INTERACTIVE SESSION CHEST & CARDIOVASCULAR RADIOLOGY

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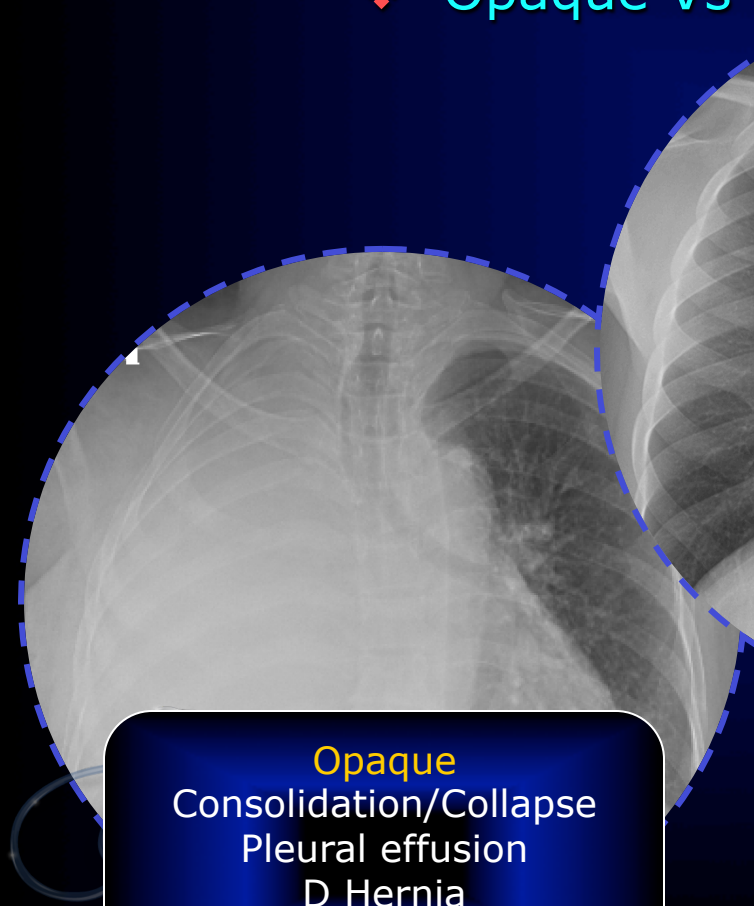
OBJECTIVES

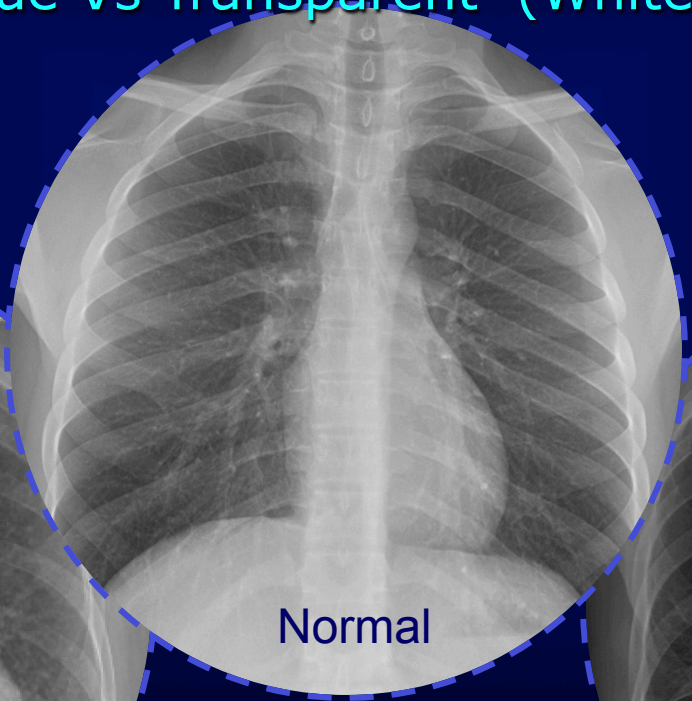
Students at the end of the lecture will be able to:

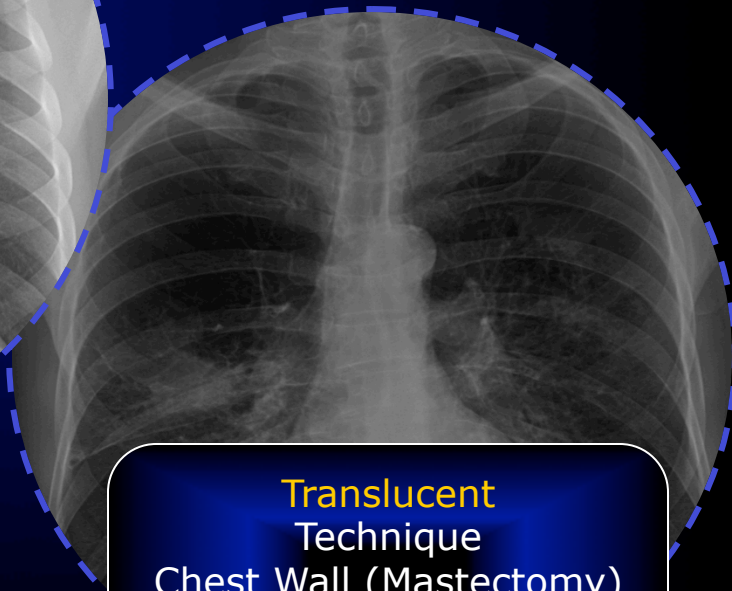
- Recognize different terms utilized in chest & cardiovascular radiography
- Develop a consistent and simplified technique for reading CXR
- Define the chest pattern of abnormality seen on the CXR

IMPORTANT TERMS

- Opaque Vs Transparent (White vs Black)





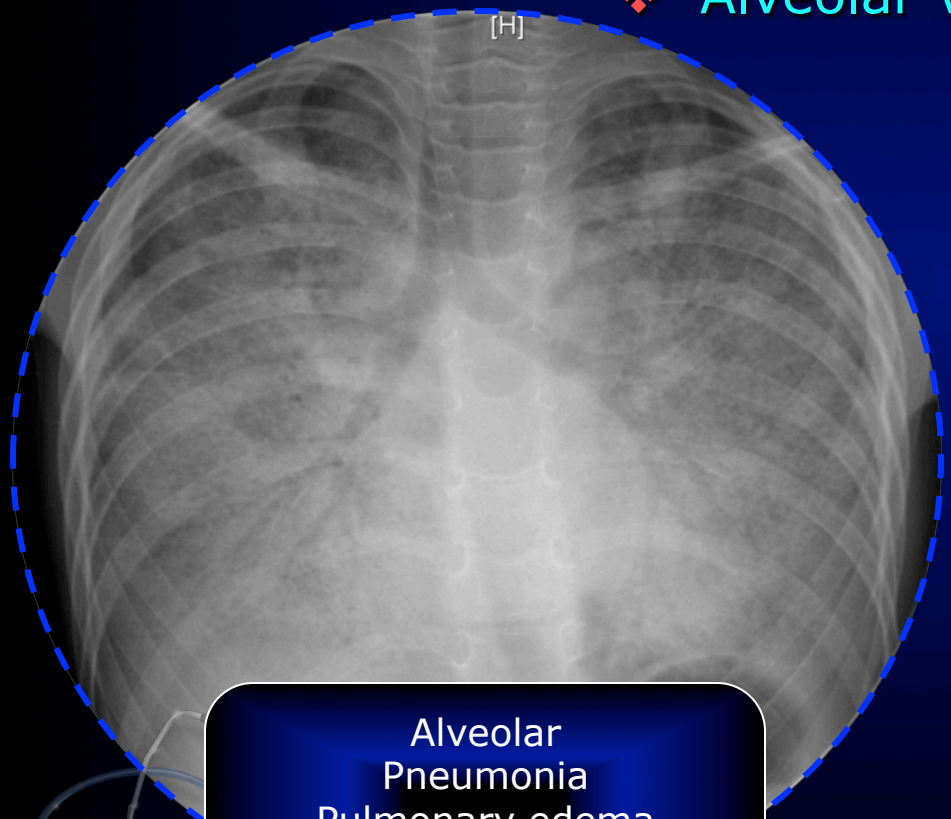


Opaque
Consolidation/Collapse
Pleural effusion
D Hernia
Agenesis/pnemonectomy

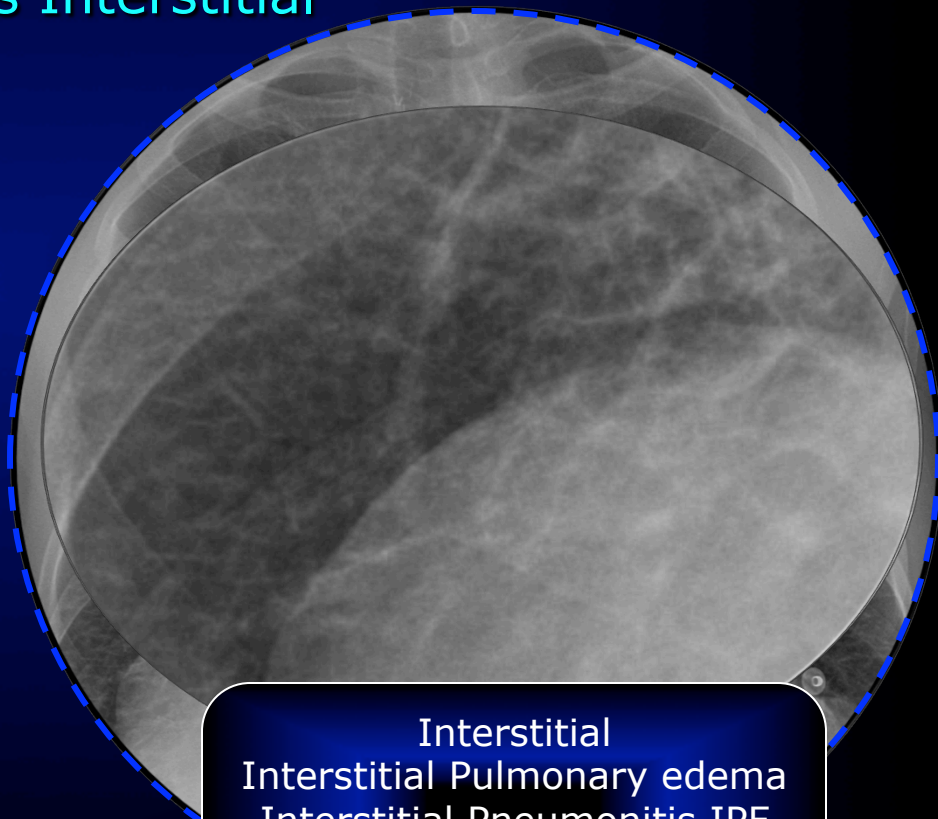
Translucent
Technique
Chest Wall (Mastectomy)
Pneumothorax
Emphysema

IMPORTANT TERMS

- Alveolar Vs Interstitial



Alveolar
Pneumonia
Pulmonary edema
Pulmonary Hemorrhage
Alveolar cell carcinoma

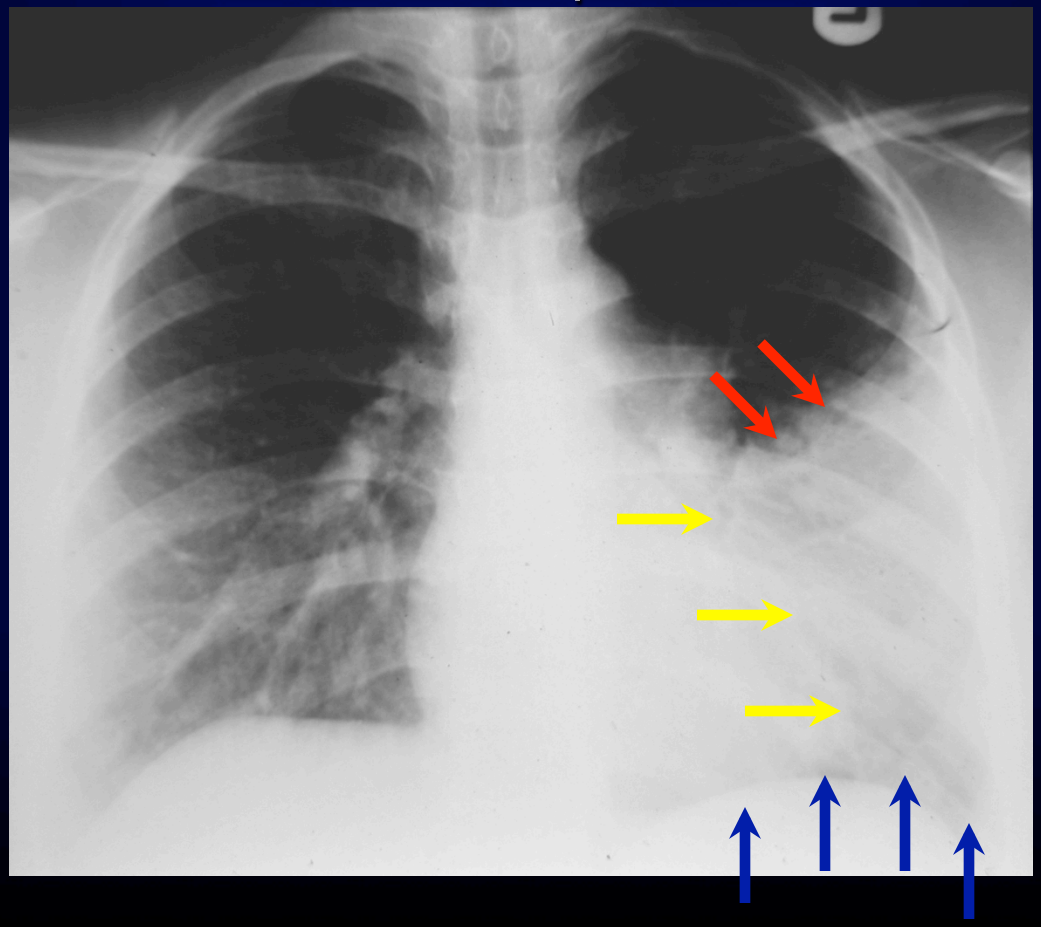


Interstitial
Interstitial Pulmonary edema
Interstitial Pneumonitis IPF
Lymphangitis Carcinomatosis

IMPORTANT TERMS

- Silhouette Sign

Alveolar or Airspace disease



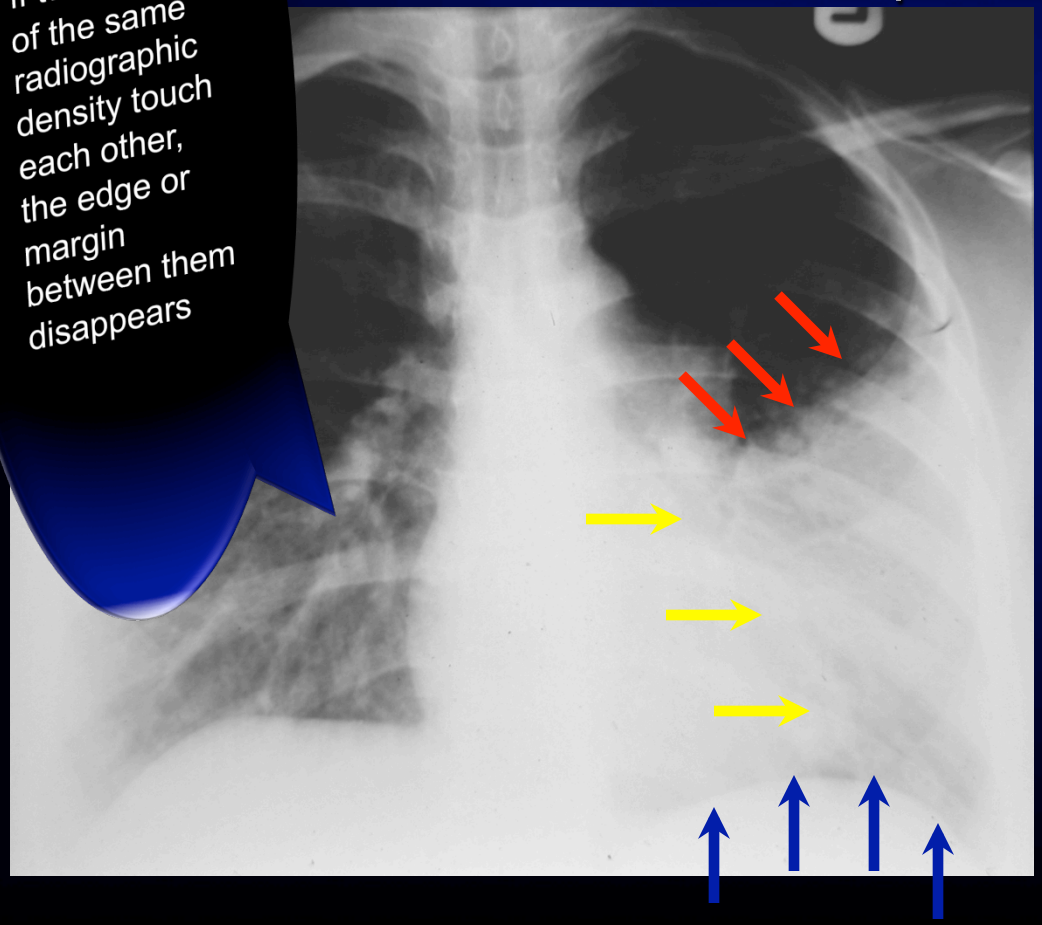
IMPORTANT TERMS

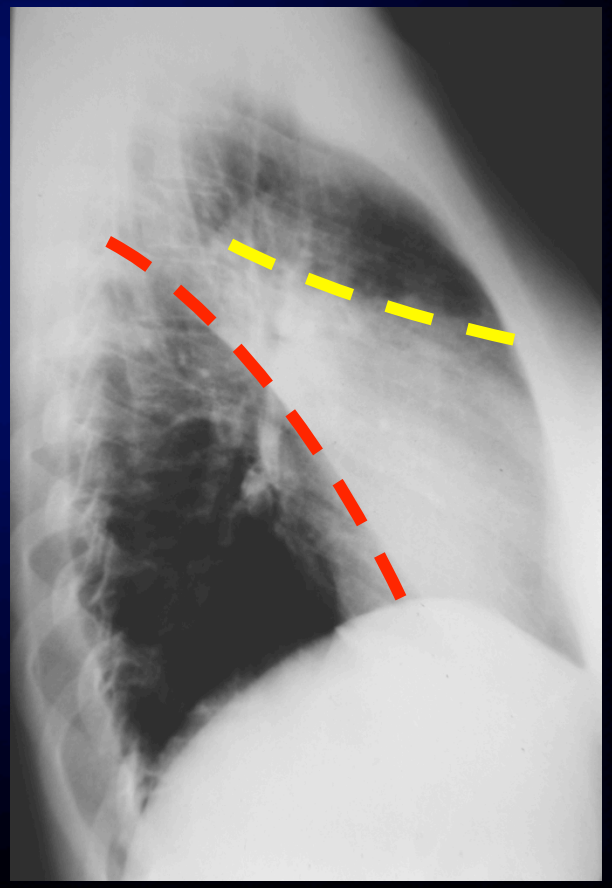
Silhouette Sign

If two objects of the same radiographic density touch each other, the edge or margin between them disappears

- Silhouette Sign

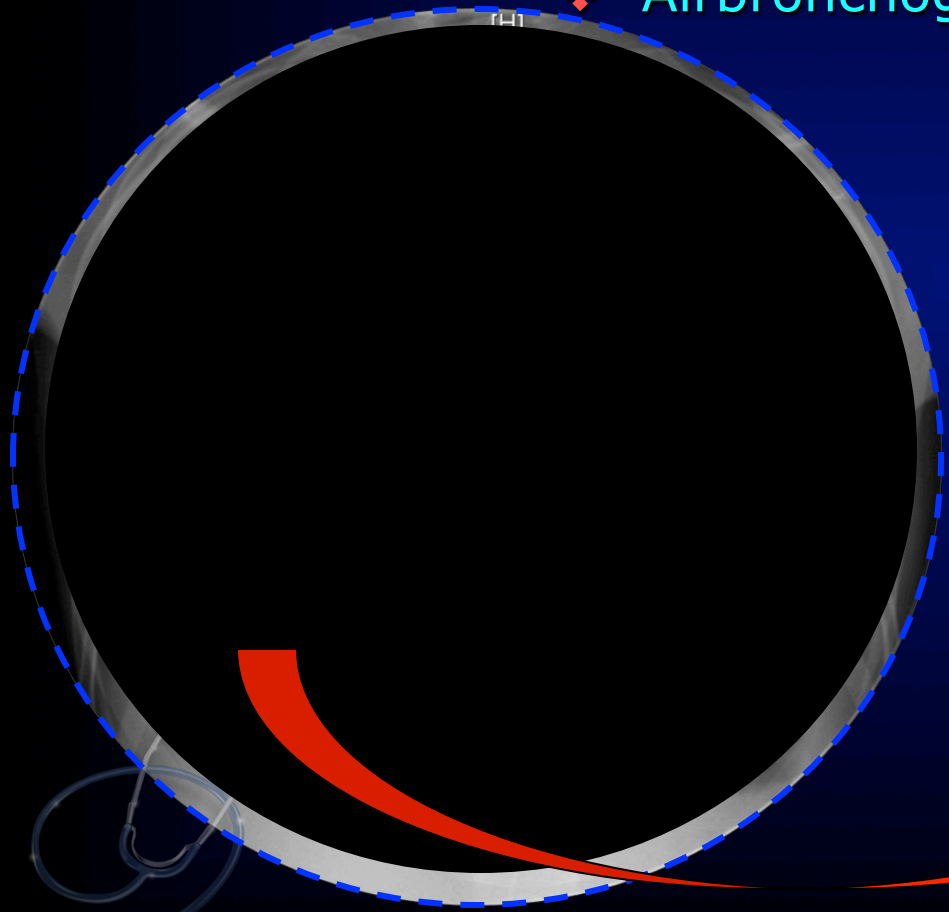
Alveolar or Airspace disease

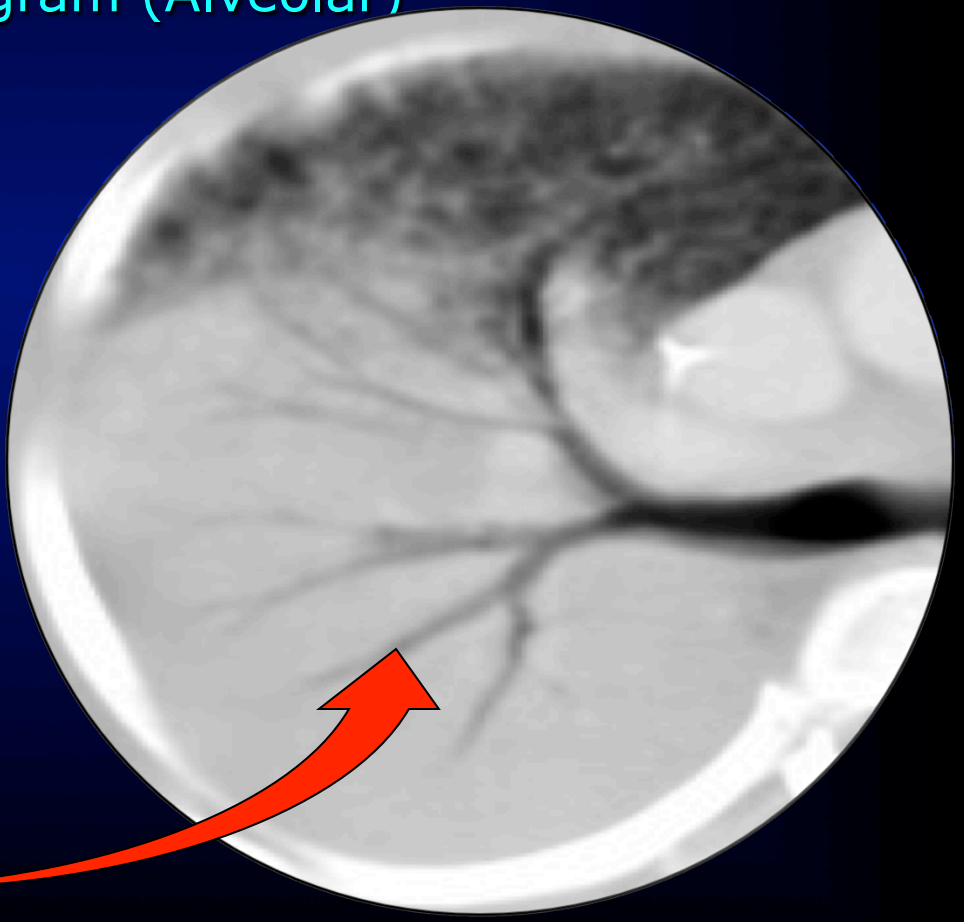




IMPORTANT TERMS

- Airbronchogram (Alveolar)





IMPORTANT TERMS

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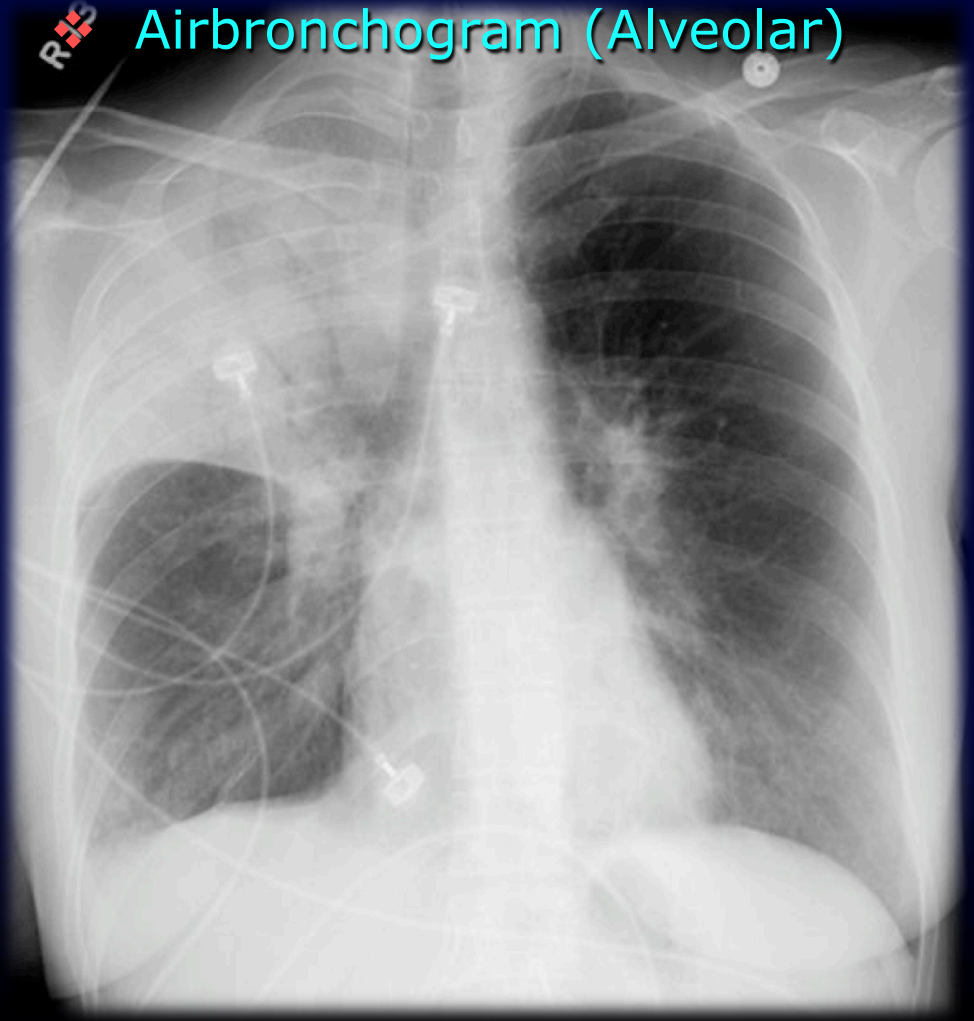
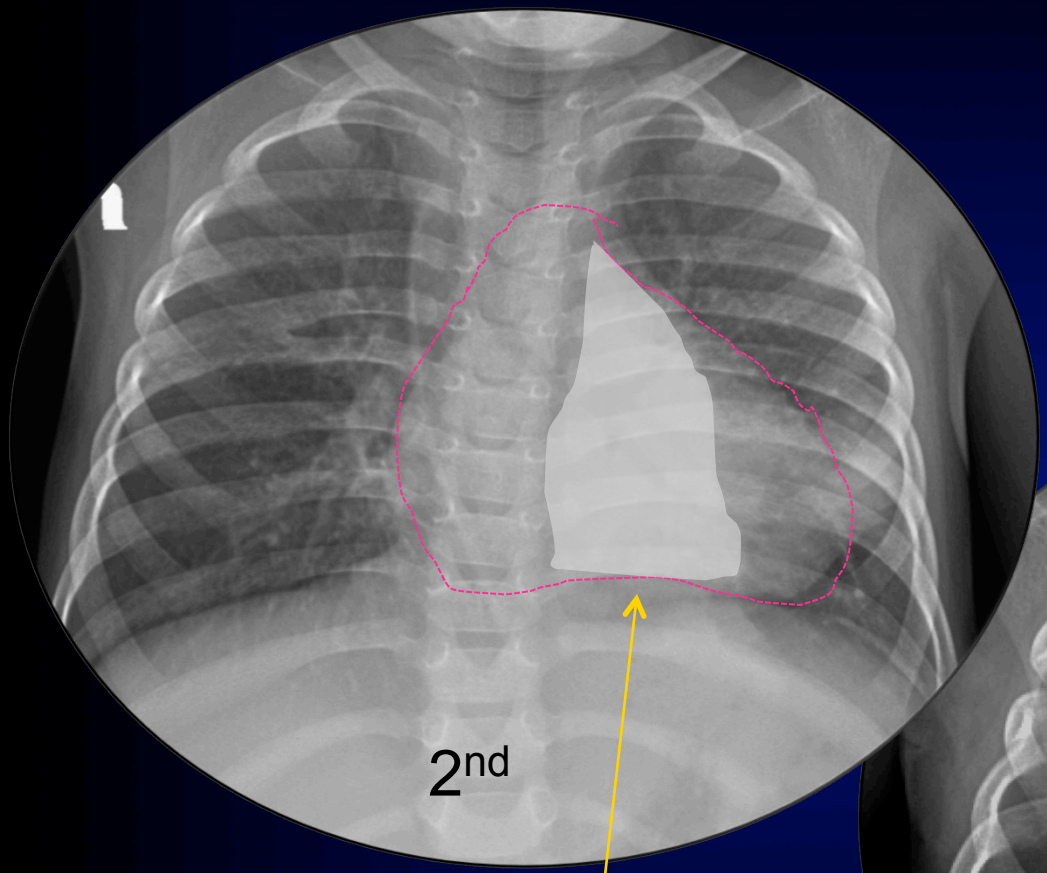


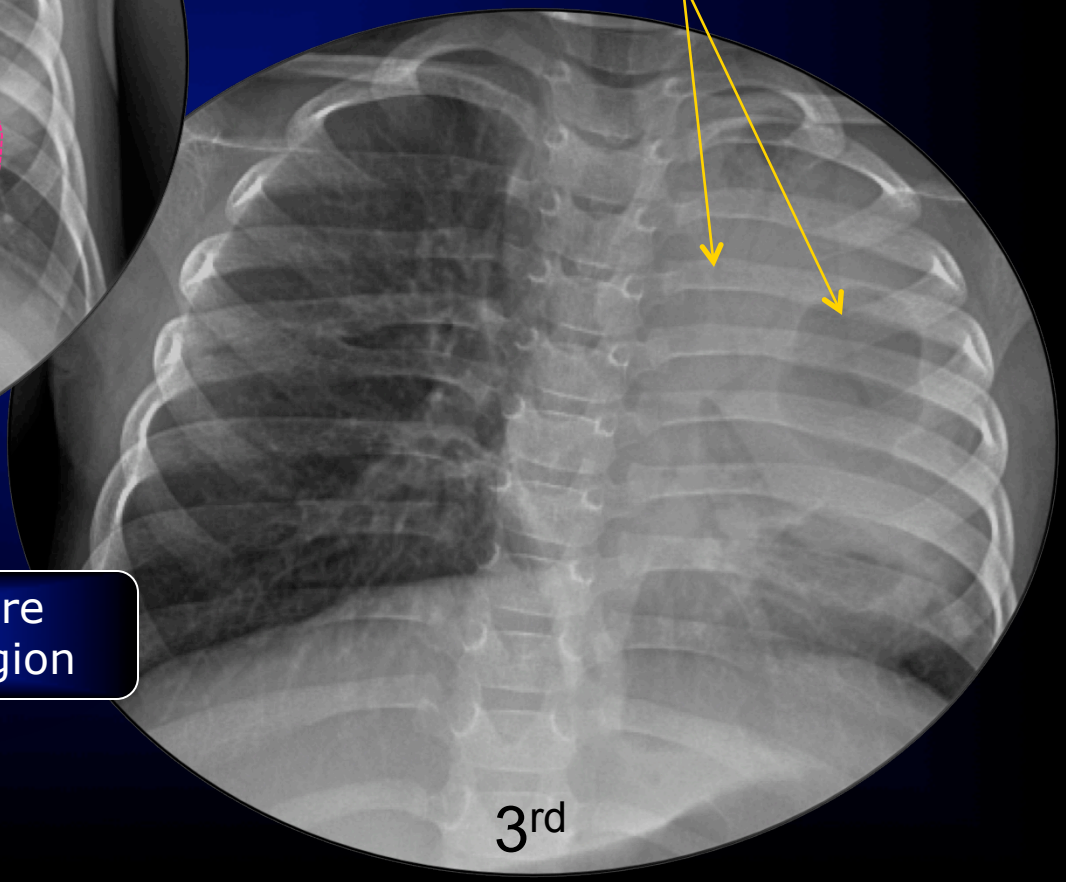
Child presenting with cough and fever

Child presenting with cough and fever



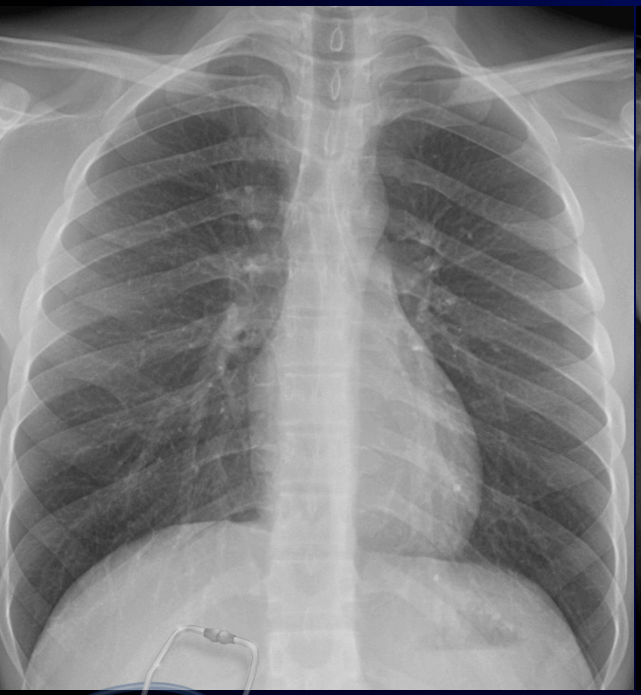
Consolidation become more obvious in retro-cardiac region

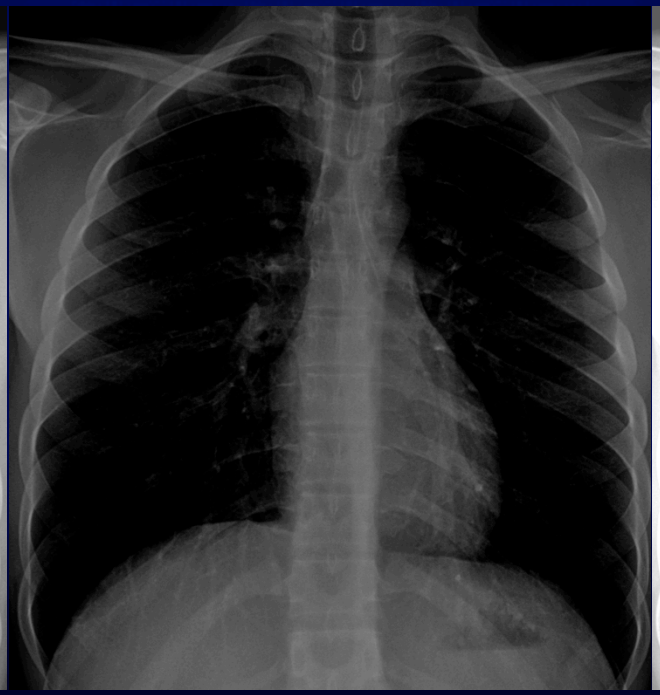
Air-bronchogram is more clear here with development of cavitation



IMPORTANT TERMS

- Adequate Exposure





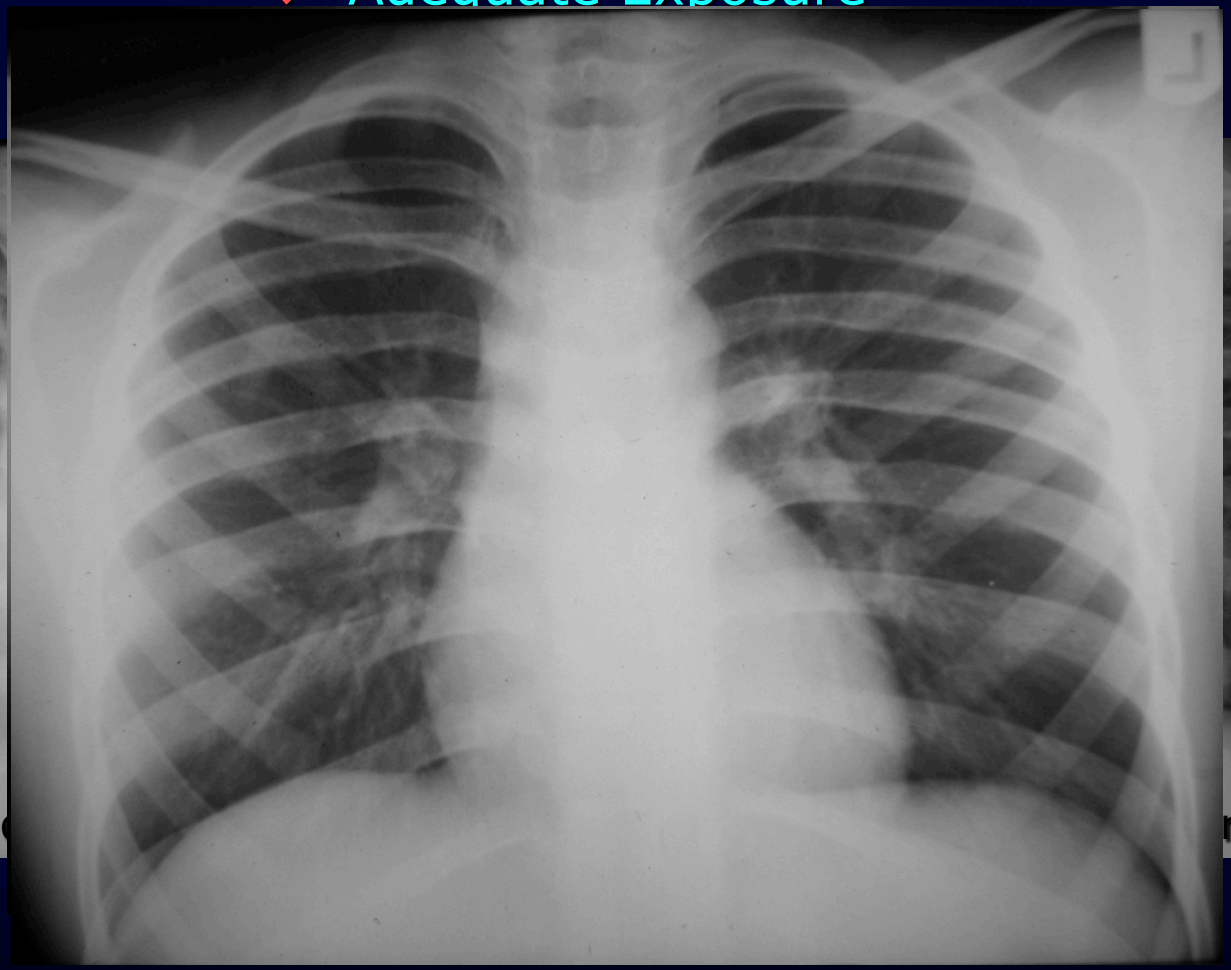
ADEQUATE

OVER

UNDER

IMPORTANT TERMS

- Adequate Exposure



Interpretation

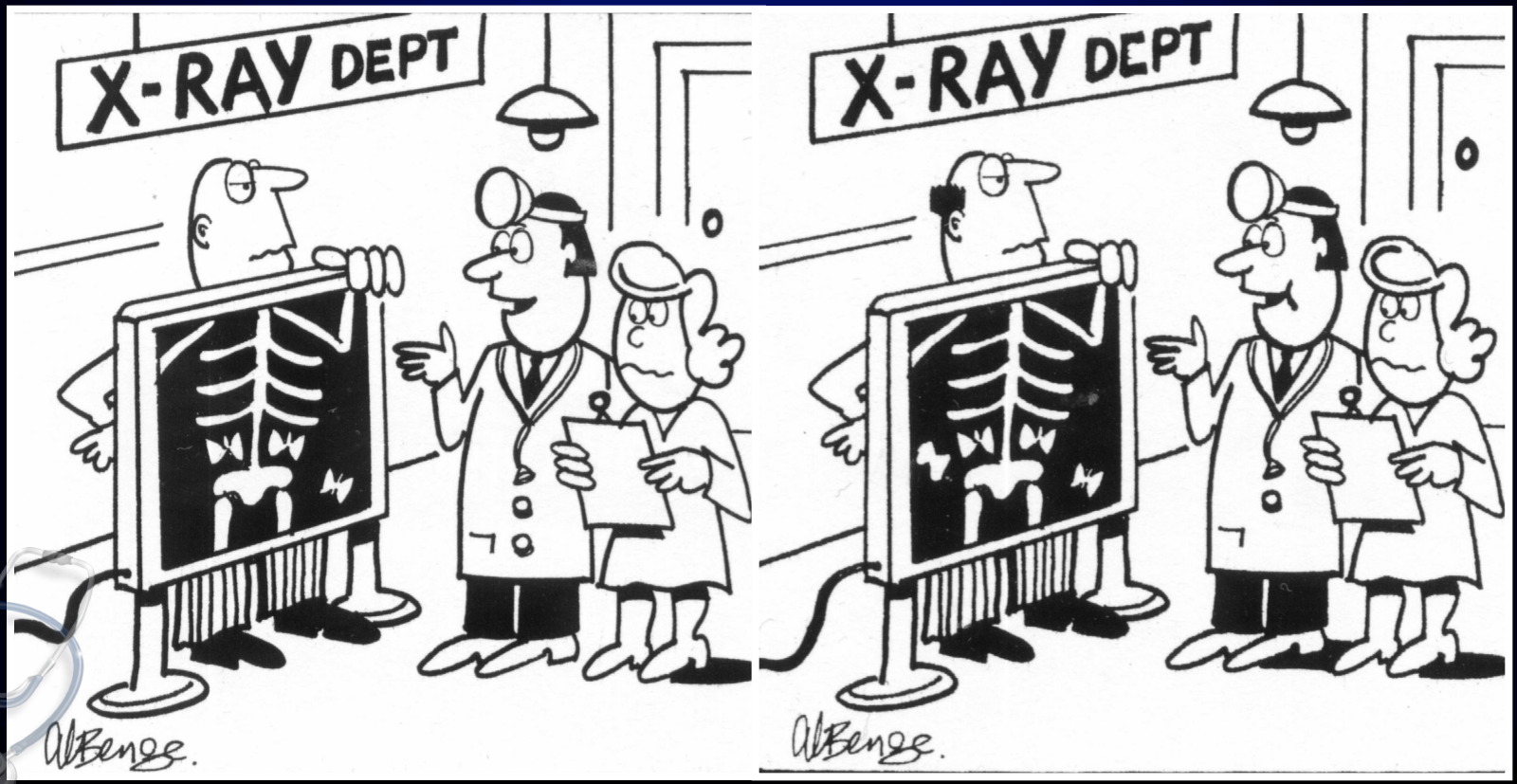
Reading X-rays is like those quizzes in the newspaper were they say:

“Our artist made ten changes when copying the picture”.

Can you spot them?

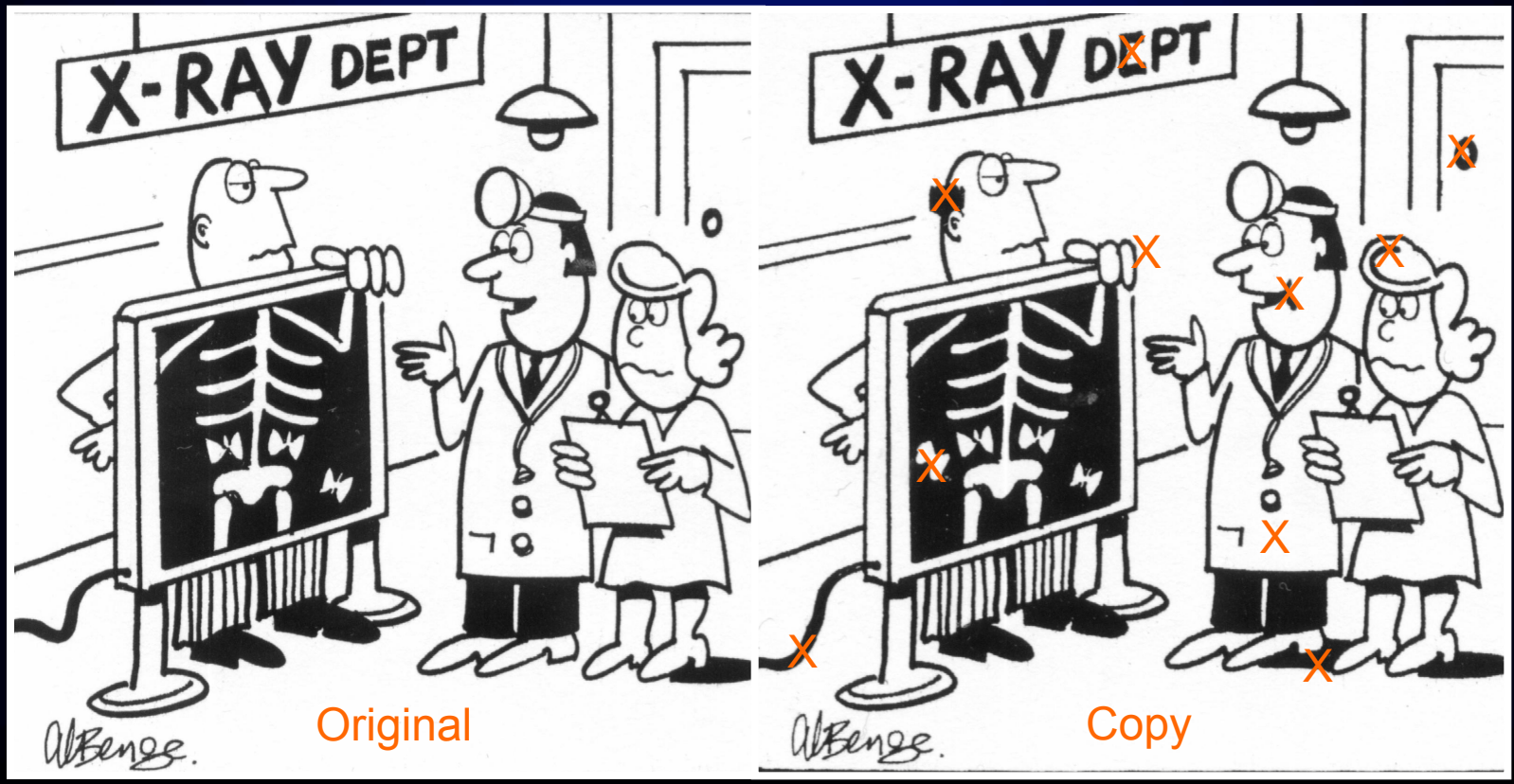
Interpretation

SPOT THE DIFFERENCE



Interpretation

SPOT THE DIFFERENCE



Interpretation

In radiology the original is not given for comparison

No one to say how many changes there are?

The original or normal radiograph of a person of a certain age and sex is a mental image that must be developed.

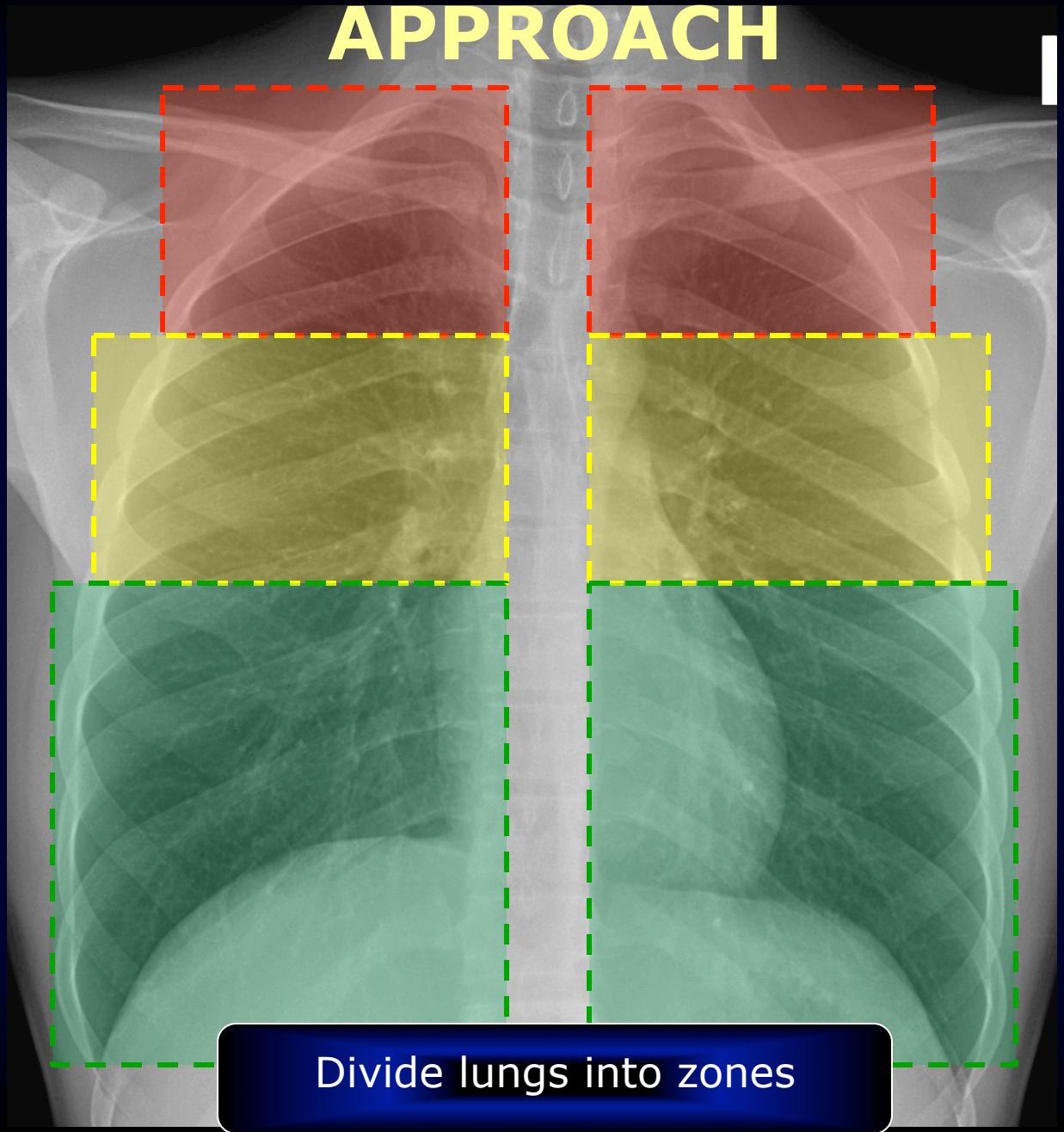
The best way to build up this mental picture is to understand the anatomy of that region and its variations

The best way interpret the findings is to use a consistent system in analyzing the radiograph

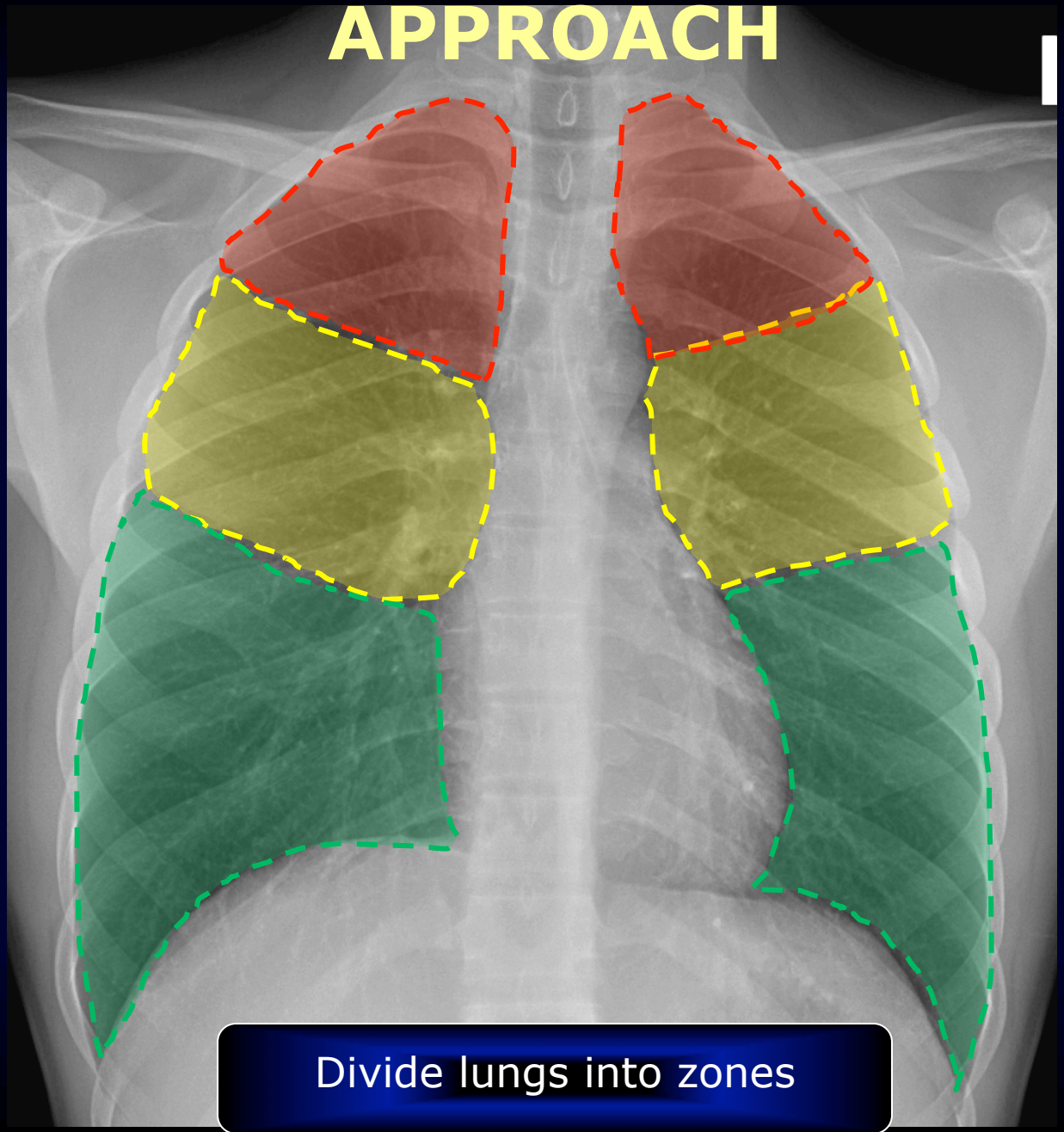
THE CHEST PATTERNS

- Define the chest pattern of abnormality seen on the X-ray.
- Develop appropriate differential for such pattern recognized.
- Decrease your differential by
  - * Careful analysis of the findings
  - * Consider evaluation of previous exams
  - * Correlate with clinical and laboratory data
- Decide for the next step.

APPROACH

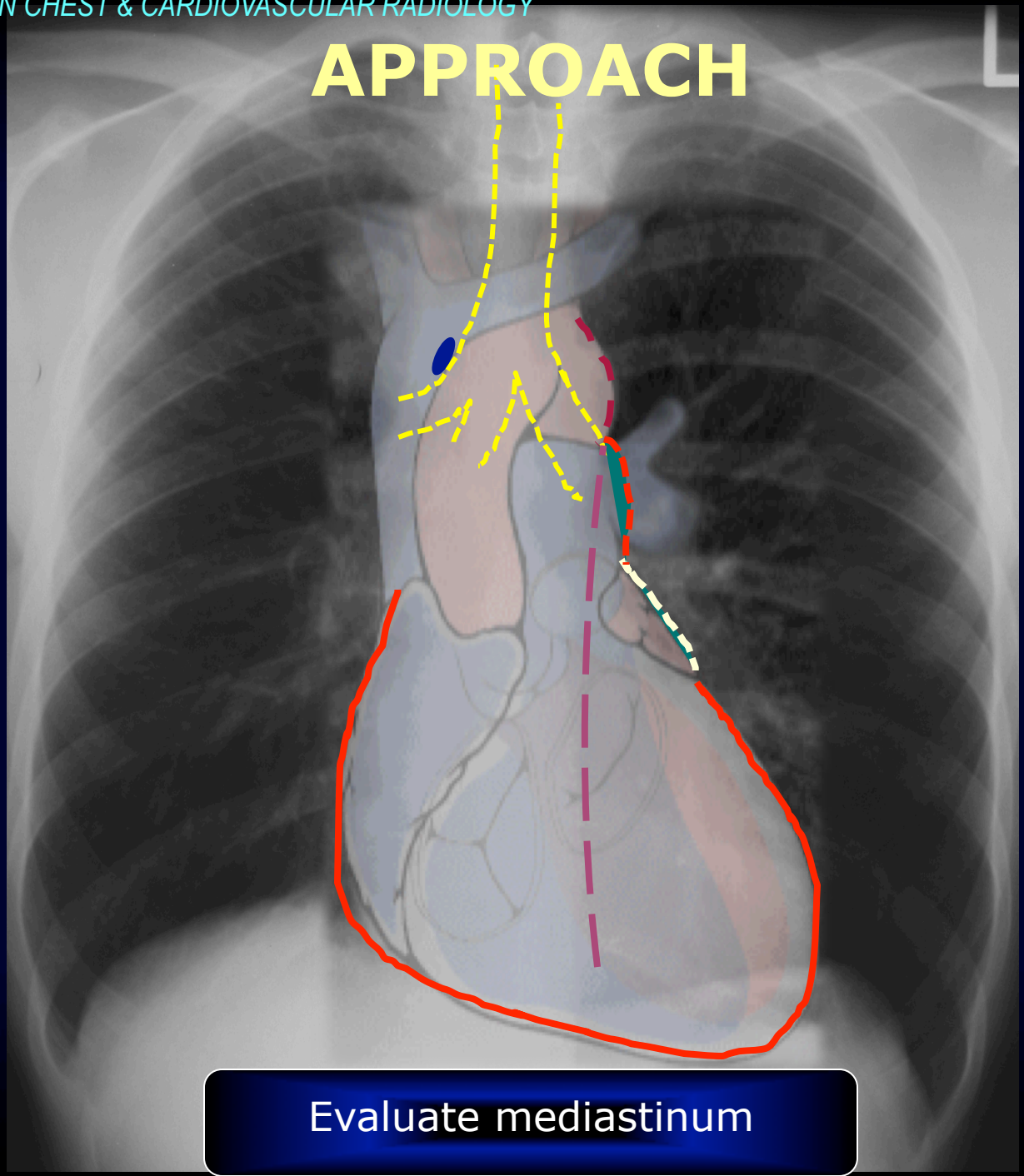


APPROACH



Divide lungs into zones

APPROACH



Evaluate mediastinum

CHEST PATTERNS

- Define the pattern of abnormality seen on the chest X-ray.
- Develop appropriate differential for such pattern recognized.
- Decrease your differential by
  - * Careful analysis of the findings
  - * Consider evaluation of previous exams
  - * Correlate with clinical and laboratory data
- Decide for the next step

CHEST PATTERNS

Examples

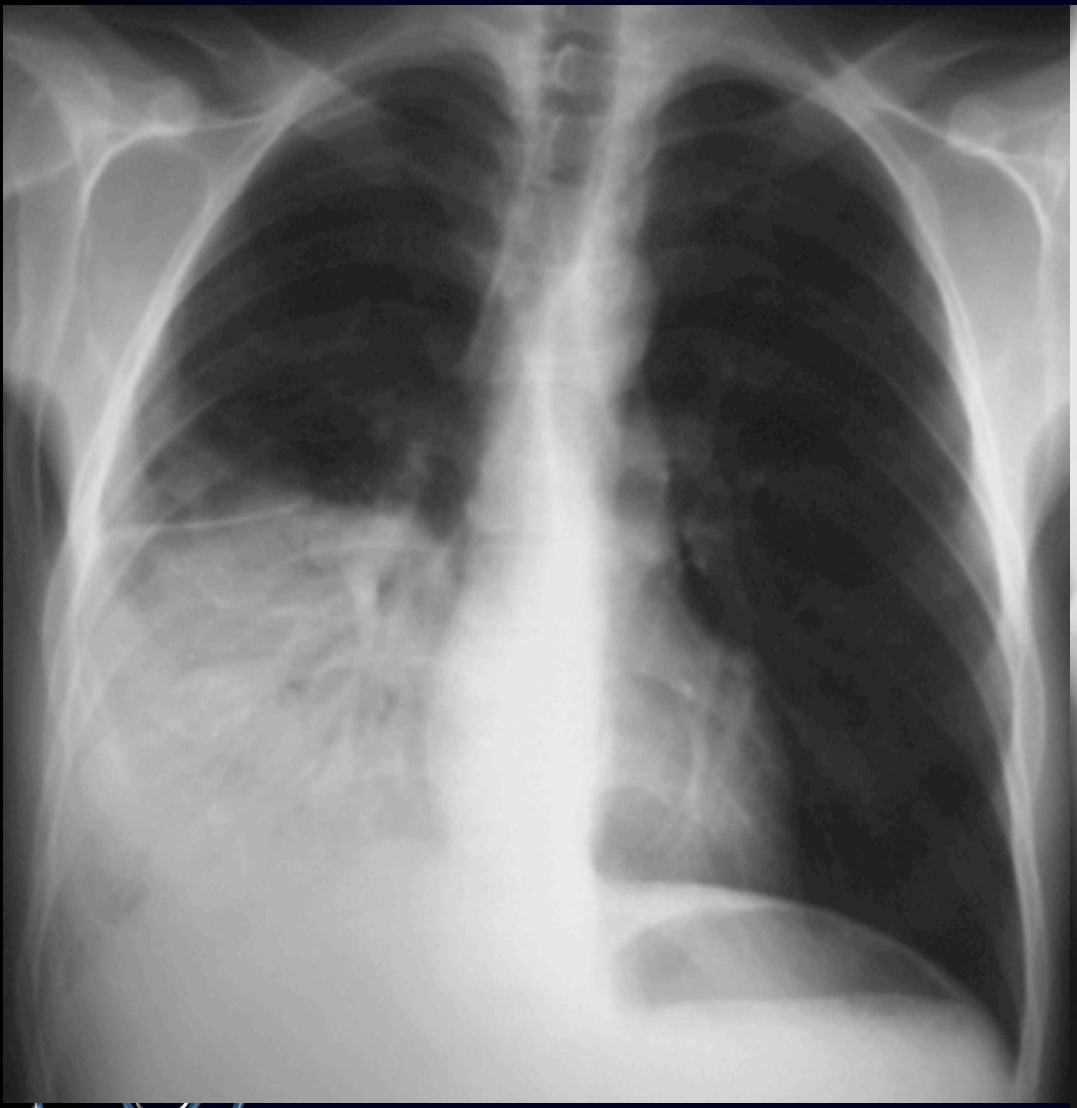
Increased Pulmonary Densities

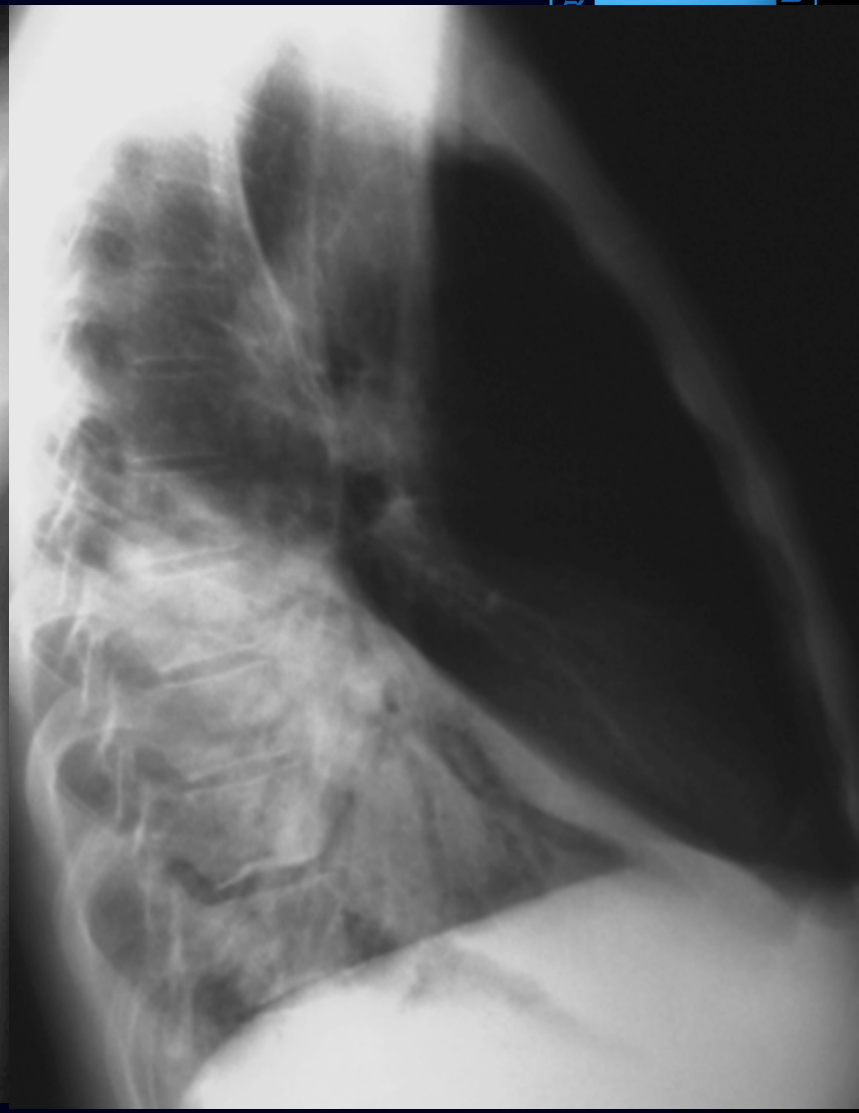
CASE 1

Adult patient presents with cough and fever for the last 3 days. His blood workup shows WBC of 18 X 10^9/L (mainly neutrophils). Chest X-ray was done.

