

Lung ultrasound quick guide

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Basics

Transducer selection:

Phased array or curvilinear

- Low frequency
- Deeper penetration

Linear

- Higher frequency / higher resolution
- Best for examining the pleura

When scanning:

- Use a “Lung” preset
- Follow a scanning protocol
- Label and save images
- Transducer marker towards the patients head
- Transducer should be perpendicular to the ribs/pleura
- Images should include two adjacent ribs

Evaluate for lung sliding, lung artifacts (A-lines and B lines), pneumothorax, pleural effusion, interstitial syndrome, and consolidations.

Normal lung

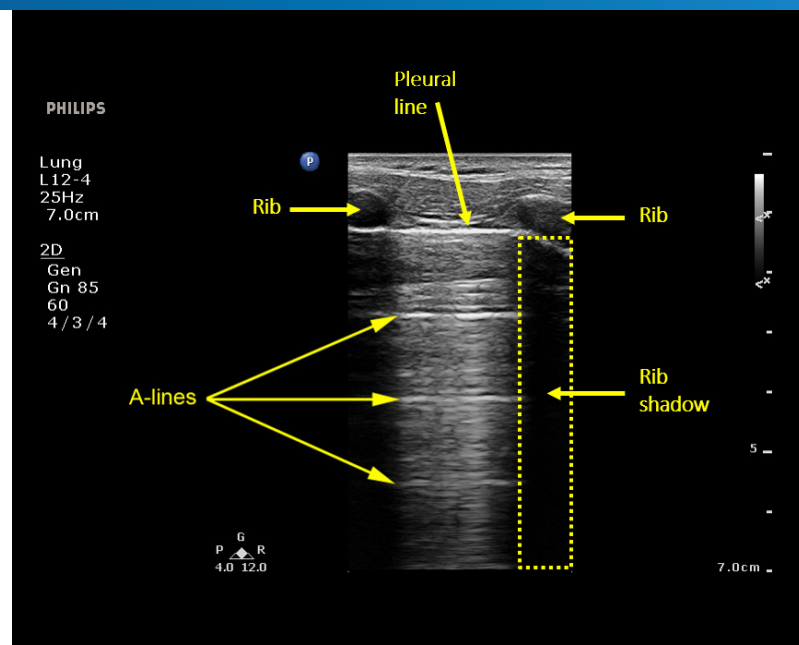
Parietal and visceral pleurae appear as a single hyperechoic “pleural line”

Pleural line will “slide” representing movement of the pleural surfaces

Rib shadows extend to bottom of the image

Image will have an “A-line” pattern

A-lines: Bright horizontal lines deep to the pleural reoccurring at intervals that are equal to the distance from the skin to the pleural line



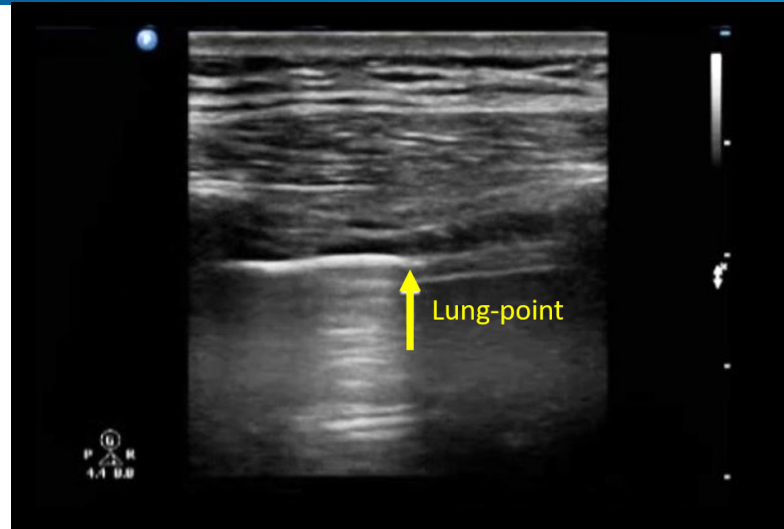
Pneumothorax

- **Absence of lung sliding**
- Absence of B-lines
- Absence of lung-pulse
- **Presence of lung-point**

Identify “lung-point” (point where visceral pleural separates from parietal pleura)

Lung sliding may be absent in: ARDS, pneumonia, fibrosis, pleurodesis, acute asthma attack, chest tubes

*Lung sliding and lung-point are best seen in real-time



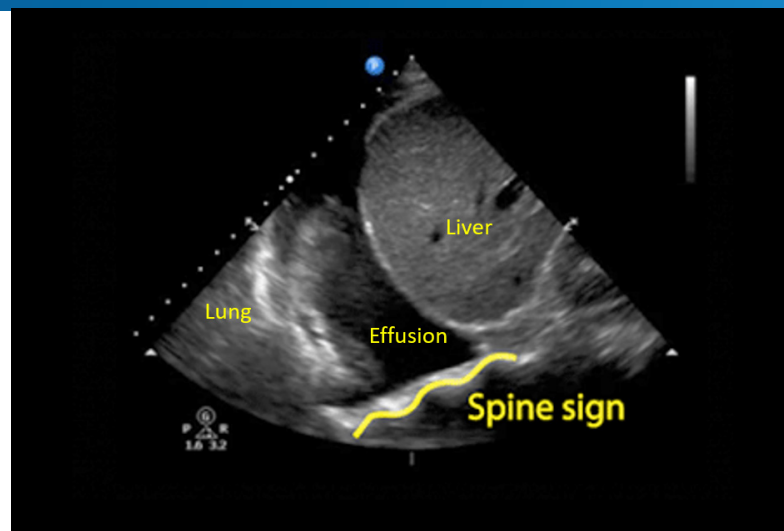
Pleural effusion

Appears as an anechoic (black) collection of fluid

“**Spine sign**”: fluid propagates the ultrasound signal and allows visualization of the spine

In moderate or large pleural effusions lung tissue may appear as a solid organ due to atelectasis and consolidation

Pleural fluid is dependent so is best seen in the posterolateral thorax



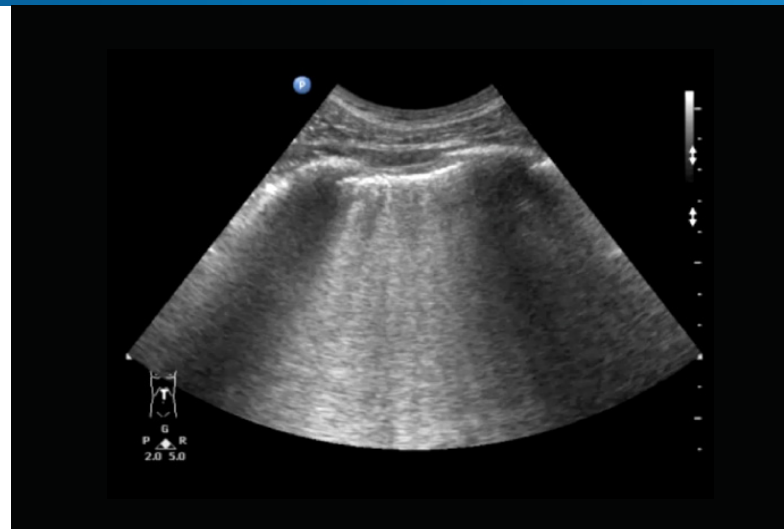
Interstitial syndrome

Images demonstrate B-lines

B-lines are a laser-like, vertical, hyperechoic artifacts that originate at the pleural line, obliterate A-lines, and move with lung sliding

B-lines occur when sound waves encounter a mixture of air and water (i.e. in pulmonary edema, pneumonia, lung contusion, ARDS).

More than 2-3 B-lines per field is abnormal



Consolidations

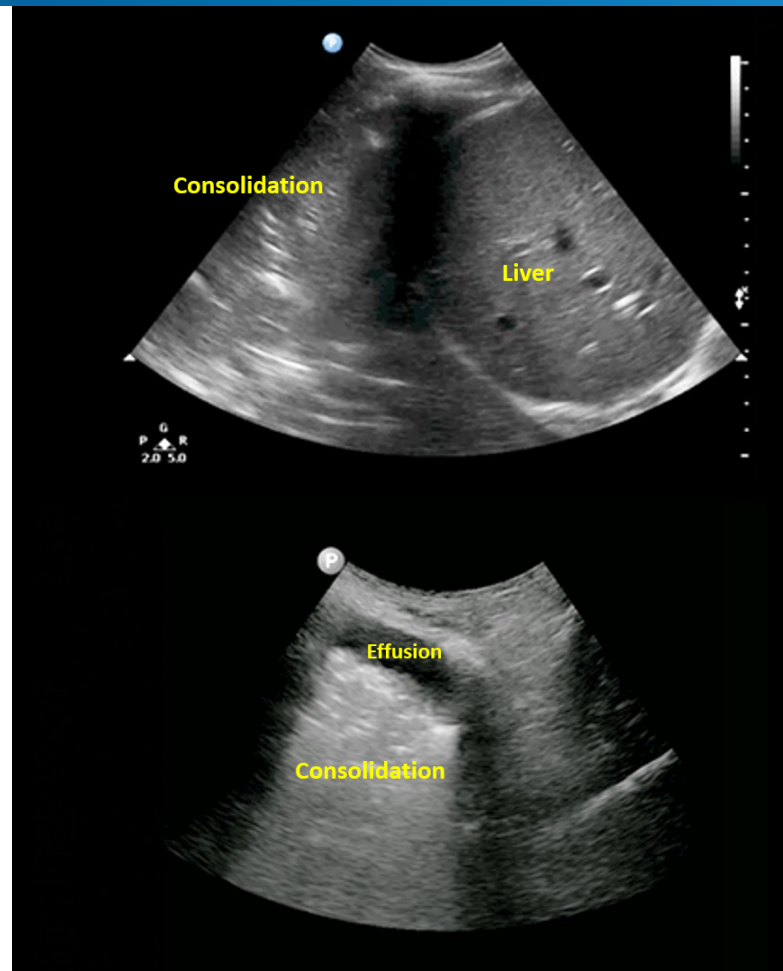
Lung has a tissue-like quality (hepatization)

Non-homogeneous distribution of B-lines

Air bronchograms may be present

Can be seen in ARDS, pneumonia, atelectasis, pulmonary infarction, lung contusion, lung cancer.

Lung-pulse is often seen



This Quick Guide is a reference tool for Dr. Sara Nikravan's "Lung ultrasound" video series

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1. Introduction: <https://youtu.be/Ck2HfEmOMqs>
2. Pneumothorax: <https://youtu.be/YOdpwwgfOig>
3. Pleural effusion: <https://youtu.be/FzDneTP4DjM>
4. Interstitial syndrome: https://youtu.be/95QYA_xZrhI
5. Consolidations: <https://youtu.be/zDNQnXETSBw>

This quick guide document reflects the opinion of the author, not Philips. Before performing any clinical procedure, clinicians should obtain the requisite education and training, which may include fellowships, preceptorships, literature reviews, and similar programs. This paper is not intended to be a substitute for these training and education programs, but is rather an illustration of how advanced medical technology is used by clinicians.

