Chest X-Ray Interpretation

**Community CXR Indications:**
- Following up known pulmonary diseases
- Evaluating malignancies (staging, determining extent of spread)
- Symptomatic pts with cardiac or respiratory symptoms

**1. Decide if the CXR quality is suitable for interpretation:**
- Make sure you have the right CXR
- Know when the X-ray was taken, to compare sequential CXRs for the pt

**Imaging technique:** AP or PA?
- Assume PA unless told otherwise
- PA: clavicles usually more Y-shaped
- AP: clavicles usually more horizontal
- In babies, AP view is common
- Only assess heart size on PA view (AP projection artificially magnifies heart)

**Rotation/Centering**
- CXR is centered when spinous processes are midway between clavicular ends
- If not centered, normal anatomy can be misinterpreted (i.e. tracheal shifts)

**Adequate inspiration? Count Ribs!**
- Good = 8-10 posterior ribs visible above diaphragm (Remember: ribs 1+2 overlap)
- Inadequate inspiration can be misinterpreted (i.e. as interstitial lung disease)

**Adequate exposure?**
- Exposure adequate when intervertebral discs can be just barely seen through the cardiac shadow (can adjust digitally)
- Under-exposure creates abnormally white lungs, over-exposure (x-ray darkening) may hide pathologies

**Costo-phrenic angles**
- Blunted = pleural effusion >200-400mL
- Wide = flat diaphragm; suggests air trapping due to obstructive lung diseases

**Hemi-Diaphragms (Right and Left)**
- Blurred = COPD, asthma exacerbation, foreign body
- Air under R hemidiaphragm = perforated viscus
- Blurred edge of diaphragm; lower lobe airspace disease
- Hemi-diaphragm height:
  - Normally R > L (liver beneath)
  - If one side higher: atelectasis

**Lung fields - Assess:**
- Degree of whiteness
- Equivalency between right and left sides
- Opacifications/Infiltrates
- Presence of Kerley A/B lines
- Lung apices (above clavicles)
- Vascularity (size, position, and whether vascular markings run to the lung periphery)

**If infiltrates present, note pattern:**
- Lobar: cloud-like densities with air bronchograms: alveolar/air-space disease (aka consolidation); suggests pus (i.e. pneumonia), blood, water, cells, or protein within alveoli
- Net-like, reticular: suggests interstitial lung diseases (upper-lobe predominant: inhalational lung injuries; lower-lobe predominant: aspiration, asbestosis, sarcoidosis, etc)

**Trachea:**
- Find air column, check for tracheal deviation (Tension pneumothorax or pleural effusion)
- If a patient is intubated, the endotracheal tube tip should ideally be 4cm above the carina

**Hilum:**
- Contains 1) pulmonary arteries/veins, 2) main-stem bronchi, 3) lymph nodes
- Enlarged? (if hilum contour is straight or convex instead of concave, hilum is enlarged)
- Hilum Shifted? Asymmetrical?
- Unilateral hilar enlargement: 95% malignant

**Heart:**
- Size (normal cardiothoracic ratio <0.5 on PA film), shape, and location within mediastinum

**Cardiac Shadows (Right and Left):**
- R cardiac shadow = R atrium
- L cardiac shadow (top to bottom) = aortic arch, L pulmonary artery, L ventricle
- Assess contour, shape, size, and location
- White blurring of any cardiac border suggests airspace disease of upper or middle lung lobes

**Cardio-phrenic angles**
- Blurred = tumor masses (lymphoma, other mediastinal tumors), pericardial fat, pericardial cysts, cardiophrenic space varices, diaphragmatic hernia

**Key References**: