

Office-Based POCUS: Interstitial Lung

Rural POCUS Rounds
27 February 2026

Disclosures:



**Rural
Ultrasound
Fellowship**



ruralultrasound.com

TIS: 0.01, MI: 0.52, Lung

Office-Based POCUS: Interstitial Lung

Rural POCUS Rounds
27 February 2026

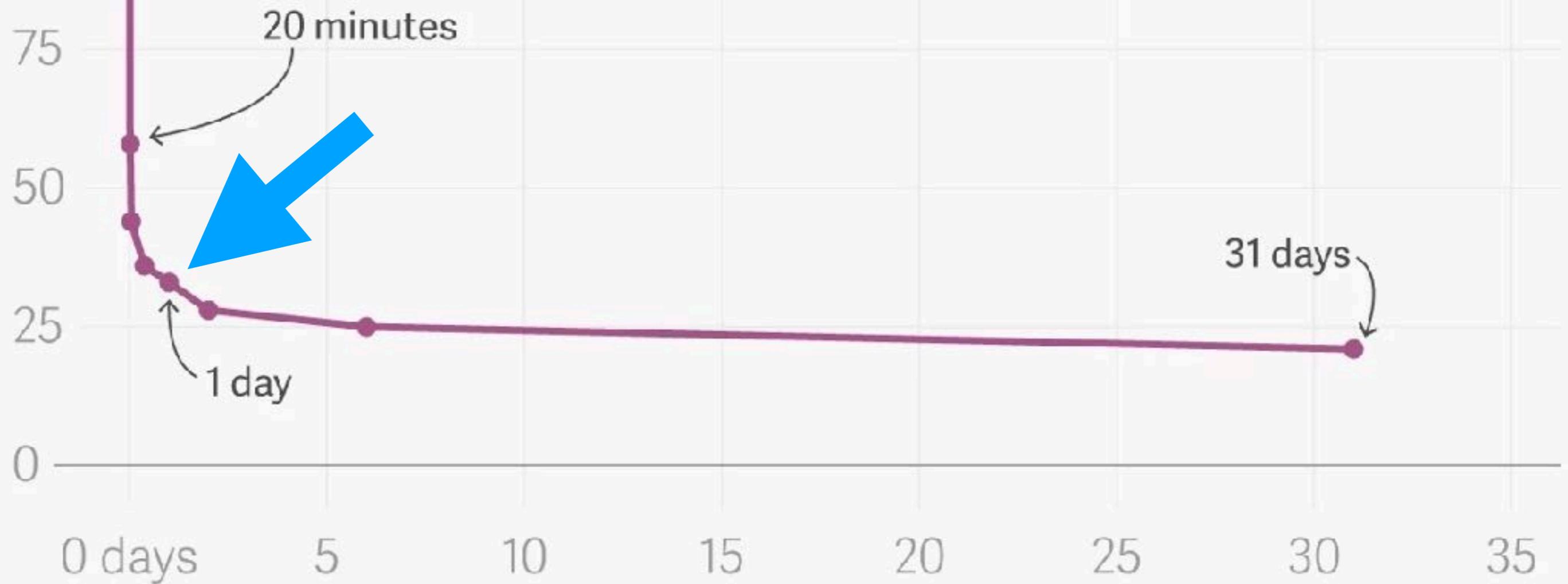
Jonathan Wallace, MD

B

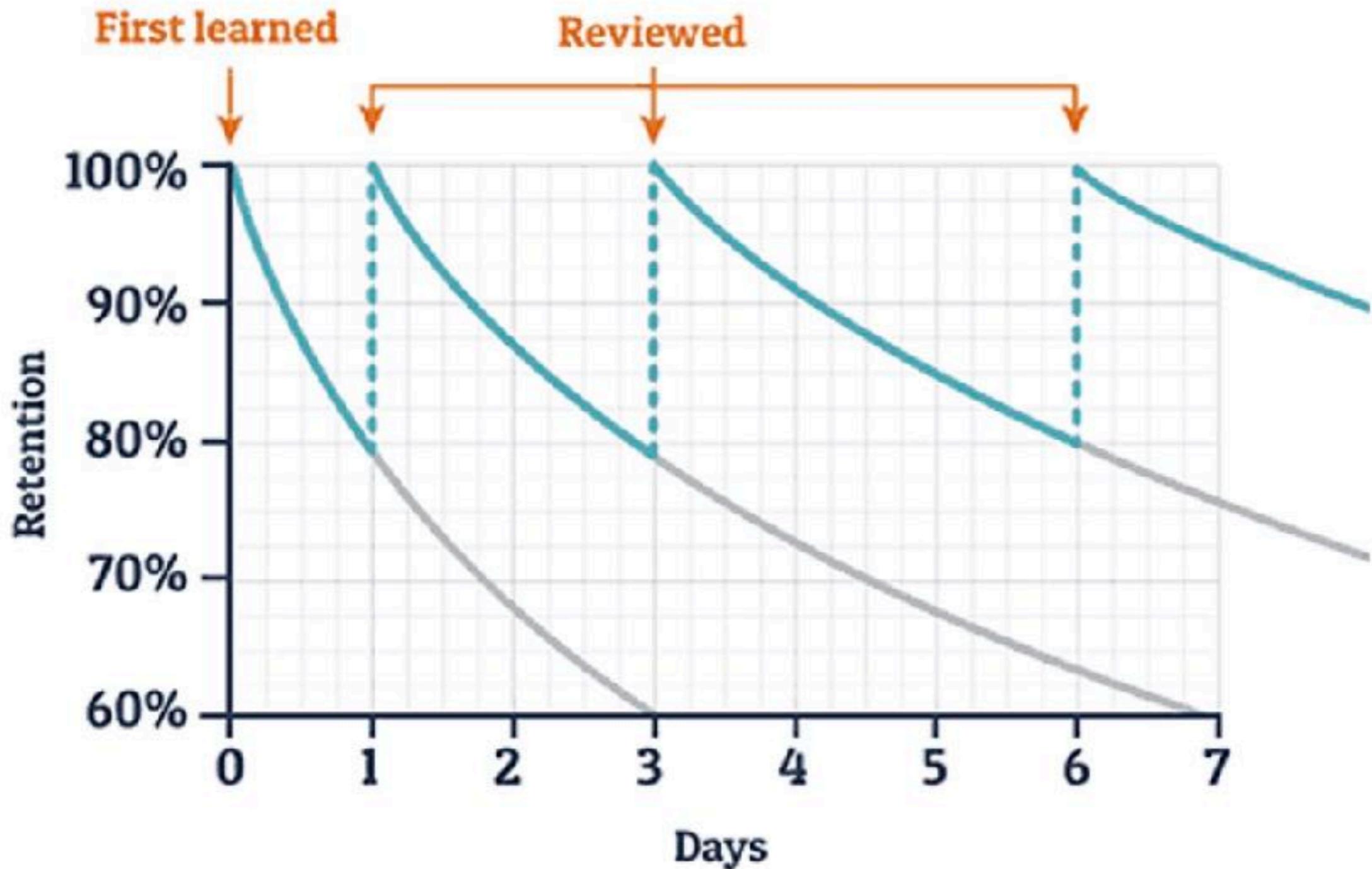
1
2
3
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13

Hermann Ebbinghaus' forgetting curve

100% of information retained



Spaced Repetition





podcast.RnRRounds.ca



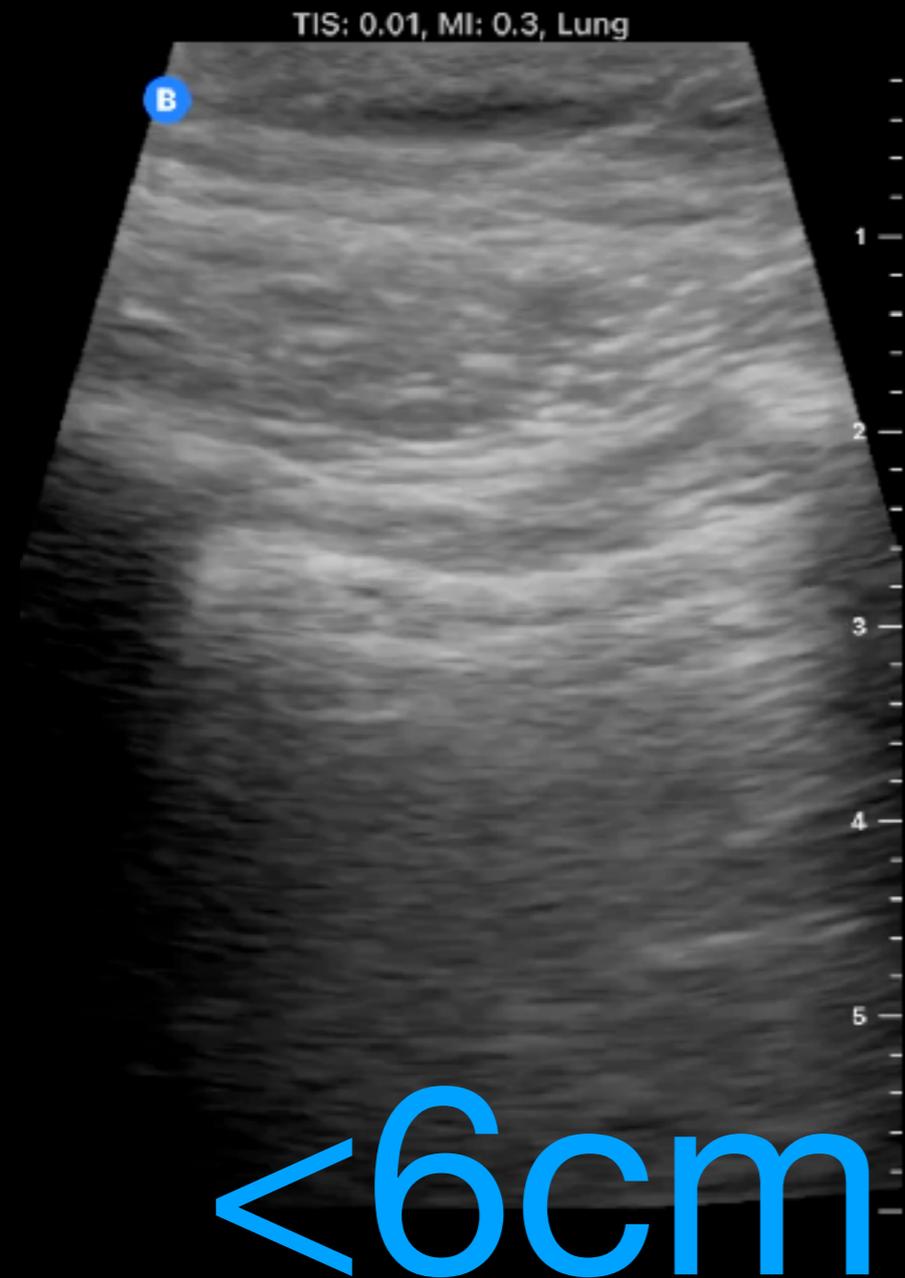
Learning Objectives:

1. Describe the diagnostic accuracy of CXR & PoCUS for common lung pathologies.
2. Recognize the common ultrasound-artifacts consistent with dry vs wet lungs:
 - *A-lines*
 - *B-lines*and well as other pathological changes:
 - *sub-pleural changes*
 - *hepatization*

