As Easy as Black & White
CXR Interpretation

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Chest x-ray anatomy
1 - Trachea
2 - Hila
3 - Lungs
4 - Diaphragm
5 - Heart
6 - Aortic knuckle
7 - Ribs
8 - Scapulae
9 - Breasts
10 - Bowel gas

Clinical Findings that show up White
• Pulmonary Edema
• Pneumonia
• Pleural Effusion
• Atelectasis
• ARDS
• Tumors
• Pericardial effusion/cardiac tamponade

Pulmonary Edema
• Fluid in the pulmonary vasculature
• Will appear white on CXR
• Butterfly or batwing pattern
• Kerley B lines: thin linear pulmonary opacities caused for fluid or cellular infiltration into the interstitium of the lungs
• Treatment:
  – Diuretics

Pulmonary Edema

http://www.slideshare.net/mahayousif?utm_campaign=profiletracking&utm_medium=sssite&utm_source=ssslideview
- **Kerley B Lines** — Horizontal lines < 2 cm long found in the lower zone periphery
- These lines are the thickened, edematous interlobular septa

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**Pneumonia**

- A pattern of localized alveolar infiltrates
- May be localized to a single lobe or be more diffuse
- Will appear white on CXR
- **Cause:**
  - Infection
- **Treatment**
  - Antibiotics

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**Pneumonia**

[Image of a chest X-ray with pneumonia and pulmonary edema]
Pleural Effusion

- Fluid in the pleural space
- At least 200 – 300 ml must be present in the pleural space to cause costophrenic blunting
- Treatment
  - Chest tube or thoracentesis to remove the fluid

Pleural Effusion

- Fluid will be white or greyish in color
- Expect to see white in the pleural space
- Fluid Levels:
  - An upright CXR will ensure that fluid levels will drop to the bottom of the cavity.
  - Fluid levels taken on a patient lying will displace the fluid laterally over the cavity and will therefore not be detected as a distinct line

Estimate of volume of pleural fluid

- 200 – 300 ml to cause costophrenic angle blunting
- > 300 ml – 300 ml
- > 2800 ml – Approx 5 liters

Atelectasis

- Collapsed or airless state of the alveoli (no oxygen in alveoli)
- Will appear white on the CXR
- Causes densities (white areas) of the lobes but usually not symmetrical changes in each lung field.
- To confirm atelectasis in lower lobe, a lateral CXR may be necessary

Atelectasis Right Upper Lobe
Atelectasis
• Causes:
  – Right mainstem intubation with ET tube
  – Secretions or mucous plugs
  – Hypoventilation of alveoli
• Treatment: Reexpand the alveoli
  – Ascertain proper ET tube placement
  – CPAP/BIPAP
  – Incentive spirometry
  – Bronchoscopy

ARDS: Acute Respiratory Distress Syndrome
• Acute alveolar insult causing pulmonary inflammation and small vessel injury
• Diffuse bilateral patchy infiltrates
• White infiltrates on CXR
• “Blizzard snowstorm”
• “Bilateral whiteout”

Cardiac Tamponade
• Fluid around the heart
• Appears white on the CXR
• Mediastinum gets wider and squares off
• Compare to older CXRs
• Causes
  – Chest trauma
  – Bleeding Post op Cardiac surgery

• Pericardial Effusion
• Water bottle
• (Above)

• Cardiomyopathy --- will see the pulmonary hiatus (vasculature)
Pneumothorax

- **Causes:**
  - Anything that causes a tear in the lung: line insertion, rib fracture
- **Treatment:**
  - Chest tube insertion if greater than 10 – 15%
  - If tension pneumothorax ---- it is a medical **EMERGENCY** and needs immediate needle decompression