



# **INTERACTIVE SESSION CHEST & CARDIOVASCULAR RADIOLOGY**

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2012





## OBJECTIVES

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

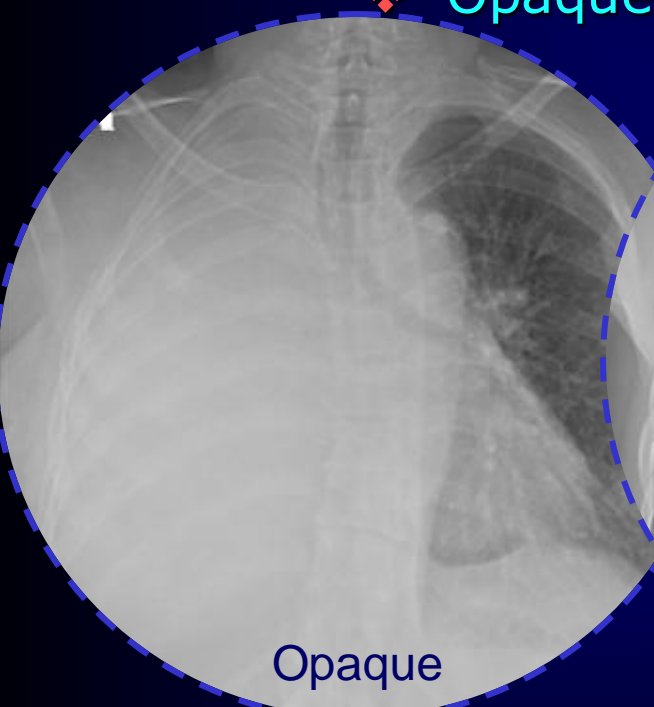
- ❖ Recognize different terms utilized in chest & cardiovascular radiography
- ❖ Develop a consistent and simplified technique for reading CXR
- ❖ Define the chest pattern of abnormality seen on the CXR



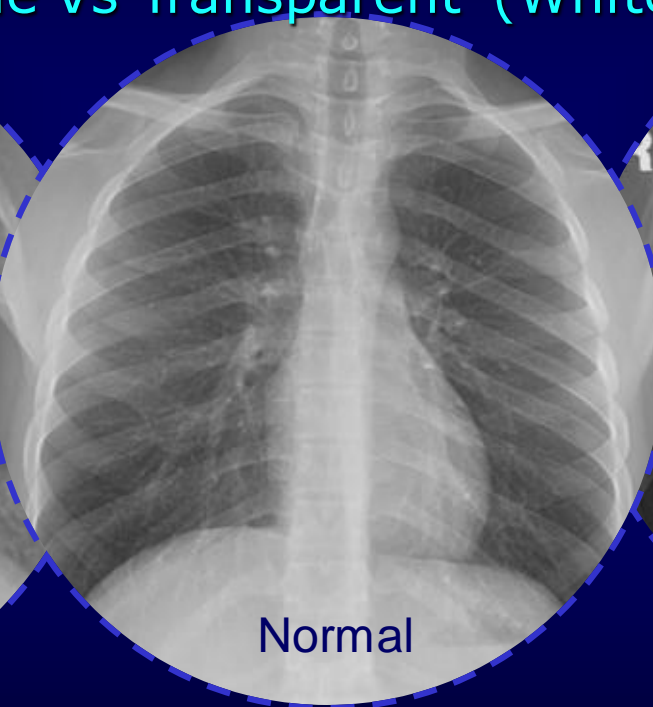


# IMPORTANT TERMS

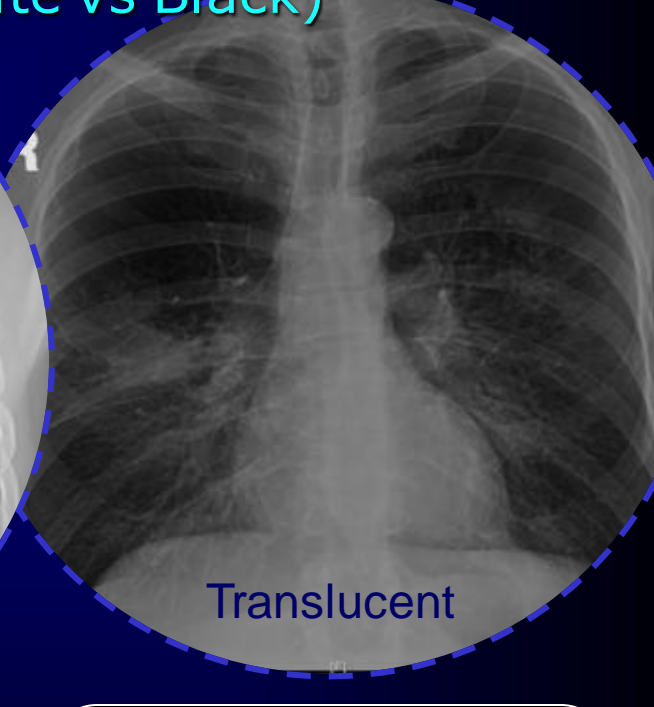
## ❖ Opaque Vs Transparent (White vs Black)



Opaque



Normal



Translucent

### Opaque

- Consolidation/Collapse
- Pleural effusion
- D Hernia
- Agensis/pnemonectomy

### Translucent

- Technique
- Chest Wall (Mastectomy)
- Pneumothorax
- Emphysema

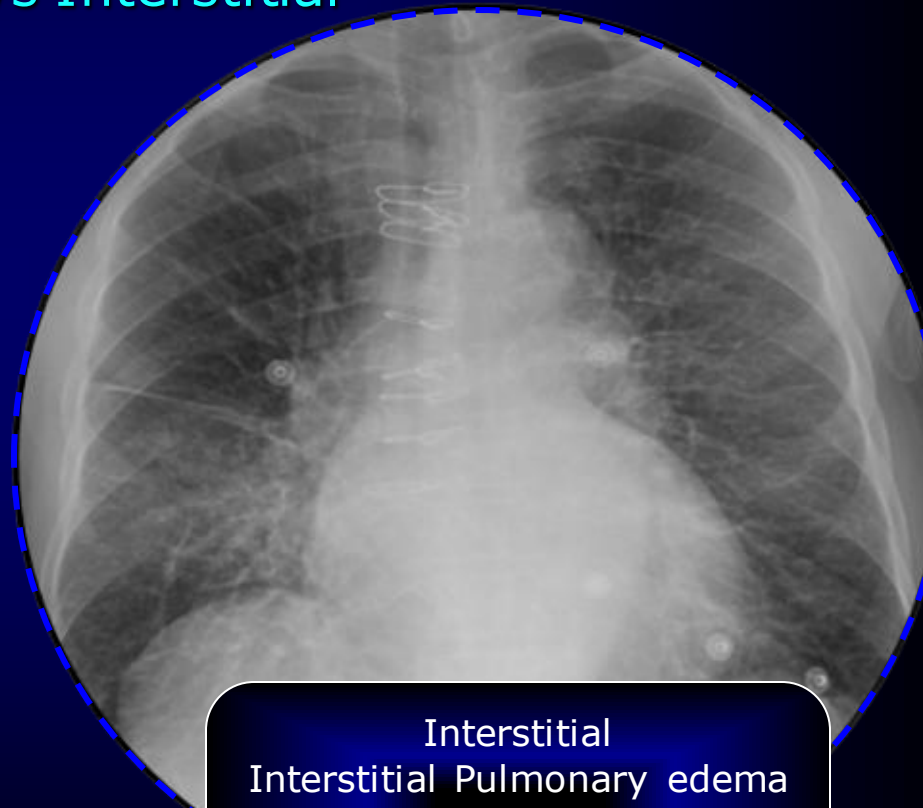


# IMPORTANT TERMS

## ❖ Alveolar Vs Interstitial



- Alveolar
- Pneumonia
- Pulmonary edema
- Pulmonary Hemorrhage
- Alveolar cell carcinoma



- Interstitial
- Interstitial Pulmonary edema
- Interstitial Pneumonitis
- IPF
- Lymphangitis
- Carcinomatosis

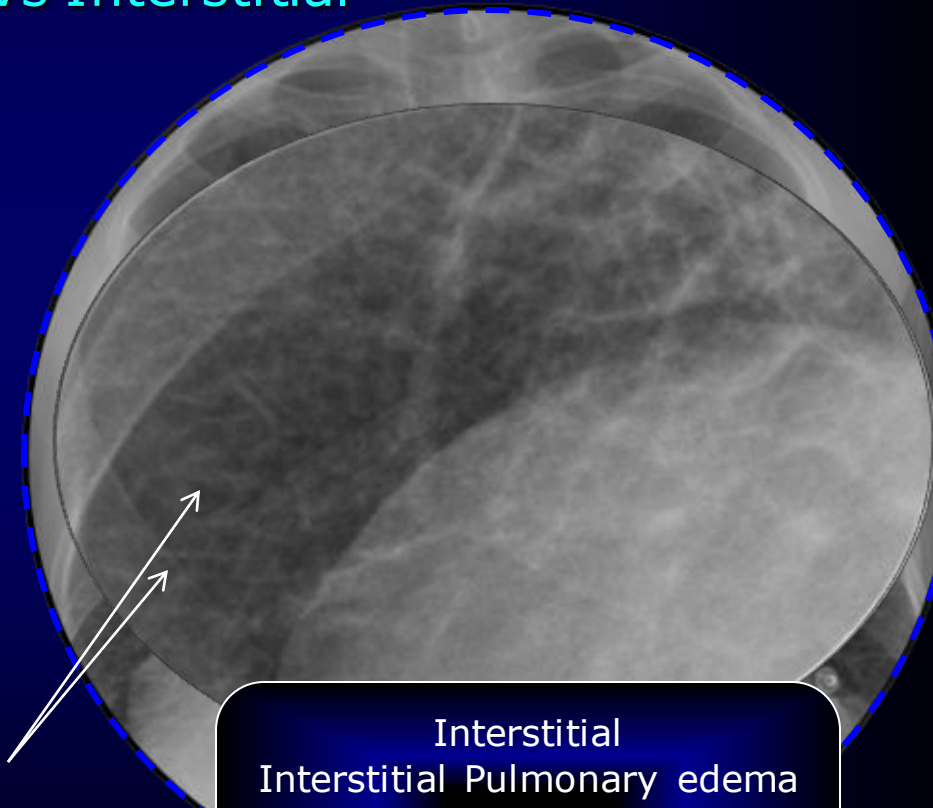


# IMPORTANT TERMS

## ❖ Alveolar Vs Interstitial



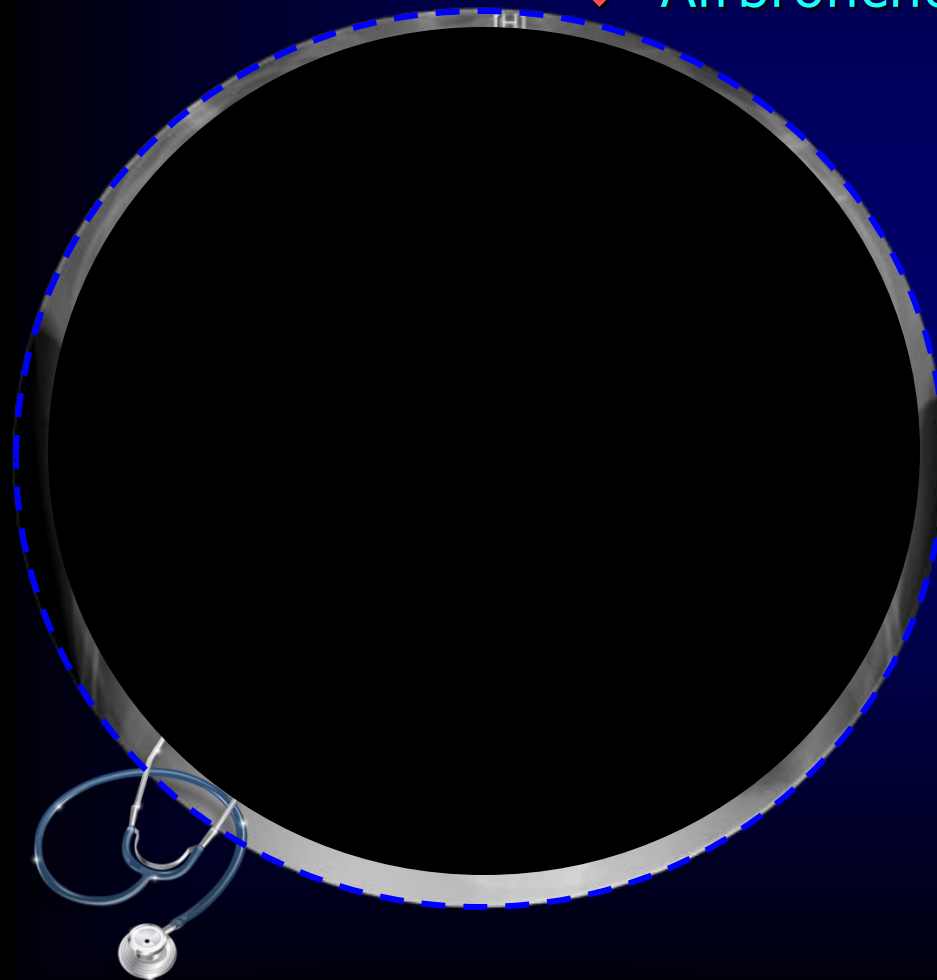
- Alveolar
- Pneumonia
- Pulmonary edema
- Pulmonary Hemorrhage
- Alveolar cell carcinoma