Two PoCUS flavours in the Lungs

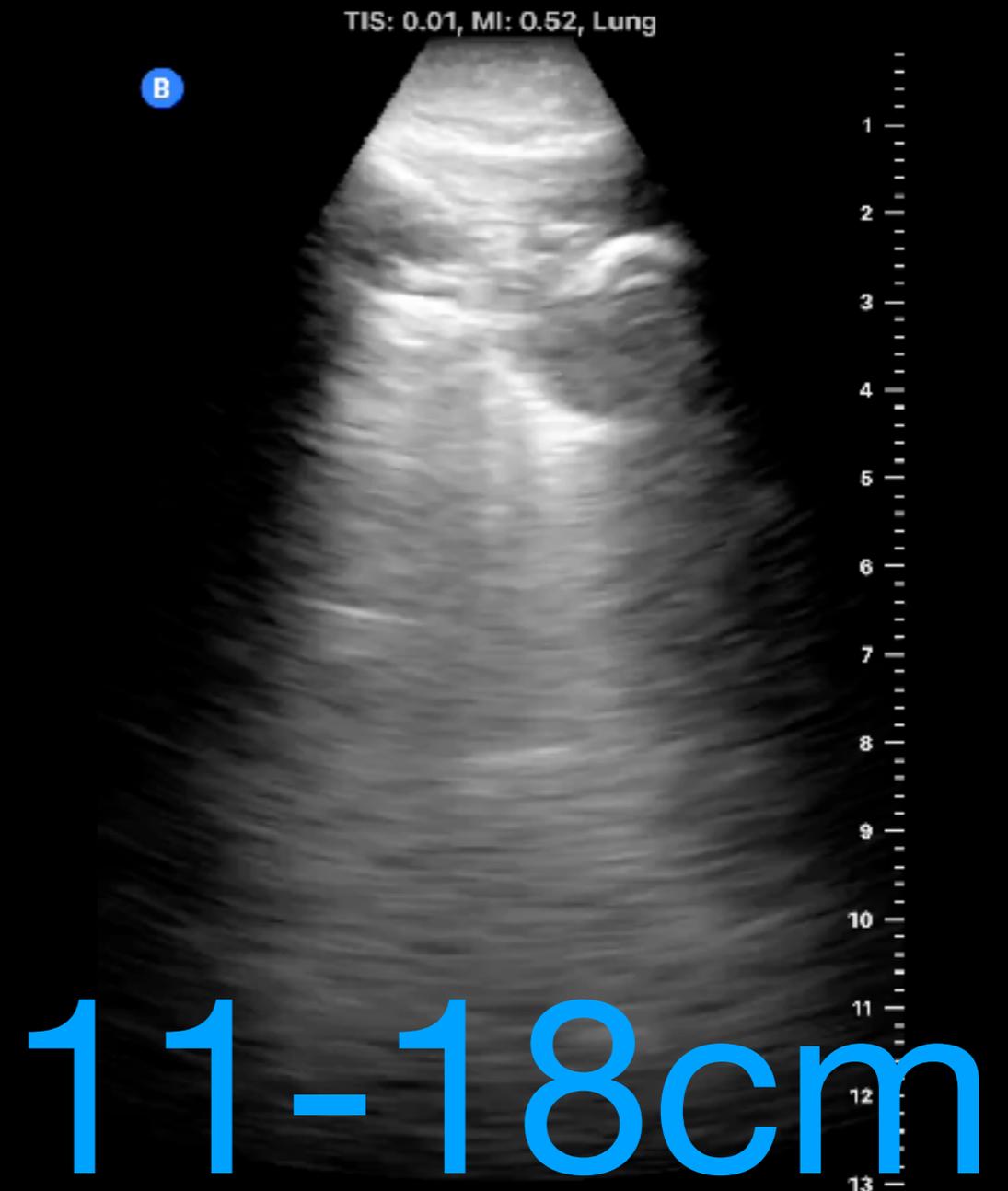
Superficial LUS (?PTX)

< 6 cm deep (Linear)
Shallow / Anatomic



Interstitial LUS (?edema)

11-18cm deep (Curvilinear)
Deep / Artifact Patterns



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Clinical Trial > Acad Emerg Med. 2005 Sep;12(9):844-9. doi: 10.1197/j.aem.2005.05.005.

A prospective comparison of supine chest radiography and bedside ultrasound for the diagnosis of traumatic pneumothorax

Michael Blaivas ¹, Matthew Lyon, Sandeep Duggal

Affiliations + expand

PMID: 16141018 DOI: 10.1197/j.aem.2005.05.005

	<u>Sensitivity</u>	<u>Specificity</u>	<u>Time</u>
CXR			
LUS			

P
T
X

pI.Effusion

Comparing accuracy of bedside ultrasound examination with physical examination for detection of pleural effusion



Michael H. Walsh¹, Kang X. Zhang², Emily J. Cox³, Justin M. Chen², Nicholas G. Cowley², Christopher J. Oleynick¹, Leo M. Smyth⁴ and Irene W. Y. Ma^{1,5,6*} 

	<u>Sensitivity</u>	<u>Specificity</u>	<u>min Vol.</u>
Phx			
CXR	51% if supine		
LUS			

CAP

RESEARCH ARTICLE

Accuracy of Lung Ultrasonography versus Chest Radiography for the Diagnosis of Adult Community-Acquired Pneumonia: Review of the Literature and Meta-Analysis

Xiong Ye¹*, Hui Xiao²*, Bo Chen³, SuiYang Zhang⁴*

	<u>Sensitivity</u>	<u>Specificity</u>
Phx		
CXR		
LUS		



Check for updates

The Journal of Emergency Medicine, Vol. 60, No. 5, pp. 615–625, 2021
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0736-4679/\$ - see front matter

<https://doi.org/10.1016/j.jemermed.2021.01.041>



Ultrasound in Emergency Medicine

LUNG ULTRASOUND VS. CHEST X-RAY STUDY FOR THE RADIOGRAPHIC DIAGNOSIS OF COVID-19 PNEUMONIA IN A HIGH-PREVALENCE POPULATION

Ryan C. Gibbons, MD, Mark Magee, MD, Harry Goett, MD, James Murrett, MD, Jessica Genninger, MD,
Kendra Mendez, MD, Matthew Tripod, MD, Nicholas Tyner, MD, and Thomas G. Costantino, MD

viral (COVID)

	<u>Sensitivity</u>		
CXR			
LUS			

Summary of Evidence:

<i>[sensitivities]</i>		LUS
viral		98%
PNA		95%

Summary of Evidence: (CXR vs LUS)

<i>(sensitivities)</i>	CXR	LUS
PTX	76%	98.5%
Pl. eff	50-90%	96%
viral	70%	98%
PNA	77%	95%

Study: **Chest CT (Standard)**

Gender: Male Female

Age at Time of Study: (years)

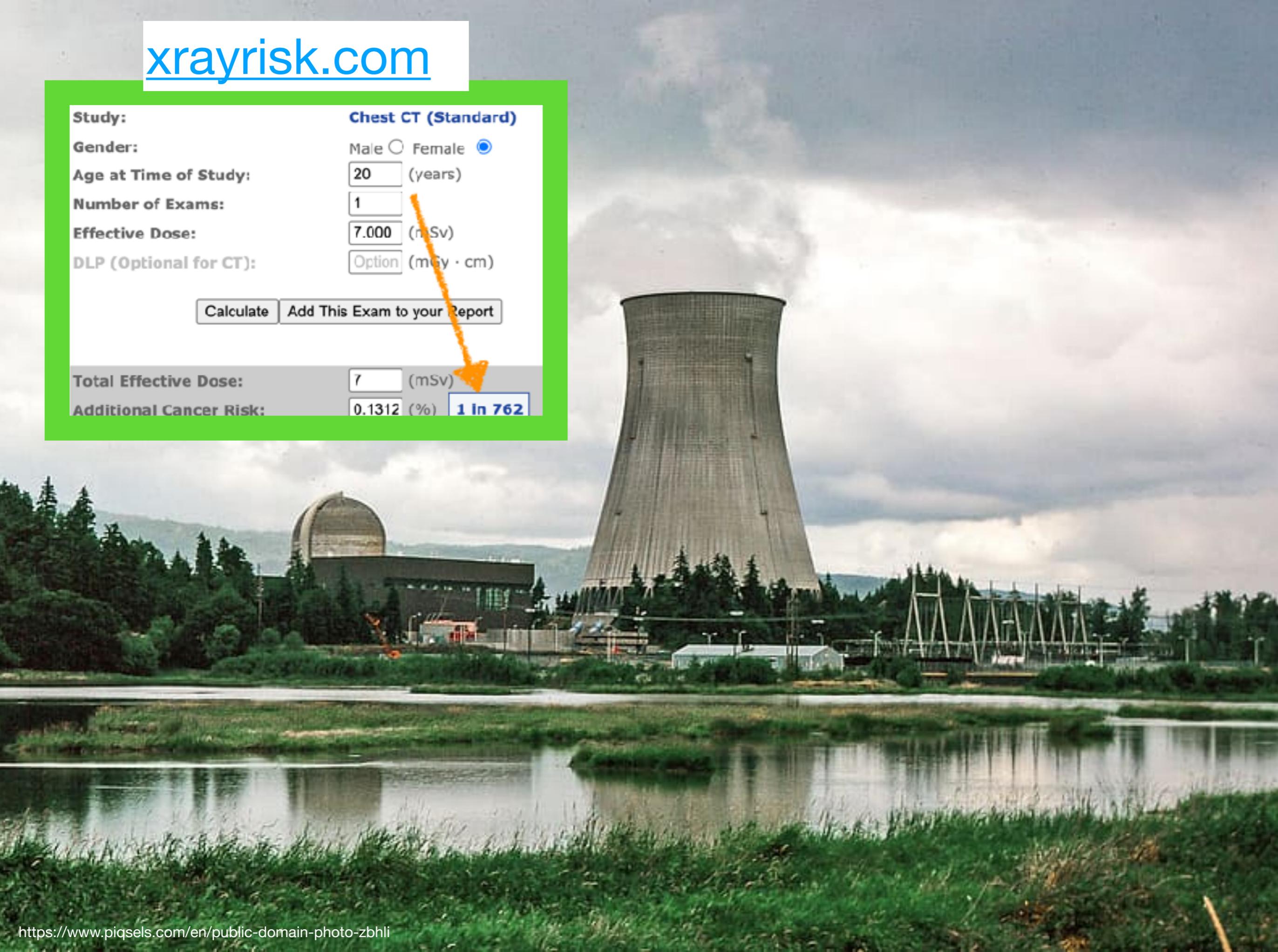
Number of Exams:

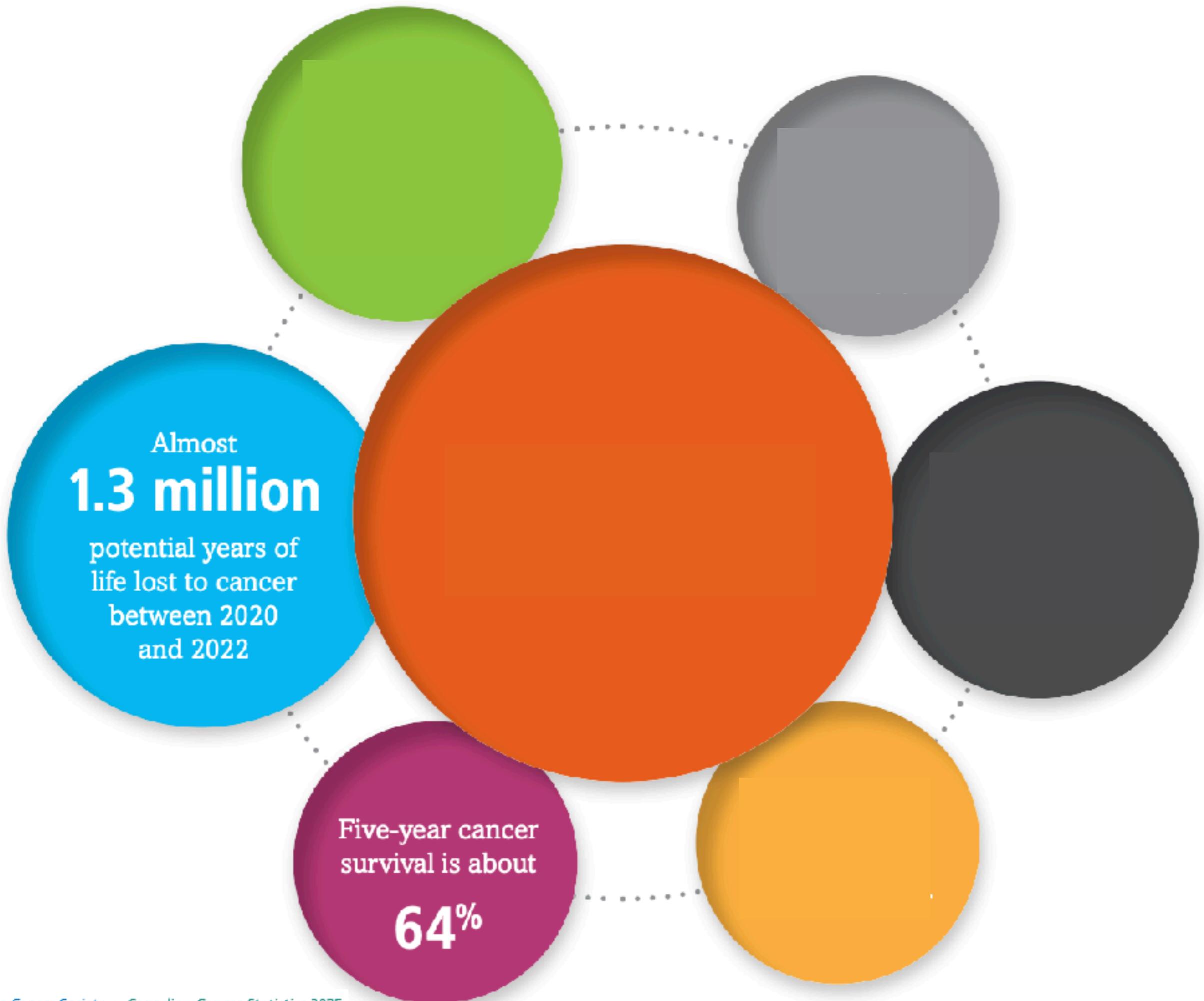
Effective Dose: (mSv)

DLP (Optional for CT): (mGy · cm)

Total Effective Dose: (mSv)

Additional Cancer Risk: (%) **1 in 762**





“ “ **1.5% to 2.0% of all cancers in the United States may be attributable to the radiation from CT examinations.** 🇺🇸

“ “ radiation from **2-3 abdominal scans** gives the same amount of radiation exposure that survivors of the **Hiroshima nuclear bombing** received 🇯🇵

Brenner DJ, Hall EJ. Computed tomography--an increasing source of radiation exposure. N Engl J Med. 2007 Nov 29;357(22):2277-84. doi: 10.1056/NEJMr072149. PMID: 18046031.