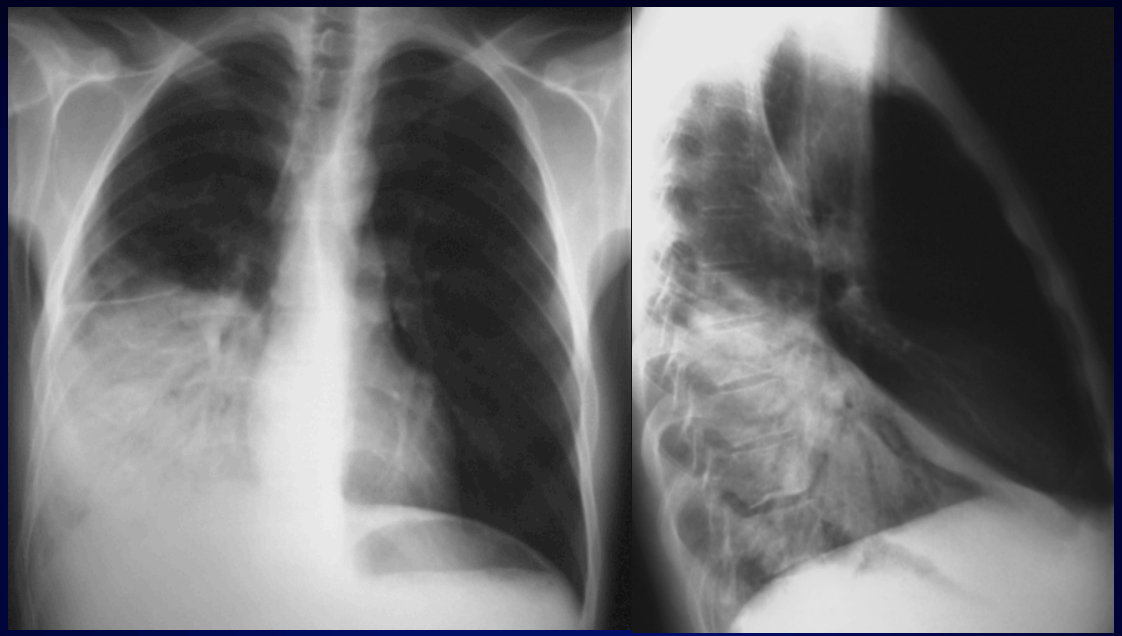
What is the most likely increased density pattern seen on this X-ray?

Adult patient presenting with cough and fever



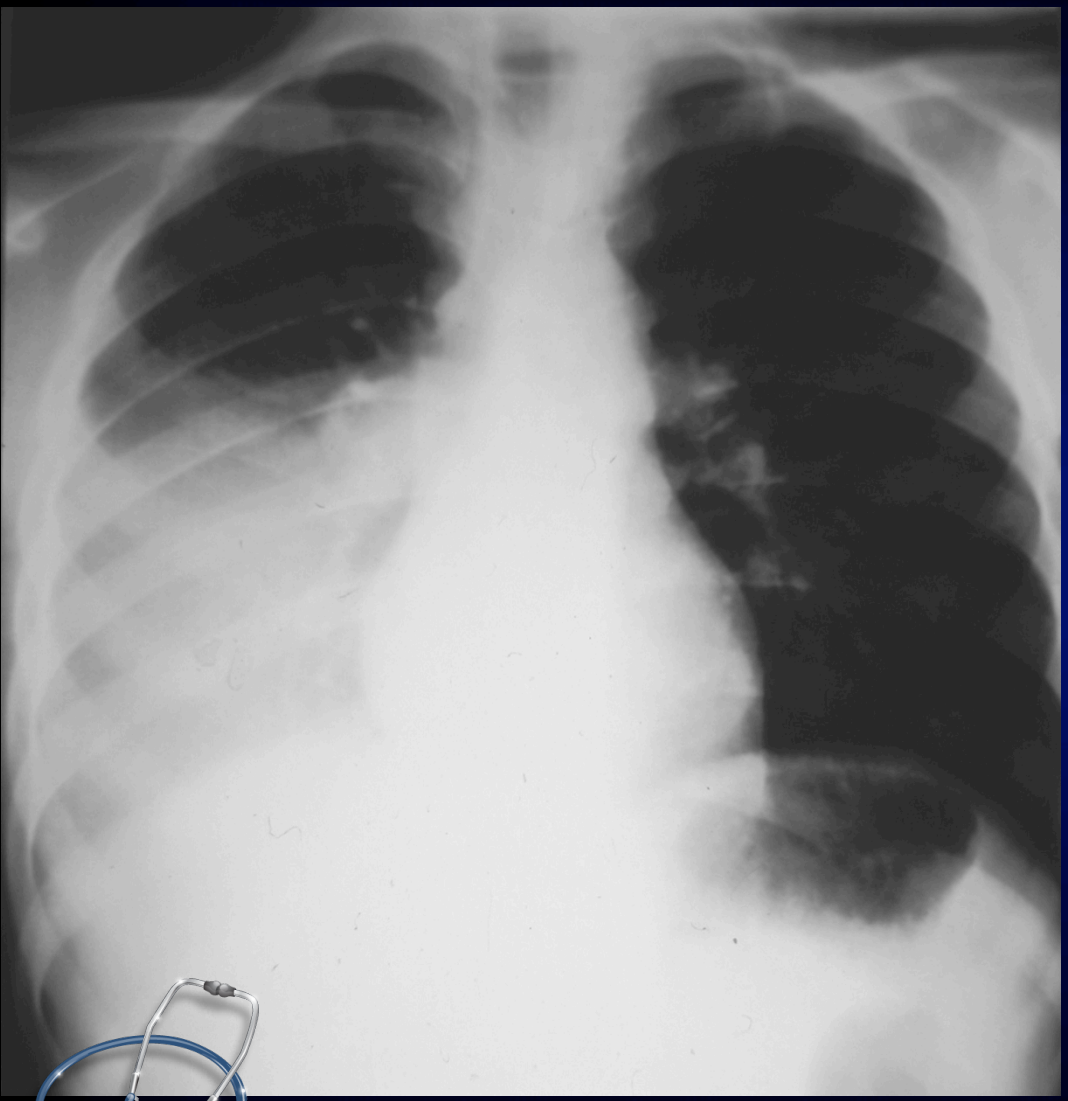


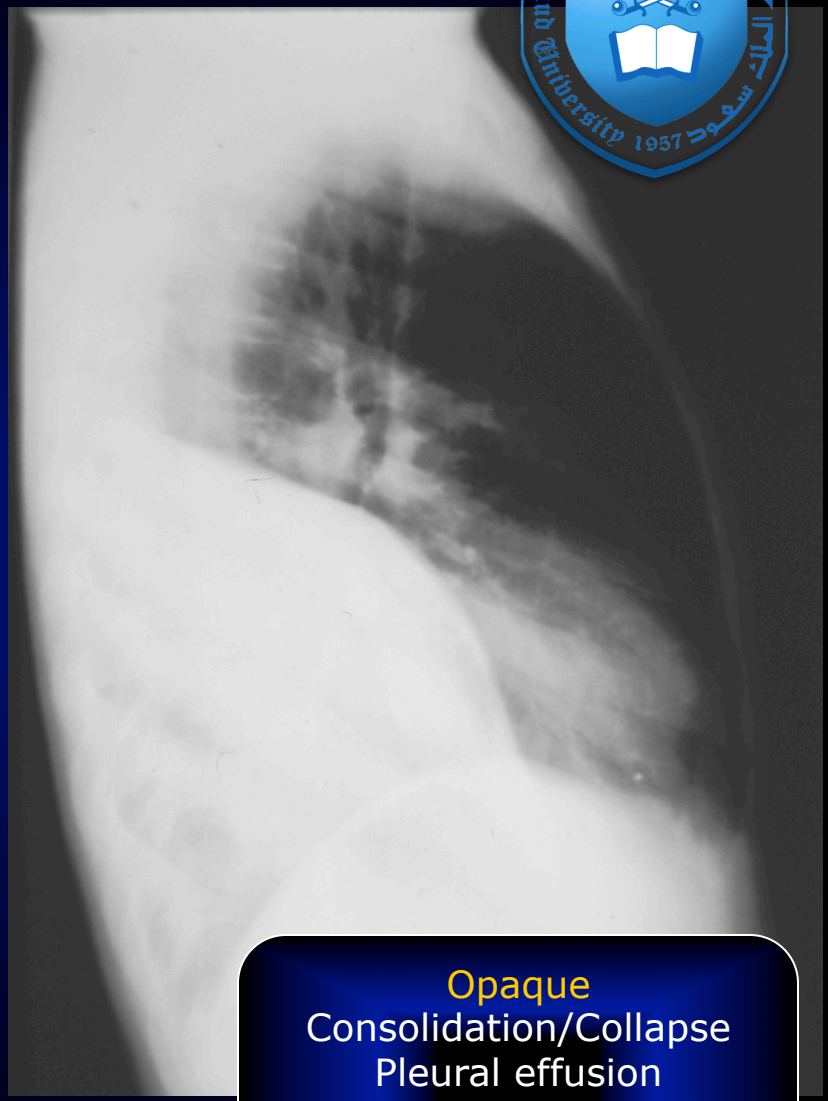
Adult patient presenting with cough and fever



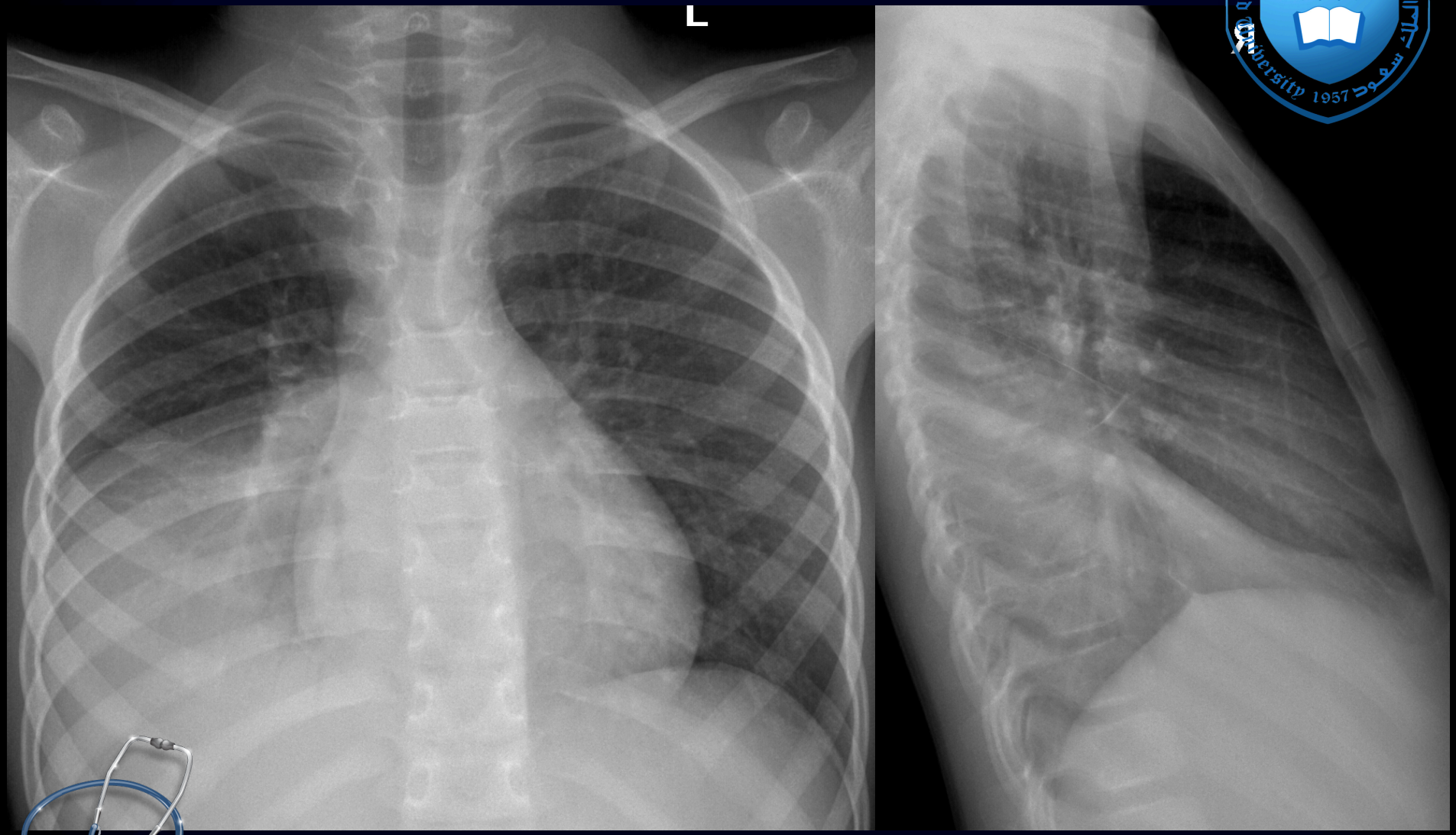
What is the most likely increased density pattern seen on this X-ray?

a- Bony thoracic cage lesion.
b- Lung parenchyma lesion.
c- Mediastinal mass lesion.
d- Pleural lesion.





Opaque
Consolidation/Collapse
Pleural effusion
D Hernia
Agenesis/pnemonectomy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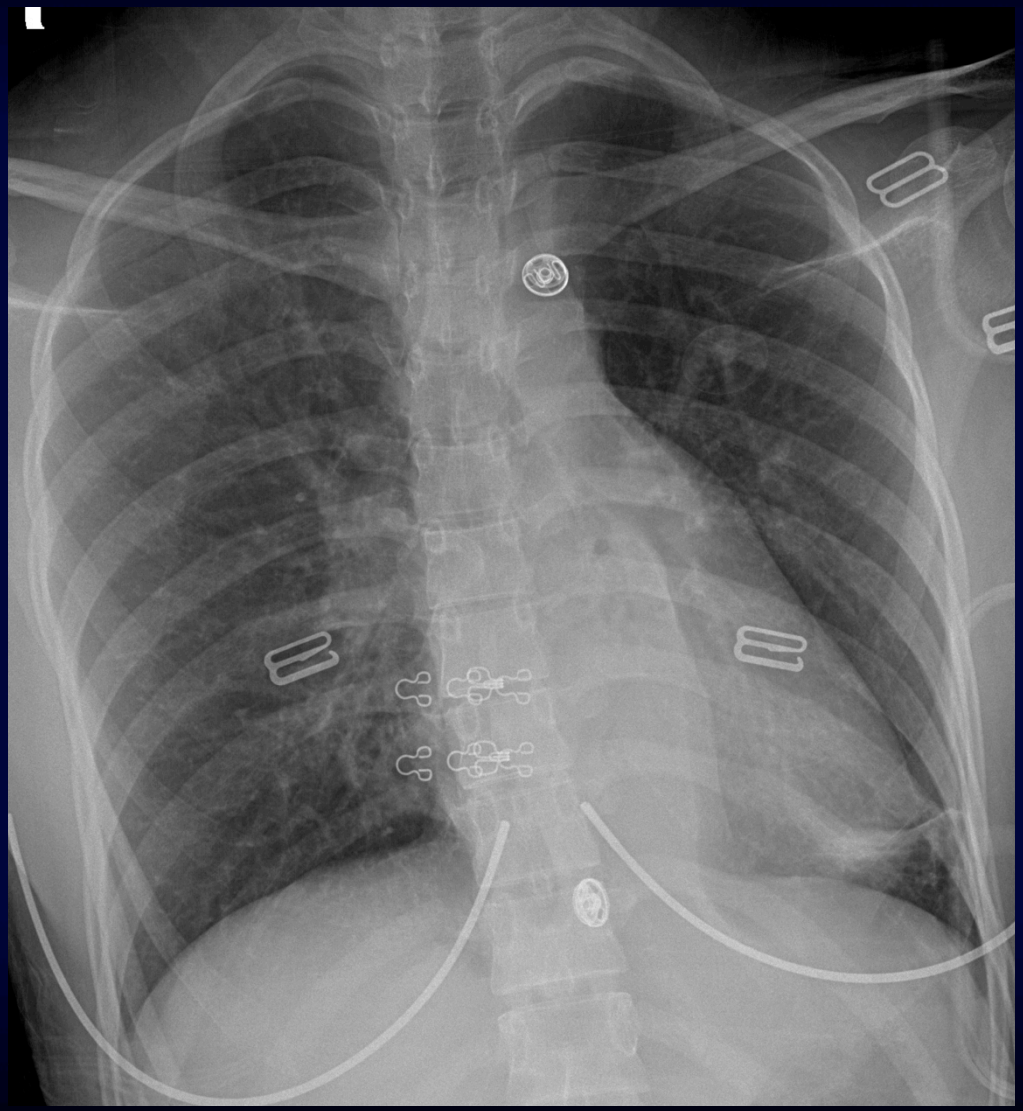
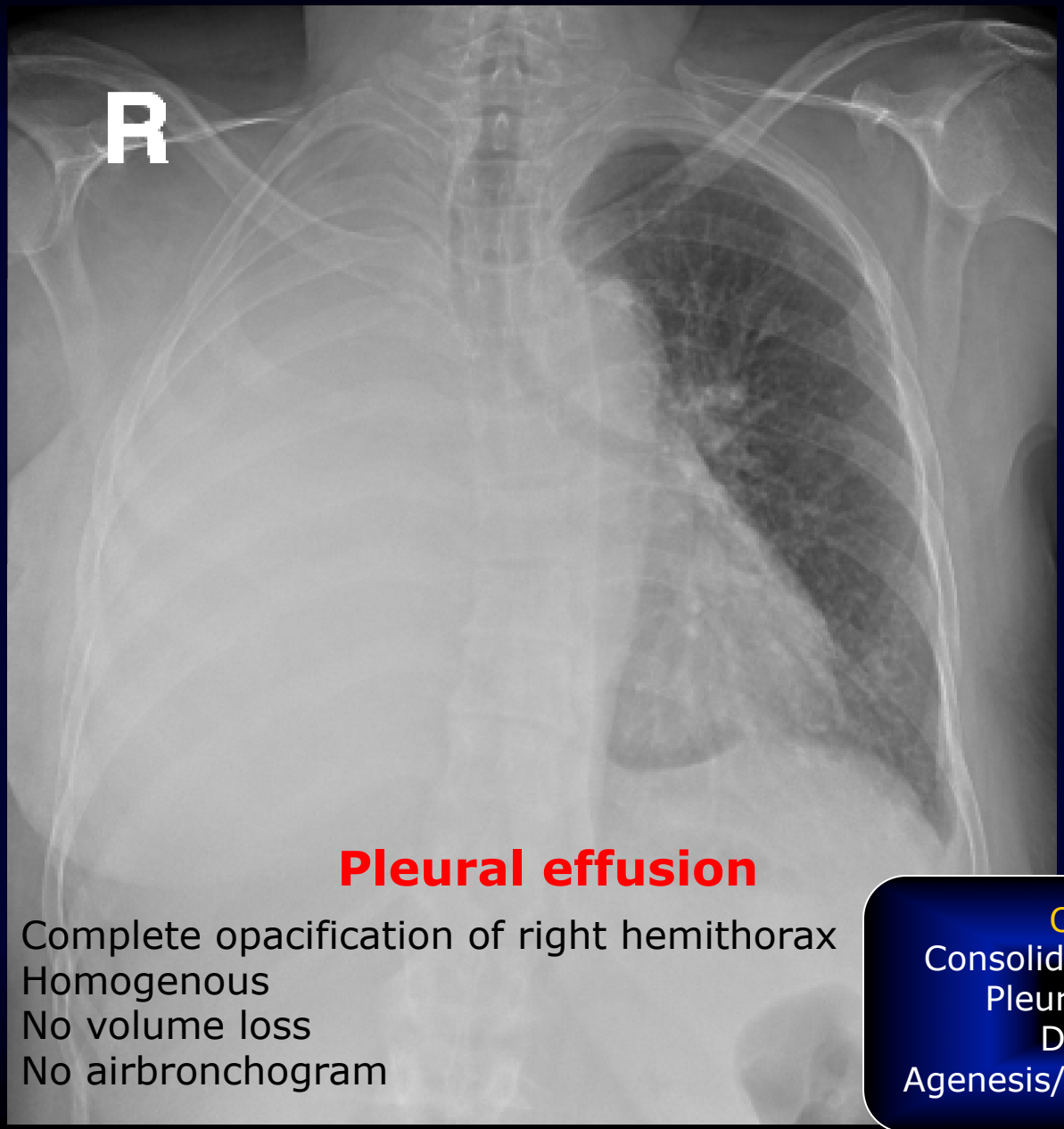
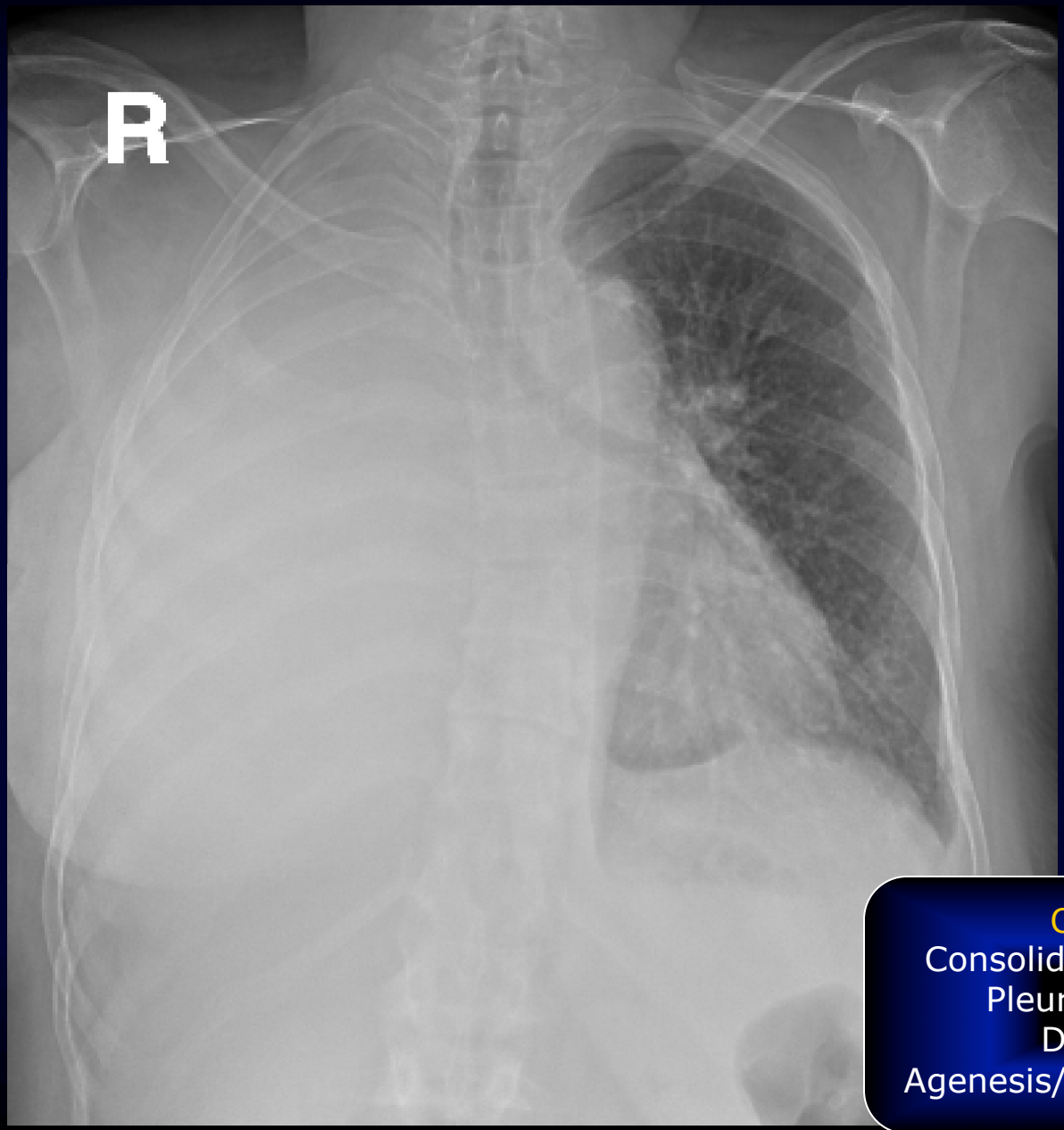




Pleural effusion

- ✓ Complete opacification of right hemithorax
- ✓ Homogenous
- ✓ No volume loss
- ✓ No airbronchogram

Opaque
Consolidation/Collapse
Pleural effusion
D Hernia
Agenesis/pnemonectomy

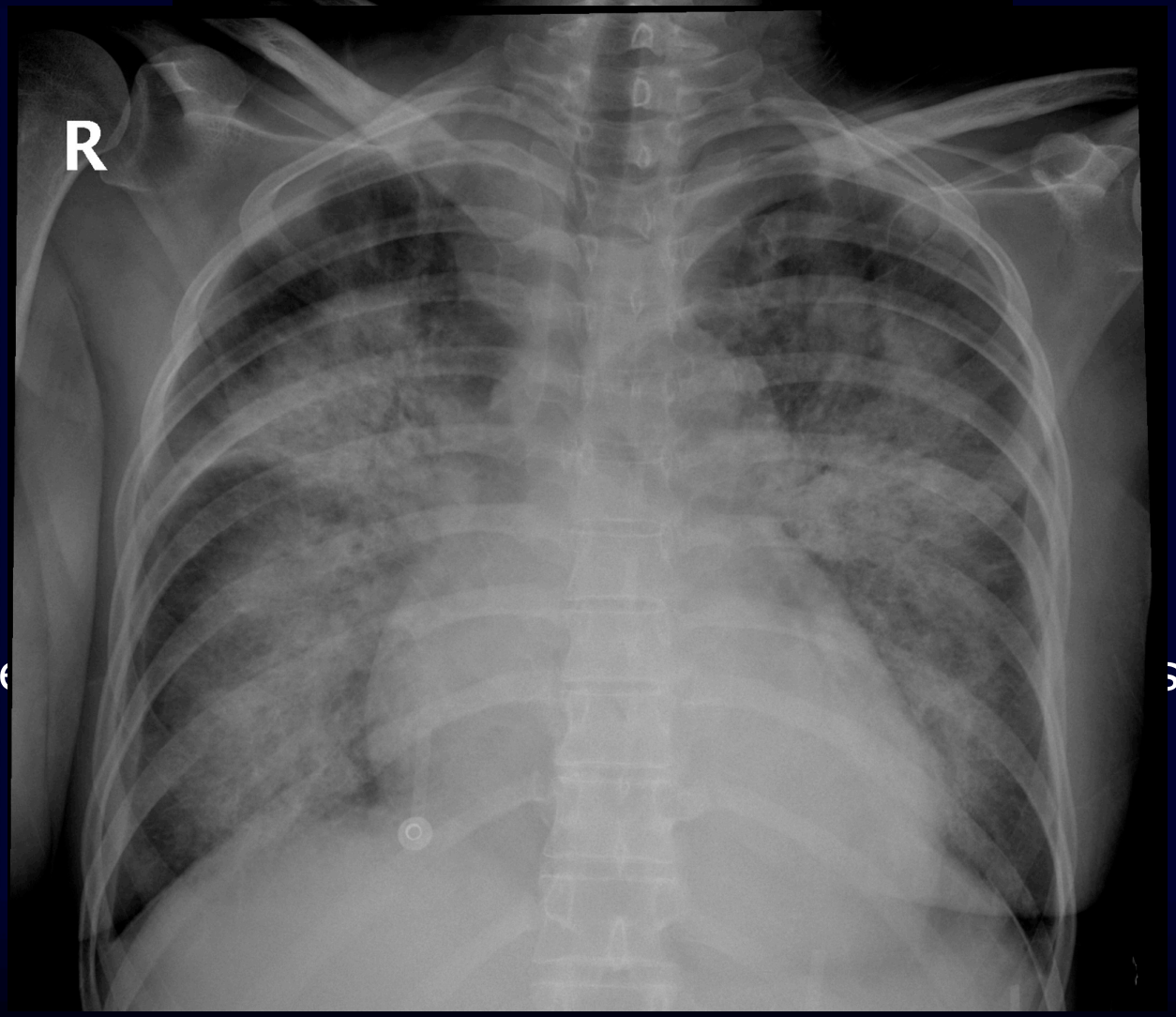


Opaque
Consolidation/Collapse
Pleural effusion
D Hernia
Agenesis/pnemonectomy

CASE 2

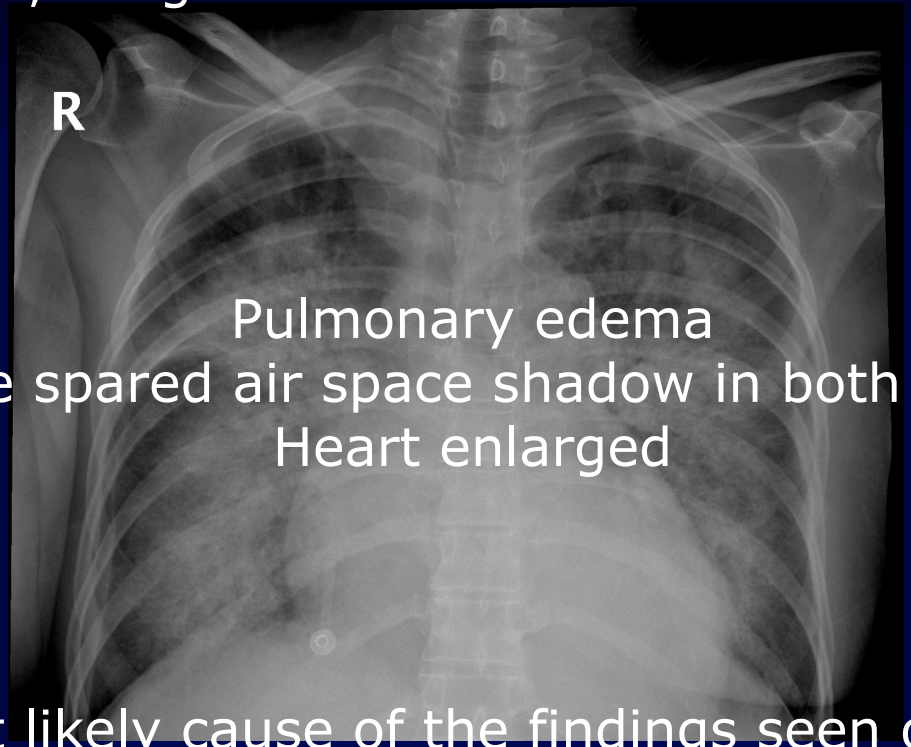
Elderly patient presenting with
dyspnea, cough and edema of both lower limbs

Elderly patient presenting with dyspnea, cough and edema of both lower limbs



What is the s X-ray?

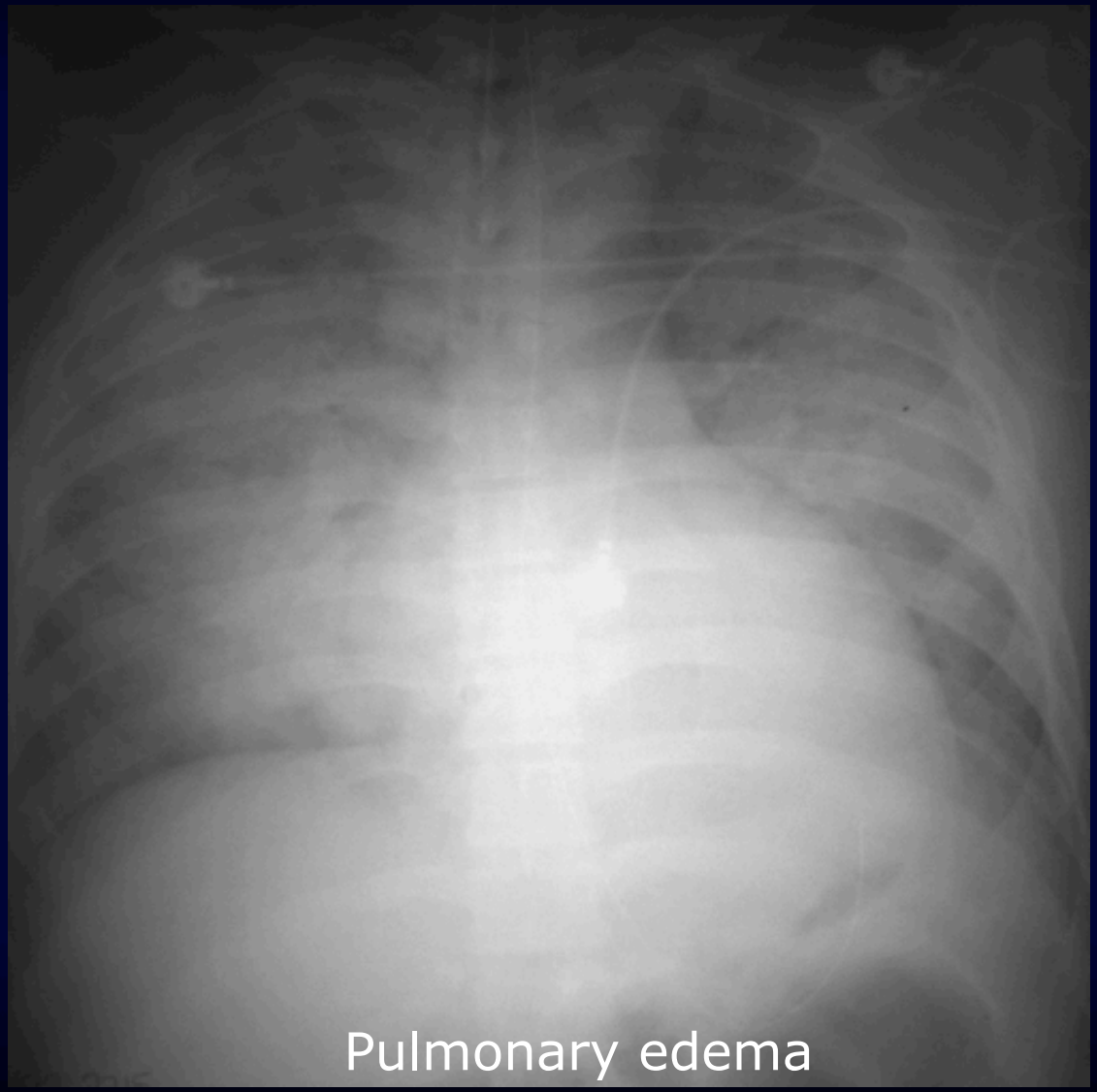
Elderly patient presenting with
dyspnea, cough and edema of both lower limbs



Pulmonary edema
Wide spared air space shadow in both lungs
Heart enlarged

What is the most likely cause of the findings seen on this X-ray?

ɑ- Pneumonia.
b- Interstitial pneumonitis.
c- Pulmonary edema.
d- Pleural lesion.



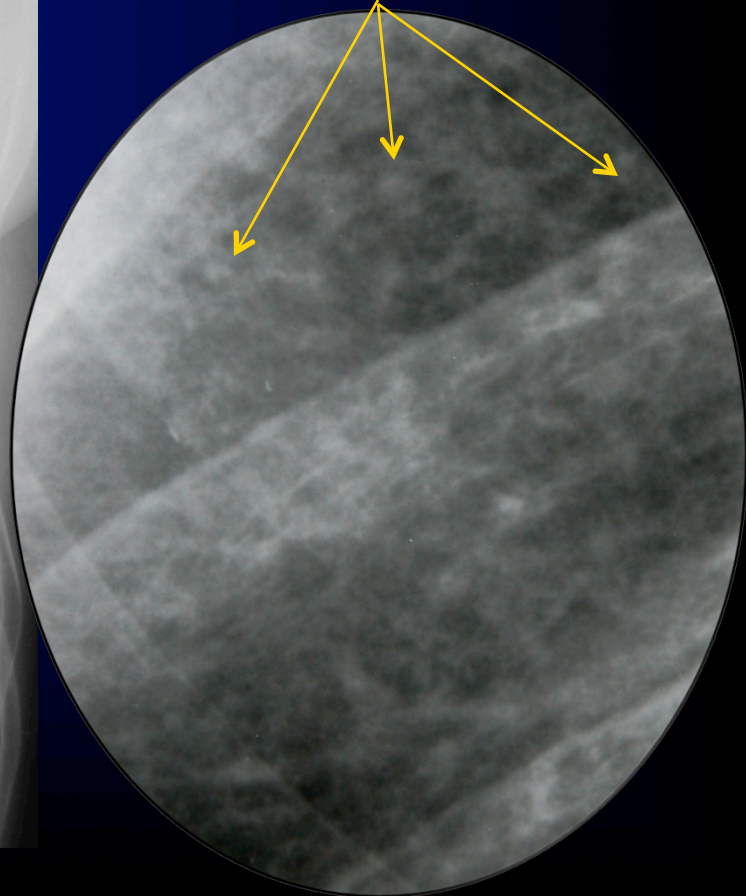
Pulmonary edema

CHEST PATTERNS

Increased Noddular Pulmonary Densities

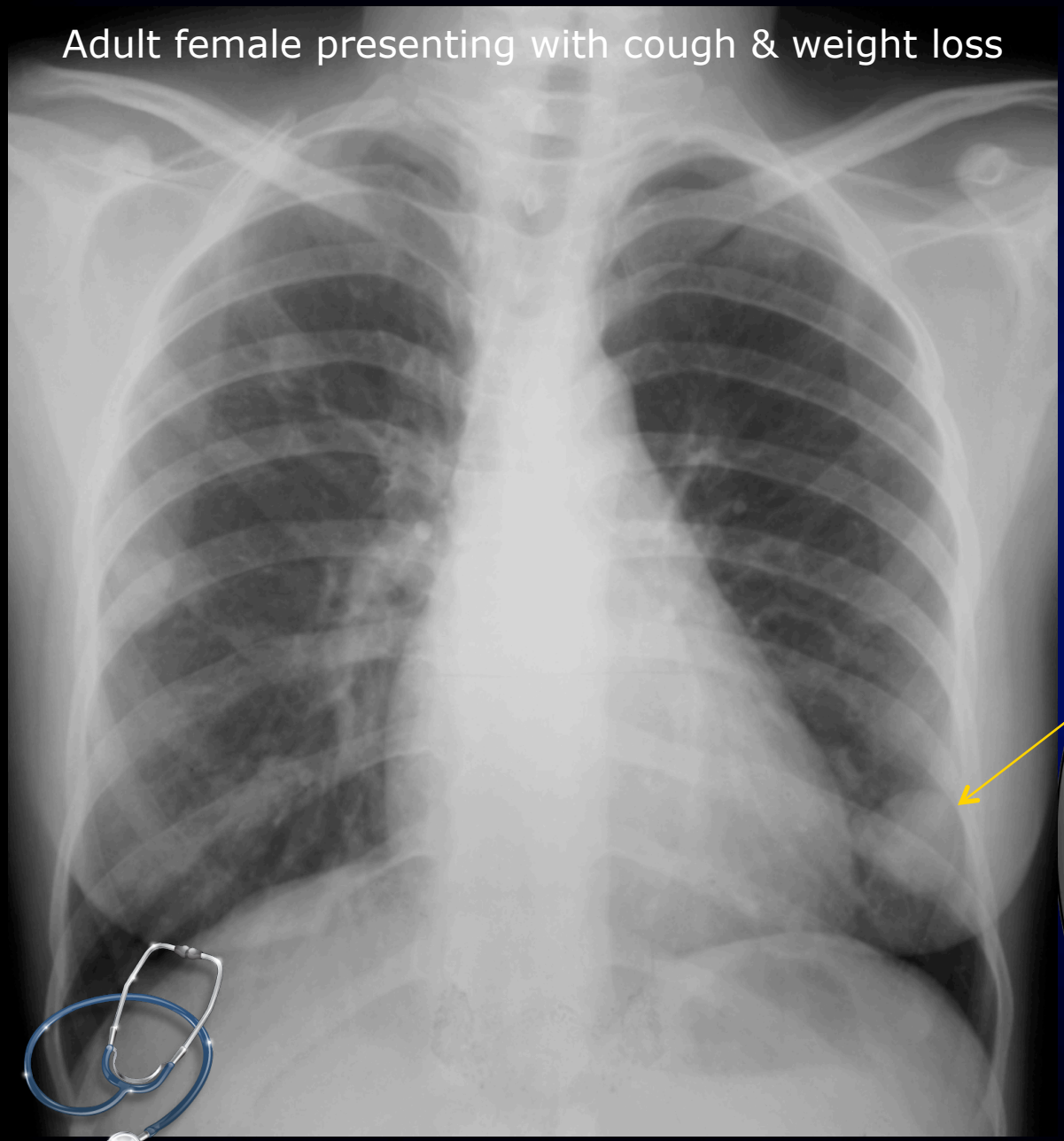
Adult patient presenting with cough, fever and weight loss

Diffuse miliary nodules



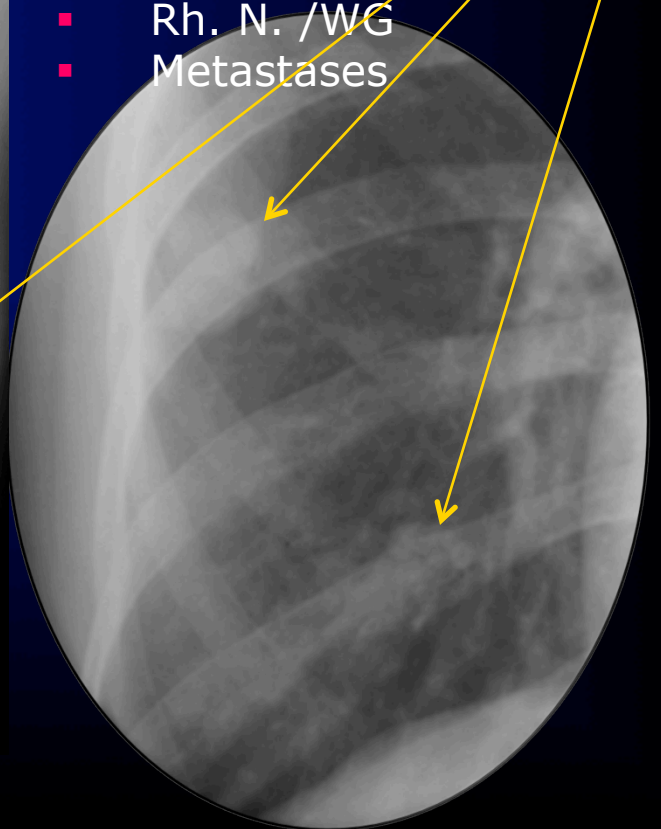
Pulmonary miliary TB

Adult female presenting with cough & weight loss



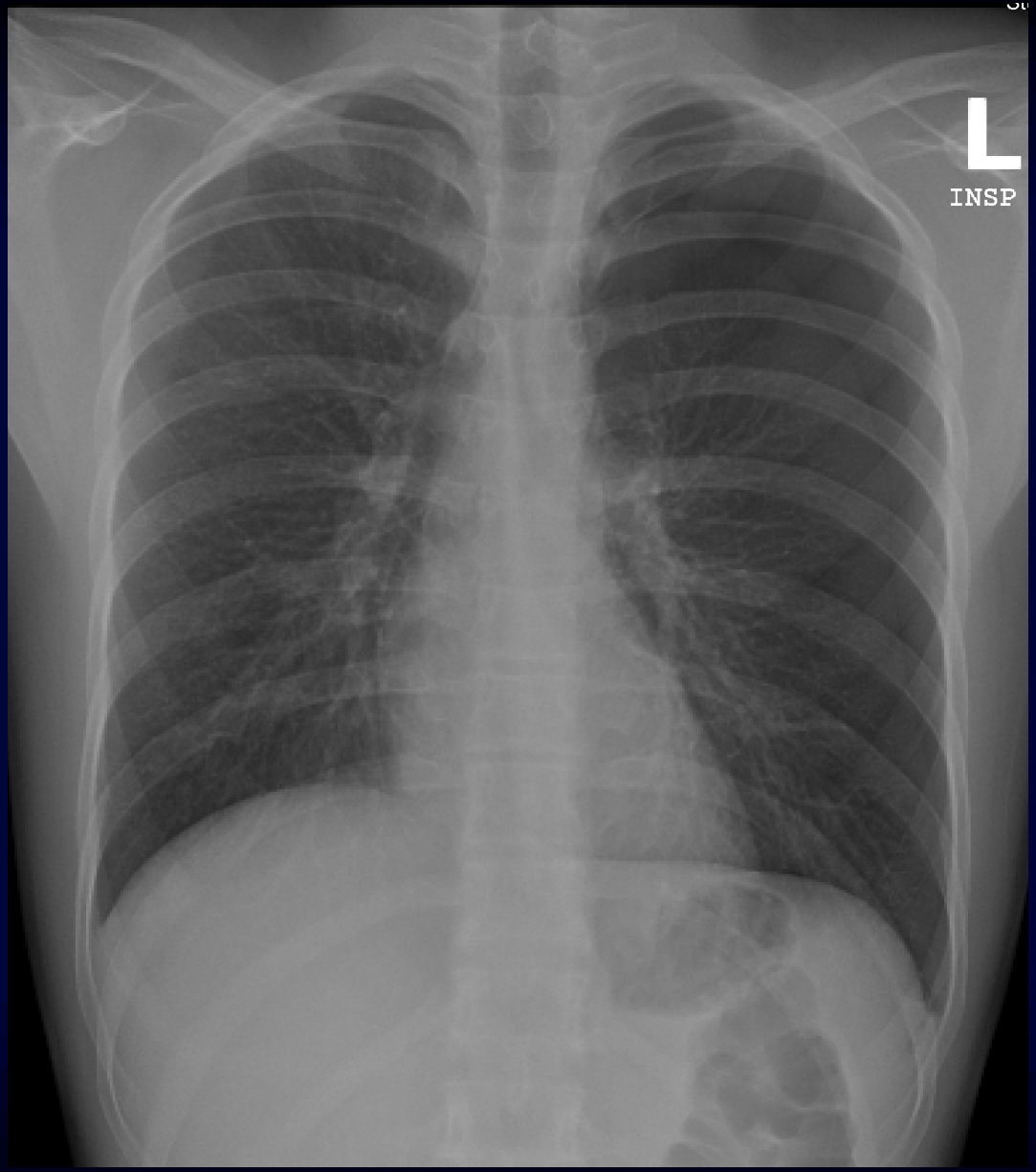
DIFFERENTIAL DIAGNOSIS

- AVM
- Abscesses
- Hydatid cysts
- Rh. N. /WG
- Metastases



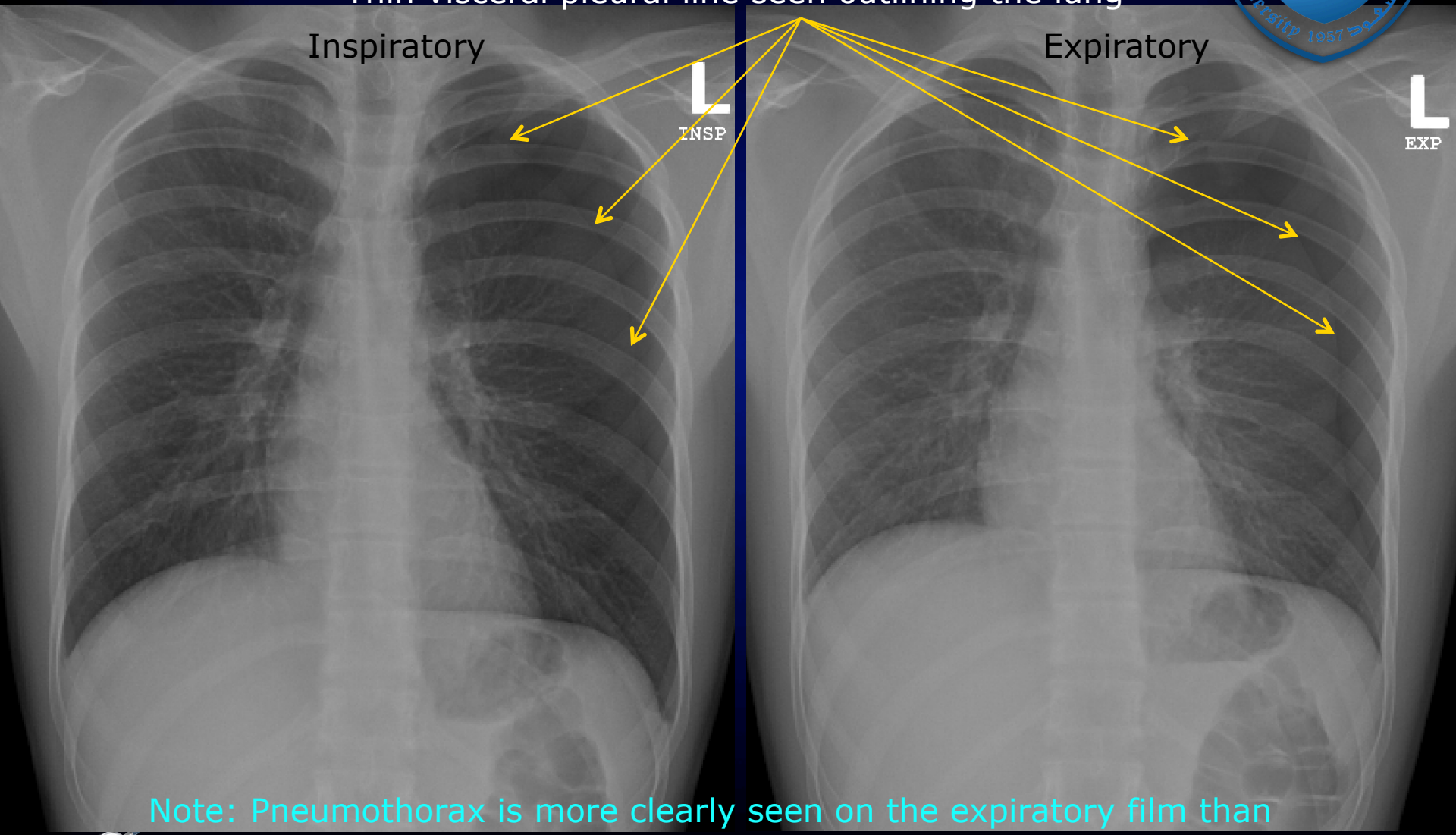
CHEST PATTERNS

Decreased Pulmonary Densities



Young Adult presenting with acute chest pain
Known to have bronchial asthma

Pneumothorax on the left side
Evident by increased decreased density of the periphery of the lung
No vascular marking in that region
Thin visceral pleural line seen outlining the lung

