The 12-Step Program

1: Name
2: Date
3: Old films
4: What type of view(s)
5: Penetration
6: Inspiration
7: Rotation
8: Angulation
9: Soft tissues / bony structures
10: Mediastinum
11: Diaphragms
12: Lung Fields

Pre-read

Quality Control

Findings
Pre-Reading

1. Check the name
2. Check the date
3. Obtain old films if available
4. Which **view(s)** do you have?
   - PA / AP, lateral, decubitus, AP lordotic
Quality Control

5. Penetration

- Should see ribs through the heart

- Barely see the spine through the heart

- Should see pulmonary vessels nearly to the edges of the lungs
**Overpenetrated Film**

- Lung fields darker than normal—may obscure subtle pathologies
- See spine well beyond the diaphragms
- Inadequate lung detail
Underpenetrated Film

• Hemidiaphragms are obscured

• Pulmonary markings more prominent than they actually are
6. Inspiration

- Should be able to count 9-10 posterior ribs

- Heart shadow should not be hidden by the diaphragm
Poor inspiration can crowd lung markings producing pseudo-airspace disease.

About 8 posterior ribs are showing.

With better inspiration, the "disease process" at the lung bases has cleared.

9-10 posterior ribs are showing.
7. Rotation

- Medial ends of bilateral clavicles are equidistant from the midline or vertebral bodies
If spinous process appears closer to the right clavicle (red arrow), the patient is rotated toward their own left side.

If spinous process appears closer to the left clavicle (red arrow), the patient is rotated toward their own right side.
8. **Angulation**

- Clavicle should lay over 3\textsuperscript{rd} rib
A film which is apical lordotic (beam is angled up toward head) will have an unusually shaped heart and the usually sharp border of the left hemidiaphragm will be absent.
Findings

9. Soft tissue and bony structures

- Check for
  - Symmetry
  - Deformities
  - Fractures
  - Masses
  - Calcifications
  - Lytic lesions
Findings

10. Mediastinum

- Check for
  - Cardiomegaly
  - Mediastinal and Hilar contours for increase densities or deformities
Findings

11. Diaphragms

- Check sharpness of borders
- Right is normally higher than left
- Check for free air, gastric bubble, pleural effusions
Findings

12. The Lung Fields!

- To help you determine abnormalities and their location...
  
  - Use silhouettes of other thoracic structures
  
  - Use fissures
# Lung Fields: Using Structures / Silhouettes

<table>
<thead>
<tr>
<th>Silhouette / Structure</th>
<th>Contact with Lung</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper right heart border/ascending aorta</td>
<td>Anterior segment of RUL</td>
</tr>
<tr>
<td>Right heart border</td>
<td>RML (medial)</td>
</tr>
<tr>
<td>Upper left heart border</td>
<td>Anterior segment of LUL</td>
</tr>
<tr>
<td>Left heart border</td>
<td>Lingula (anterior)</td>
</tr>
<tr>
<td>Aortic knob</td>
<td>Apical portion of LUL (posterior)</td>
</tr>
<tr>
<td>Anterior hemidiaphragms</td>
<td>Lower lobes (anterior)</td>
</tr>
</tbody>
</table>
Lung Fields: Using Structures / Silhouettes

- Upper right heart border / ascending aorta (anterior RUL)
- Right heart border (medial RML)
- Anterior hemidiaphragms (anterior lower lobes)
- Aortic knob (Apical portion of LUL)
- Upper left heart border (anterior LUL)
- Left heart border (lingula; anterior)
Lung Fields: Fissures

The fissures can also help you to determine the boundaries of pathology

<table>
<thead>
<tr>
<th>Major Oblique Fissure</th>
<th>Separates the LUL from the LLL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Major Fissure</td>
<td>Separates the RUL/RML from the RLL</td>
</tr>
<tr>
<td>Right Minor Fissure</td>
<td>Separates the RUL from the RML</td>
</tr>
</tbody>
</table>
Now for the Cases…

Remember… be systematic!
PA view: RML consolidation and loss of right heart silhouette
Lateral View: RML wedge shaped consolidation
RML pneumonia
RUL infiltrate / consolidation, bordered by minor fissure inferiorly

Patchy LLL infiltrate that obscures the left hemidiaphragm; right and left heart borders obscured

RUL and LLL pneumonia
Underpenetrated; possible nonspecific obscuring of left heart border; mostly normal
Multiple bilateral cavitary lesions with air-fluid levels c/w pulmonary abscesses

Tuberculosis
28 y/o female with sudden onset SOB while jogging this morning

Well demarcated paucity of pulmonary vascular markings in right apex

Left spontaneous pneumothorax
RML consolidation that appears wedge shaped on lateral view

RML pneumonia
RLL infiltrate / consolidation

RLL pneumonia
Increased vascular markings; otherwise normal
Patient BIBA to ER s/p airplane crash.

Widened mediastinum

Concern for aortic injury
Explain the prominence of the right atrium on this AP radiograph.

Patient rotated to their right (left shoulder forward)
Dilatation of the main pulmonary artery with decreased peripheral vascular markings

?? Pulmonary embolism ??
Obscuring of the right and left heart borders; infiltrate at the bases

Bilateral aspiration pneumonia
Diffuse bilateral fluffy interstitial infiltrates

Pneumocystis carinii pneumonia
LUL pneumonia
Severe pulmonary TB
Left lung opacity

Later diagnosed as lung cancer
Cardiomegaly, increased pulmonary vascular markings, fluid in the horizontal fissure

CHF
What do the arrows indicate?

Kerley B Lines

Short (1-2 cm) white lines at the lung bases, perpendicular to the pleural surface representing distended interlobular septa.
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Findings
The End

Questions?