Berrington de González A, Mahesh M, Kim KP, Bhargavan M, Lewis R, Mettler F, Land C. Projected cancer risks from computed tomographic scans performed in the United States in 2007. Arch Intern Med. 2009 Dec 14;169(22):2071-7. doi: 10.1001/archinternmed.2009.440. PMID: 20008689;

phx,
CXR \ll **LUS** \approx **CT**

- pneumothorax
- pleural effusion
- CHF
- pneumonia
- viral

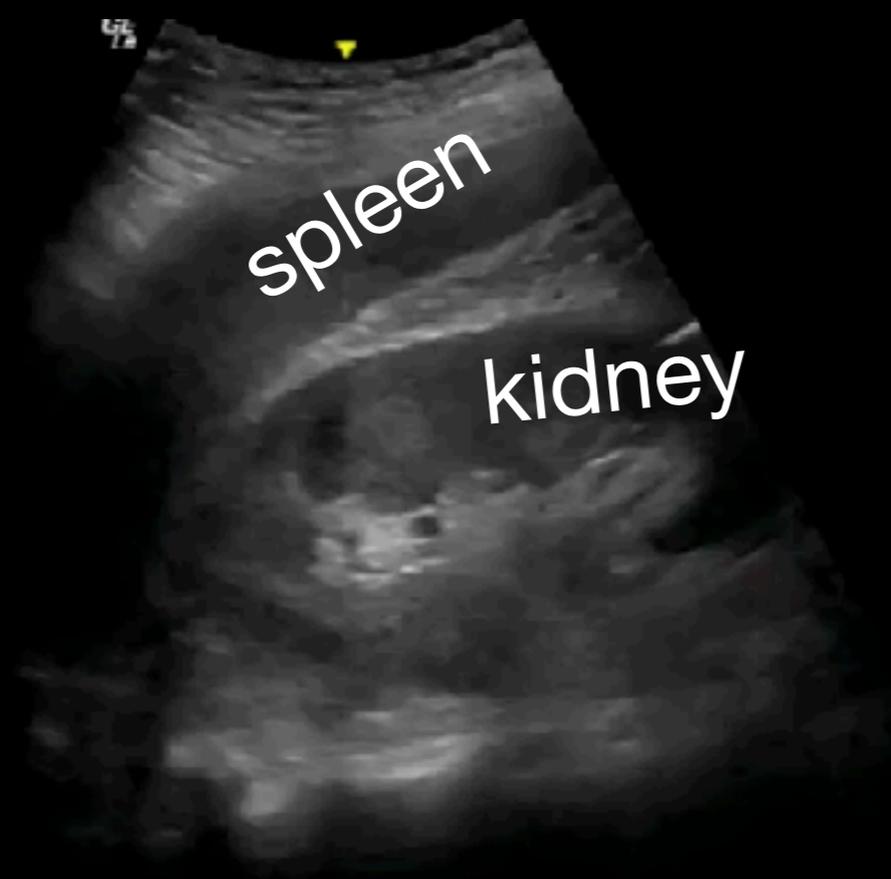
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ugly bags of mostly water





spleen

kidney

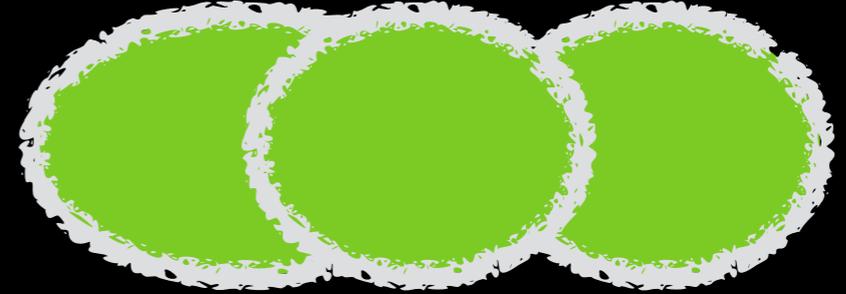


heart

BONE



AIR



BONE

A diagram showing the word "BONE" in blue capital letters. Four orange arrows are positioned over the letters: two pointing down and two pointing up, alternating from left to right. A white horizontal line is drawn below the word.

**BONE
SHADOW**

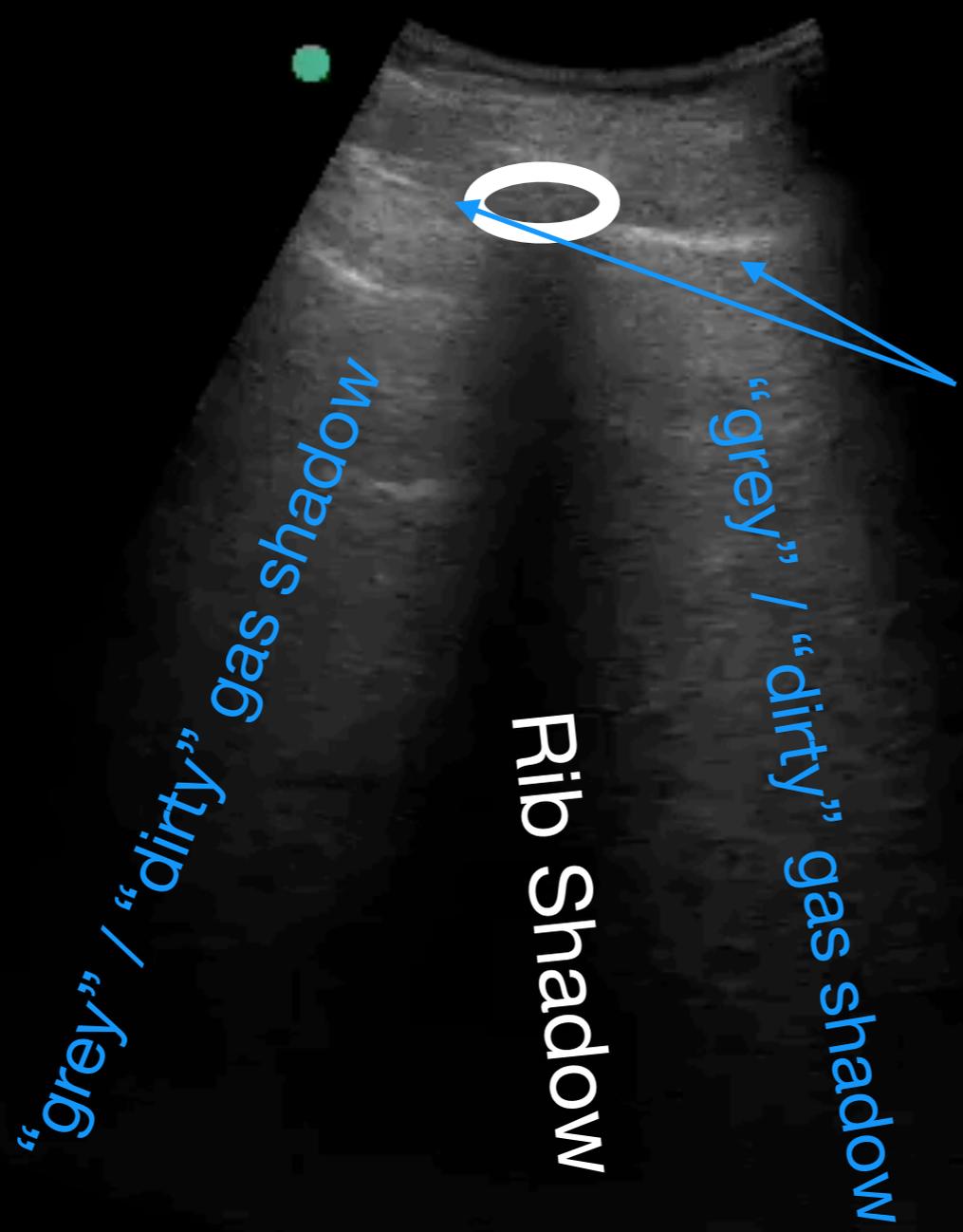
AIR

A diagram showing the word "AIR" in green capital letters. Four orange arrows are positioned over the letters: two pointing down and two pointing up, alternating from left to right.A diagram showing a grey rounded rectangular shape representing a gas shadow. At the top edge, several orange arrows point downwards into the shape, and several point upwards out of it, illustrating the interaction of X-rays with gas. The text "Dirty" is enclosed in quotes, followed by "GAS" and "SHADOW" in large white capital letters.

**“Dirty”
GAS
SHADOW**

Gen
S

Abd
C60
93%
MI
0.6
TIS
0.1



pleura

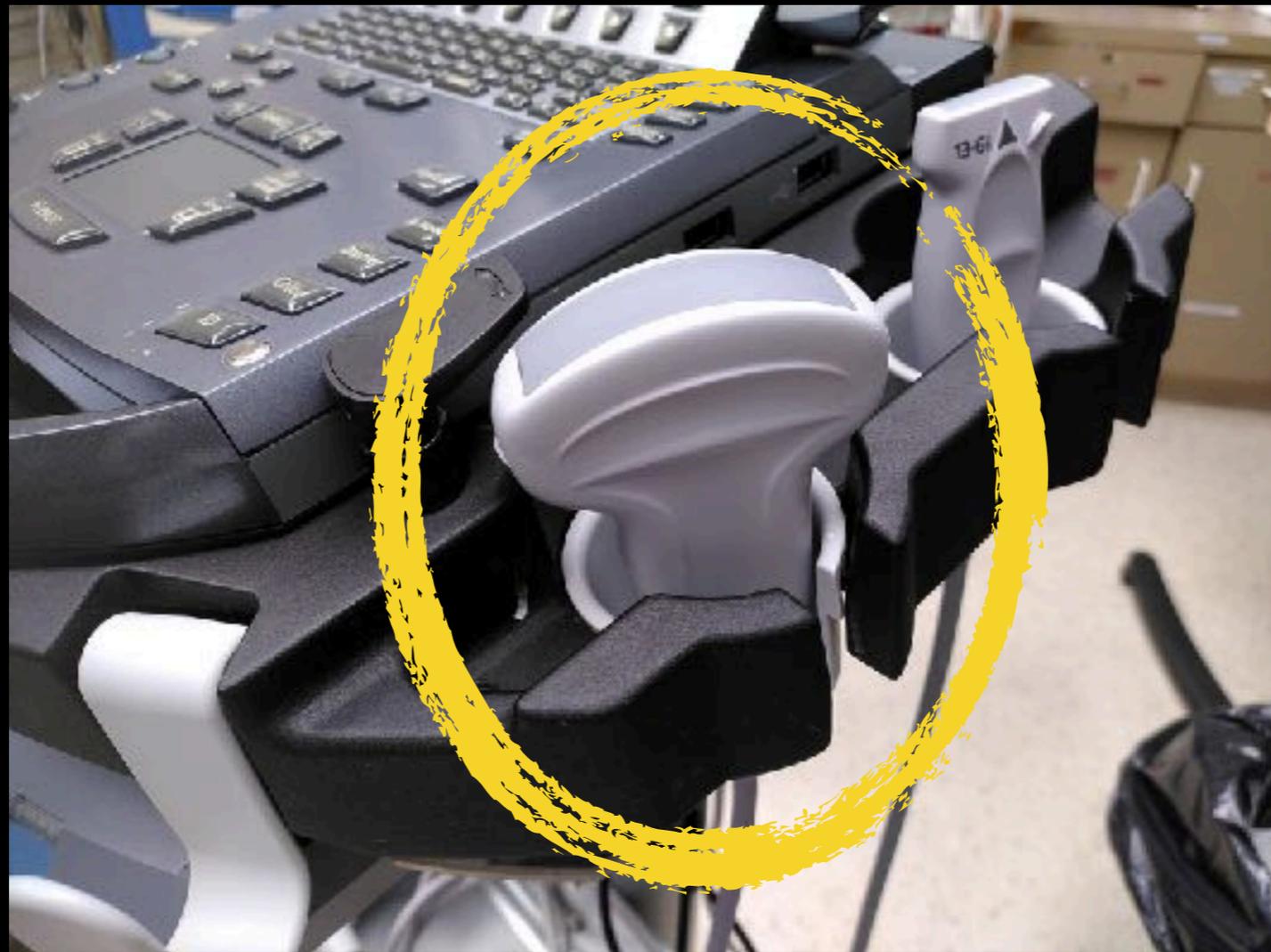
“grey” / “dirty” gas shadow

Rib Shadow

“grey” / “dirty” gas shadow

18

Curvilinear



Make it ugly!