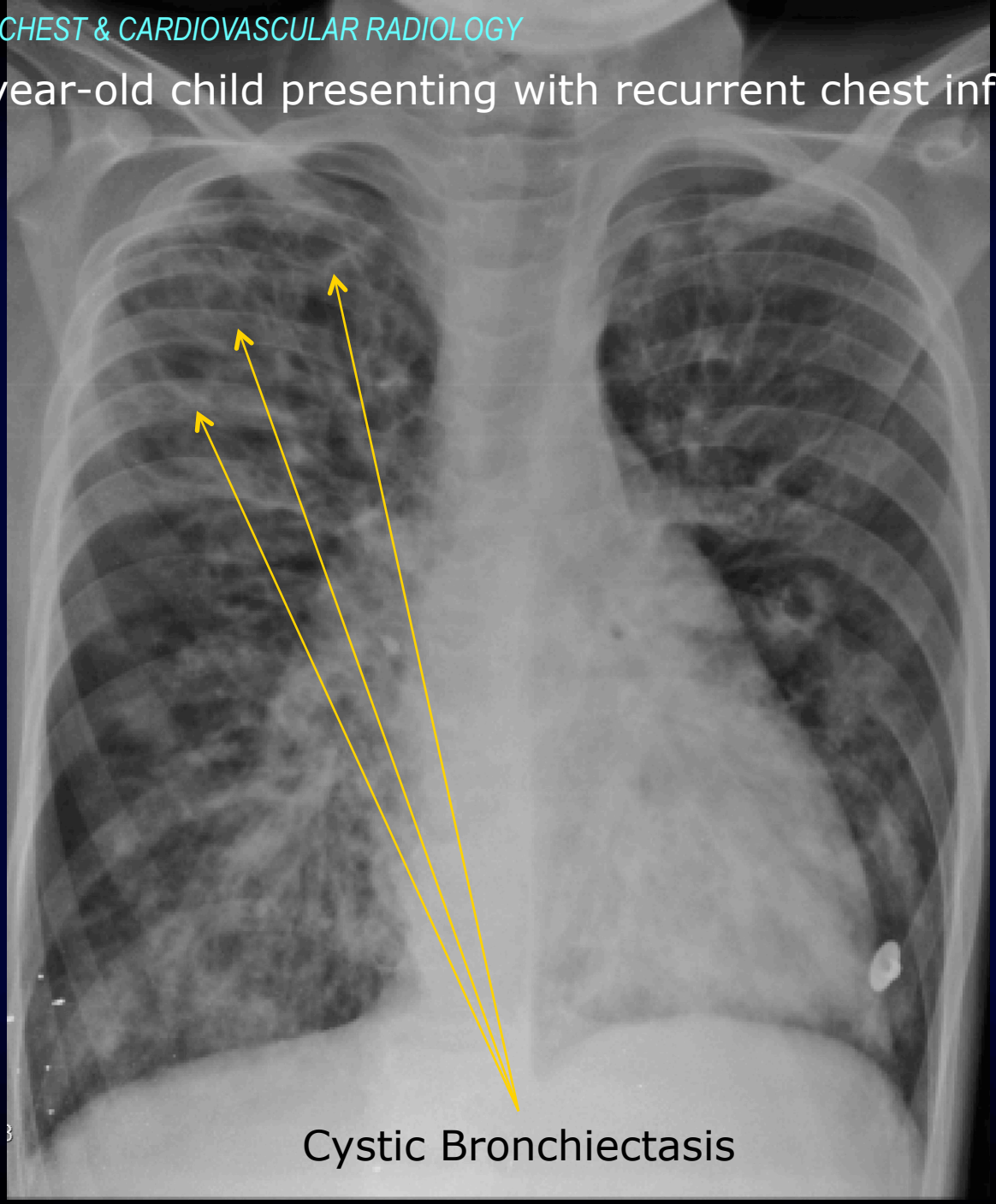


Note: Pneumothorax is more clearly seen on the expiratory film than inspiratory one

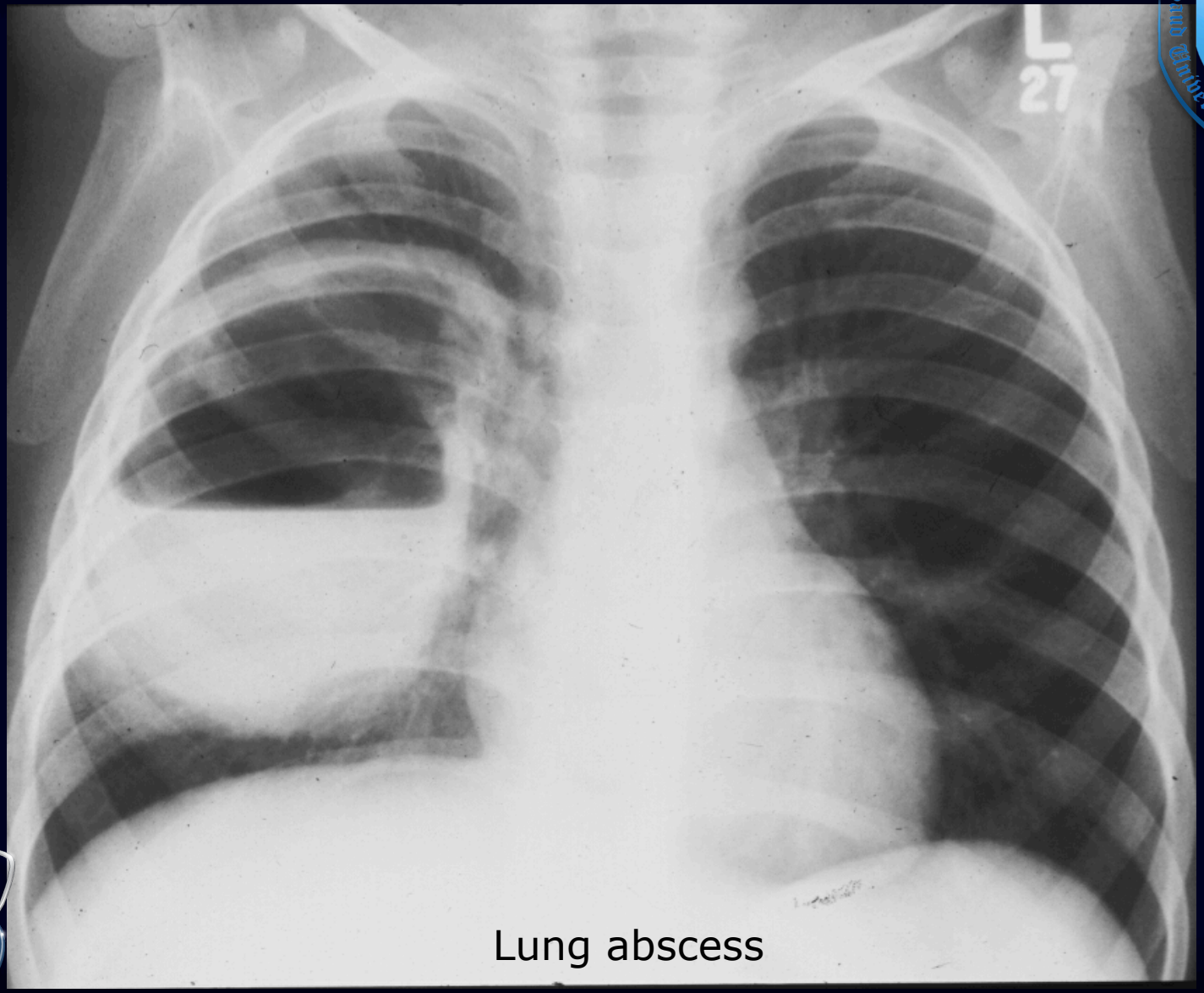
CHEST PATTERNS

Cavitary/Cystic pulmonic lesions

12 year-old child presenting with recurrent chest infection



Cystic Bronchiectasis

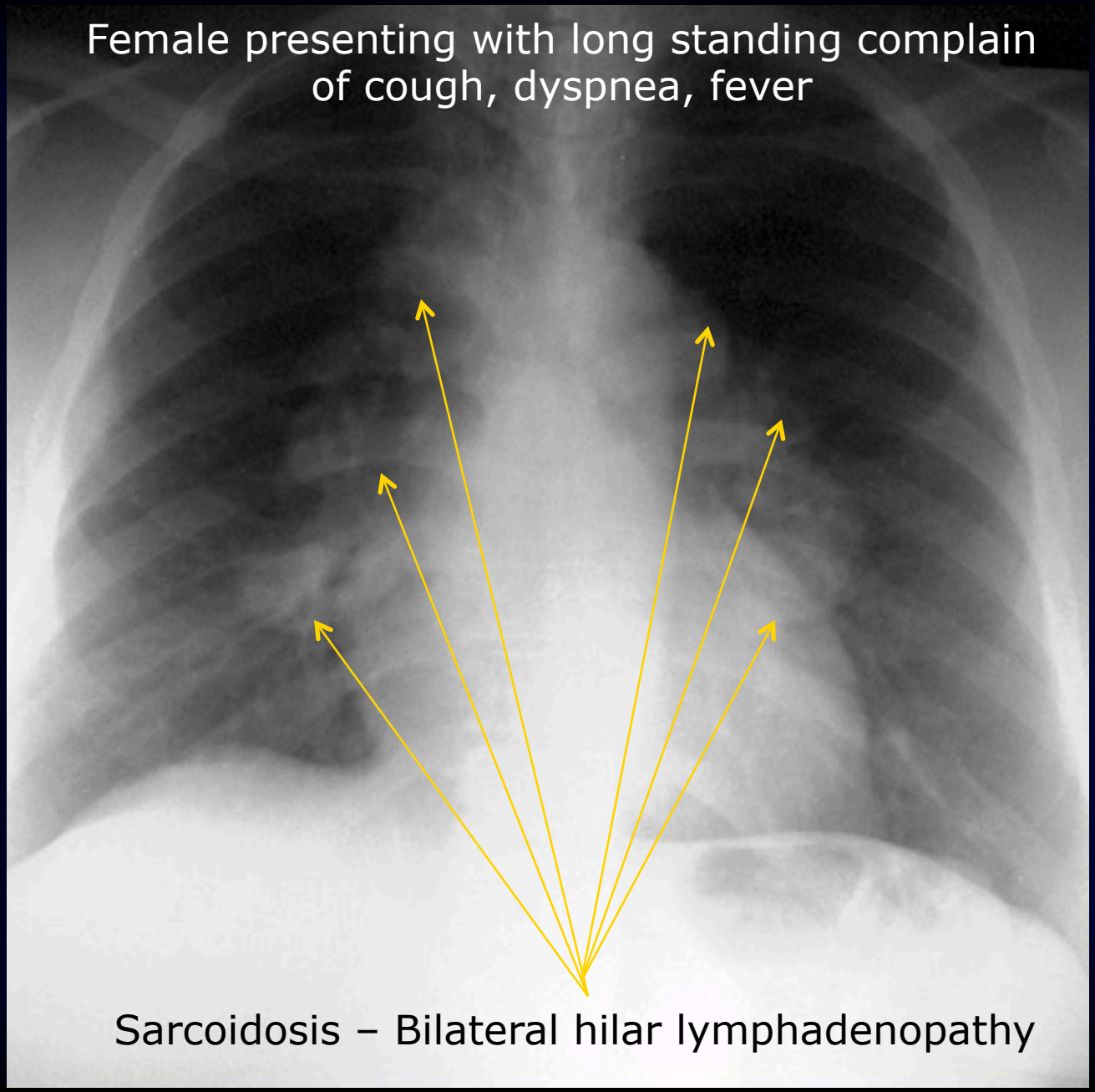


Lung abscess

CHEST PATTERNS

Mediastinal Masses

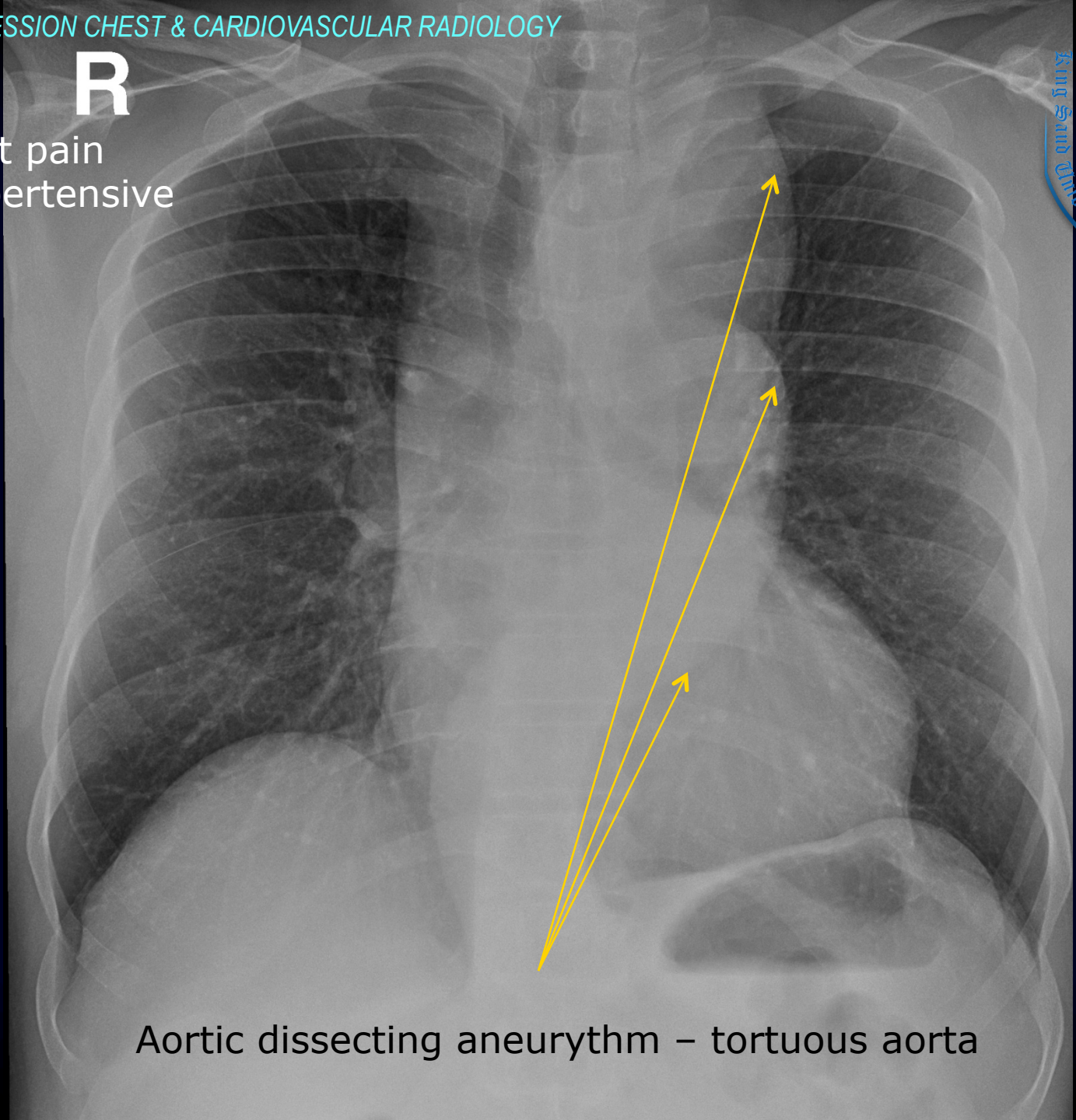
Female presenting with long standing complain of cough, dyspnea, fever



Sarcoidosis – Bilateral hilar lymphadenopathy

R

Acute chest pain
Known hypertensive



Aortic dissecting aneurythm – tortuous aorta

Reference Book and Other Resources

- ✓ "Diagnostic Imaging" book by Peter Armstrong
- ✓ http://www.med-ed.virginia.edu/courses/rad/cxr/
- ✓ http://www.radiologyanatomy.com/index.php
- ✓ http://eradiology.bidmc.harvard.edu/LearningLab/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THANK YOU