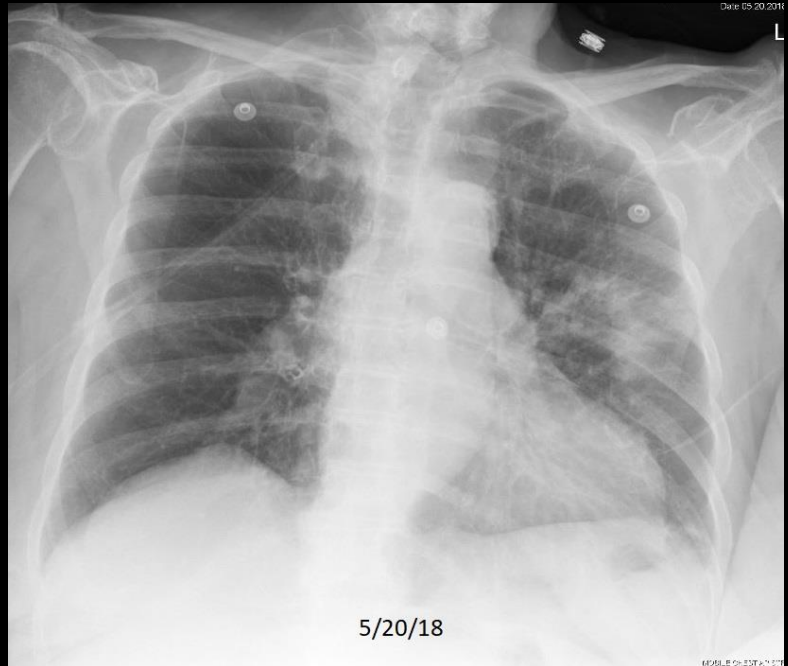


C325. 80 year old with dyspnea. No fever, cough, or other additional symptoms.

Quiz Case 7 of 10 – B

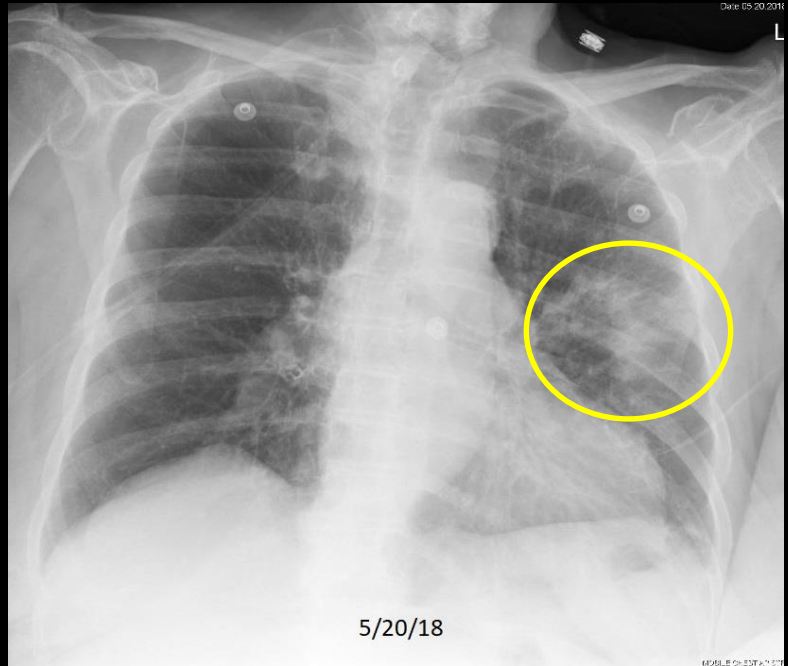
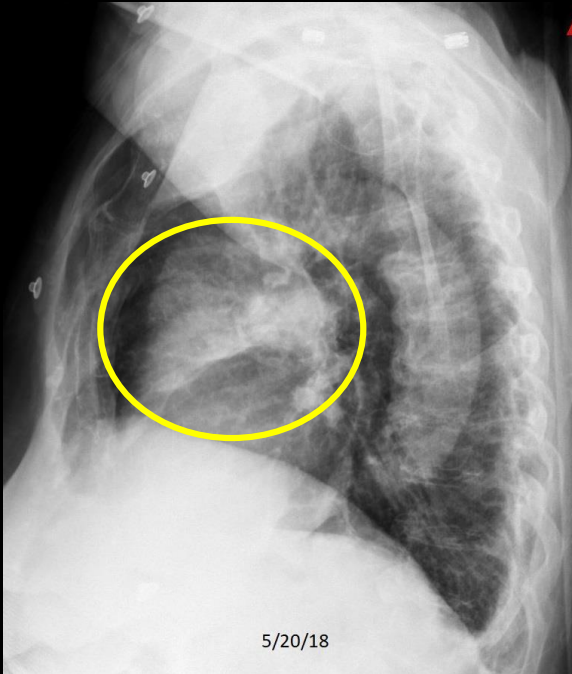


Quiz Case 7 of 10 – A shows a focal lung density



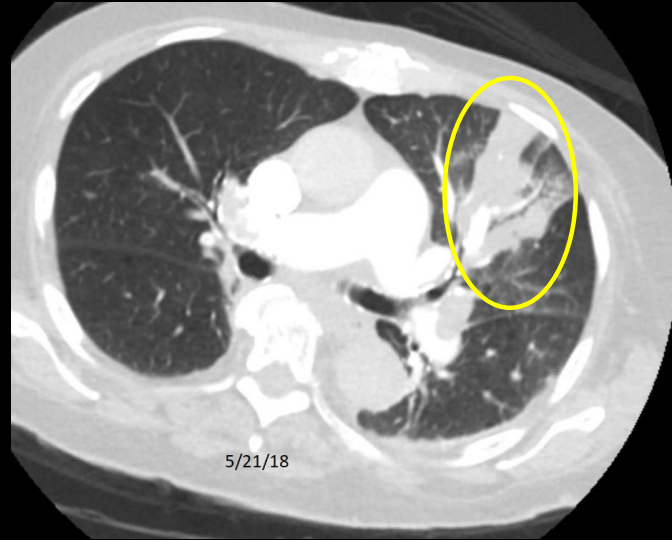
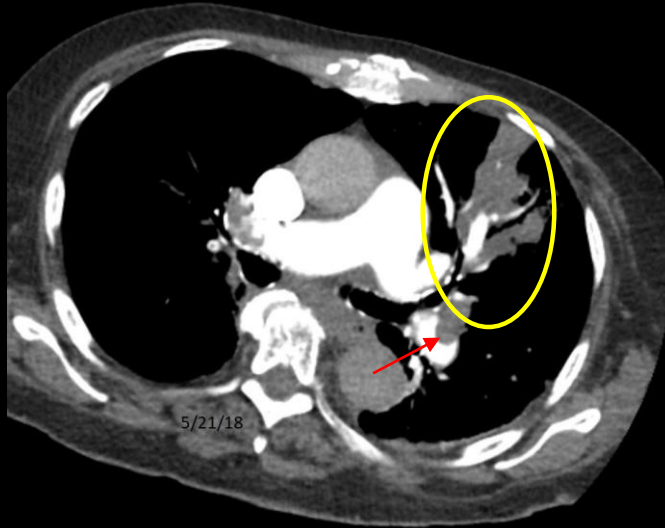
C325. 80 year old with dyspnea. No fever, cough, or other additional symptoms. Left chest density.

Quiz Case 7 of 10 – A shows a focal lung density



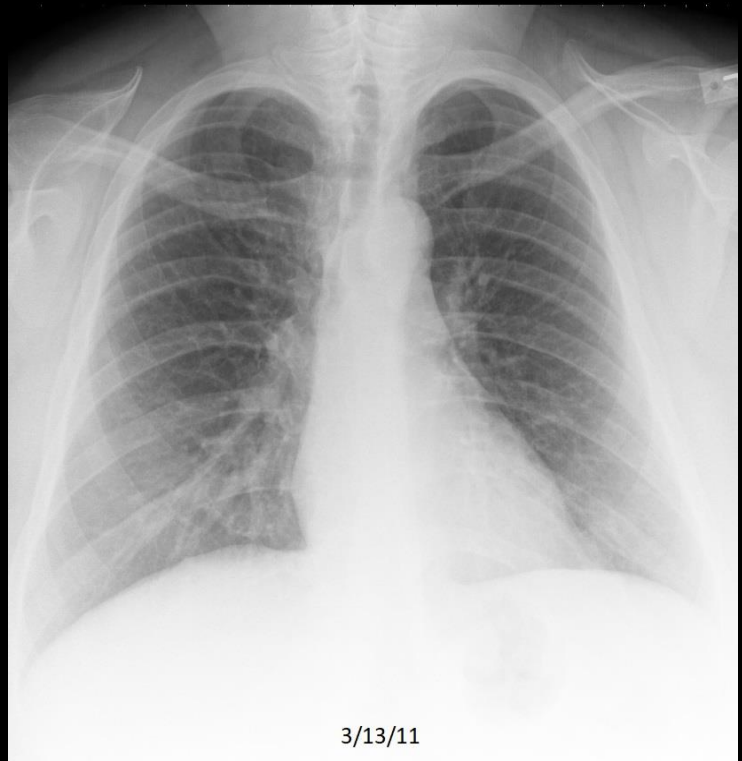
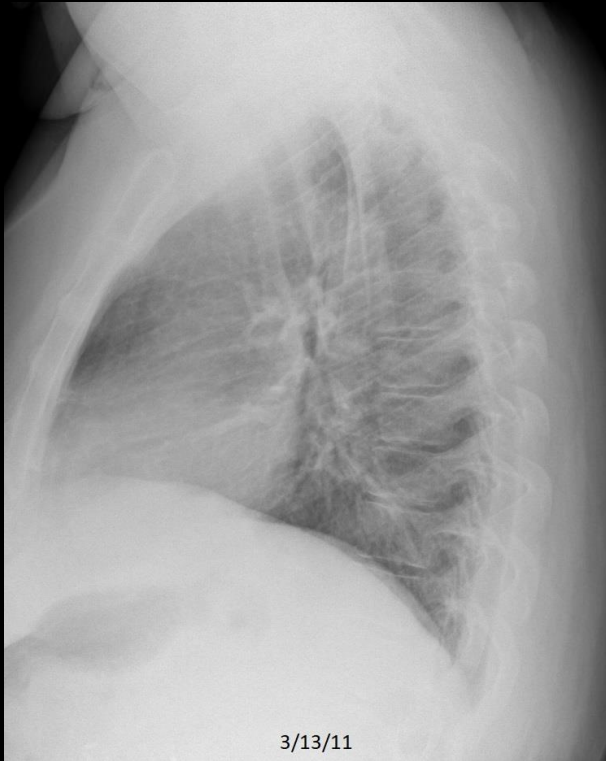
C325. 80 year old with dyspnea. No fever, cough, or other additional symptoms. **Left lung density.**

Quiz Case 7 of 10 – A shows a focal lung density

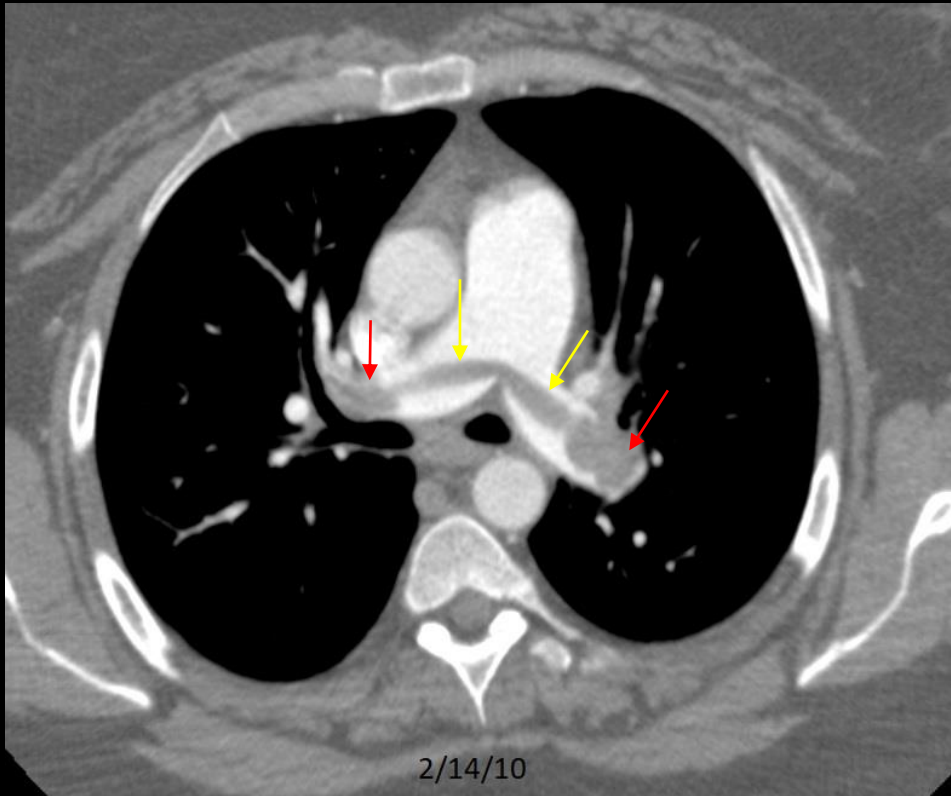


C325. 80 year old with dyspnea. No fever, cough, or other additional symptoms. Left chest density. CT shows **pulmonary embolism** and **infarction**.