- Interstitial
- Interstitial Pulmonary edema
- Interstitial Pneumonitis
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- Lymphangitis
- Carcinomatosis

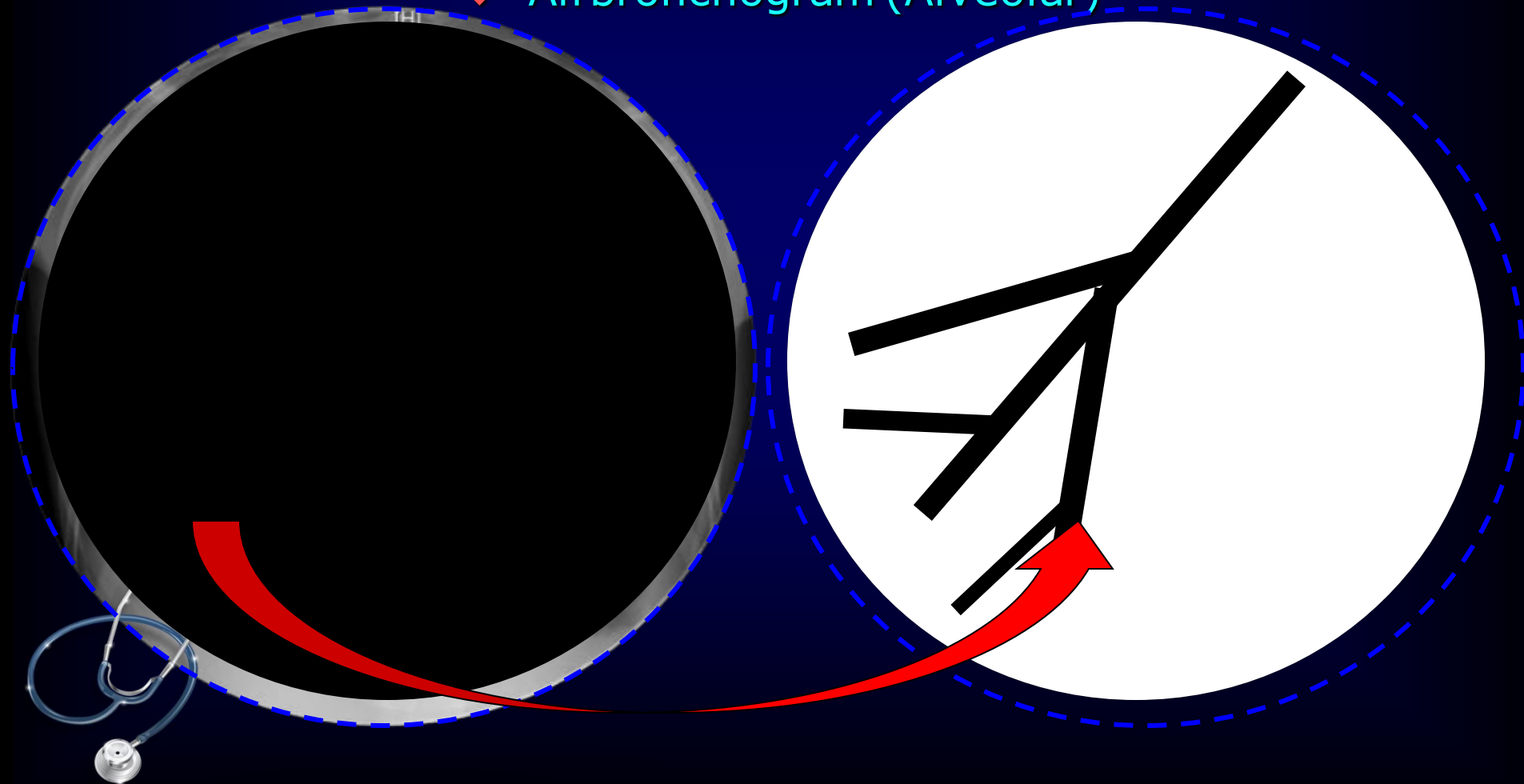
# IMPORTANT TERMS

## ❖ Airbronchogram (Alveolar)



# IMPORTANT TERMS

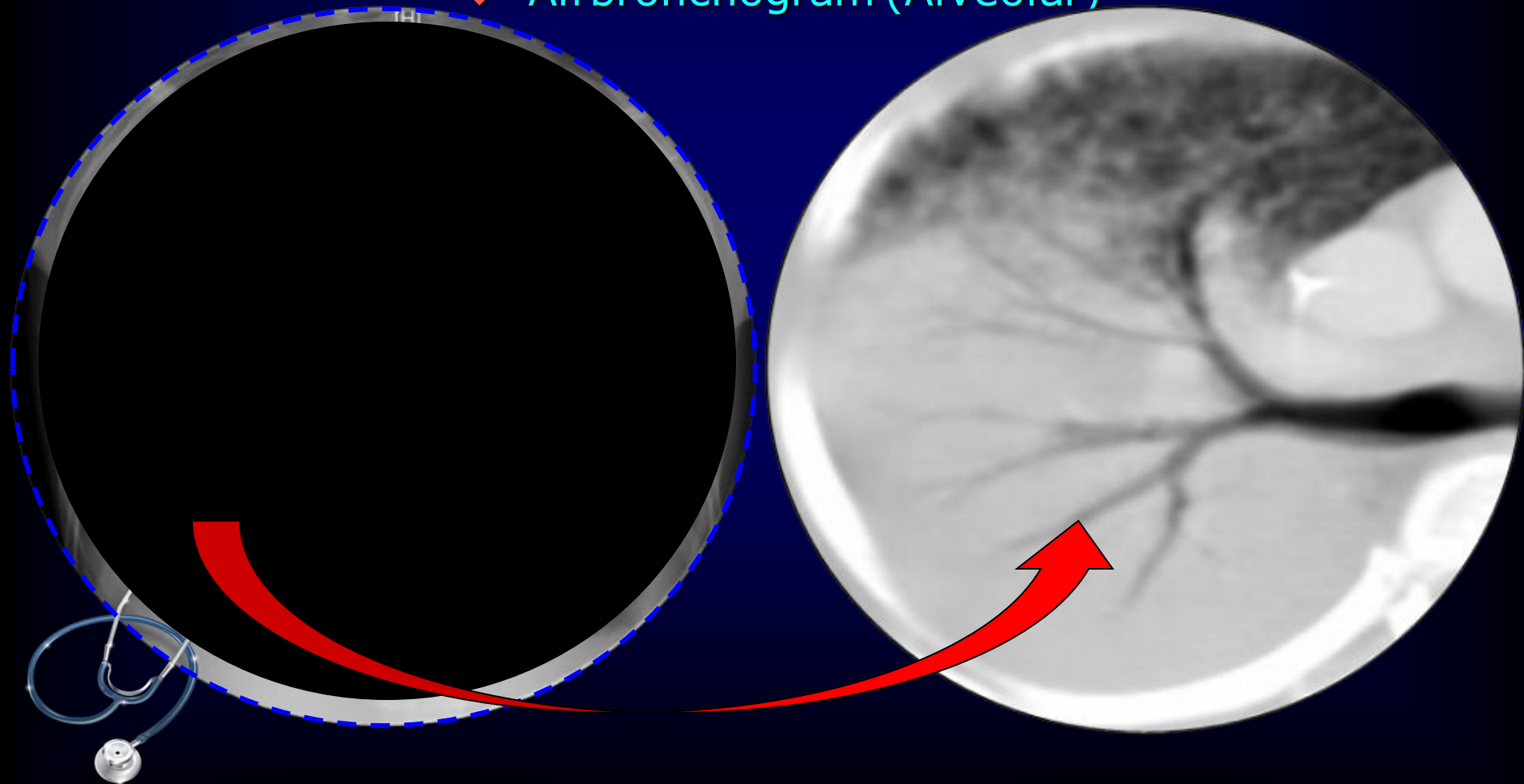
## ❖ Airbronchogram (Alveolar)