Make it ugly!



Sonosite: (Recipe):

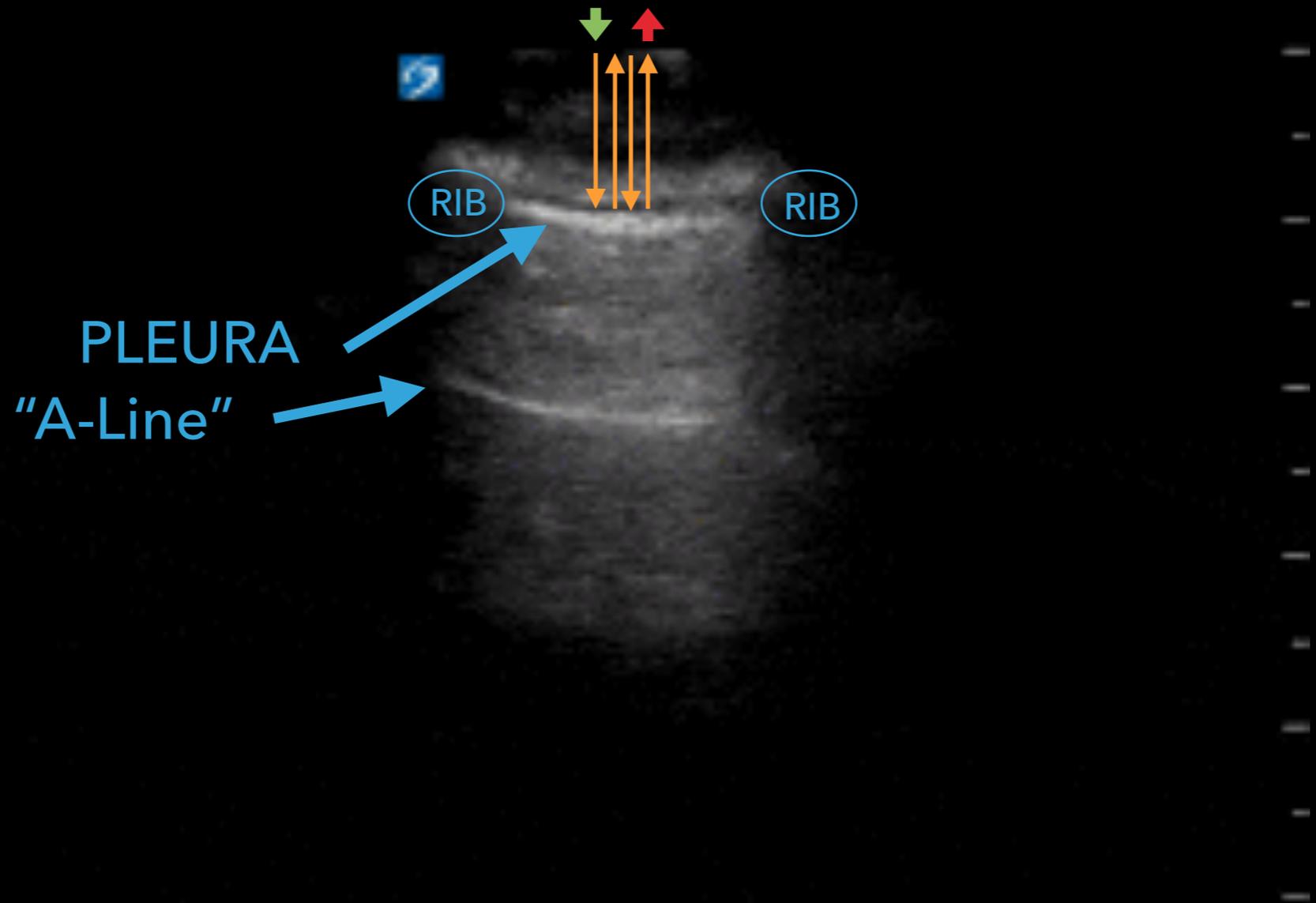
1. MultiBeam OFF
2. Tissue Harmonics OFF
3. Gain UP

Make it ugly!

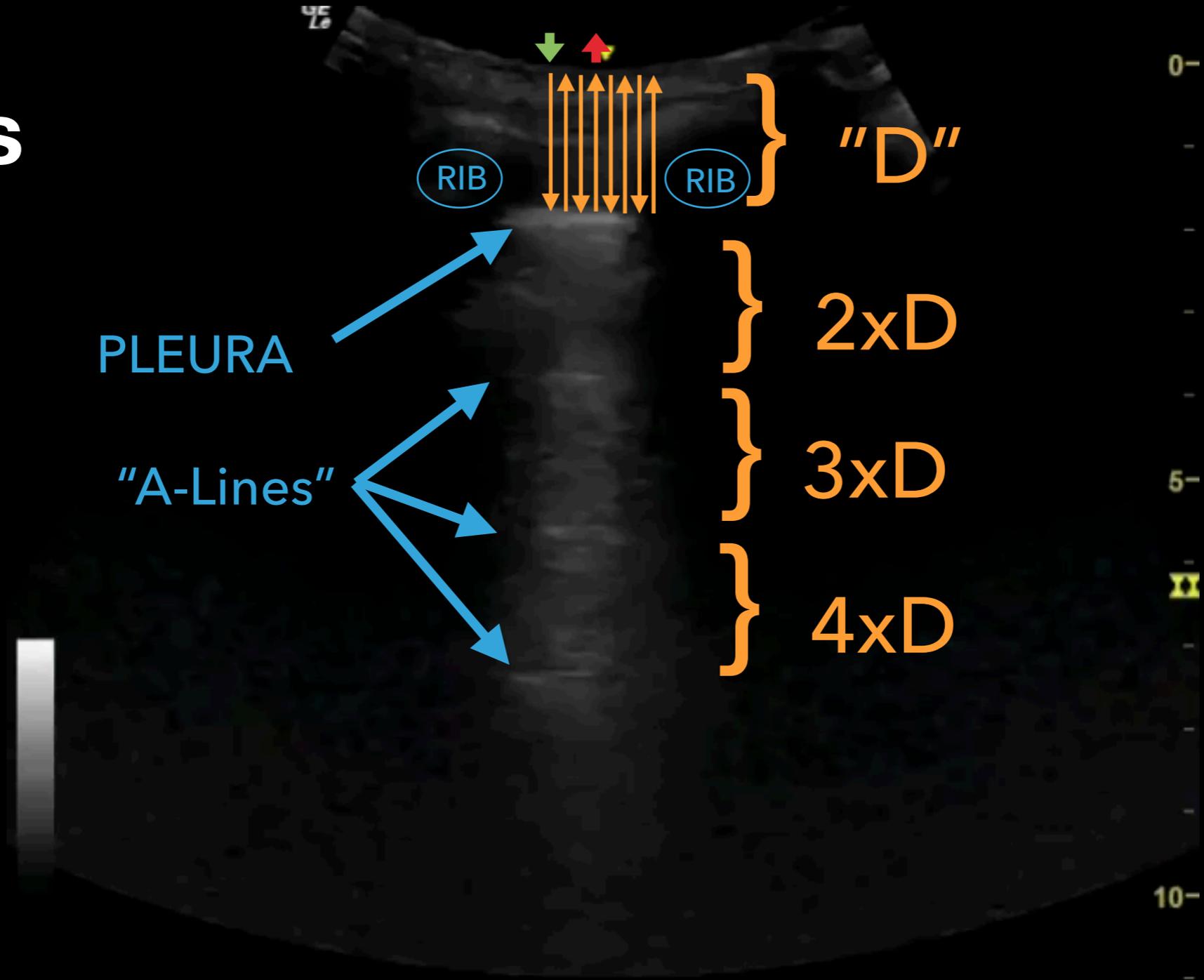
Get Your Own Machine's Recipe:

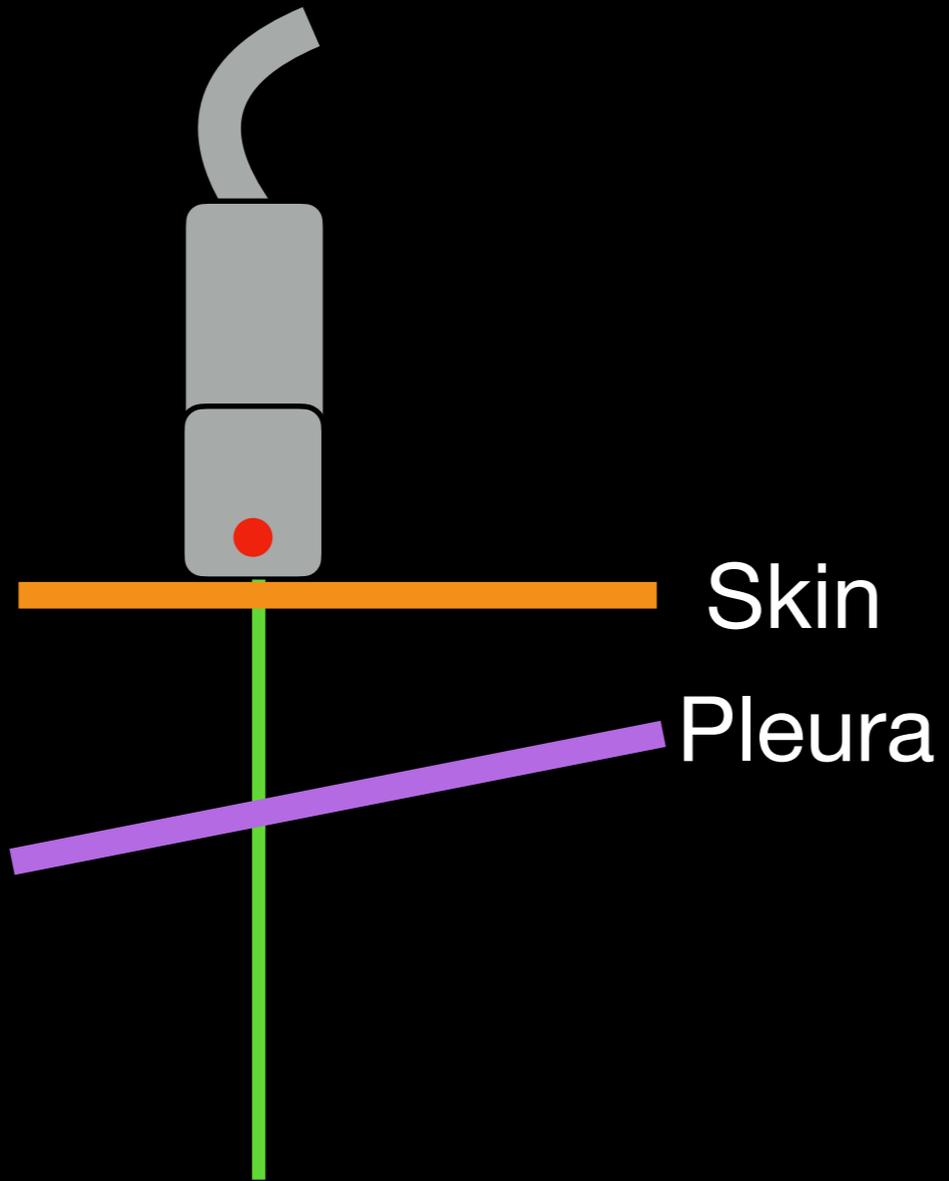
1. Ask your regional PoCUS Expert
2. Ask your Sales Rep
3. Learn advanced-PoCUS physics

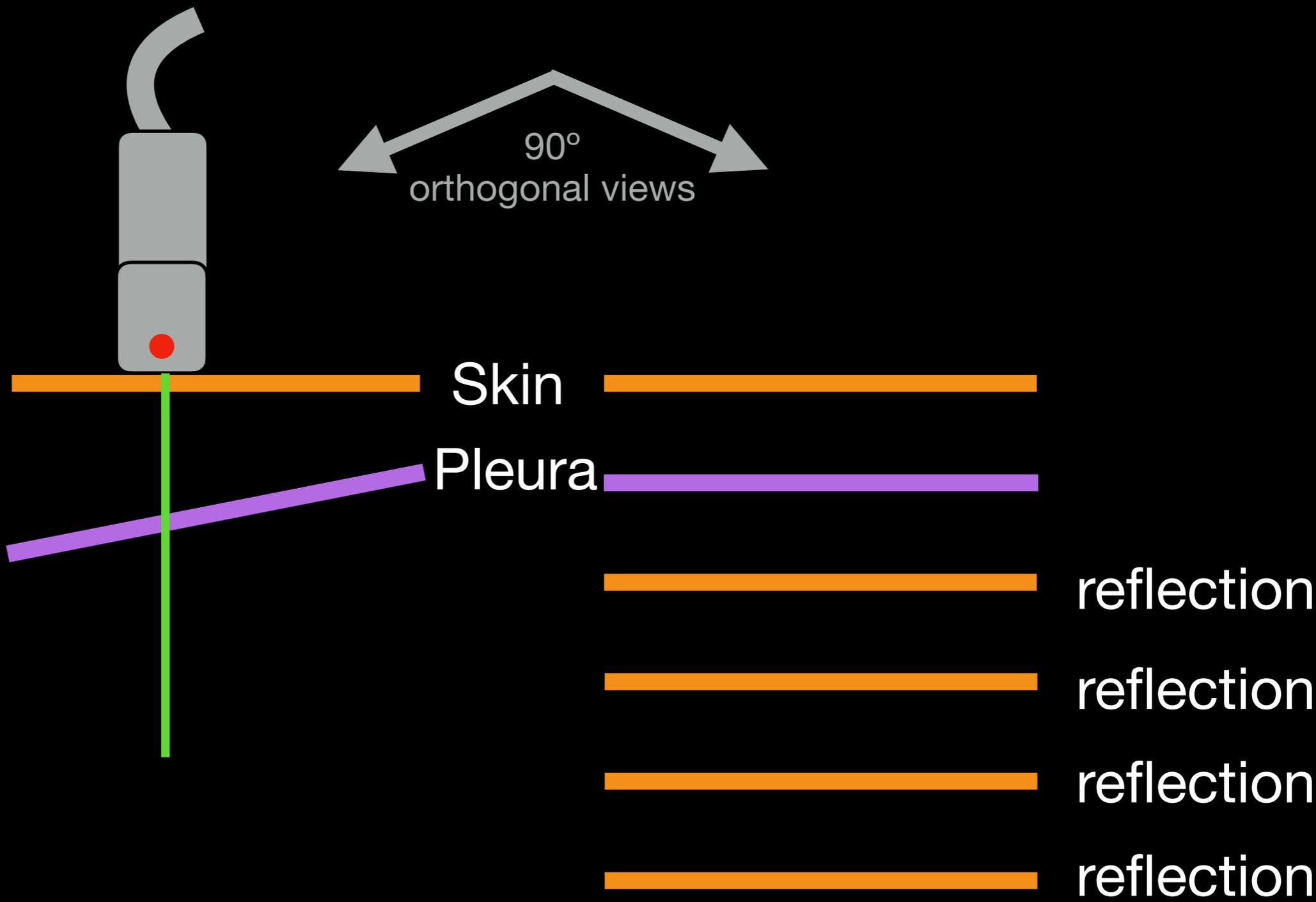
A-lines

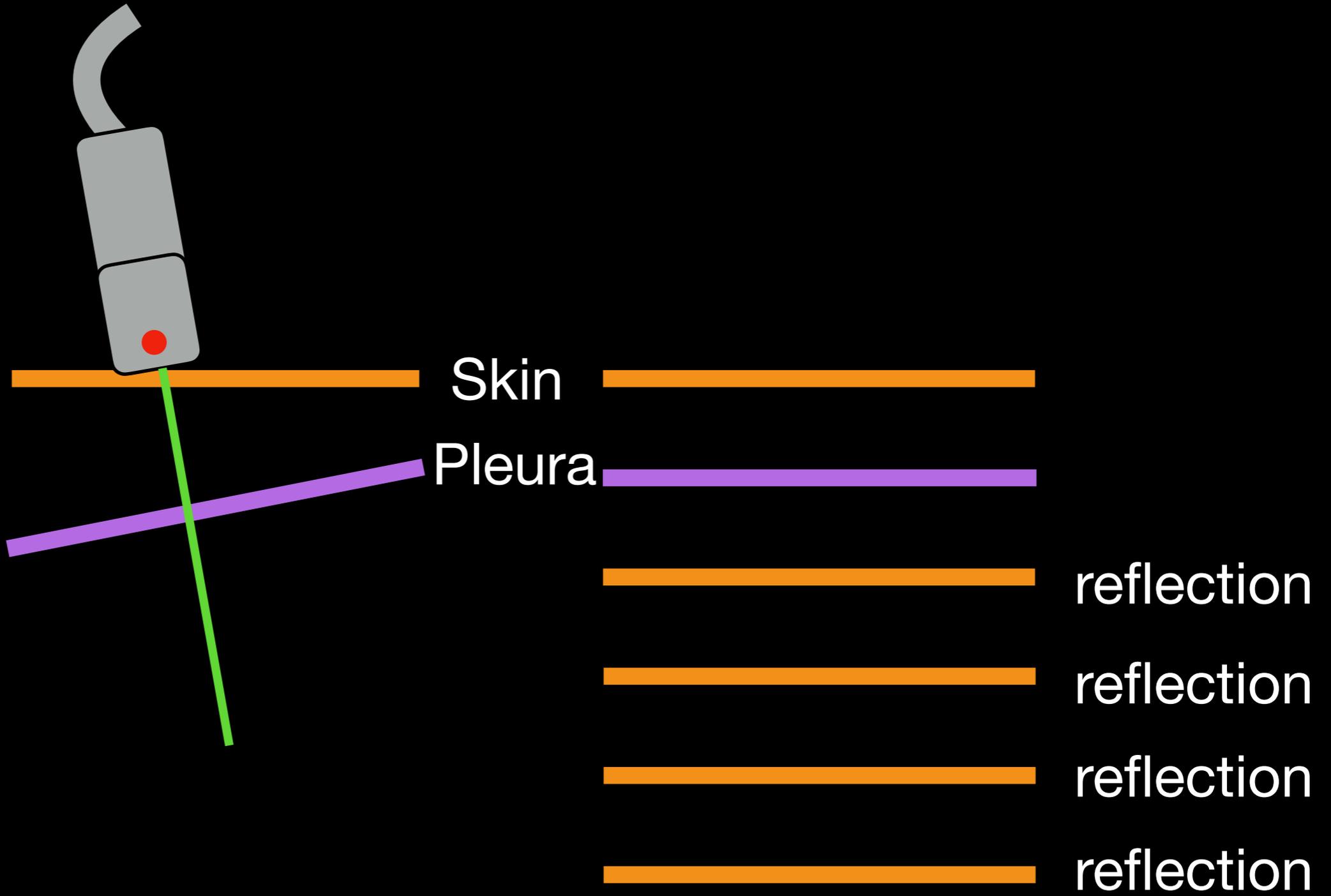


A-lines





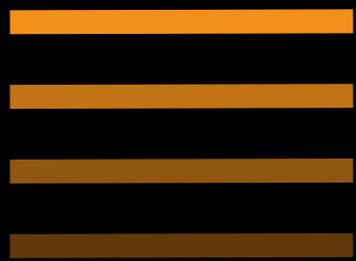






Fan as you scan! [Lung]