Quiz Case 7 of 10 – B showed a normal CXR

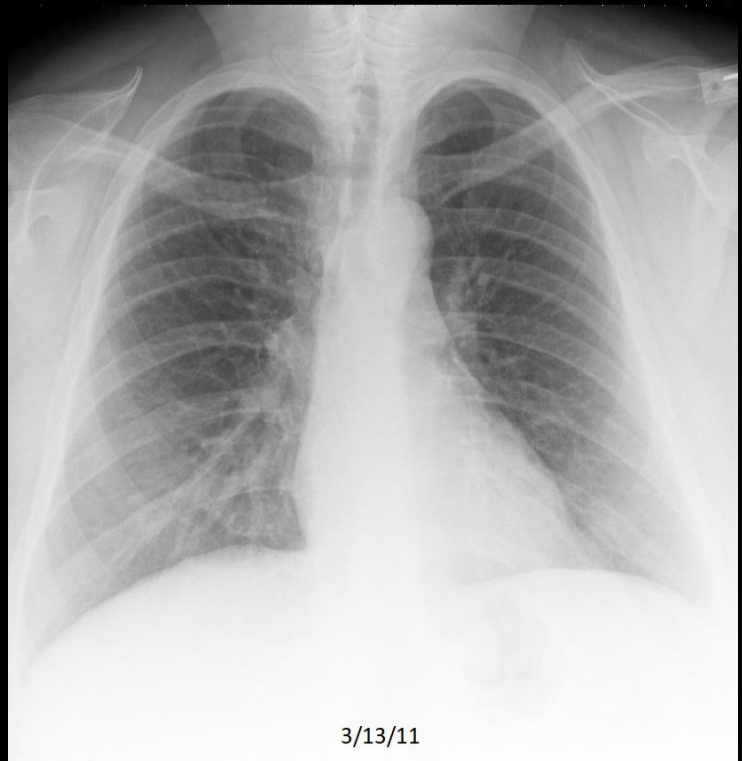
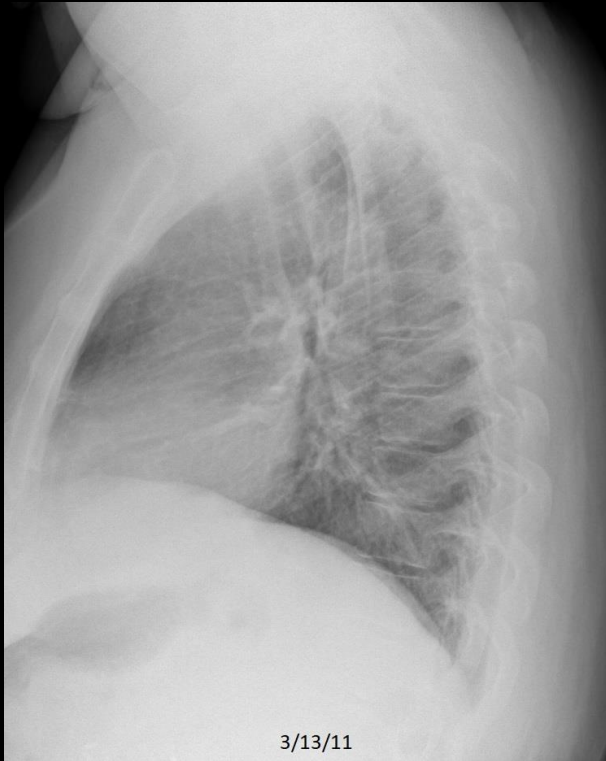


Quiz Case 7 of 10 – B also had a PE

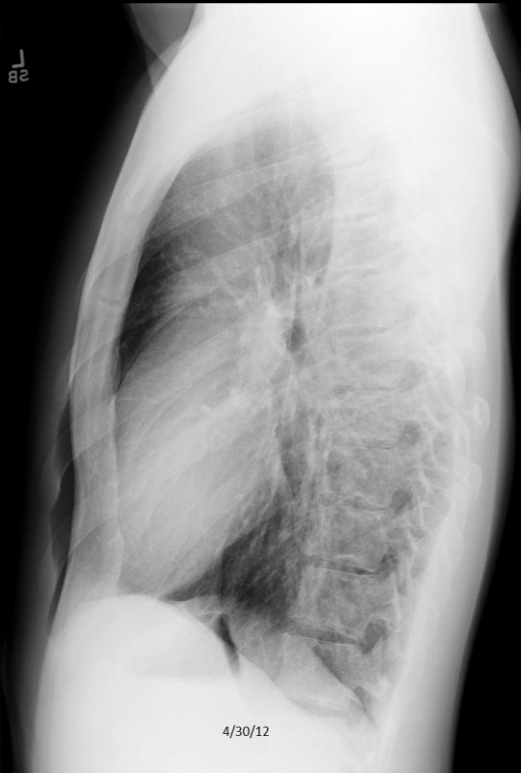


C122. 44 year old woman with chest pain. CT shows a **large saddle embolus** (with **saddlebags**!).

Quiz Case 7 of 10 – B showed a normal CXR

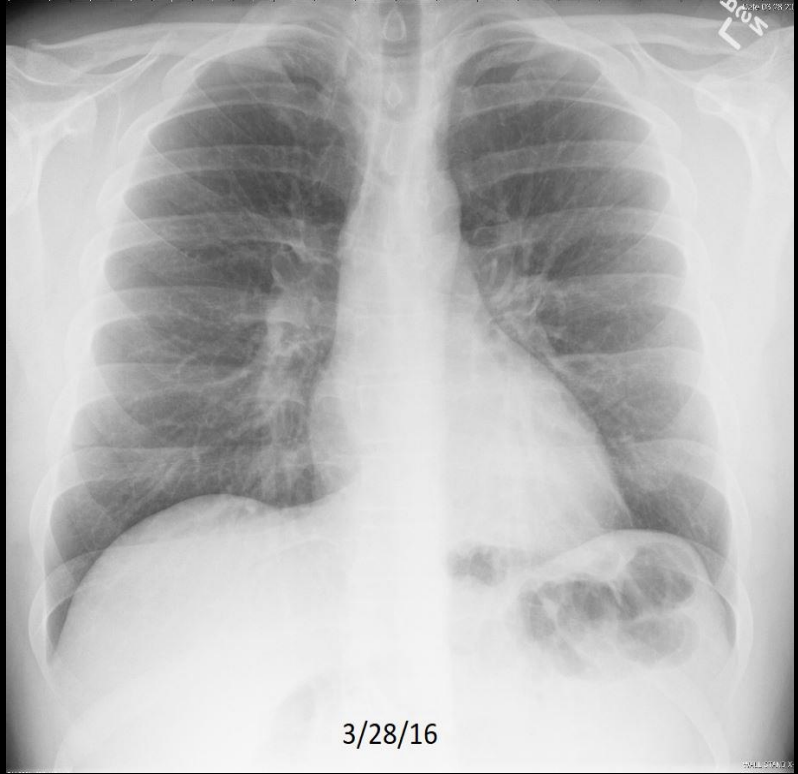


Quiz Case 8 of 10 – A

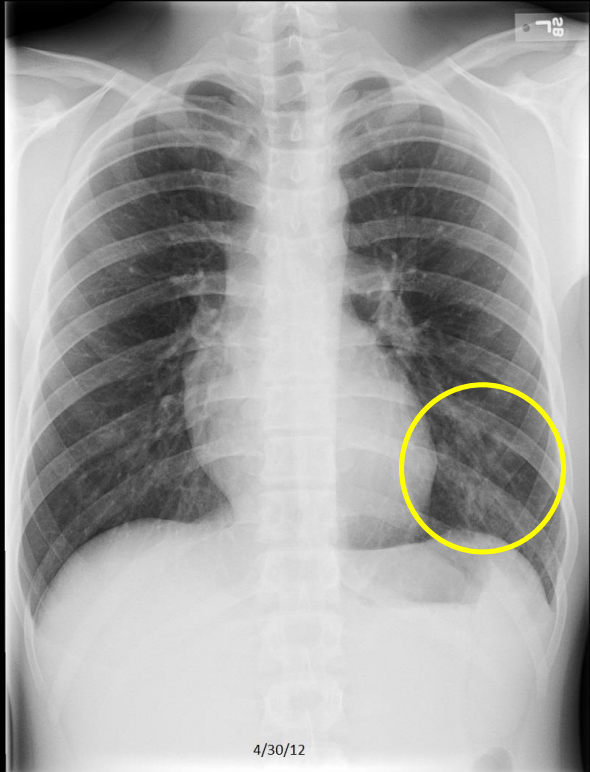
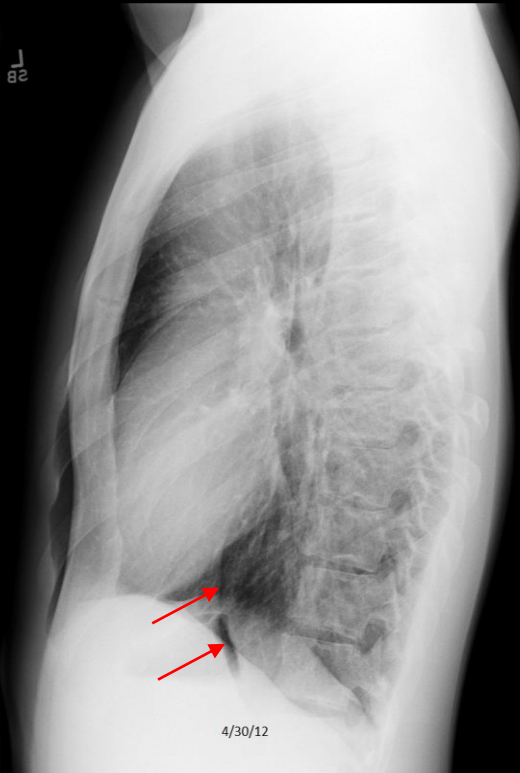


C157. 17 year old with cough.

Quiz Case 8 of 10 – B

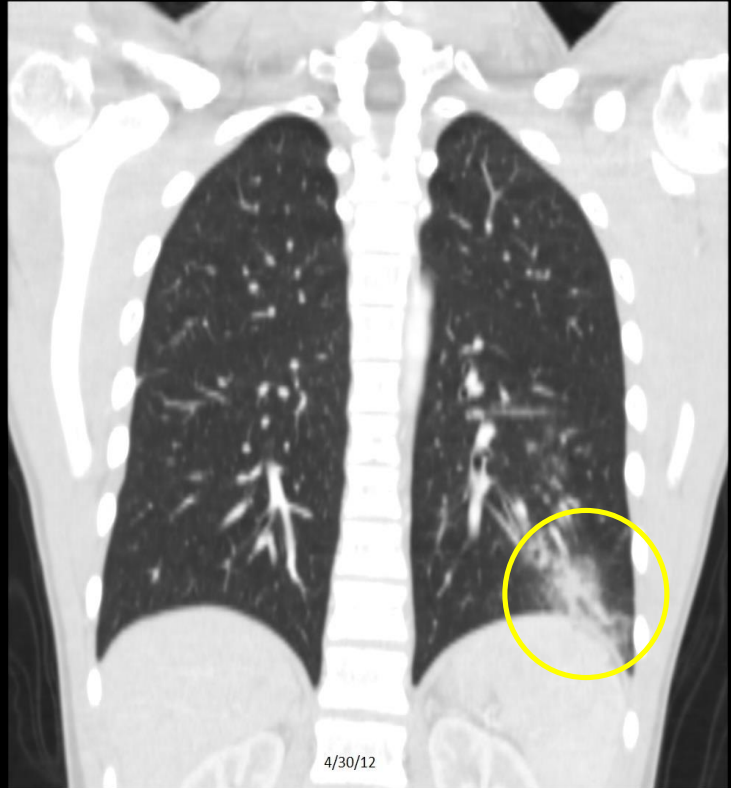
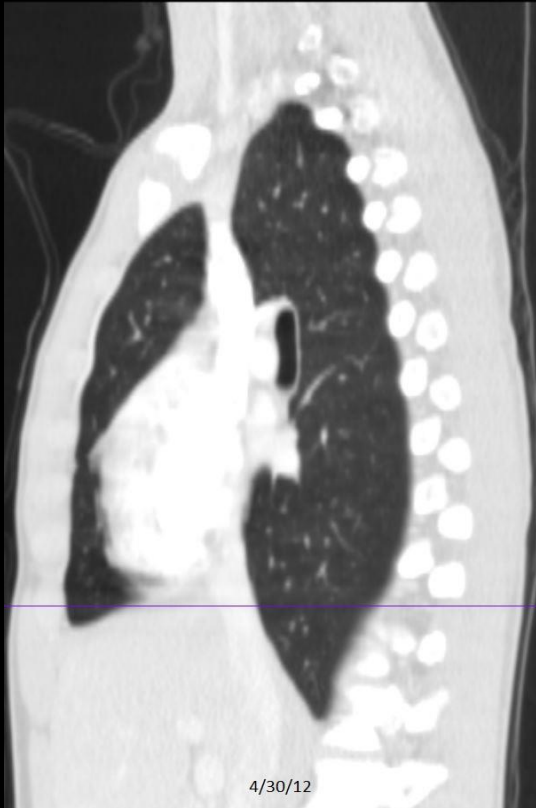


Quiz Case 8 of 10 – A shows a focal lung density



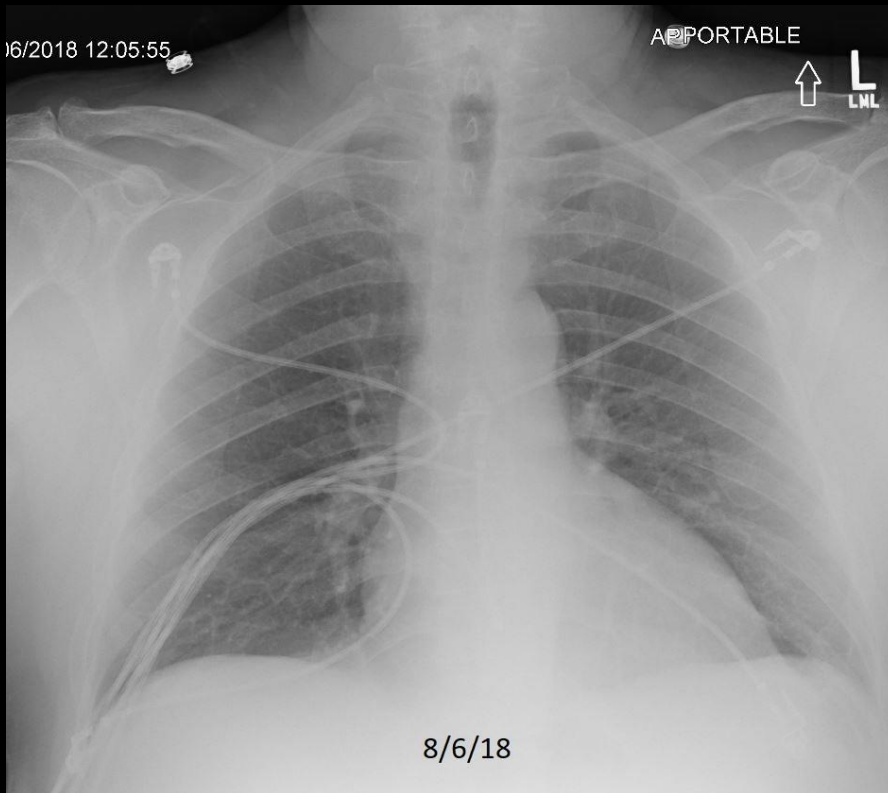
C157. 17 year old with cough. Left lung density and possible free air.

Quiz Case 8 of 10 – A shows a focal lung density



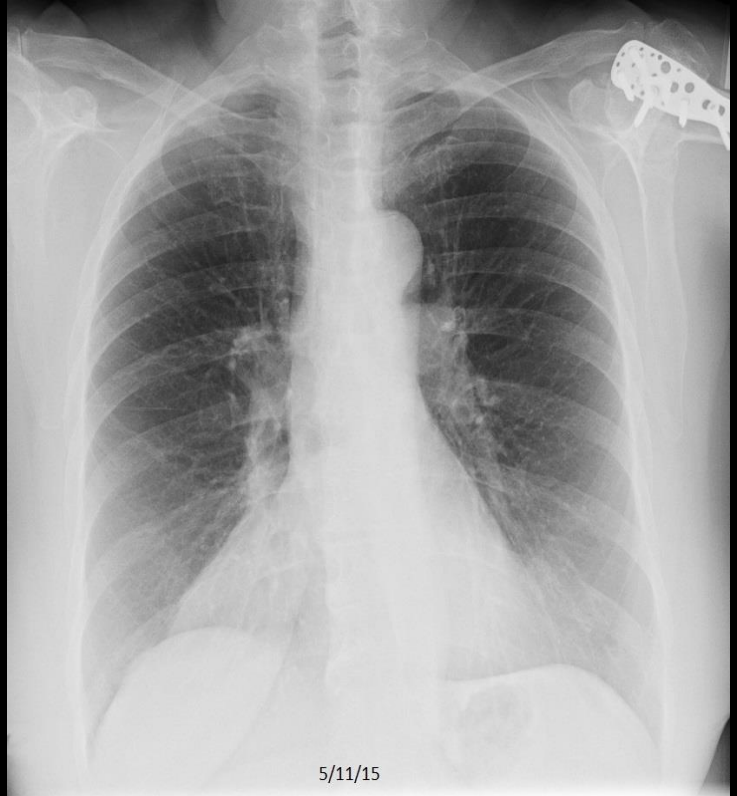
C157. 17 year old with cough. Left lung density and possible free air. CT shows consolidation with no free air. Pneumonia.

Quiz Case 9 of 10 – A



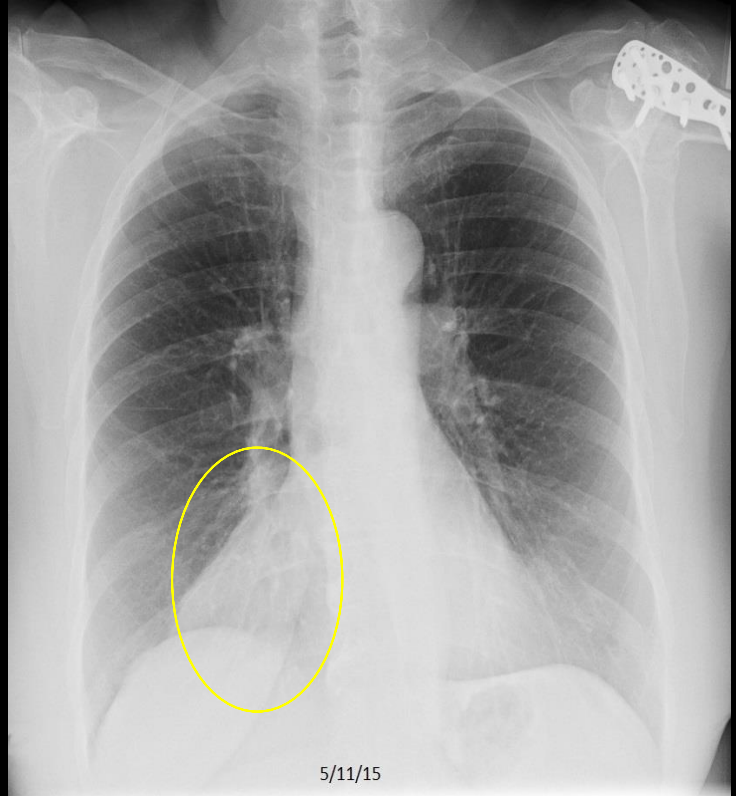
C326. 65 year old man with chest pain.

Quiz Case 9 of 10 – B

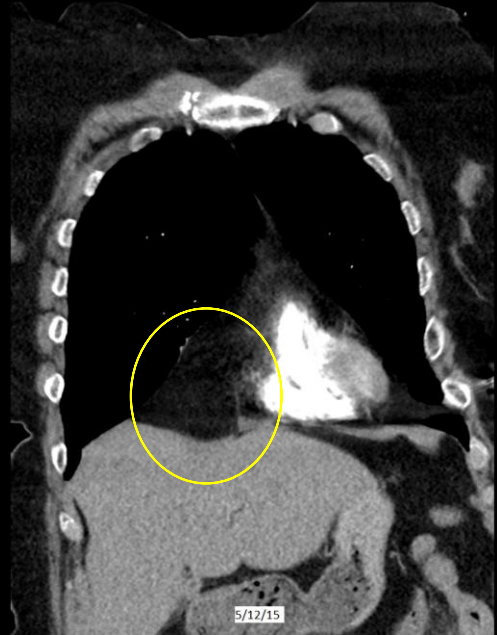
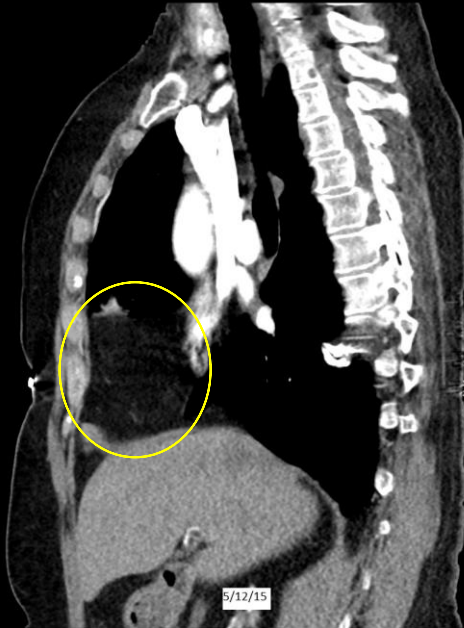


C492. 70 year old with dyspnea. Right lung density.

Quiz Case 9 of 10 – B shows a focal lung density

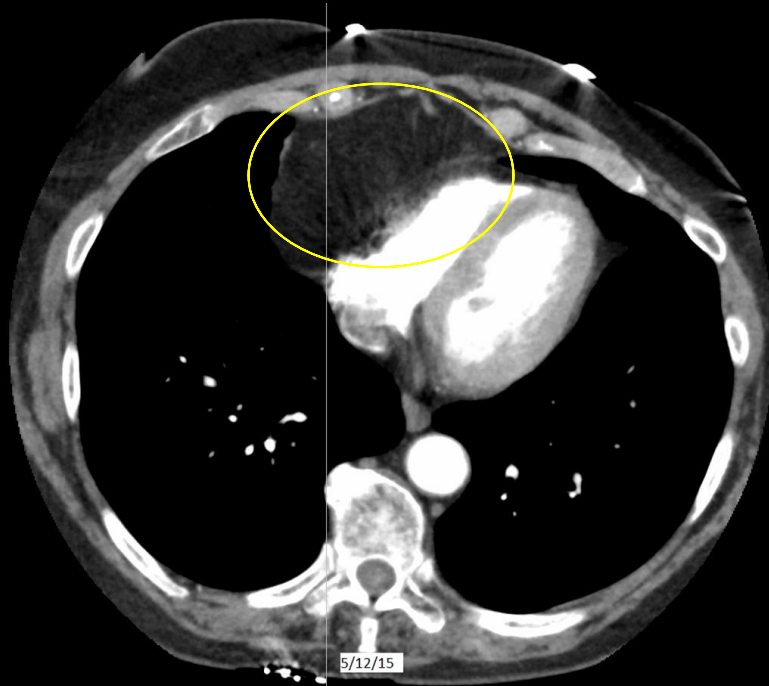


Quiz Case 9 of 10 – B shows a focal lung density



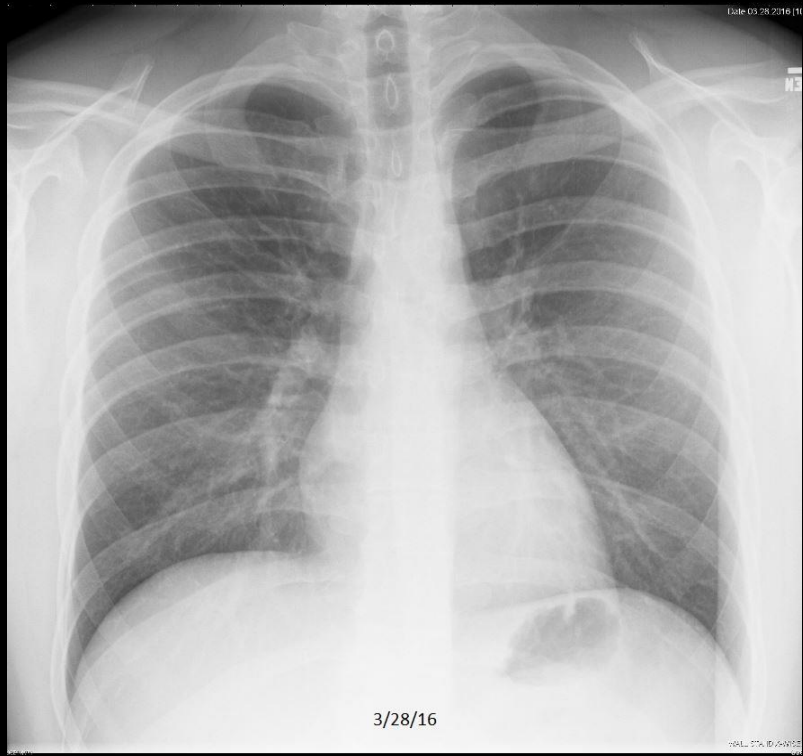
C492. 70 year old with dyspnea. Right lung density. **Prominent right heart fat pad.**

Quiz Case 9 of 10 – B shows a focal lung density



C492. 70 year old with dyspnea. Right lung density. **Prominent right heart fat pad.**

Quiz Case 7 of 10 – B

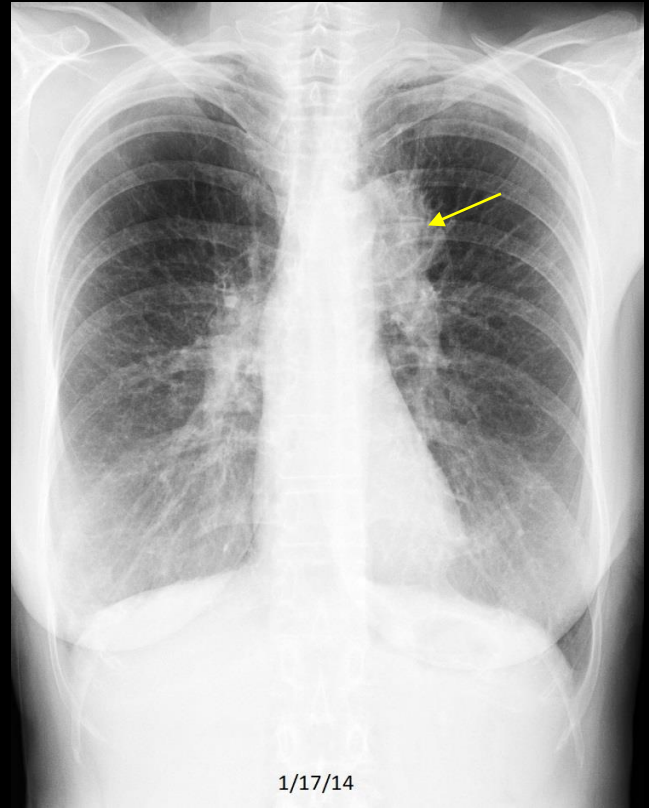
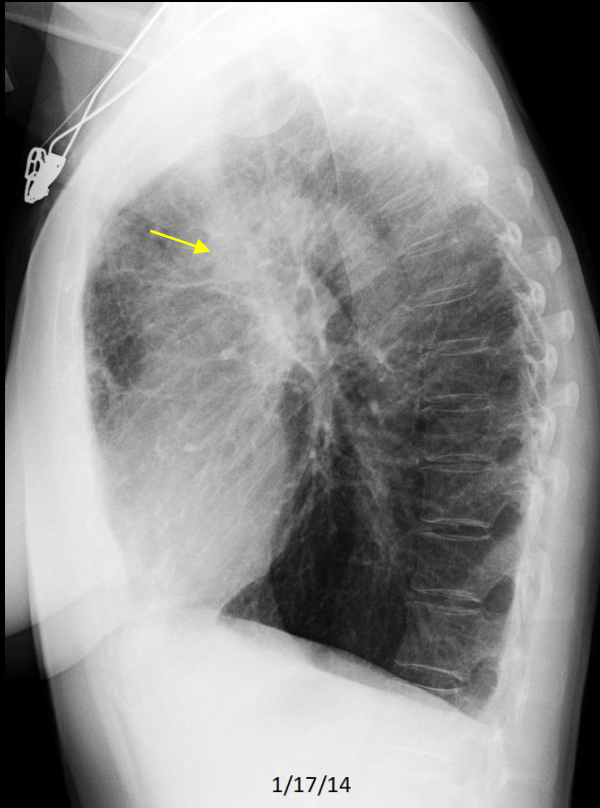


C251. 20 year old man with dyspnea.

Quiz Case 10 of 10 – B

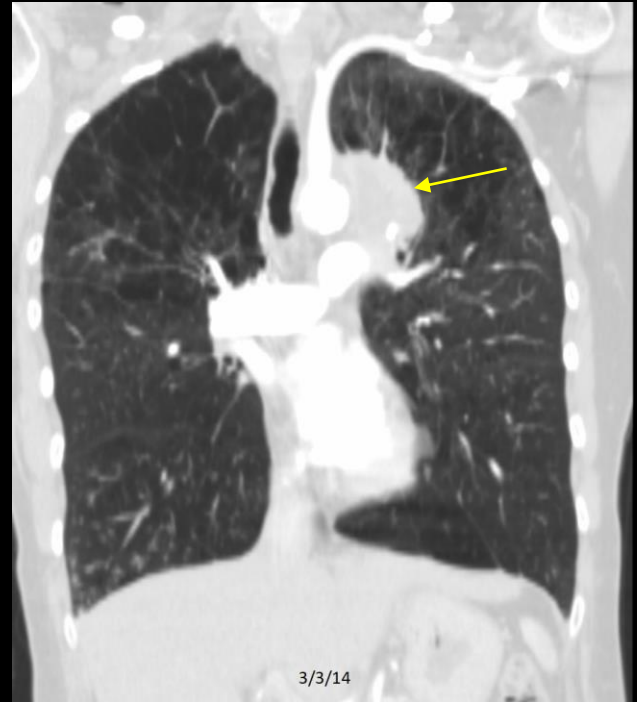
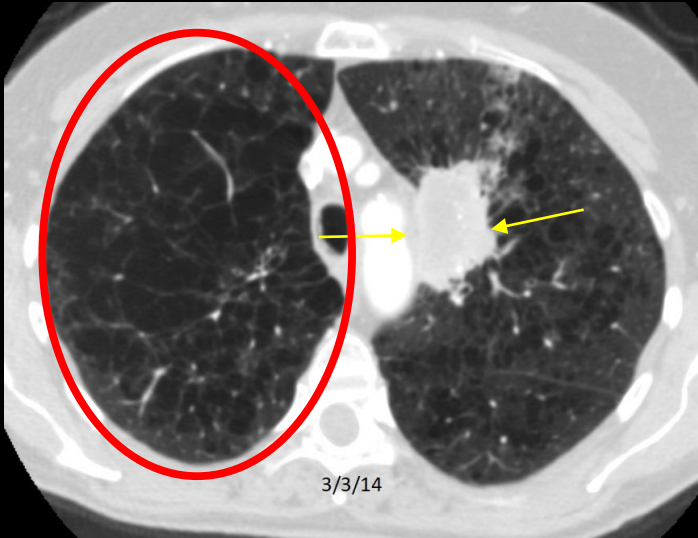


Quiz Case 10 of 10 – B shows a focal lung density



C154. 71 year old with cough. **Left lung mass.** Emphysema.

Quiz Case 10 of 10 – B shows a focal lung density



C154. 71 year old with cough. **Left lung mass** and **emphysema**. Lung cancer.

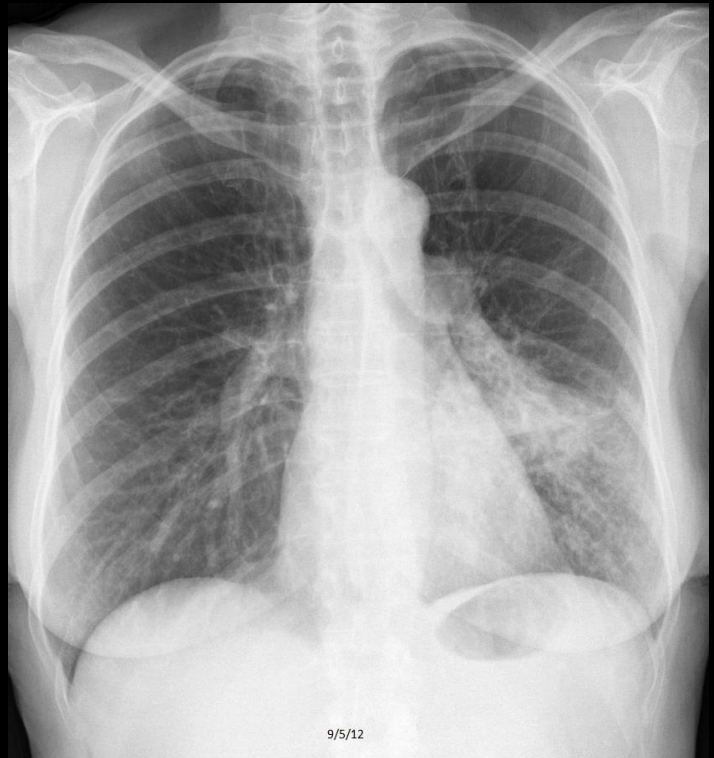
Review Quiz

Identify Each CXR as:

**Normal, CHF, Pneumonia,
Emphysema, Cardiomegaly without
CHF, Atelectasis/Scar, or Focal Chest
Density**

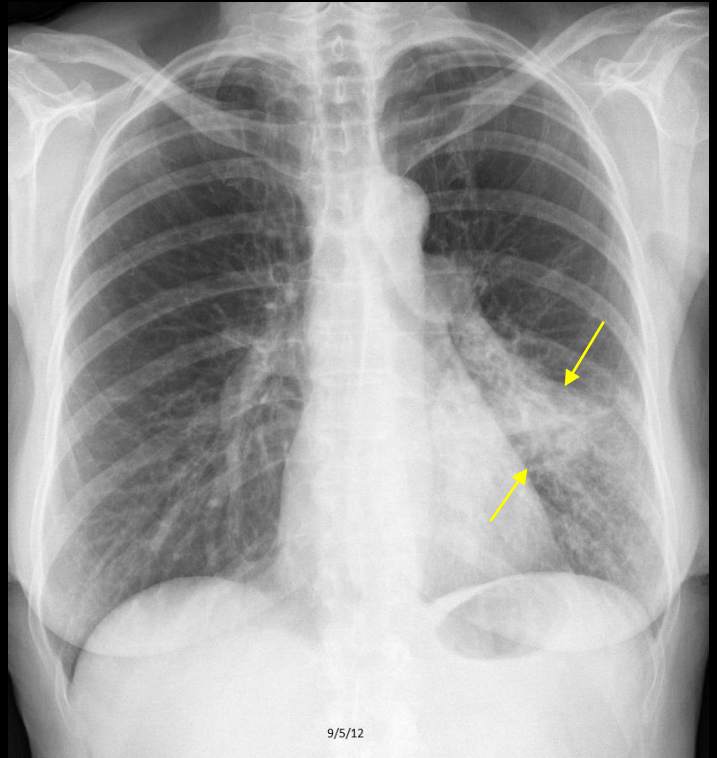
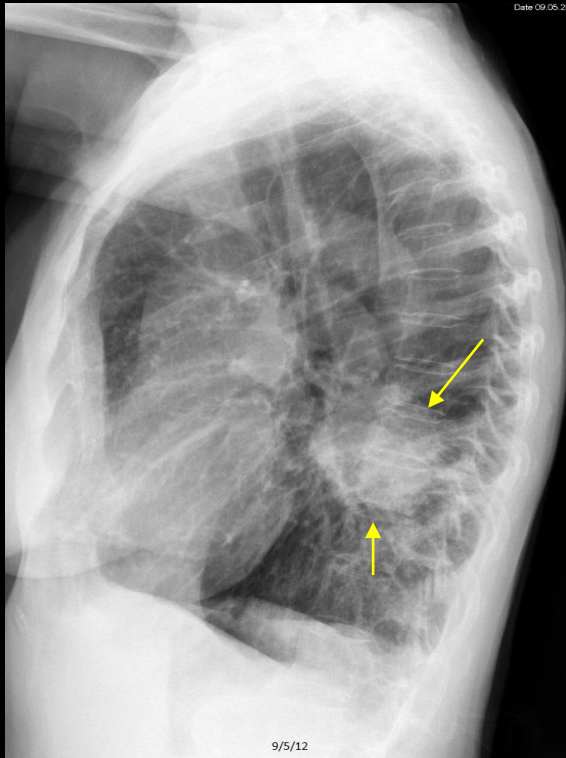
Review Quiz Case 1 of 10

Normal, CHF, Pneumonia, Emphysema, Cardiomegaly without failure, Atelectasis/Scar, or Focal Chest Density?



Review Quiz Case 1 of 10

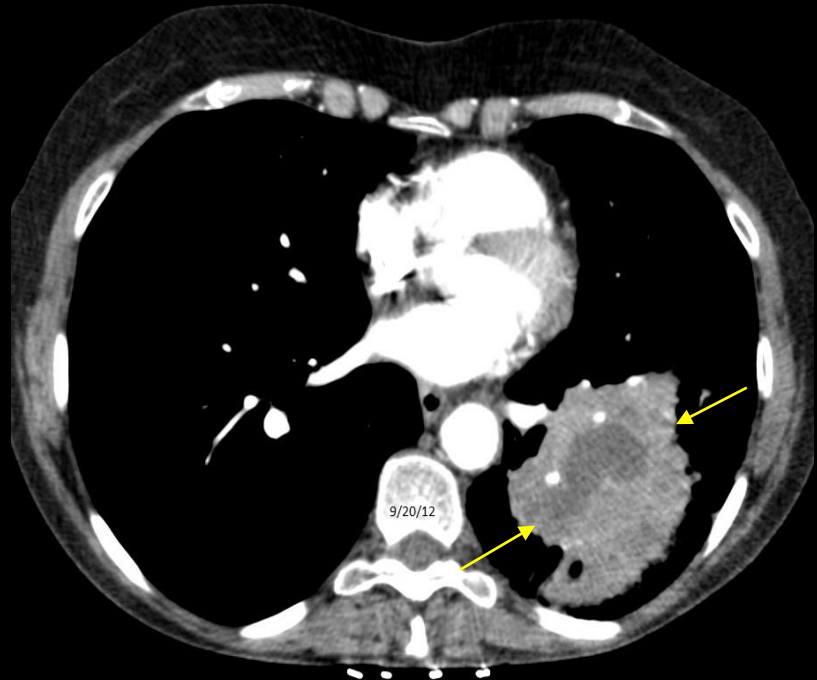
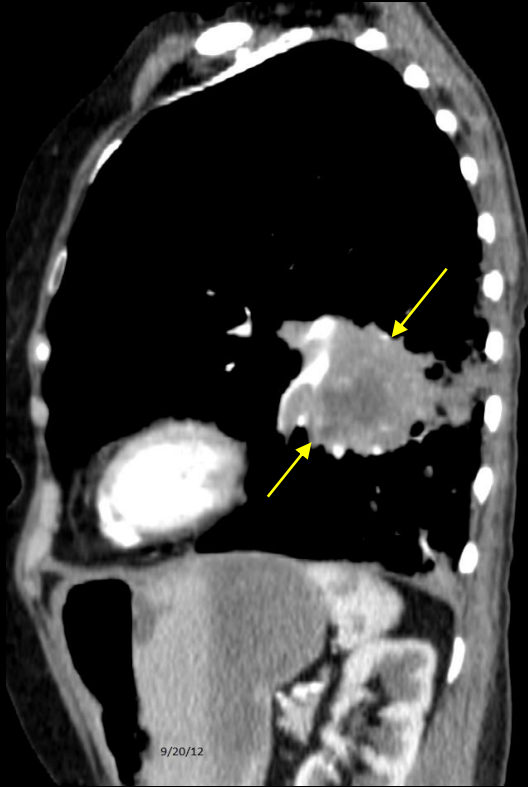
Focal Chest Density



C164. 64 year old woman with cough. **Left lung density.**

Review Quiz Case 1 of 10

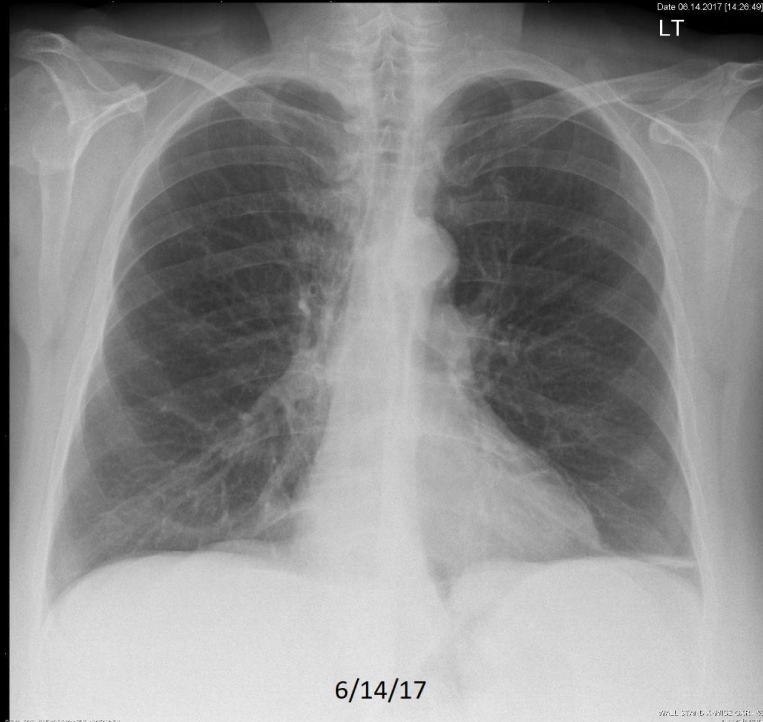
Focal Chest Density



C164. 64 year old woman with cough. **Left lung density.** Non small-cell lung cancer.

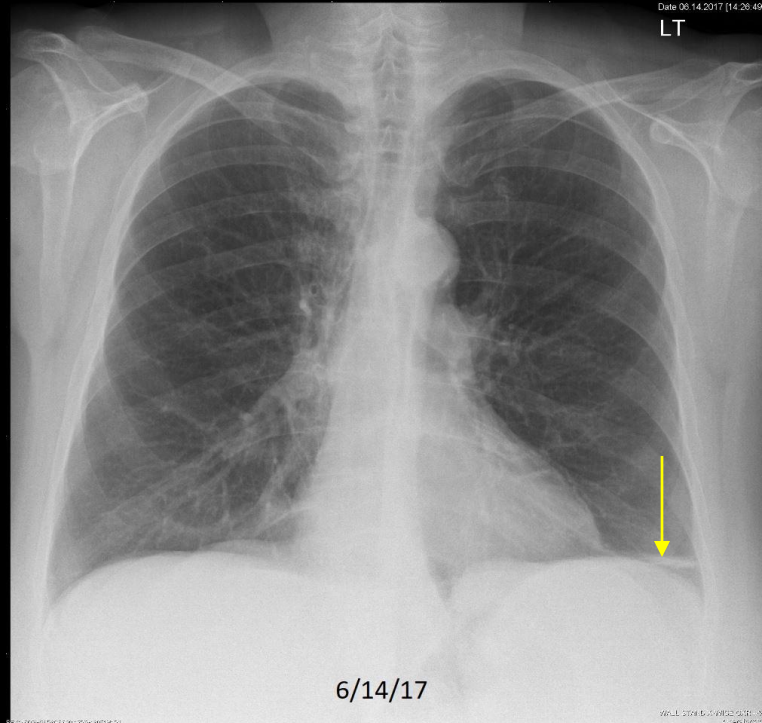
Review Quiz Case 2 of 10

Normal, CHF, Pneumonia, Emphysema, Cardiomegaly without failure, Atelectasis/Scar, or Focal Chest Density?