# IMPORTANT TERMS

## ❖ Airbronchogram (Alveolar)







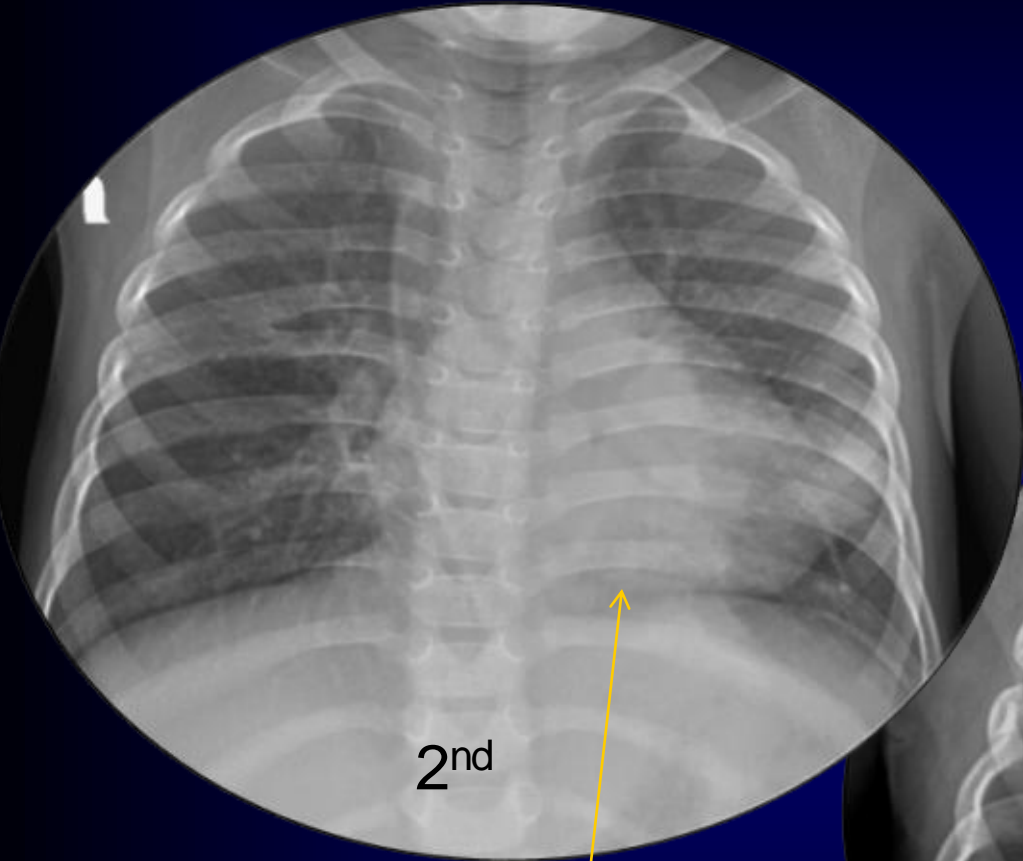
SUPINE

Child presenting  
with cough and fever



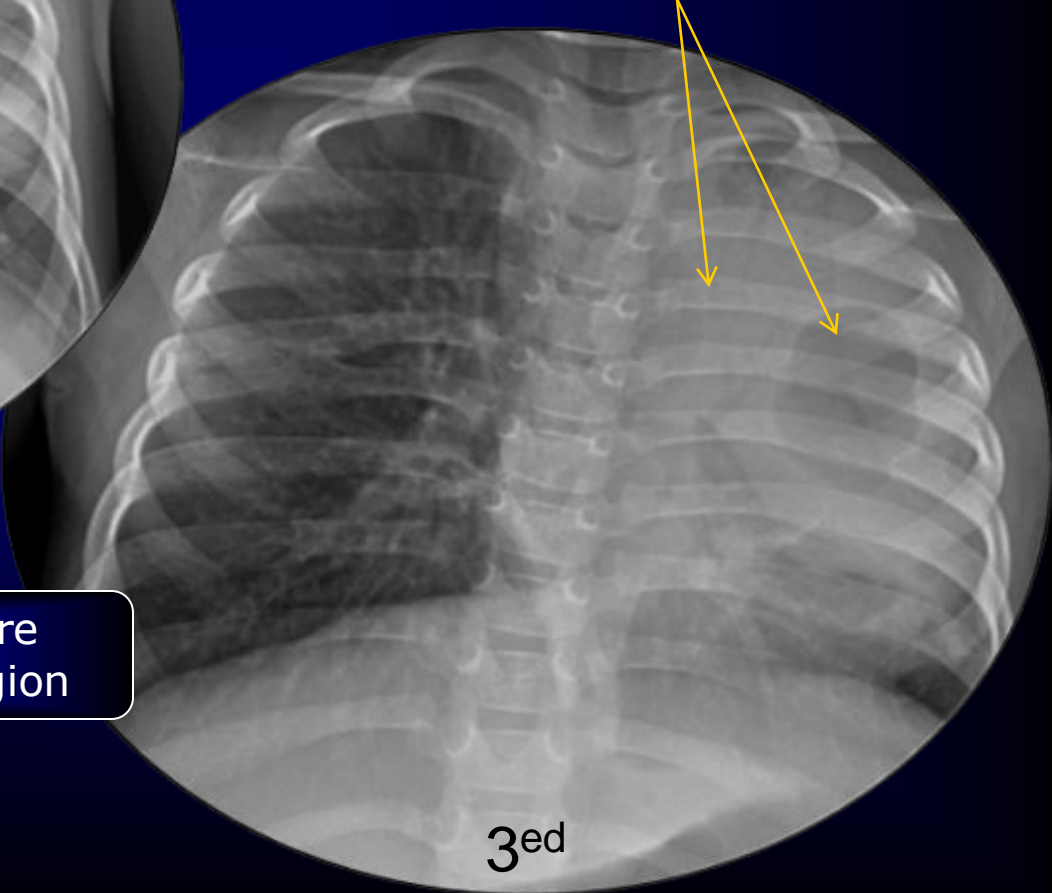


Child presenting with cough and fever



Consolidation become more obvious in retro-cardiac region

Air-bronchogram is more clear here with development of cavitation



# IMPORTANT TERMS

## ❖ Adequate Exposure



ADEQUATE

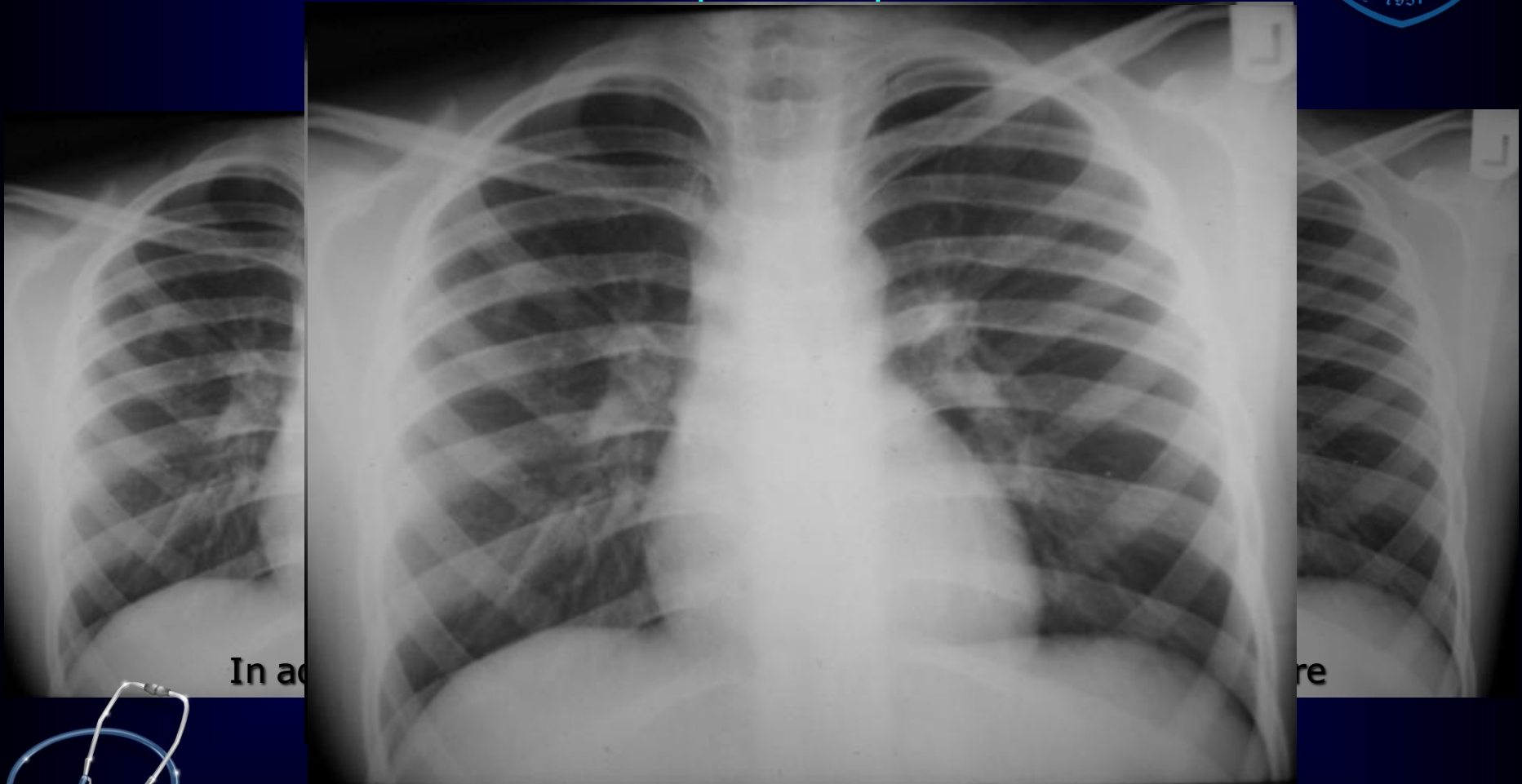
OVER

UNDER

# IMPORTANT TERMS



## ❖ Adequate Exposure



# IMPORTANT TERMS



## ❖ Adequate Exposure



In adequate Exposure



Adequate Exposure







# *Interpretation*

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

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

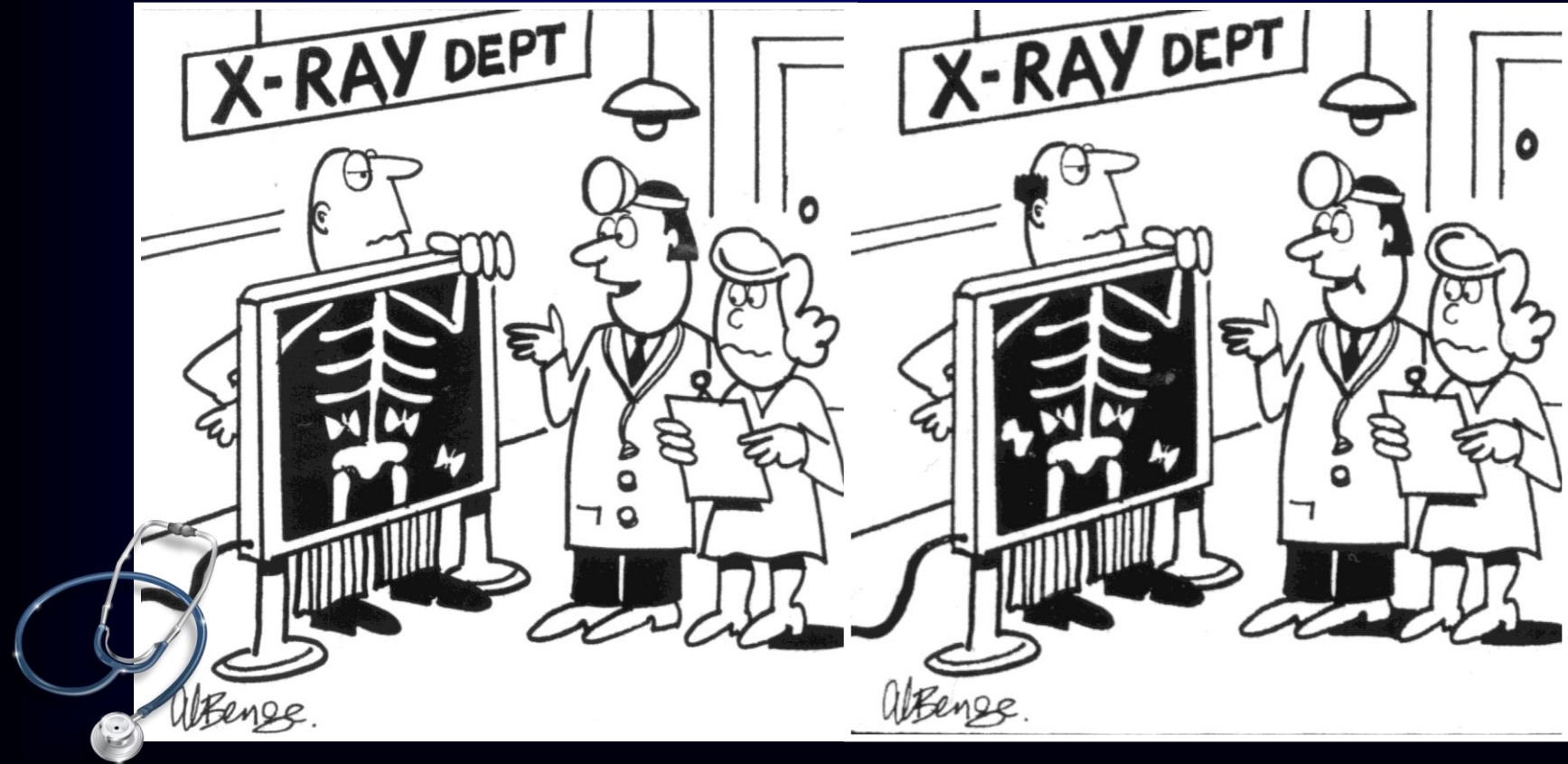
Can you spot them?





