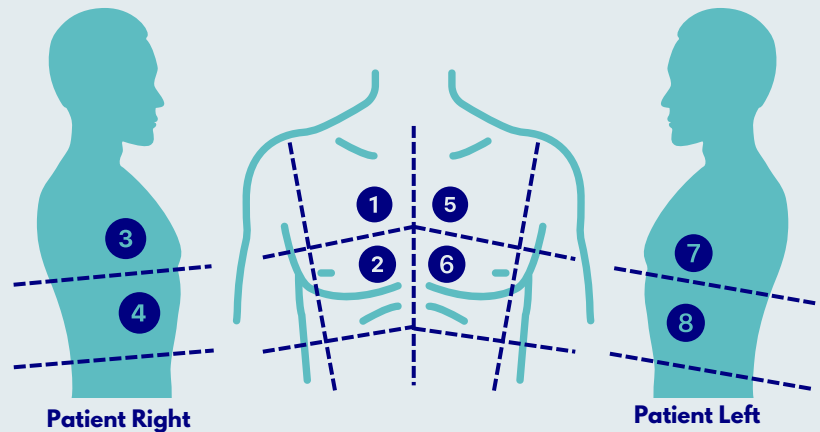


LUNG ULTRASOUND

Lung Zones

For scanning purposes, the lungs are divided into 8 zones.*

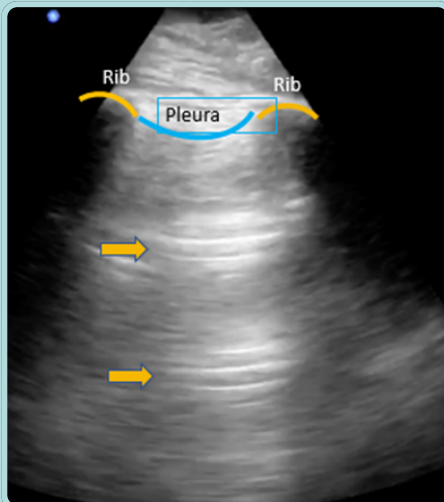
- Patient's right side
 - Anterior: 1, 2
 - Lateral: 3, 4
- Patient's left side
 - Anterior: 5, 6
 - Lateral: 7, 8
- Most commonly scanned zones: 1, 4, 5, 8



*Some scanning protocols incorporate 12 scanning zones, which include 4 posterior zones on the back of the patient.

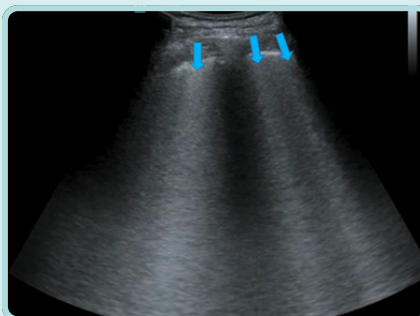
Normal Lung (A-lines)

- Hyperechoic horizontal lines
- Parallel to the pleura
- Repeating lines
- Not physical structures in the lung; reverberation artifacts

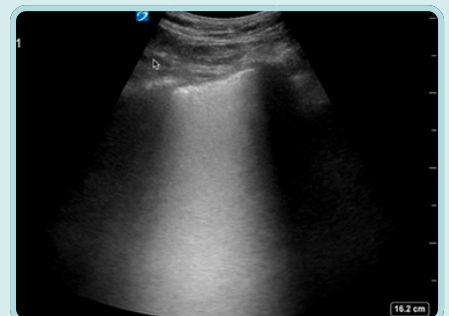


B-lines

- Hyperechoic vertical lines (resemble flashlight beams)
 - Discrete lines or confluent
- Originate from pleura
- Extend to bottom of field
- Erase A-lines (cannot have both)
- Dynamic (must have lung sliding)
 - B-lines appear to be moving in conjunction with pleura
- >3 B-lines per rib space: positive
- >2 positive zones: diffuse



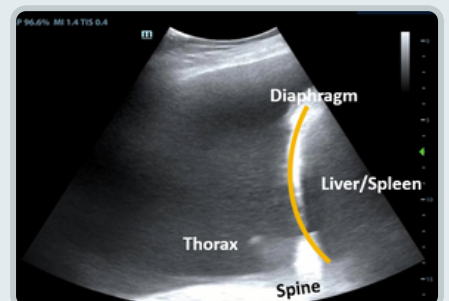
Discrete



Confluent

Pleural Effusion

- Hypoechoic fluid
- Above diaphragm
- Spine sign
- Lateral zones (4 on the right or 8 on left) are best for looking at pleural effusion



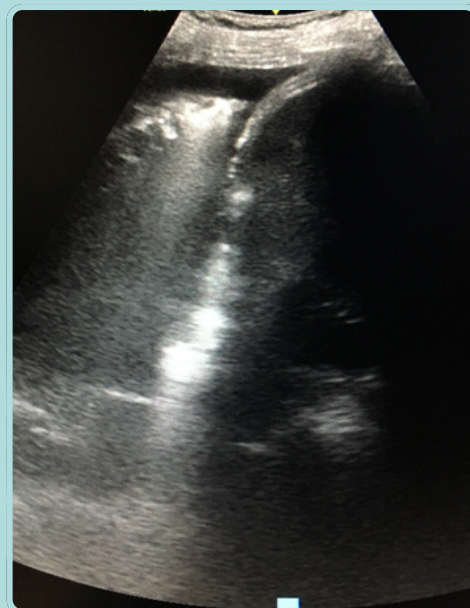
Consolidation

- Air bronchograms (static or dynamic)
- Fluid bronchograms (static or dynamic)
- Sensitivity for pneumonia > 85%

Ddx for consolidation:

- Pneumonia
- Infarction
- Contusion
- Hemorrhage
- Lymphoma
- Other neoplasm
- Vasculitis

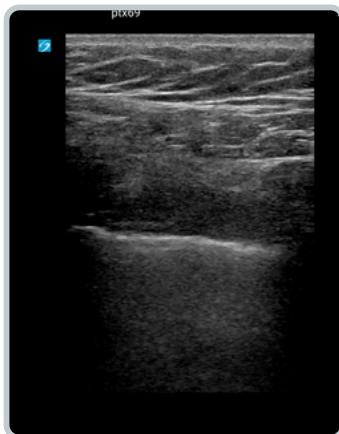
Use the "lawnmower" approach, running the probe systematically up and down lung fields on both sides (anteriorly, laterally, posteriorly)



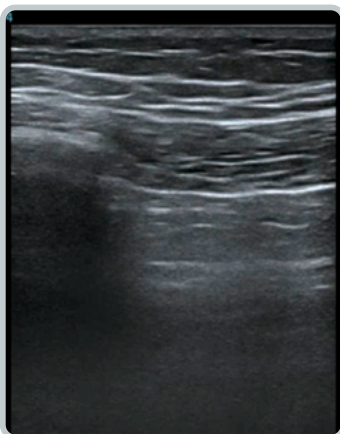
Pneumothorax

- No lung sliding* (no shimmering)
- Barcode sign in M mode
- Lung point (transition between expanded and collapsed lung)
- B-lines = no pneumo

Linear probe views



+ lung sliding (no pneumo)



- lung sliding (pneumo)

*False Positives (other reasons for no lung sliding)

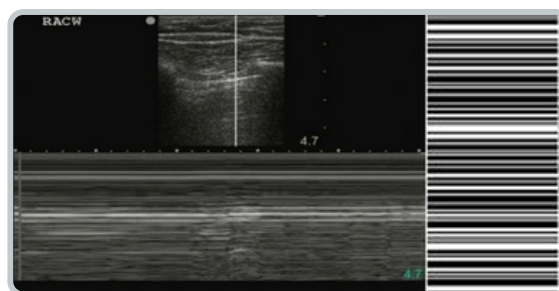
- Pleural scarring
- Adhesions
- COPD/blebs
- Pneumonectomy
- Pneumonia
- Poor respiratory effort

M mode outputs

Seashore sign:



Barcode sign:



False Negatives

- Small/localized PTX: need to systematically search entire lung field to find if PTX is very small, as surrounding area still sliding normally
- Bilateral PTX: symmetric appearance is falsely reassuring