Review Quiz Case 2 of 10

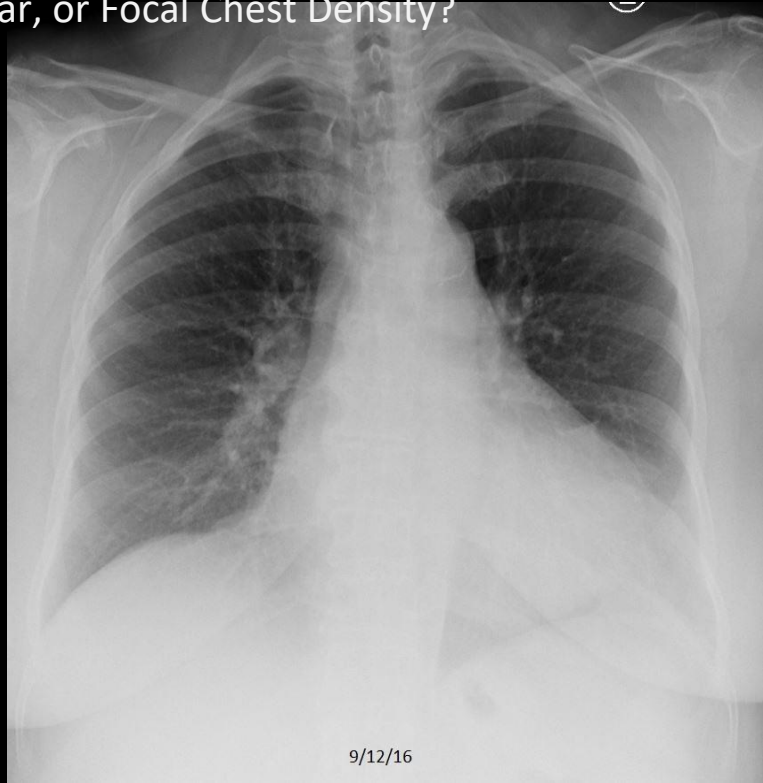
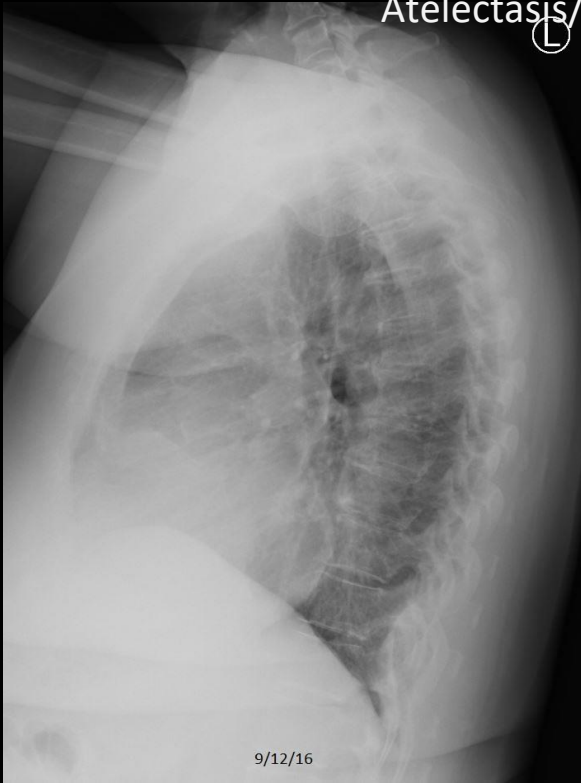
Atelectasis/Scar



C629. 64 year old man with dyspnea. Linear opacity of the left lung base.

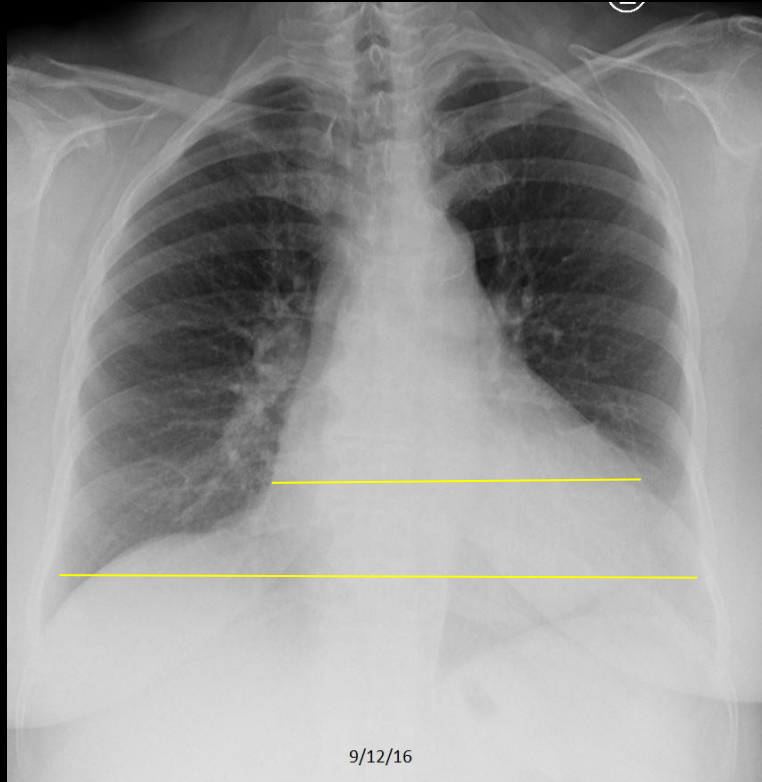
Review Quiz Case 3 of 10

Normal, CHF, Pneumonia, Emphysema, Cardiomegaly without failure, Atelectasis/Scar, or Focal Chest Density?



Review Quiz Case 3 of 10

Cardiomegaly without failure



C601. 65 year old woman with cough. **Cardiomegaly.** The cardiothoracic ratio is 0.58. Ratios over 0.50 and increases from prior are abnormal.

Review Quiz Case 4 of 10

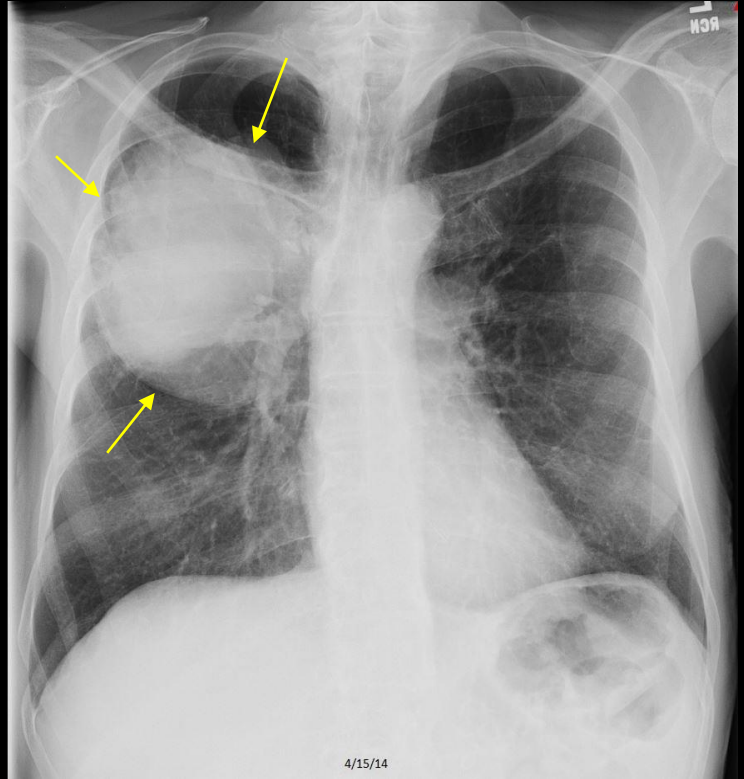
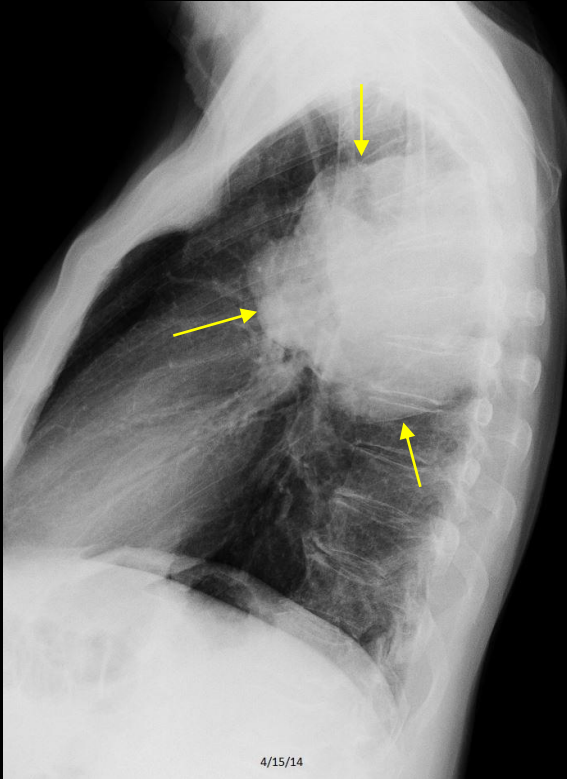
Normal, CHF, Pneumonia, Emphysema, Cardiomegaly without failure, Atelectasis/Scar, or Focal Chest Density?



C165. 70 year old man with hemoptysis.

Review Quiz Case 4 of 10

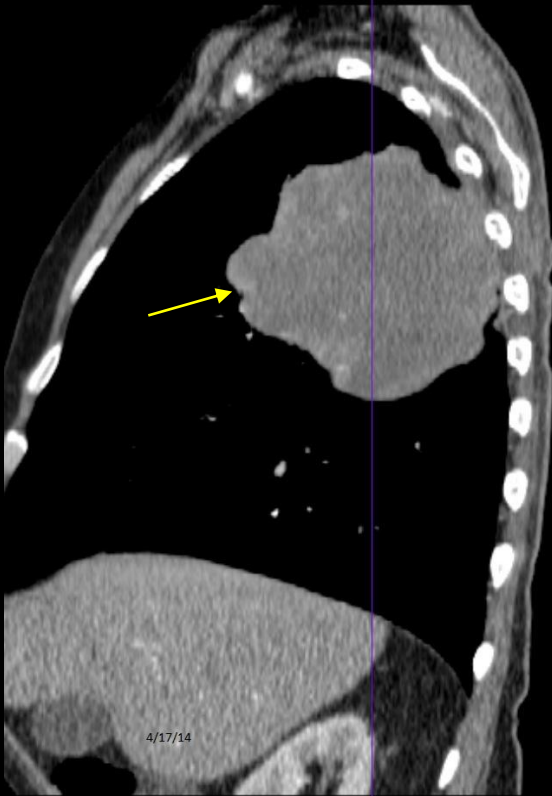
Focal Chest Density



C165. 70 year old man with hemoptysis. Right lung mass.

Review Quiz Case 4 of 10

Focal Chest Density



C165. 70 year old man with hemoptysis. **Right lung mass.** Lung cancer.

Review Quiz Case 5 of 10

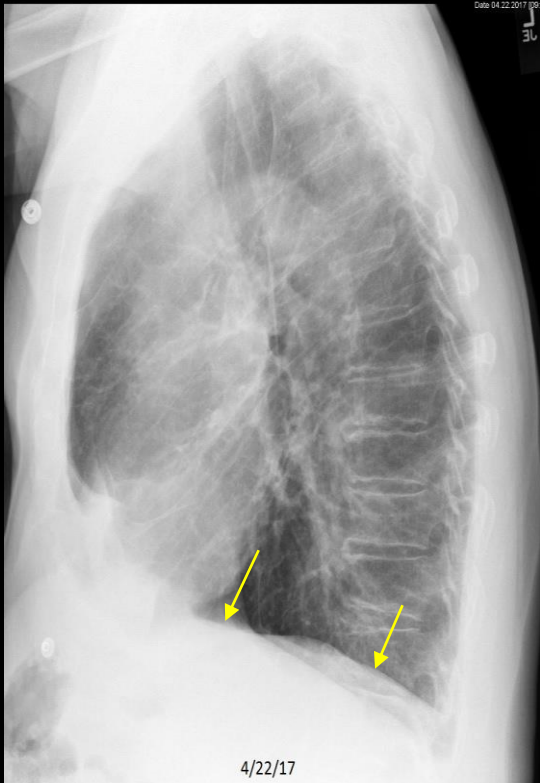
Normal, CHF, Pneumonia, Emphysema, Cardiomegaly without failure, Atelectasis/Scar, or Focal Chest Density?



C363. 65 year old man with chest pain.

Review Quiz Case 5 of 10

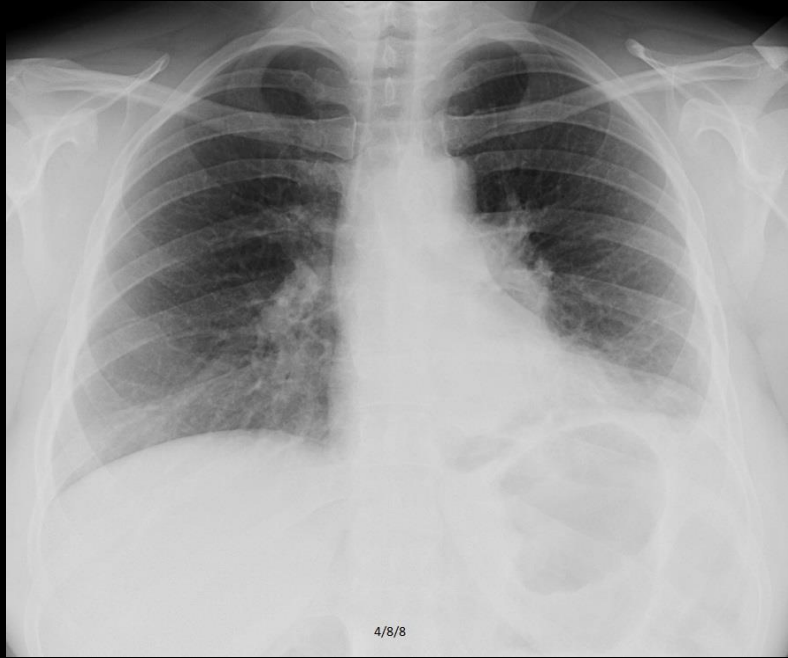
Emphysema



C363. 65 year old man with chest pain. Hyperinflated lungs with flattening of the diaphragm.

Review Quiz Case 6 of 10

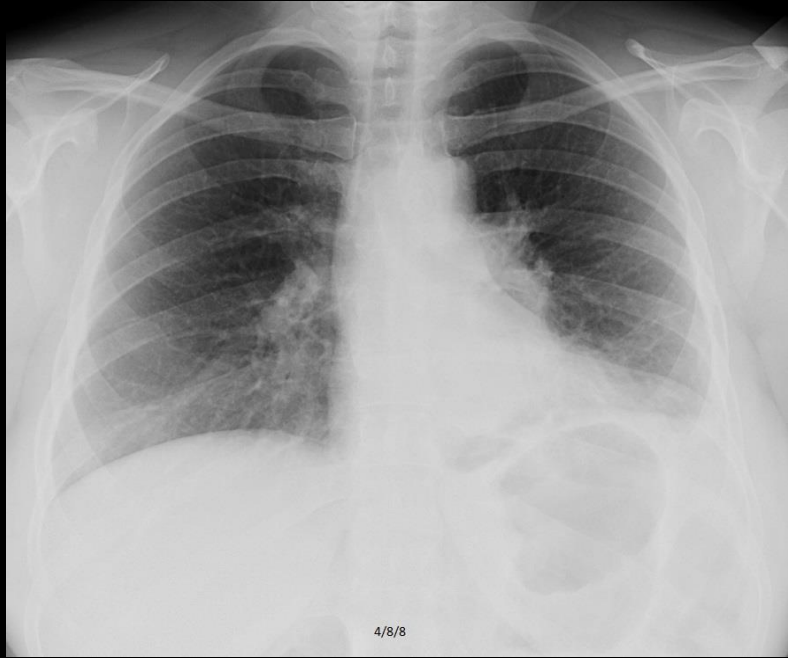
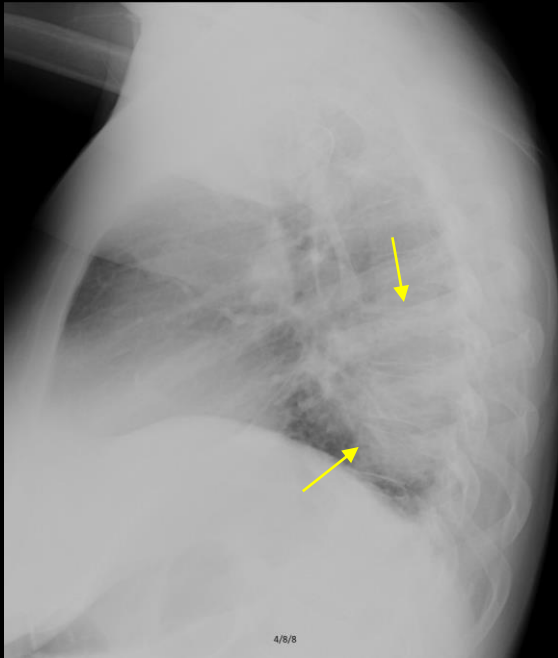
Normal, CHF, Pneumonia, Emphysema, Cardiomegaly without failure, Atelectasis/Scar, or Focal Chest Density?



C174. 41 year old woman with cough, fever, and an elevated WBC count.

Review Quiz Case 6 of 10

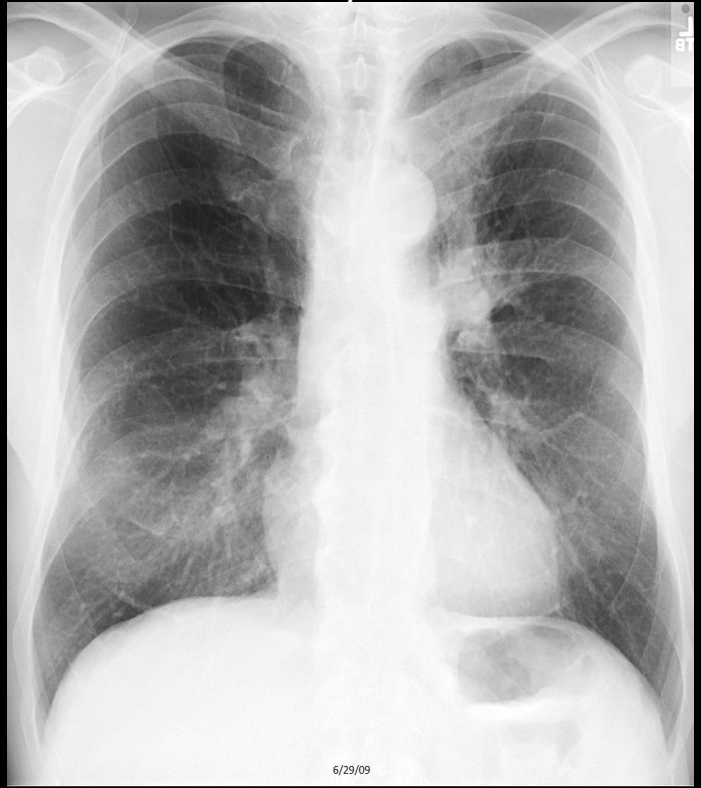
Pneumonia



C174. 41 year old woman with cough, fever, and an elevated WBC count. **There is left lung opacity best seen on the lateral study.** Note that without the history of fever and cough, this case would have been placed in the "Focal Chest Density" category (and some radiologists may place it in that category anyway, and advise CT study).

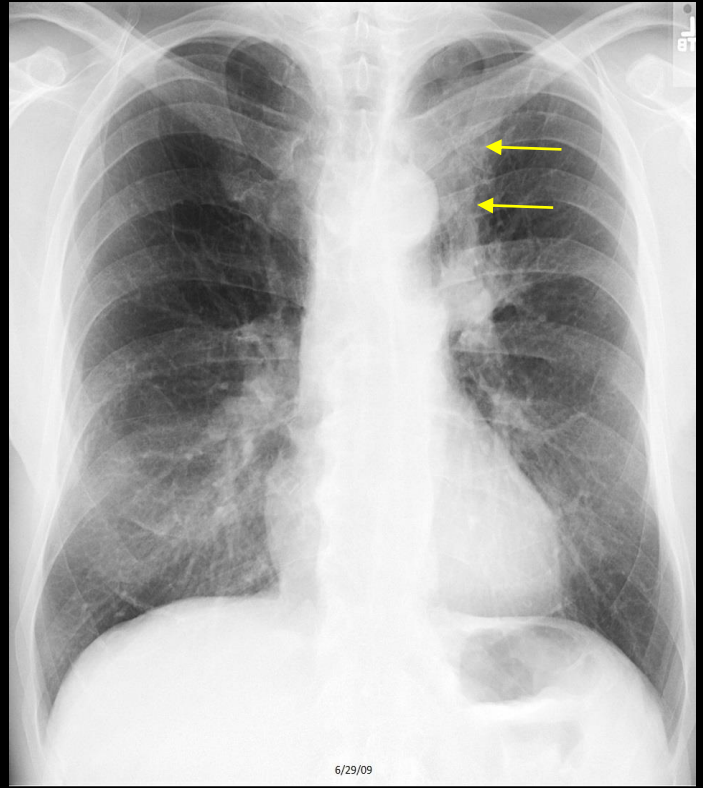
Review Quiz Case 7 of 10

Normal, CHF, Pneumonia, Emphysema, Cardiomegaly without failure, Atelectasis/Scar, or Focal Chest Density?



Review Quiz Case 7 of 10

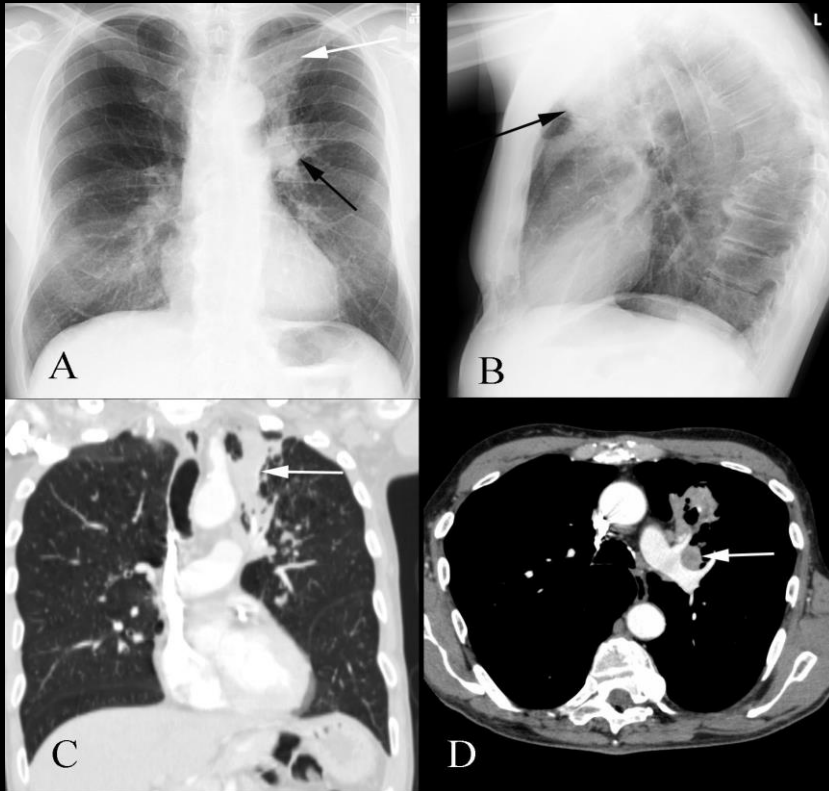
Focal Chest Density



C166. 68 year old smoker with cough and hemoptysis. **Left lung density.**

Review Quiz Case 7 of 10

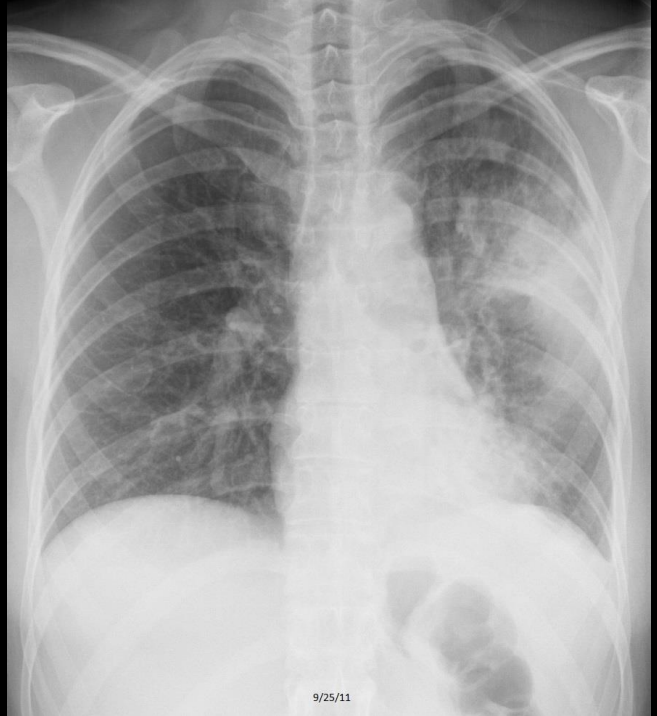
Focal Chest Density



C166. 68 year old smoker with cough and hemoptysis. Left lung density. Non small-cell lung cancer. The patient also has fusion of multiple mid vertebral bodies.

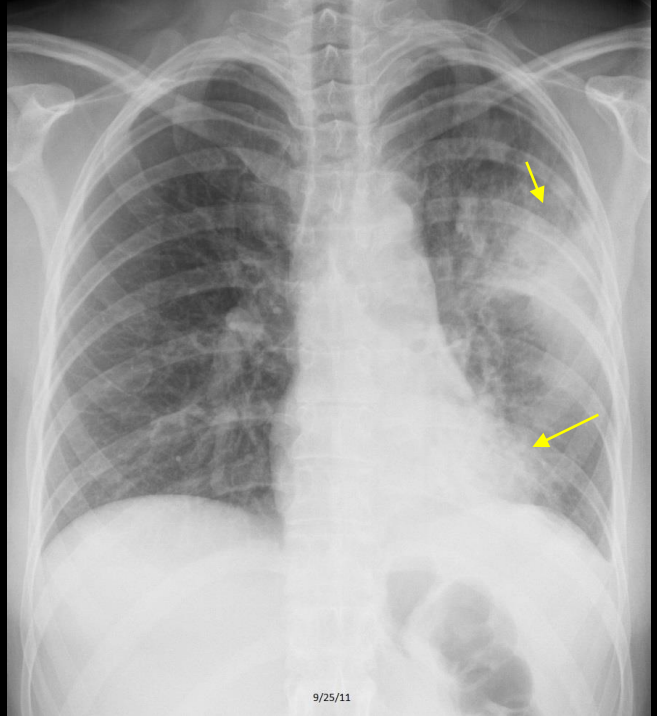
Review Quiz Case 8 of 10

Normal, CHF, Pneumonia, Emphysema, Cardiomegaly without failure, Atelectasis/Scar, or Focal Chest Density?



Review Quiz Case 8 of 10

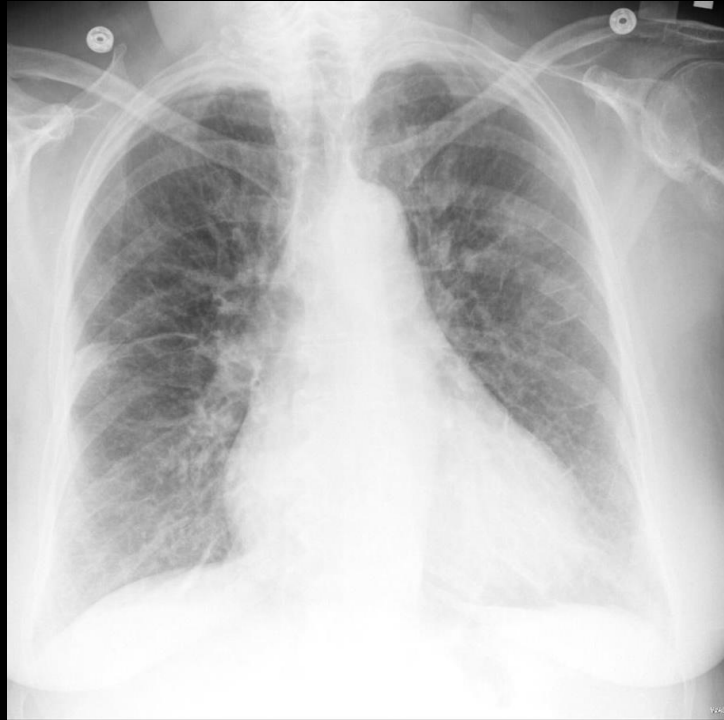
Pneumonia



C564. 36 year old woman with cough and fever. Multifocal opacity of the left lung.

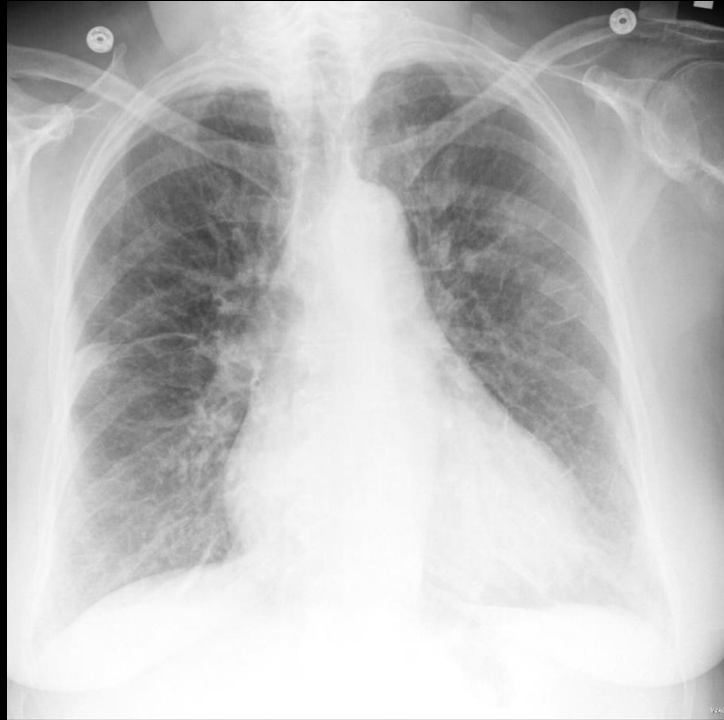
Review Quiz Case 9 of 10

Normal, CHF, Pneumonia, Emphysema, Cardiomegaly without failure, Atelectasis/Scar, or Focal Chest Density?



C572. 74 year old woman with acute shortness of breath.

Review Quiz Case 9 of 10 Congestive heart failure.



C572. 74 year old woman with acute shortness of breath. **Cardiomegally, diffuse increased lung density, prominent upper lobe pulmonary vessels, peribronchial cuffing, and indistinct vascular margins.**

Review Quiz Case 10 of 10

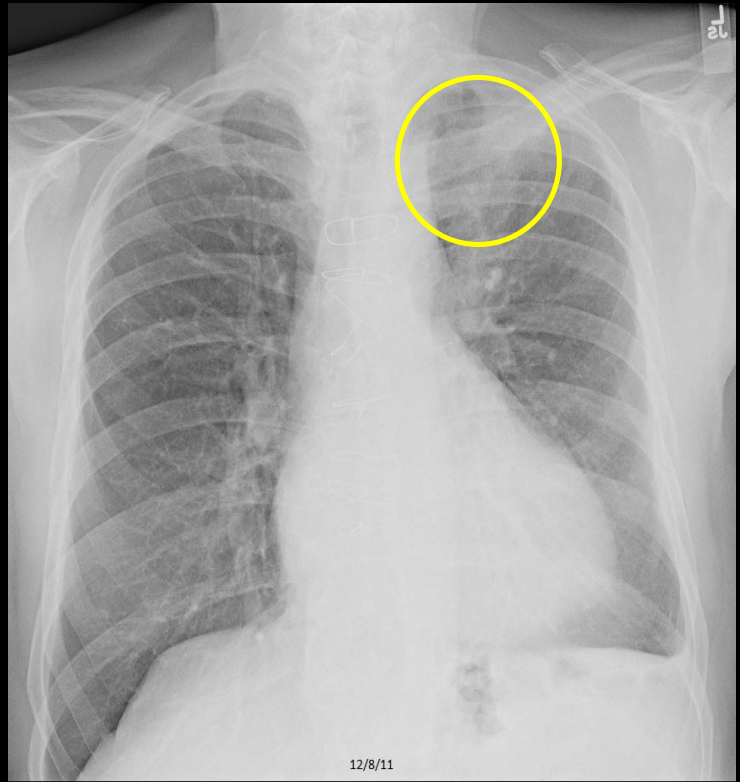
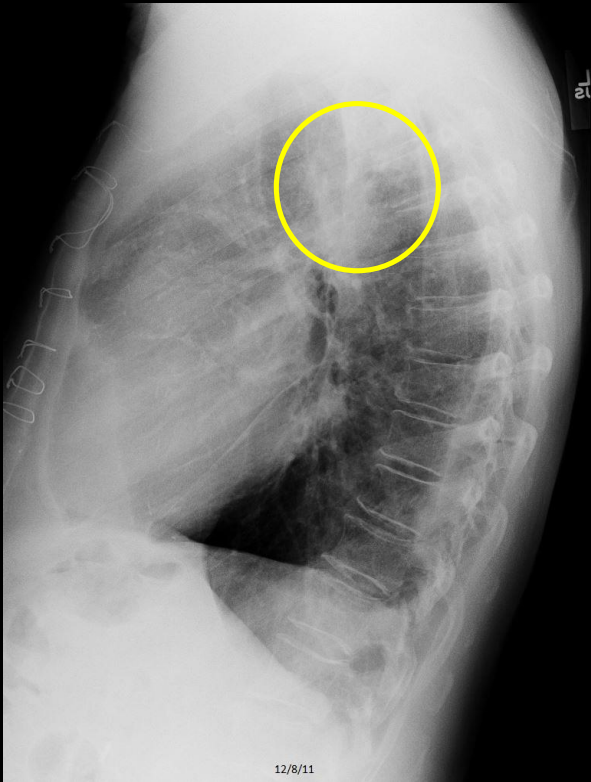
Normal, CHF, Pneumonia, Emphysema, Cardiomegaly without failure, Atelectasis/Scar, or Focal Chest Density?



C167. 84 year old man with hemoptysis. Left lung density.

Review Quiz Case 10 of 10

Focal Chest Density



C167. 84 year old man with hemoptysis. Left lung density.

Review Quiz Case 10 of 10

Focal Chest Density



RECAPITULATION

FOCAL CHEST DENSITY

INDICATIONS: cough, dyspnea, malaise, chest pain.

FINDINGS: Focal chest density. It may be difficult or impossible to differentiate masses from consolidation (or a combination of mass and consolidation), or lung, mediastinal, or chest wall masses. In addition, in cases of obvious lung consolidation without clinical features of pneumonia, pulmonary infarction should be considered. Although textbooks often differentiate these entities (and while this may be a valuable academic exercise), if the finding is new and the patient does not have a known cause for the abnormality, virtually all these cases need evaluation with CT. Indeed, the category might well be called "Chest abnormality that needs further evaluation with a CT study".

IMPRESSION: Describe density. Usually, recommend CT study for further evaluation.

Chest Radiography
End of Lecture 7
Focal Chest Density

Go to Lecture 8
Pleural Effusion