# Interpretation

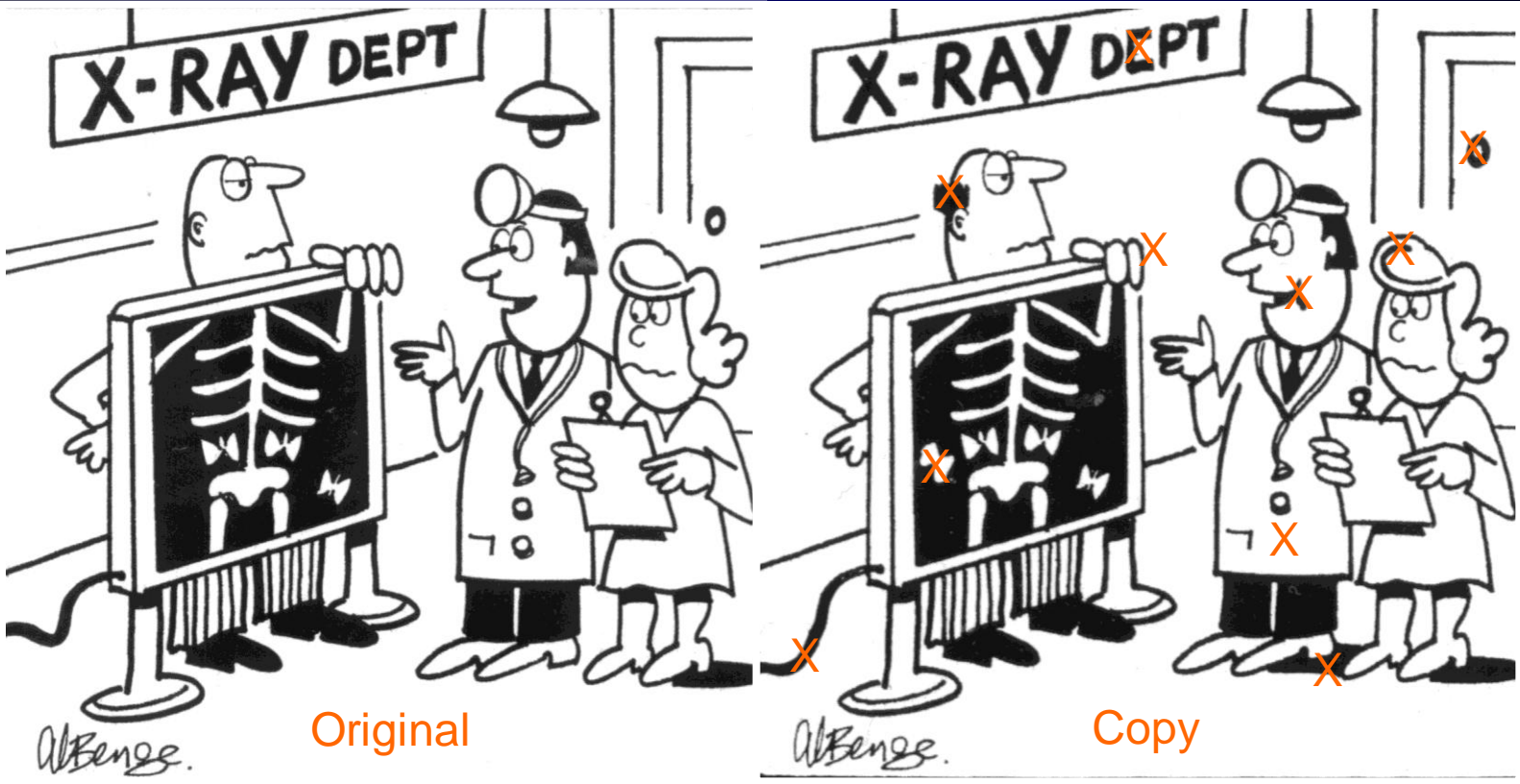
**SPOT THE DIFFERENCE**





# 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

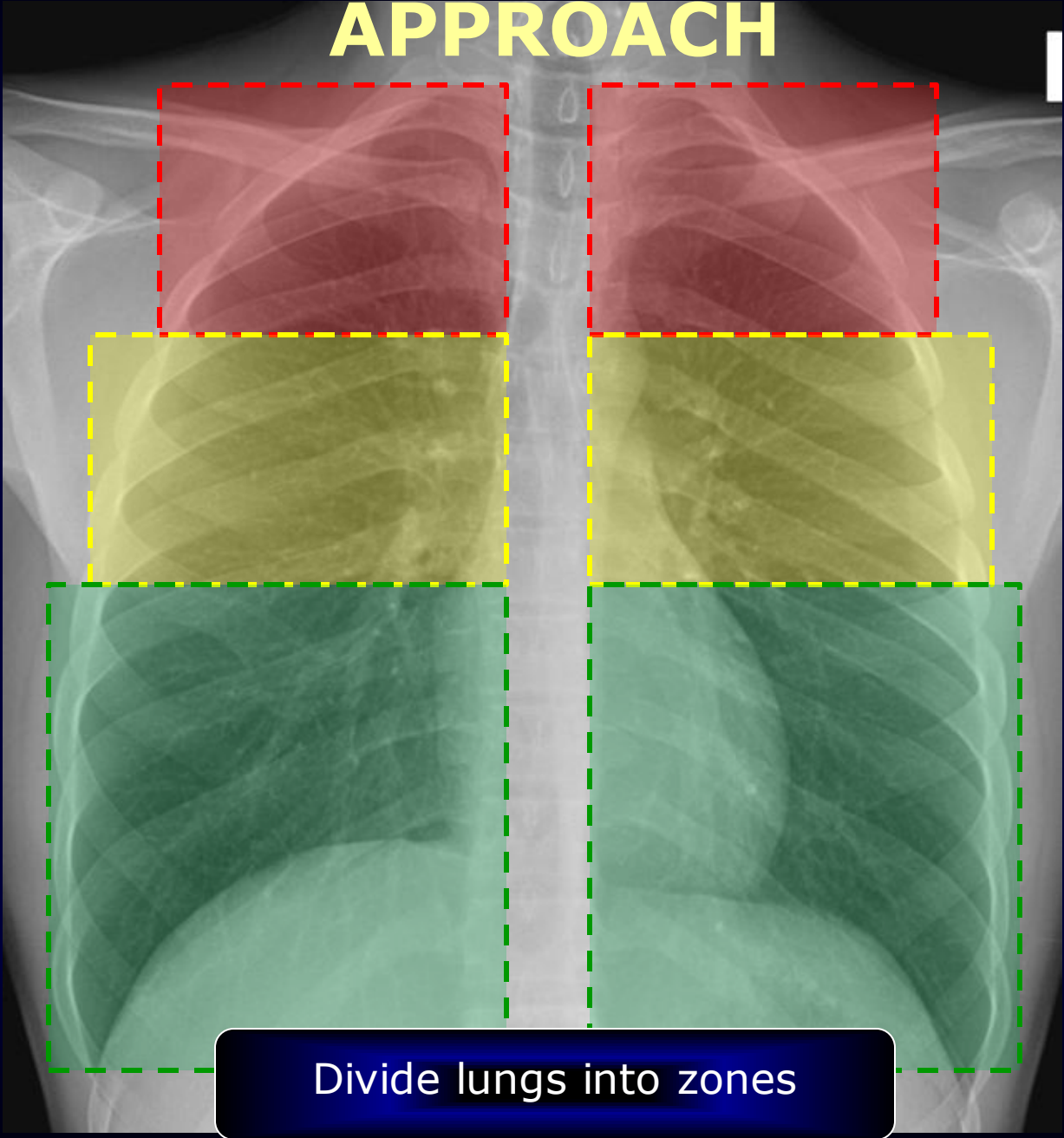
The best way interpret the findings is to use a consistent system in analyzing the radiograph

## 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

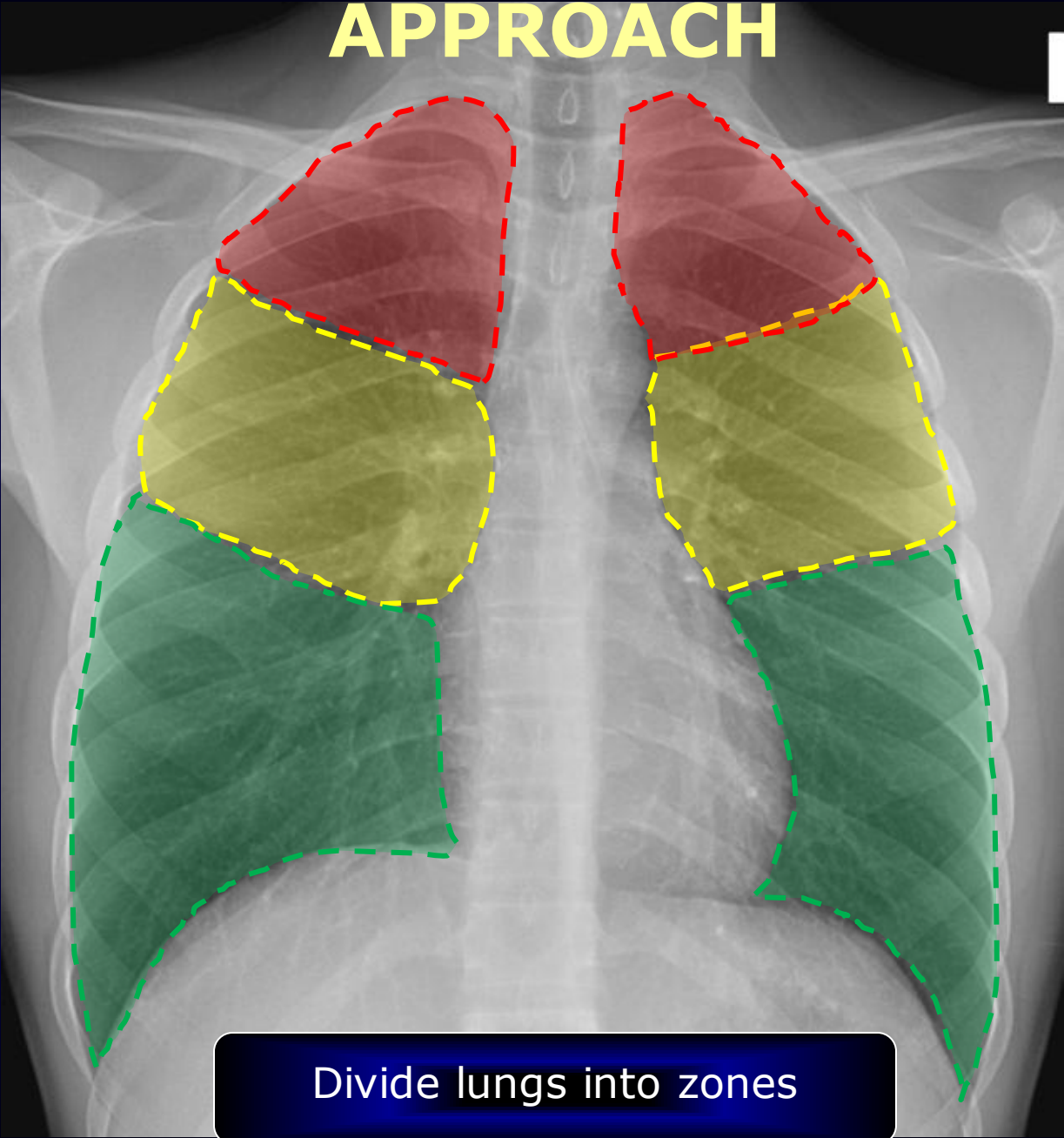


Divide lungs into zones





# APPROACH

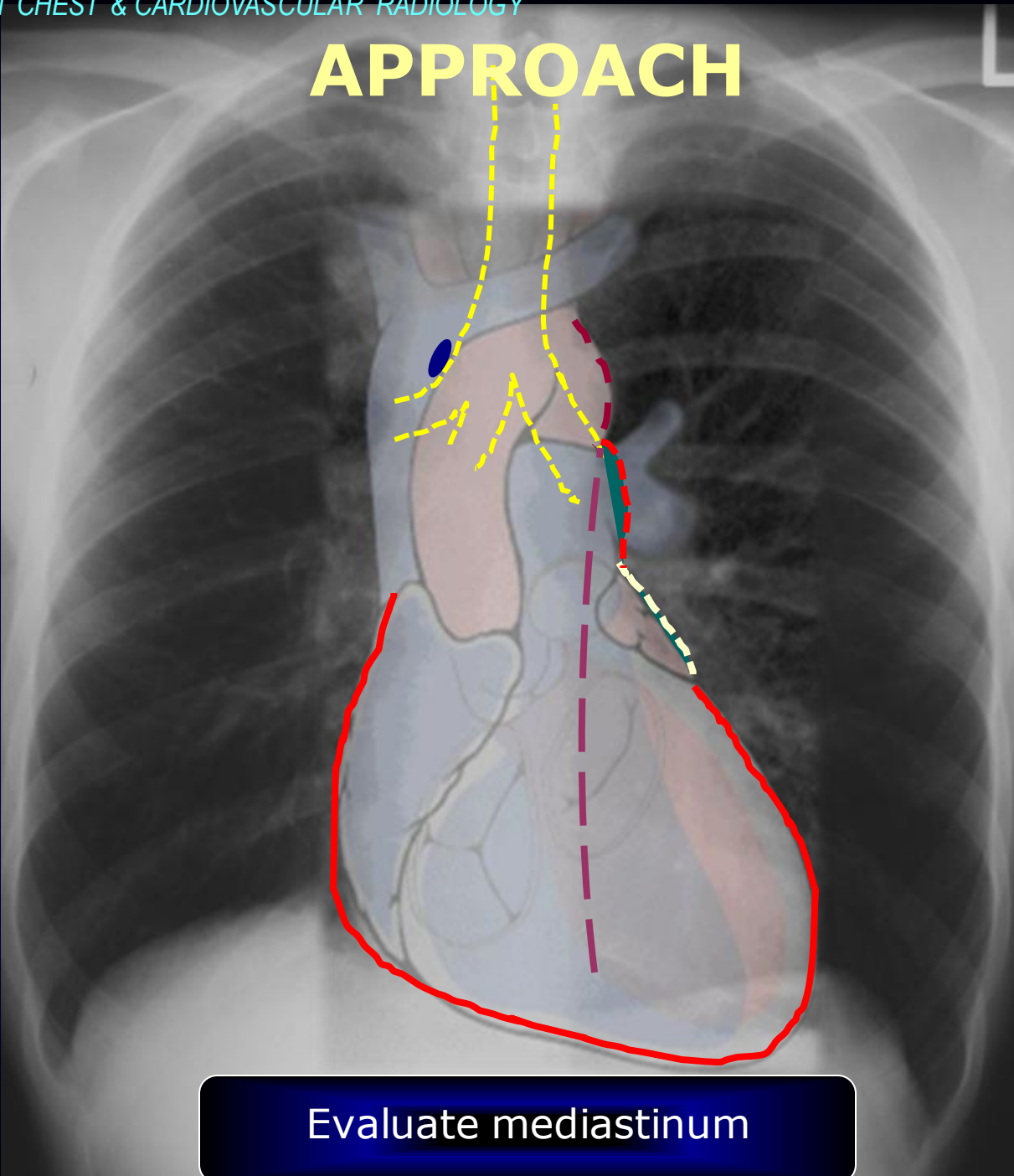


Divide lungs into zones





# 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  $18 \times 10^9/L$  (mainly neutrophils). Chest X-ray was done.

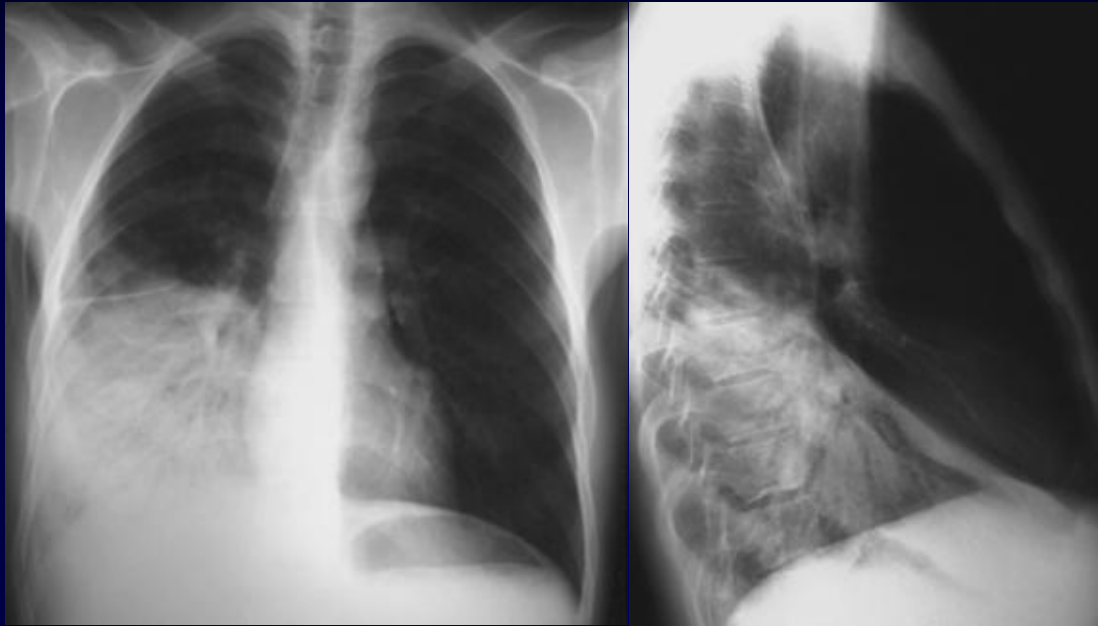
What is the most likely increased density pattern seen on this X-ray?



## Adult patient presenting with cough and fever



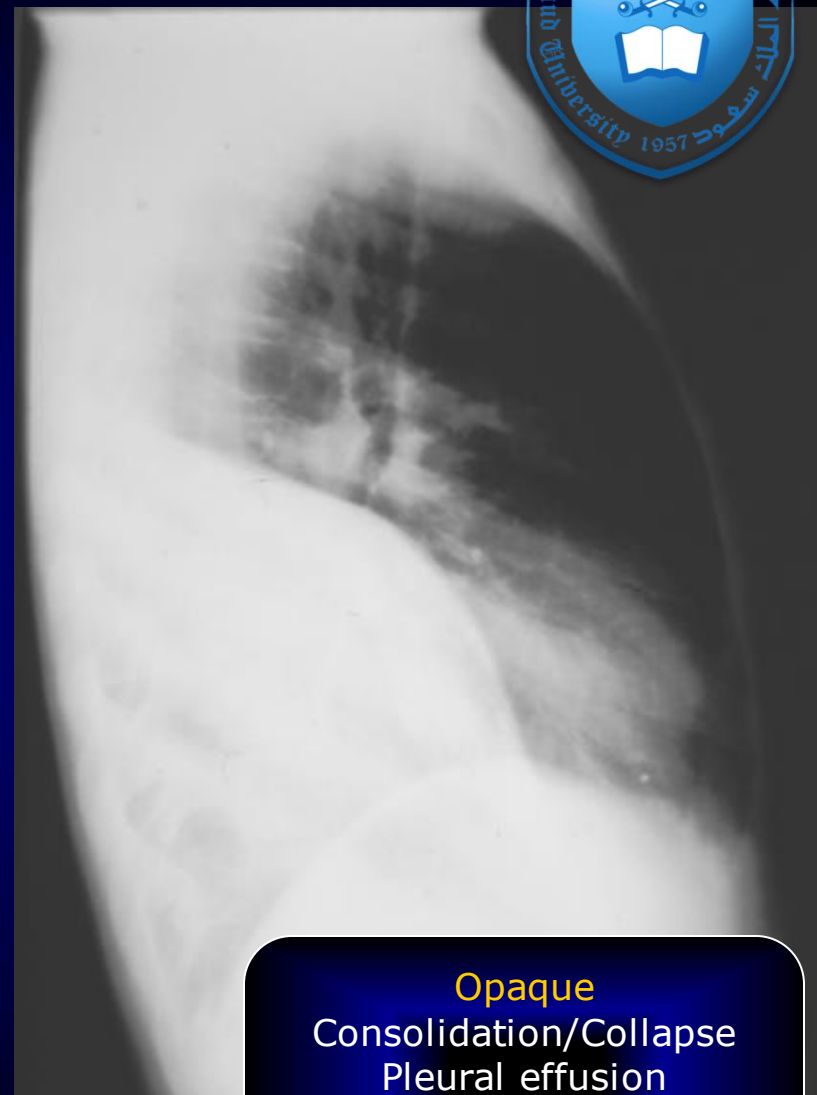
## Adult patient presenting with cough and fever



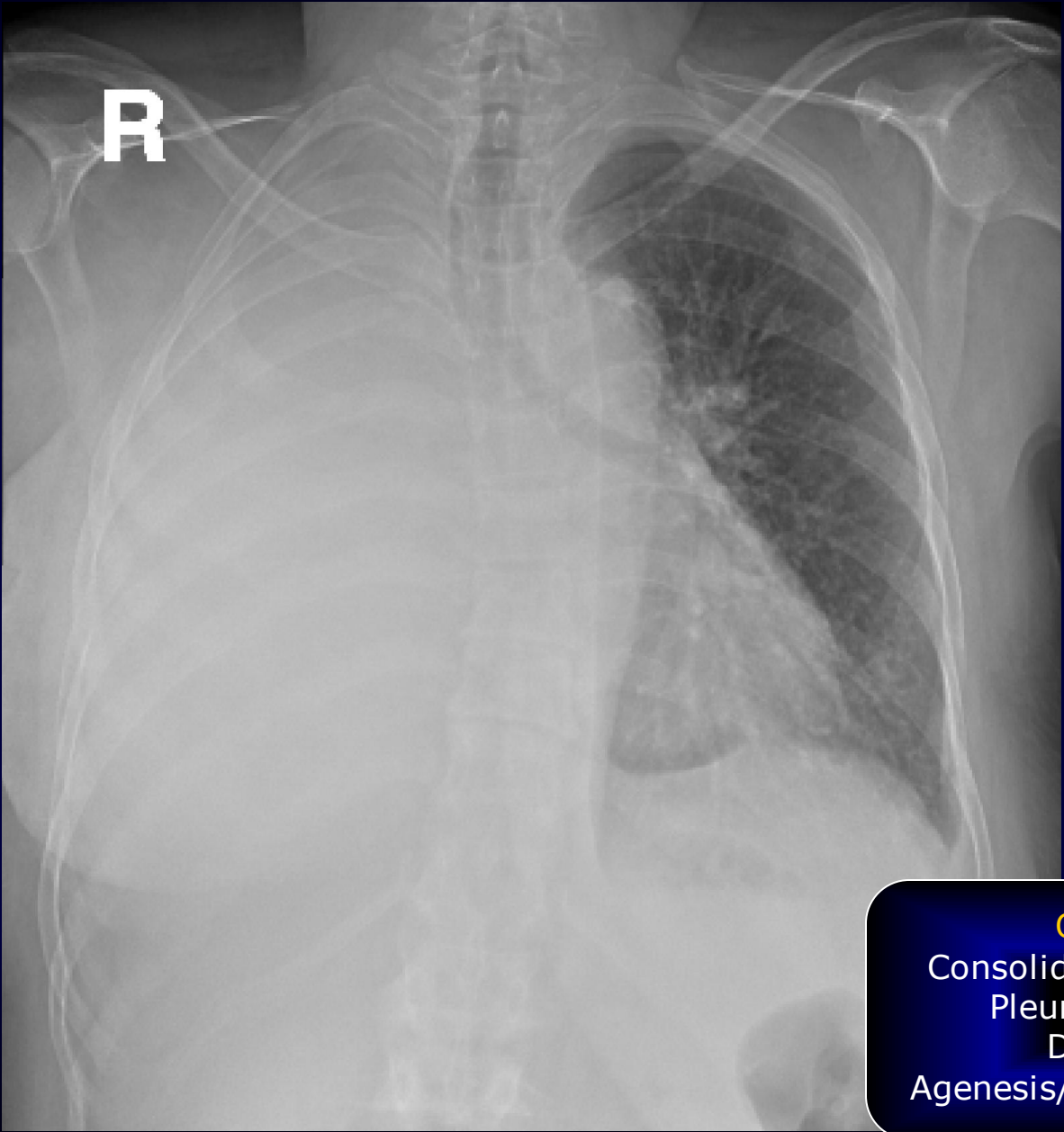
What is the most likely increased density pattern seen on this X-ray?

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





**Opaque**  
Consolidation/Collapse  
Pleural effusion  
D Hernia  
Agenesis/pneumonectomy



**Opaque**  
Consolidation/Collapse  
Pleural effusion  
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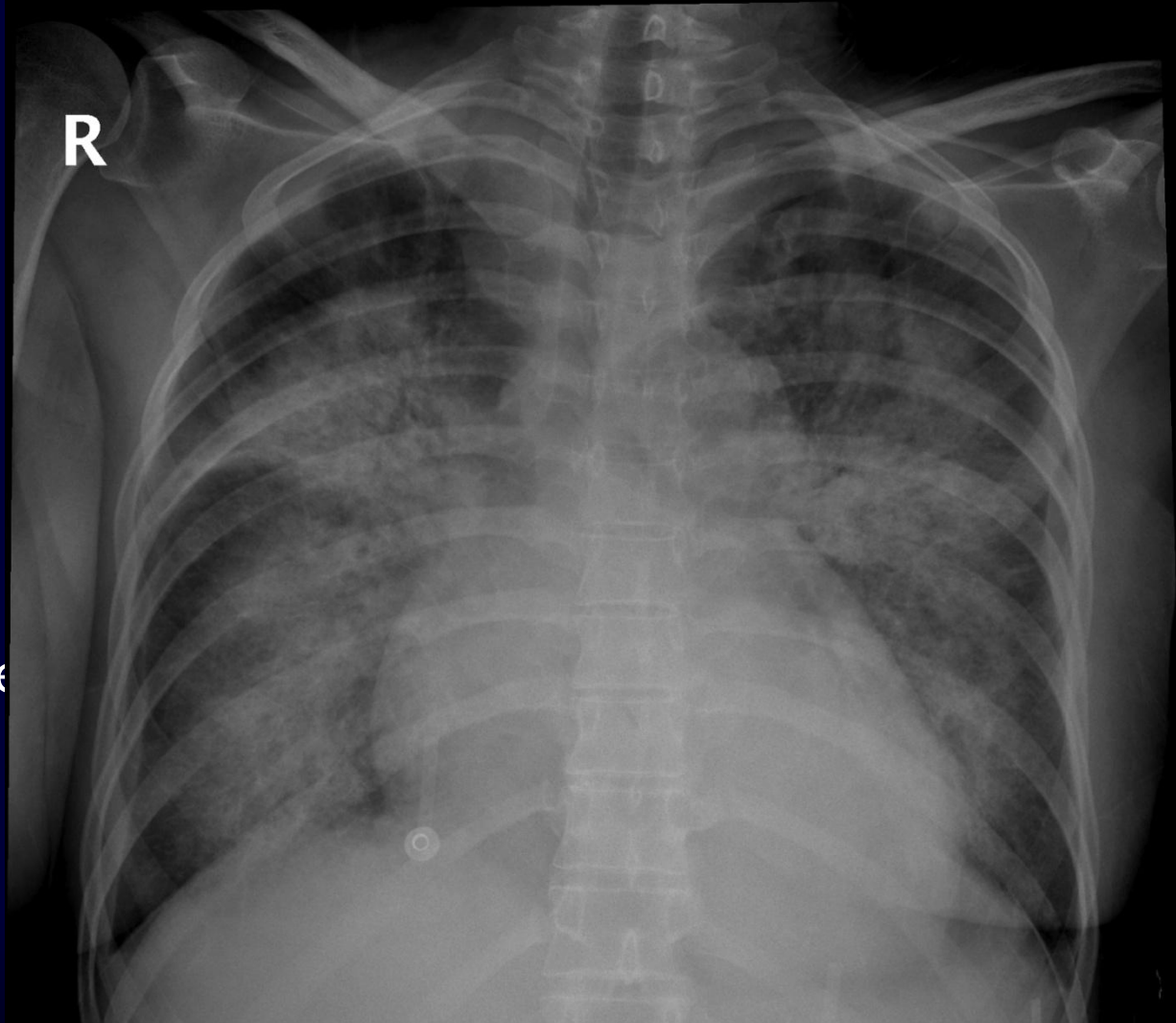
# CASE 2

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





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

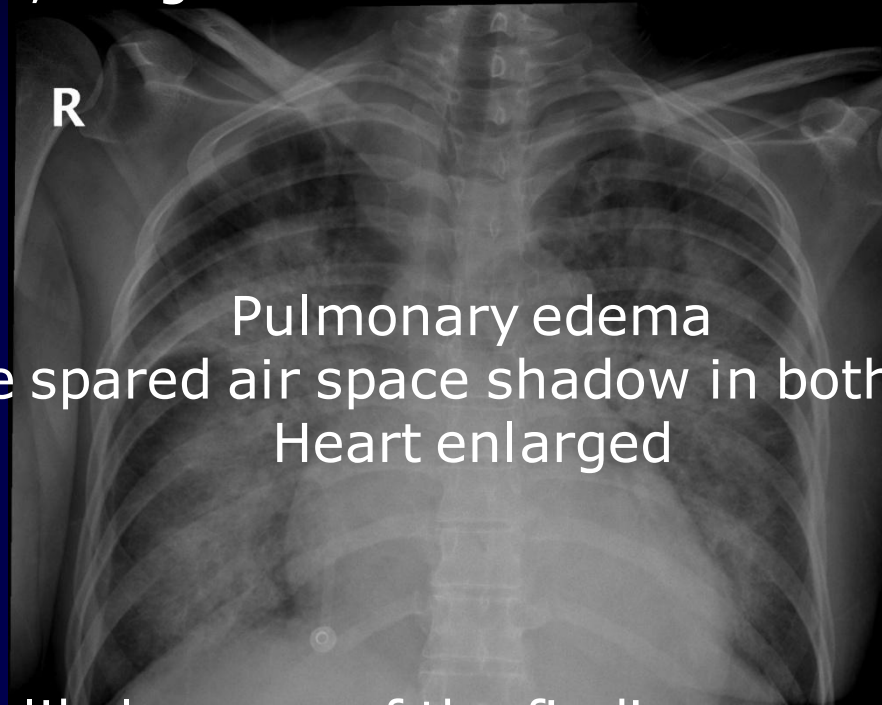


What is the

s X-ray?



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

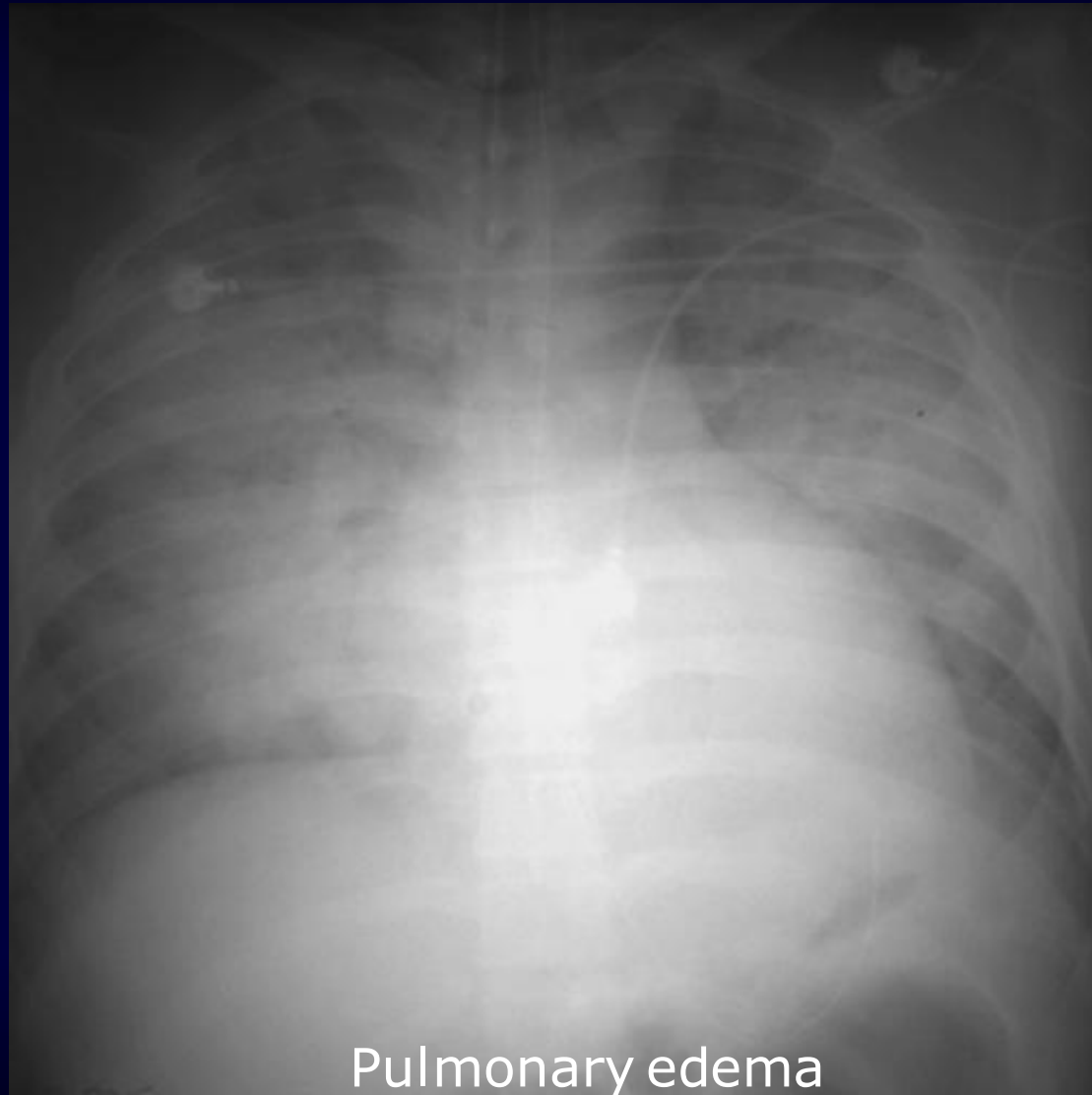


Pulmonary edema  
Wide spared air space shadow in both lungs  
Heart enlarged

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

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





Pulmonary edema





# CHEST PATTERNS

Increased Nodular Pulmonary Densities

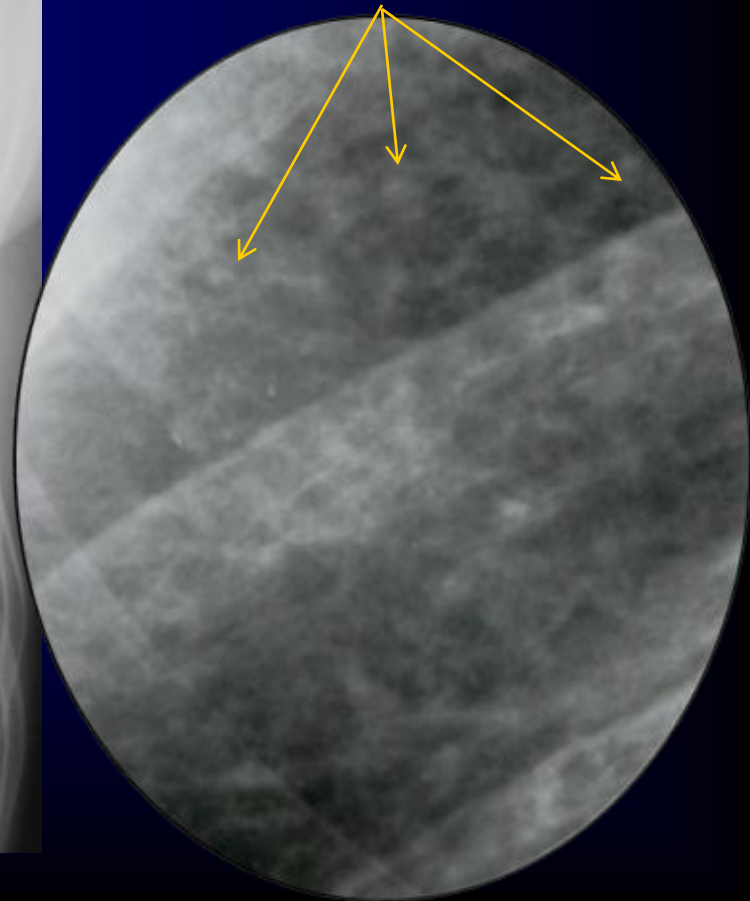


Adult patient presenting with cough,  
fever and weight loss



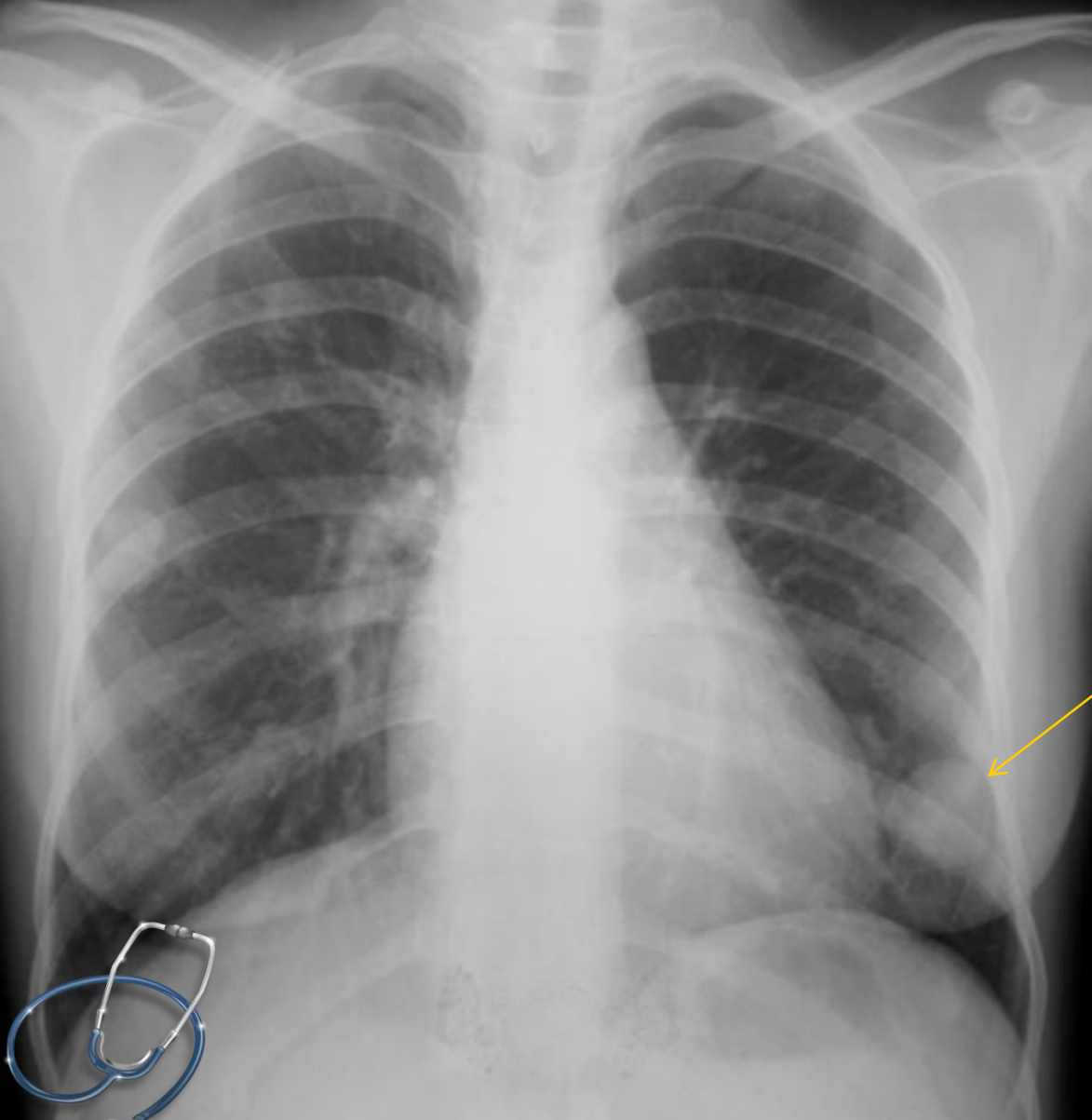
Pulmonary miliary TB

Diffuse miliary nodules



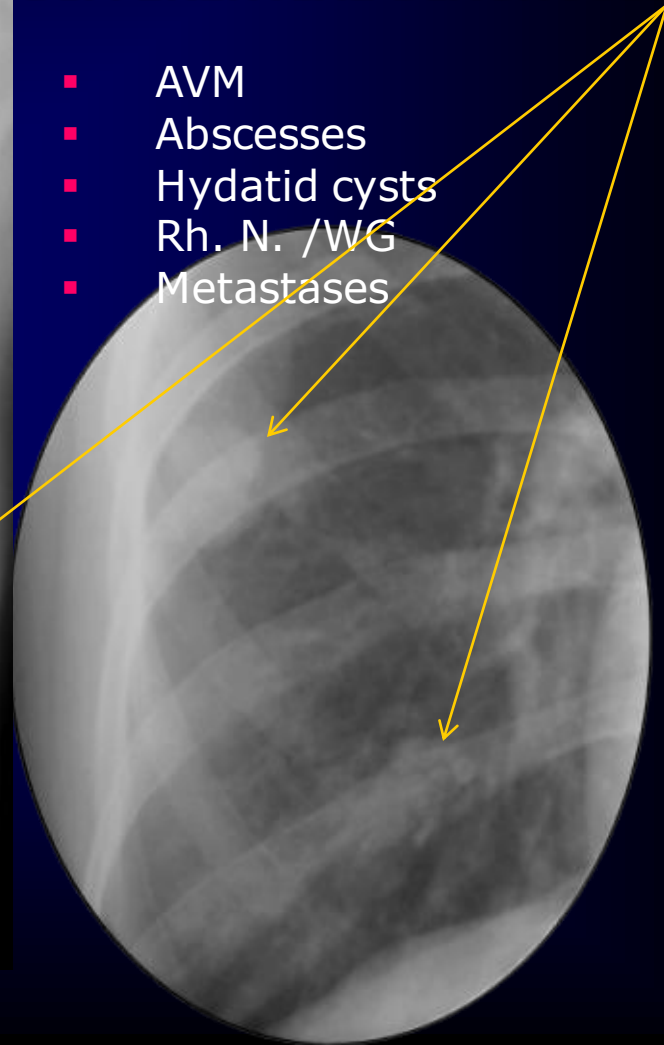


Adult female presenting with cough & weight loss



## DIFFERENTIAL DIAGNOSIS

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





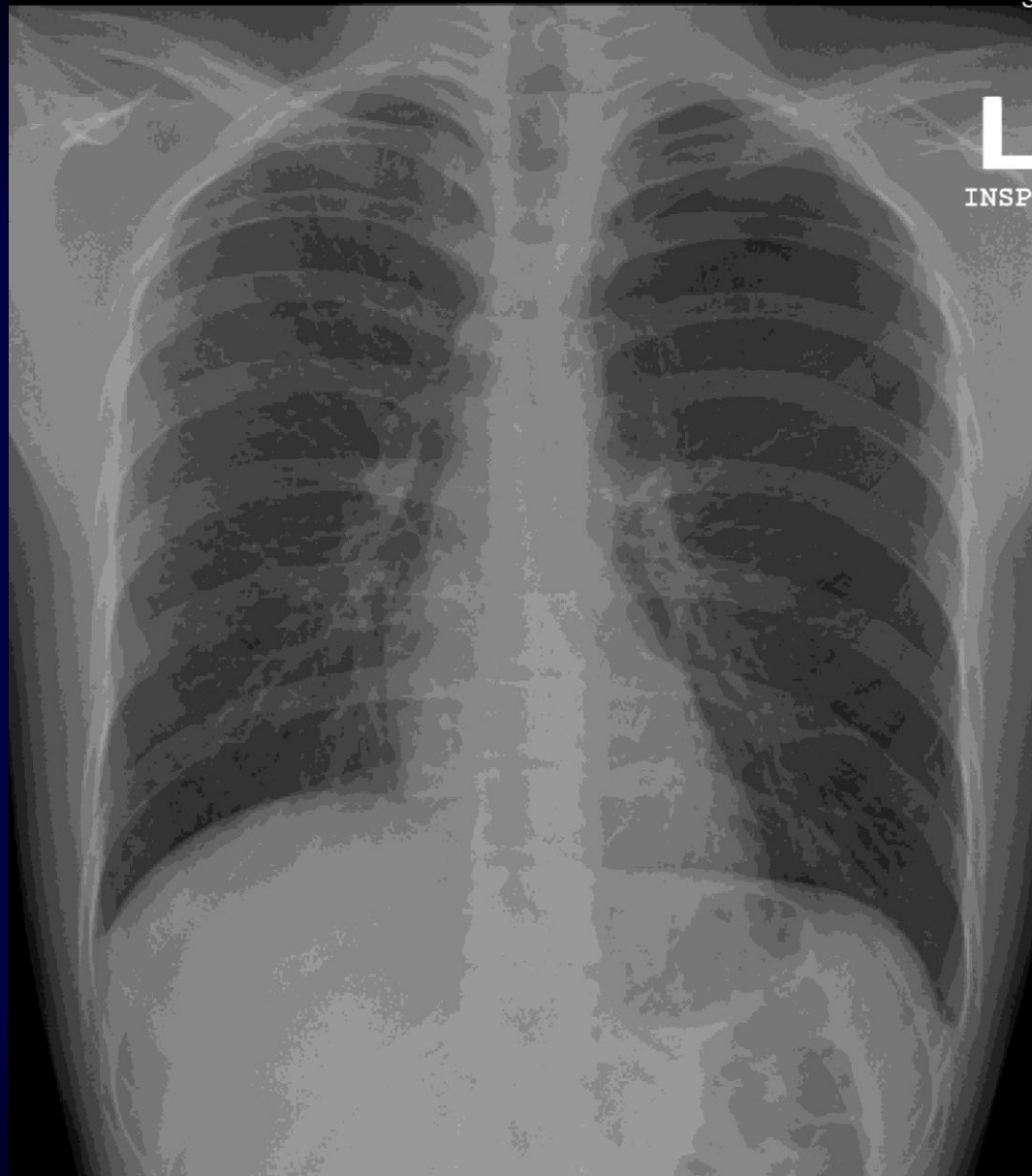


# CHEST PATTERNS

Decreased Pulmonary Densities



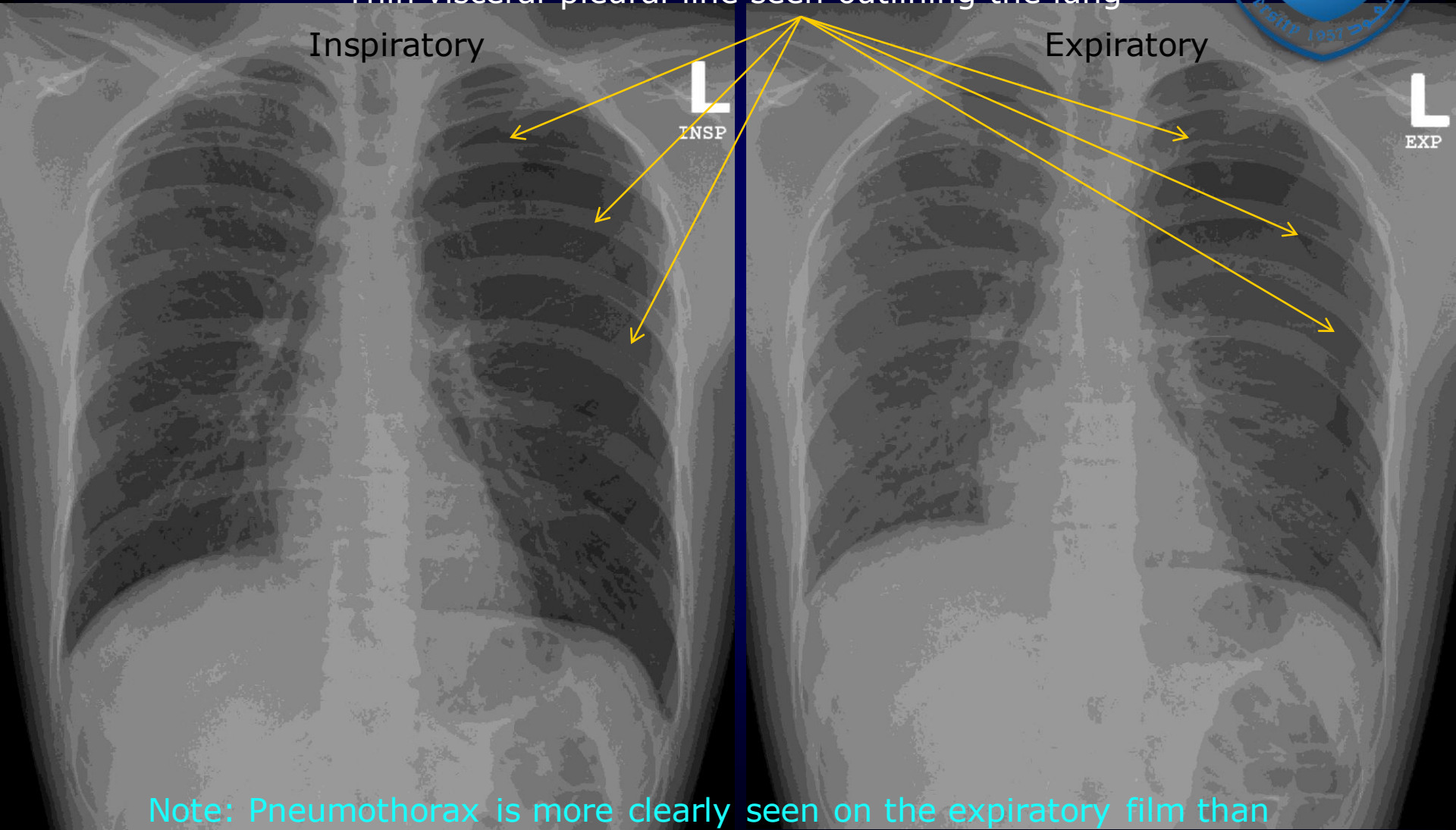




Young Adult presenting with acute chest pain  
Known to have bronchial asthma



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



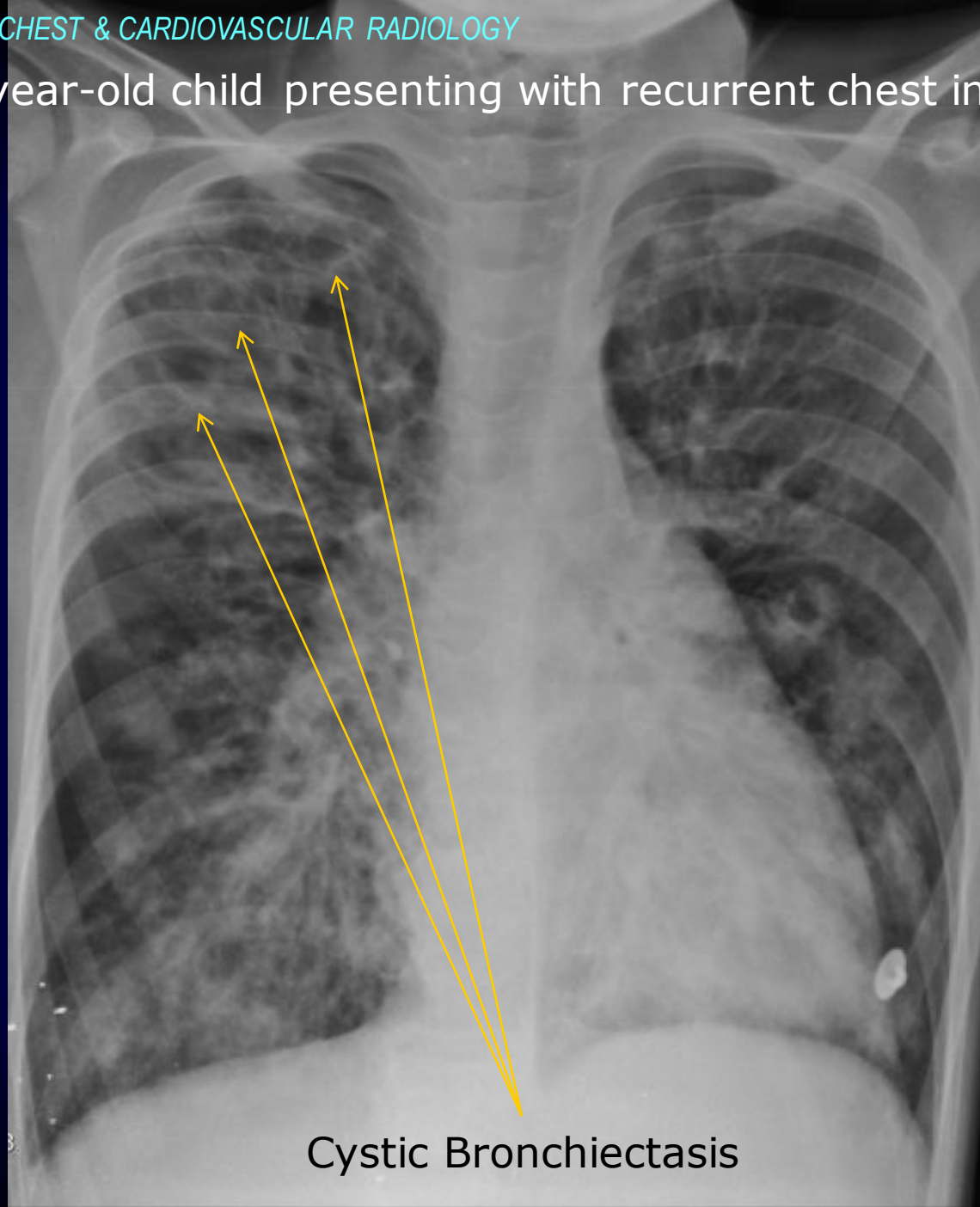


# CHEST PATTERNS

Cavitary/Cystic pulmonic lesions

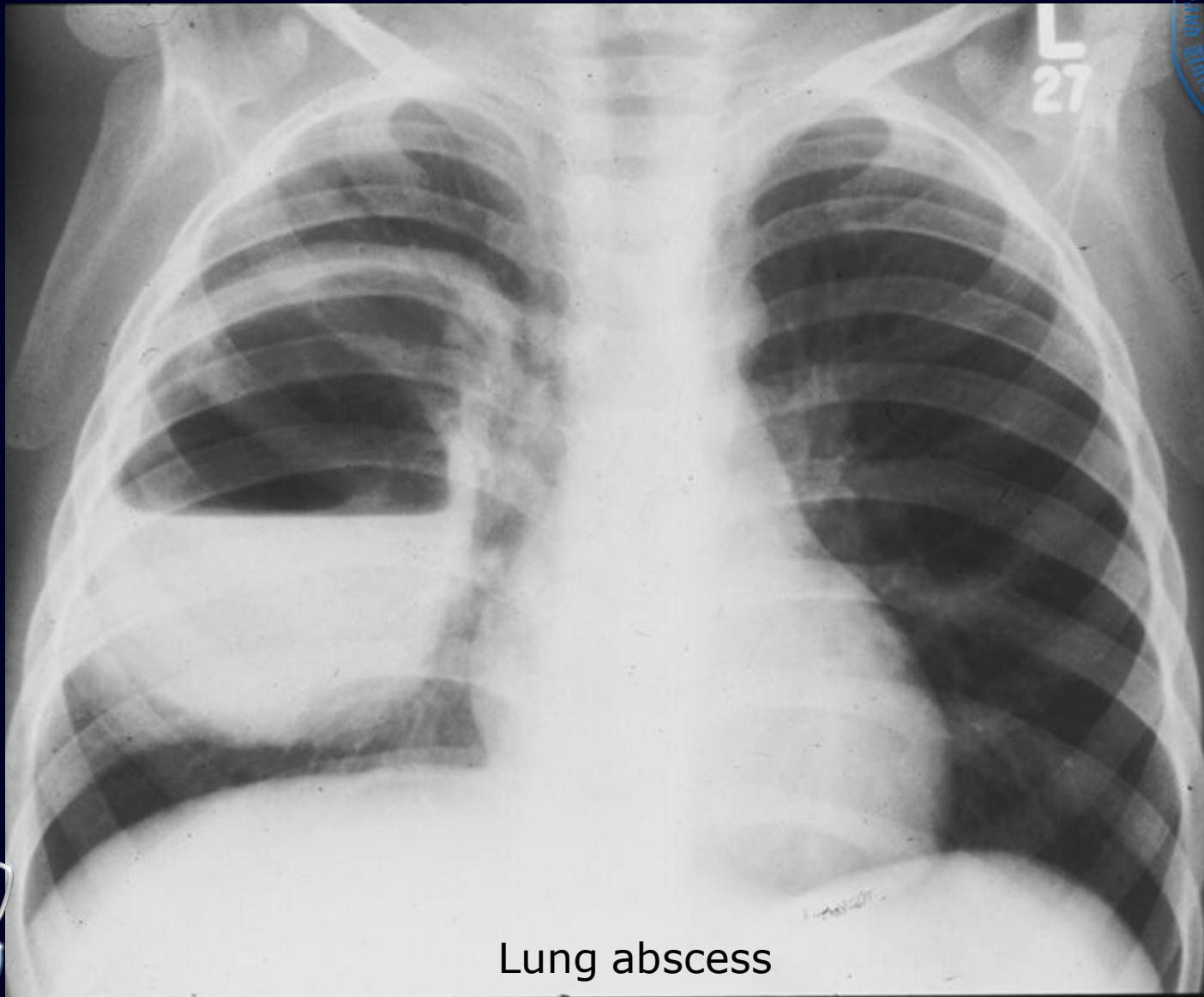


12 year-old child presenting with recurrent chest infection



Cystic Bronchiectasis





Lung abscess



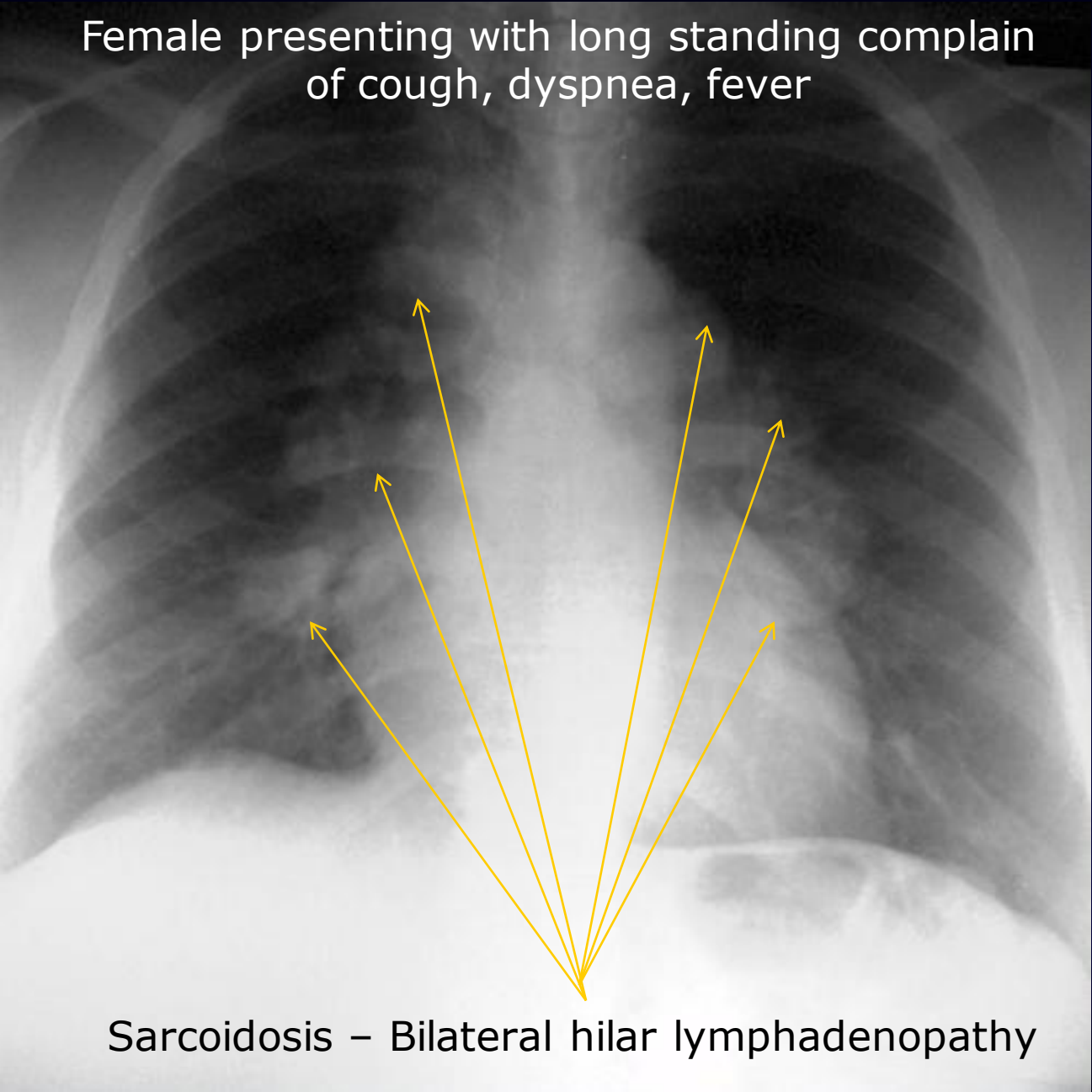


# CHEST PATTERNS

## Mediastinal Masses







R

Acute chest pain  
Known hypertensive



Aortic dissecting aneurysm – 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