A-Lines



= aerated

A-Lines



= aerated

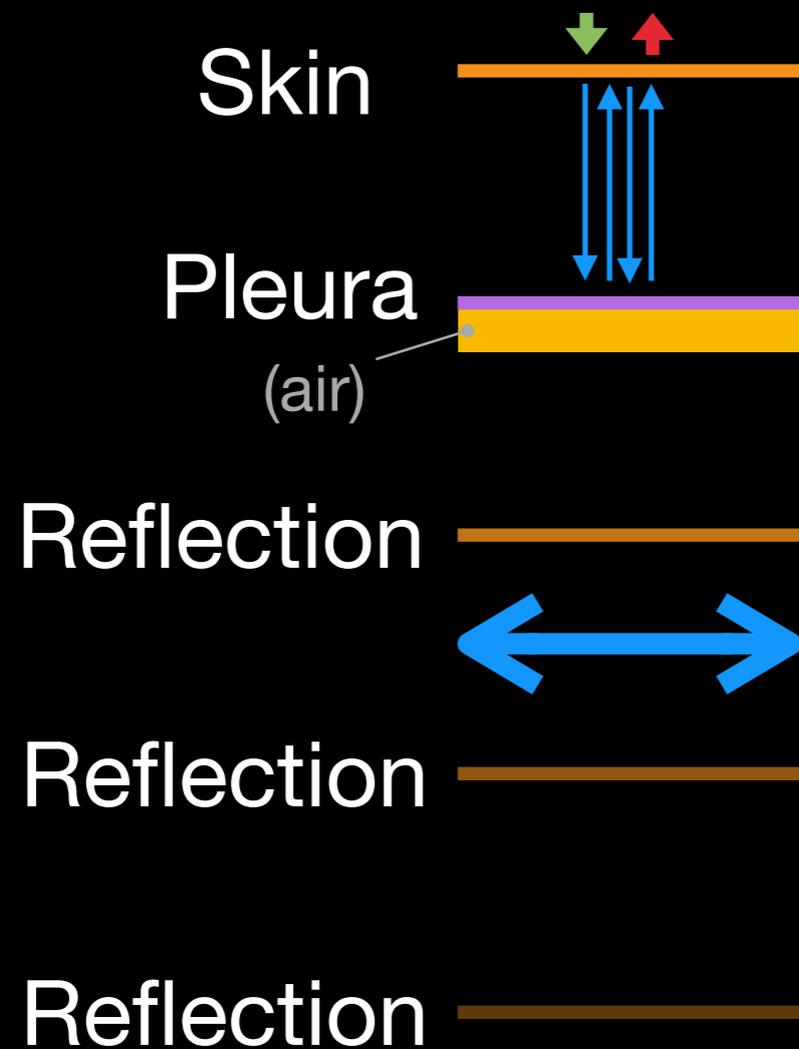
B-Lines



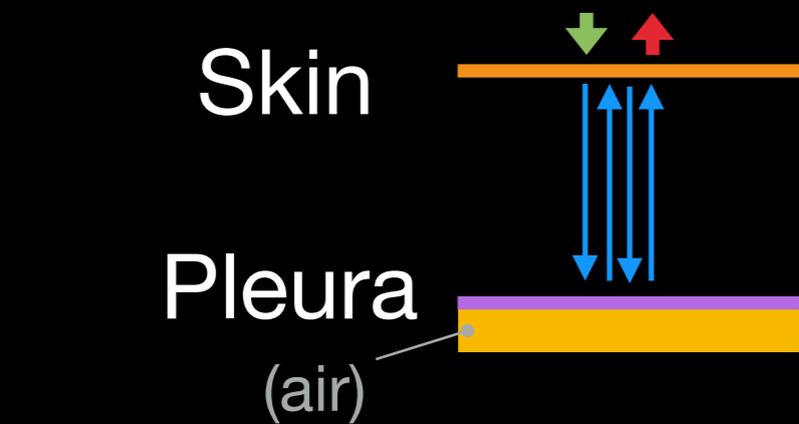
= fluid

A-Lines

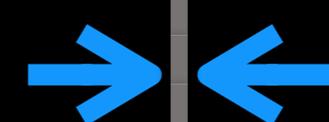
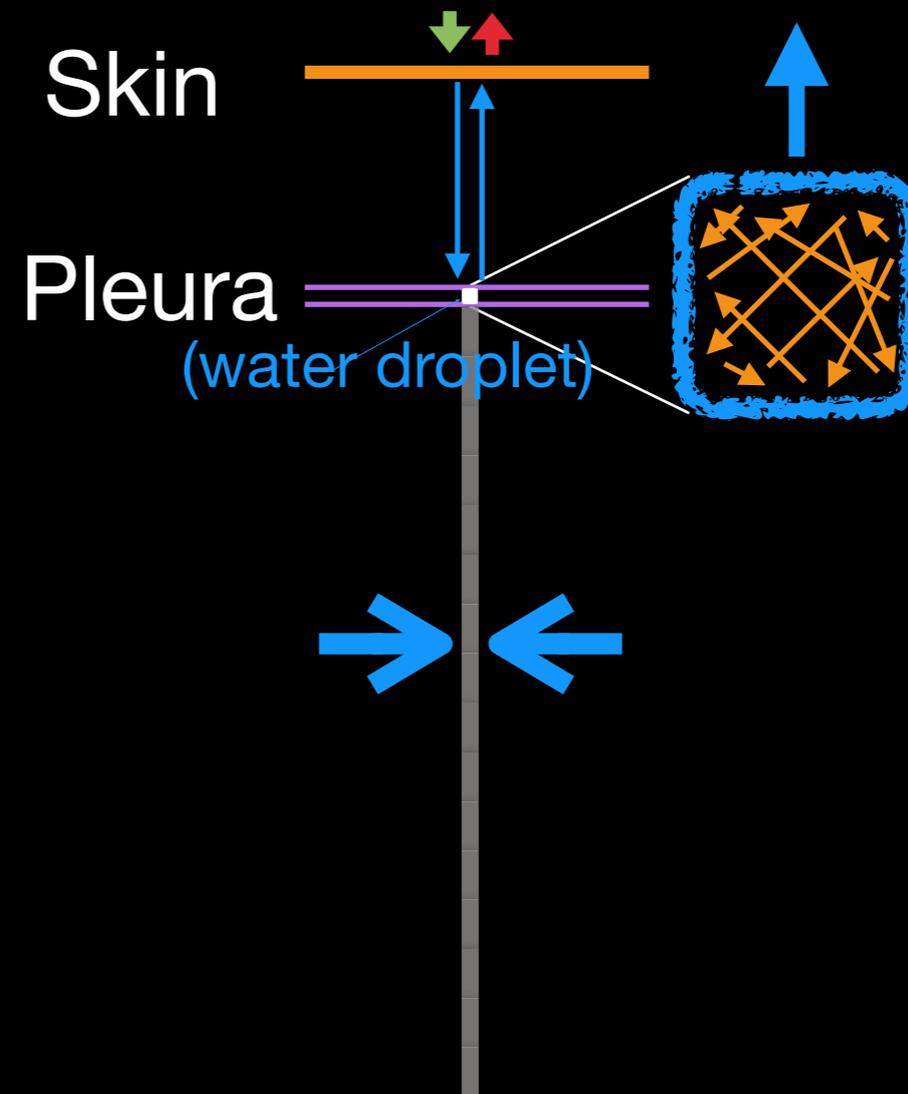
B-Lines



A-Lines



B-Lines



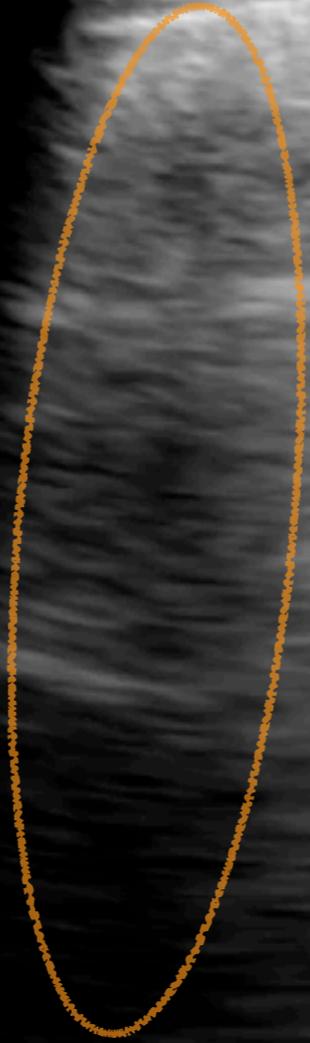
TIS: 0.01, MI: 0.52, Lung

B

A-Lines



intermittent
mobile, B-Line



Really?

Microdrops of fluid?

<i>(sensitivities)</i>	CXR	LUS
PTX	76%	98.5%
Pl. eff	50-90%	96%
viral	70%	98%
PNA	77%	95%



Using B-Lines:

- Distribution
- History
- Severity *[real-time]*

B-Line Severity:

B-Line Severity:

27M LUNG

Gen
S

RT
T7



2018May27 21:02

Abd

- C60



98%

MI

0.8

TIS

0.1

A

B

11

Home

Home/Set

Label ..

Symbols...

X Word

Done

B-Line Severity:

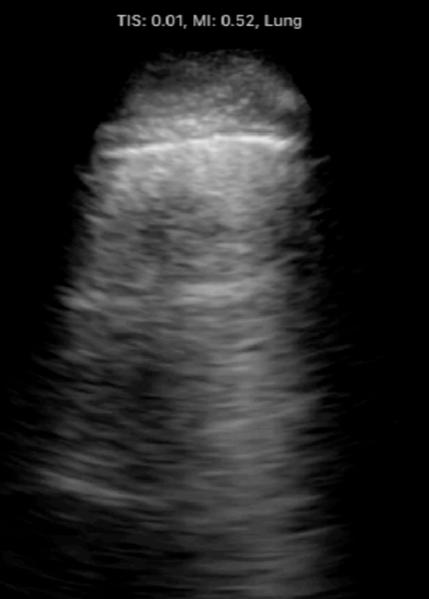


B-Line Severity:



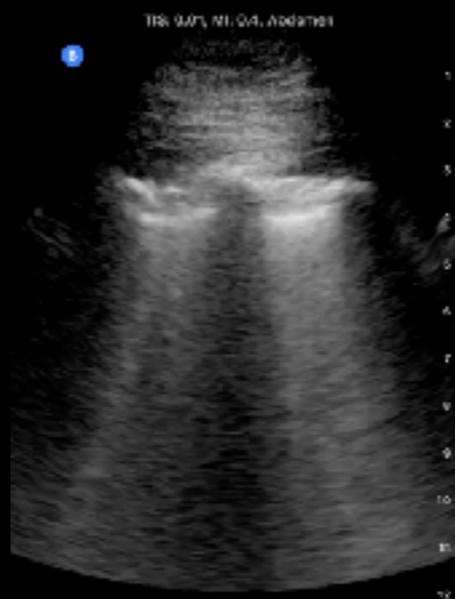
A-Lines

(Dry, Normal)



1-2 B-Lines

(Normal)



3+ B-Lines

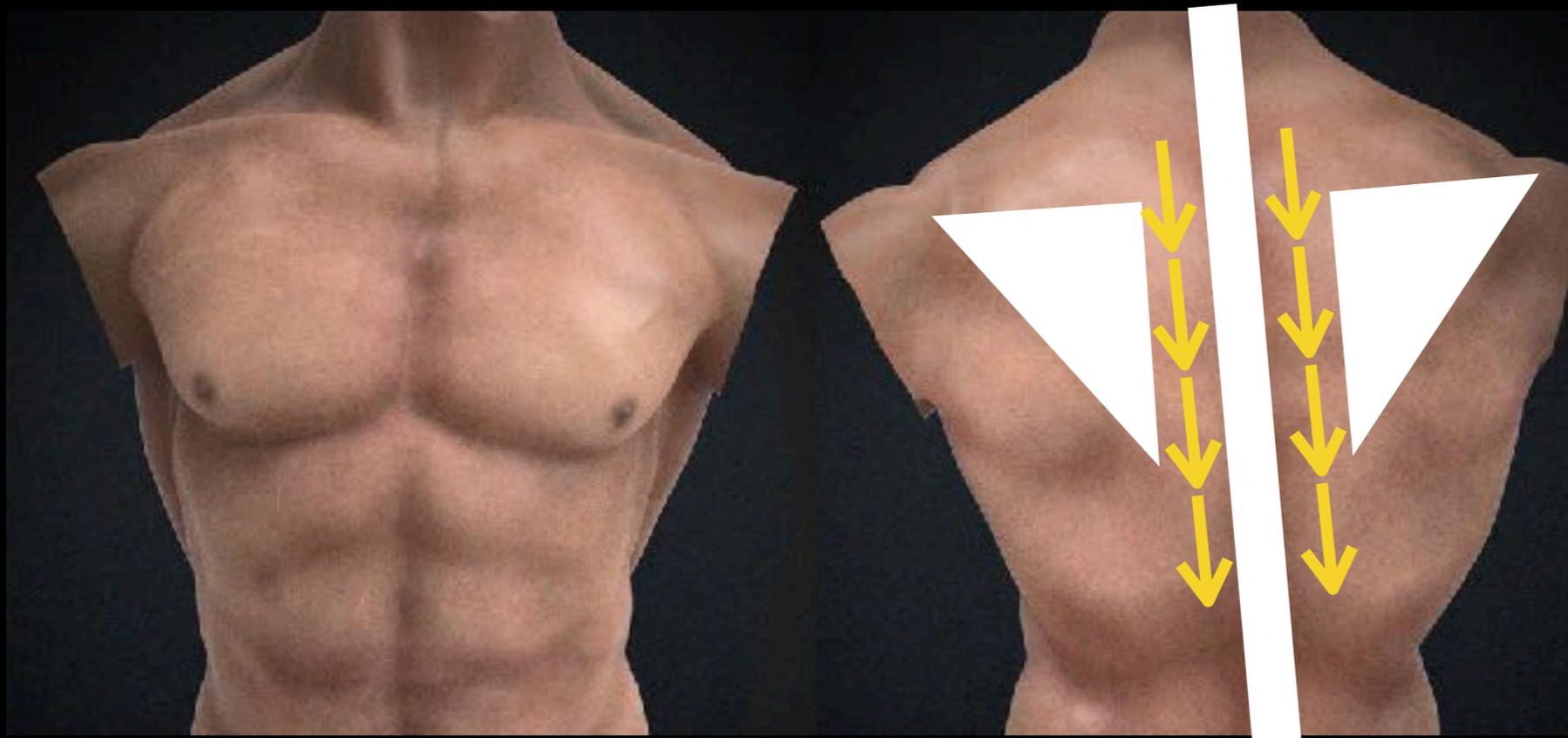
(Patho)



B-Line confluence

(Patho)

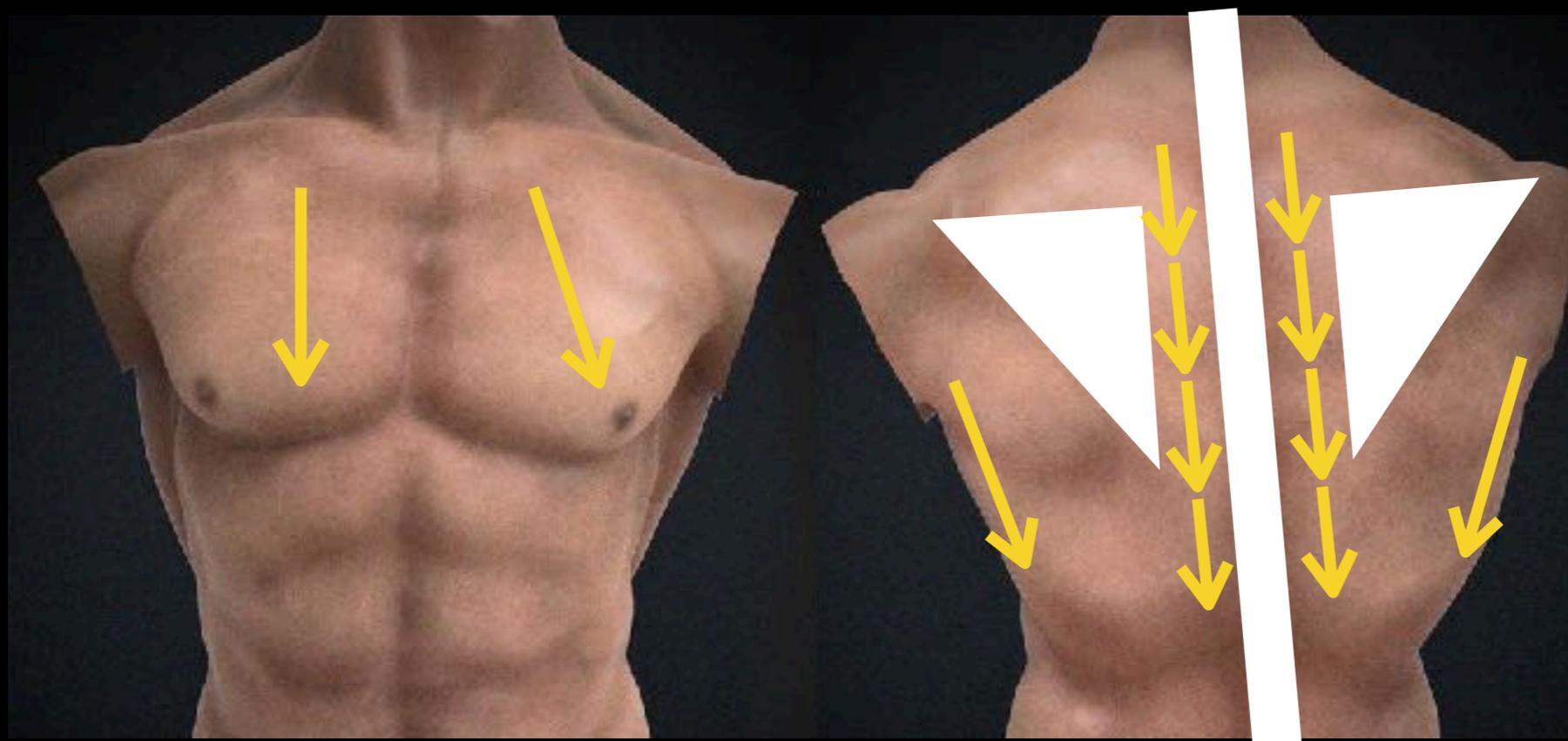
How to we actually do this?



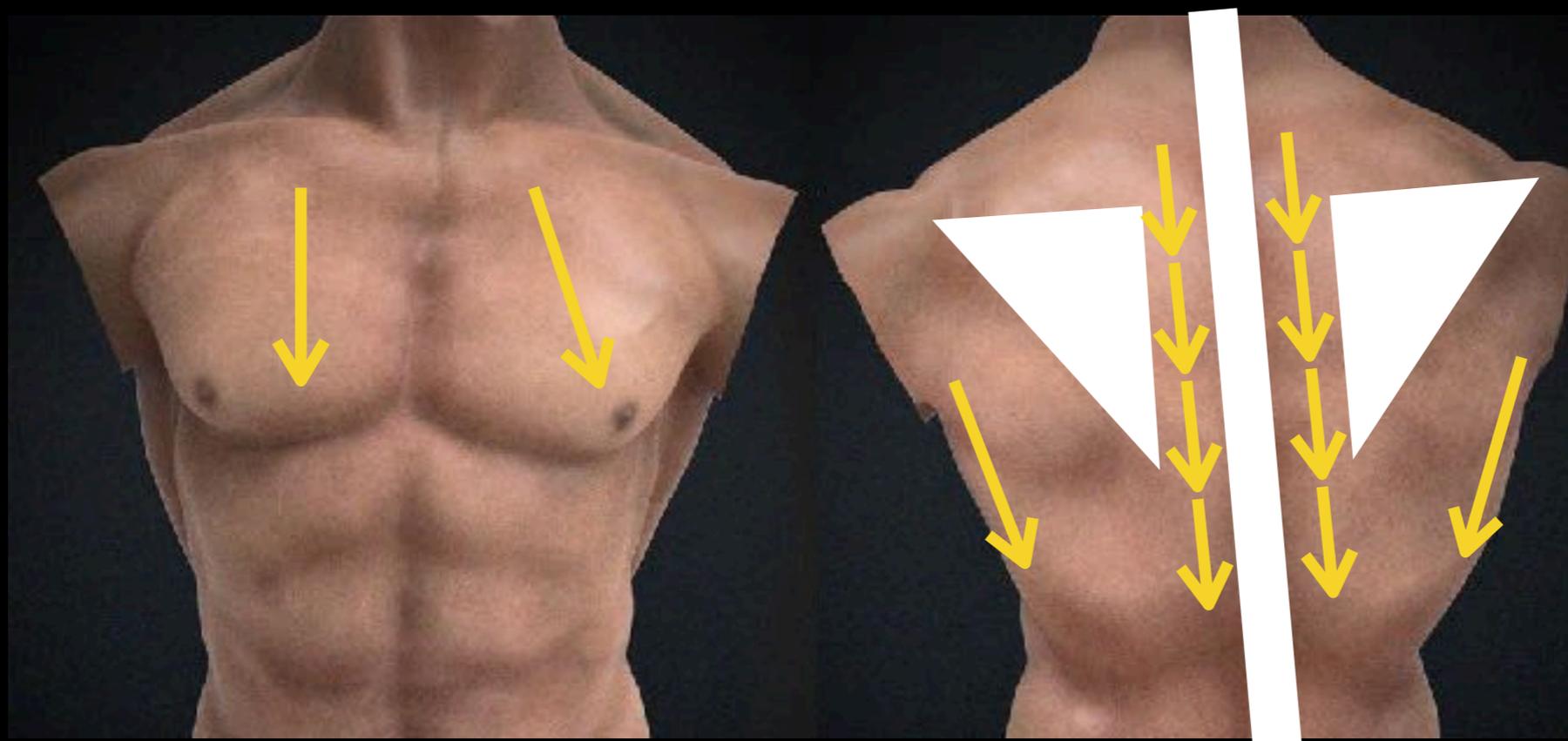
How to we actually do this?



How to we actually do this?



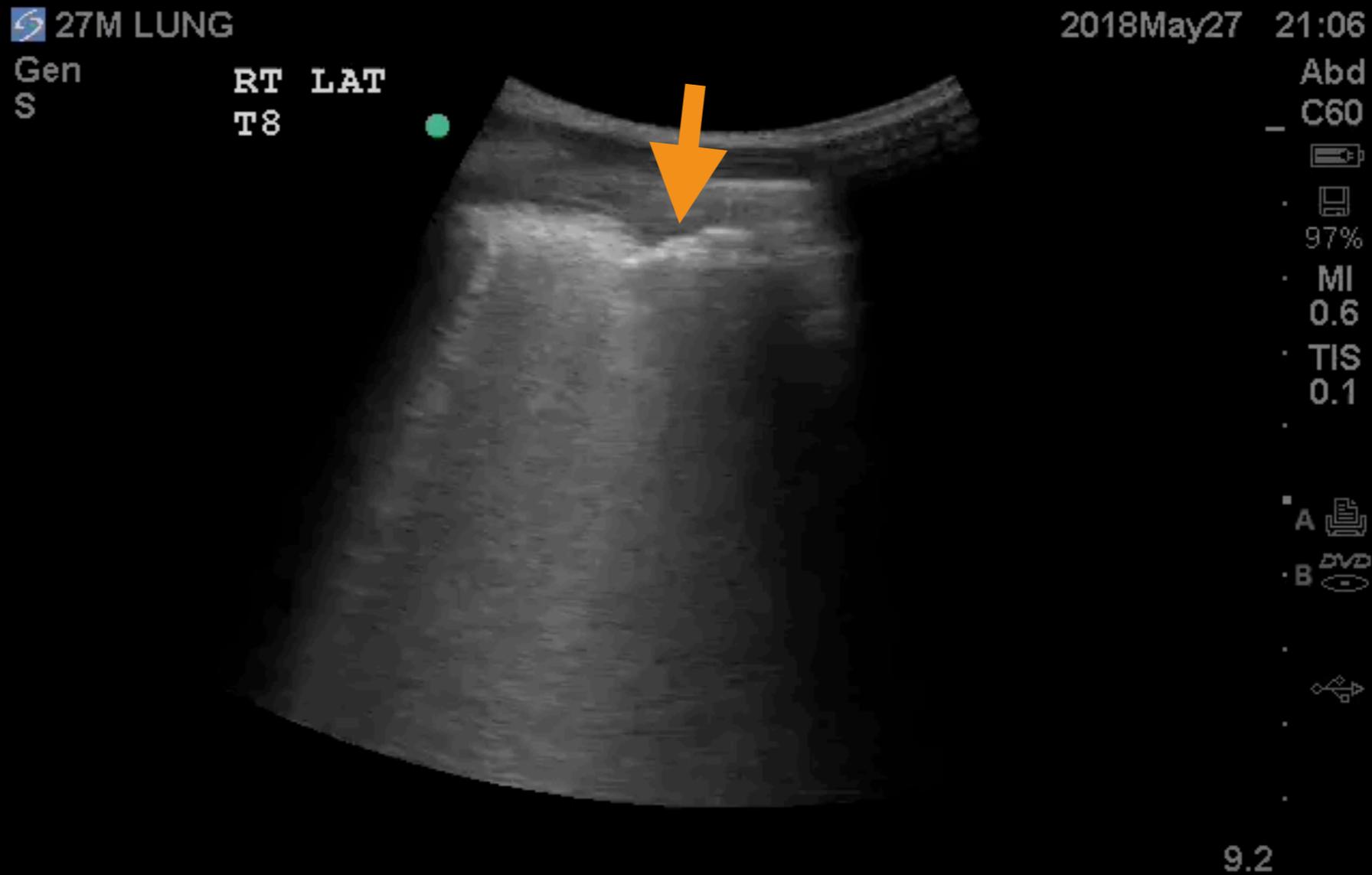
How to we actually do this?



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 - *hepatization*

SubPleural Changes:



Hepatization:

gas shadow

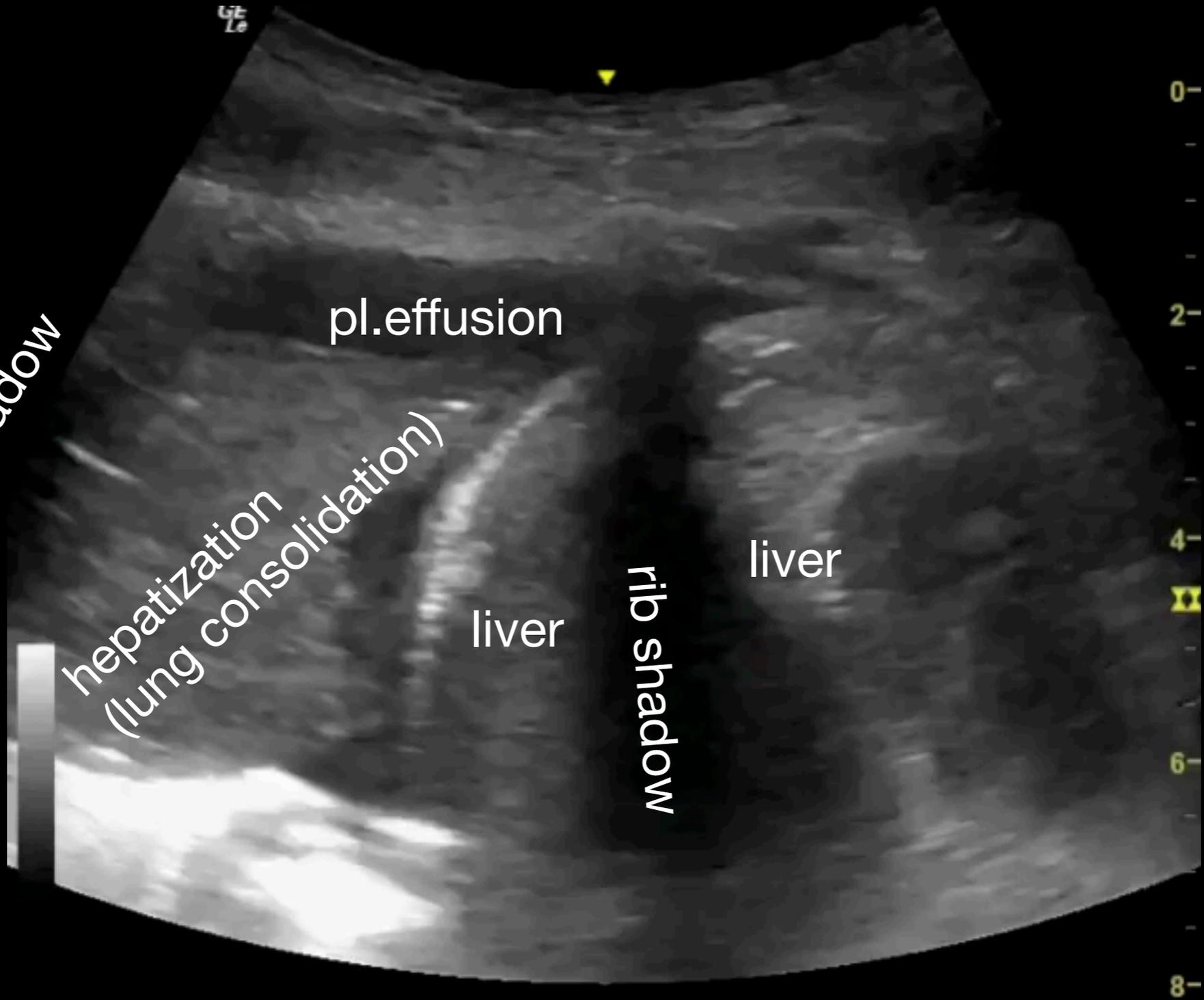
hepatization
(lung consolidation)

pl. effusion

liver

rib shadow

liver



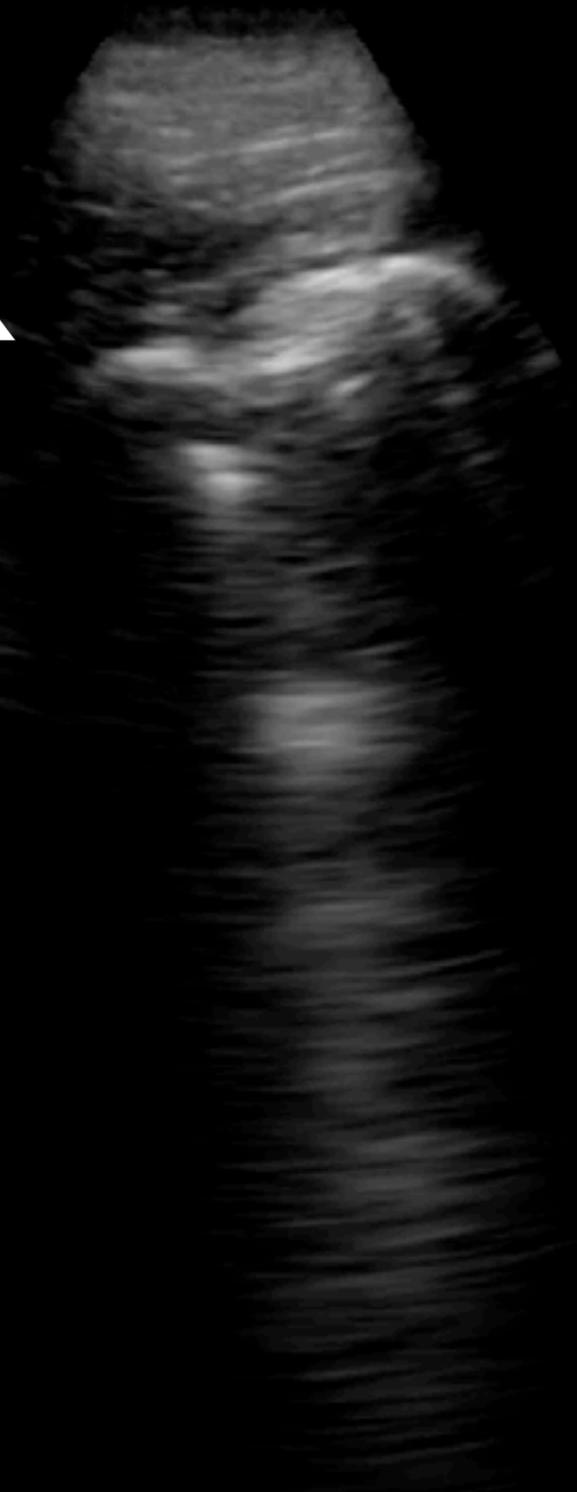
TIS: 0.01, MI: 0.52, Lung

B

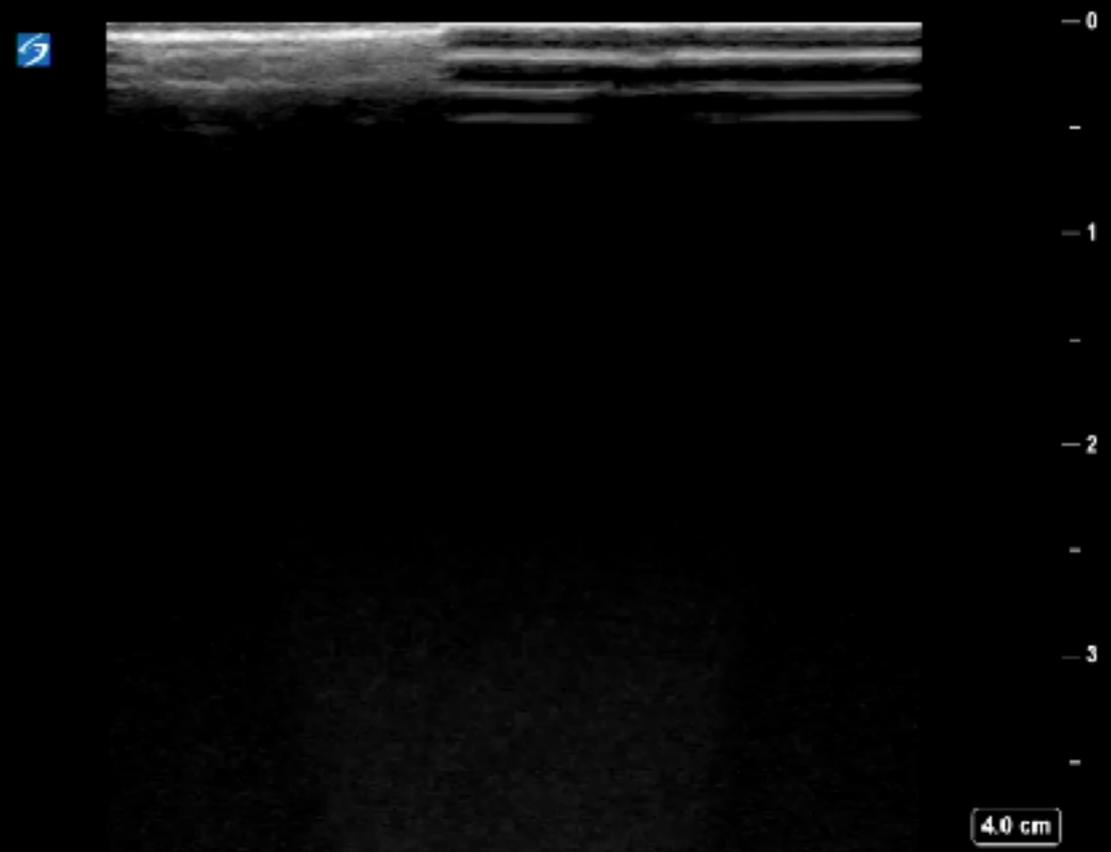
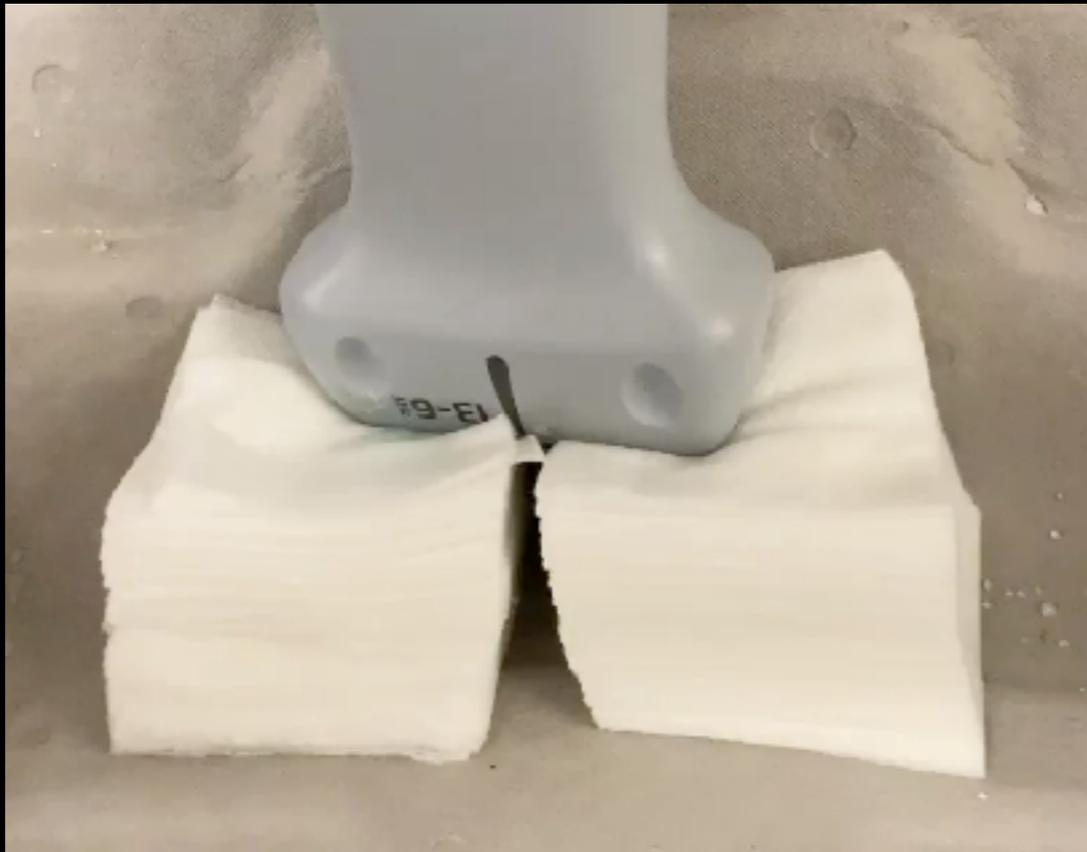
pleural line

hepatization

gas shadow starts

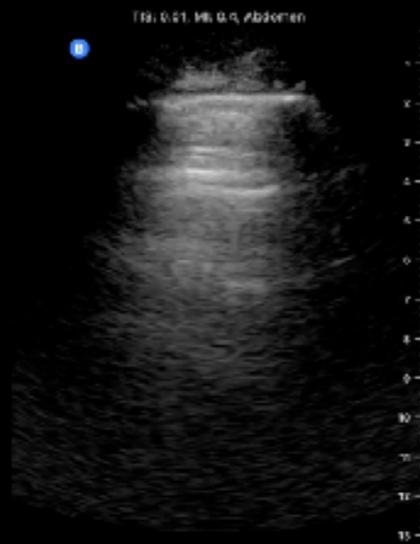


Hepaticization Demo:

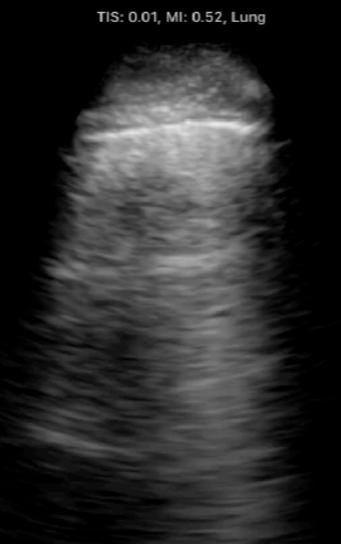


Video Credit: Dave Kirschner MD

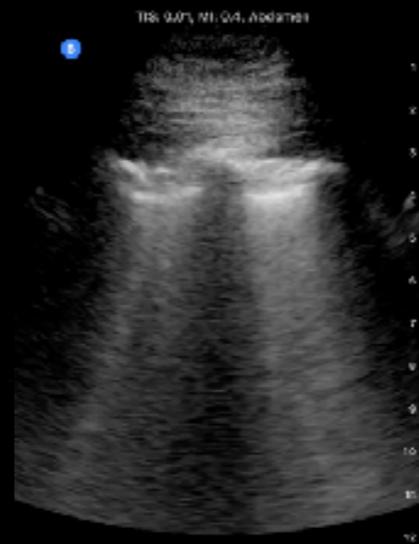
Pathology Spectrum:



A-Lines



1 B-Line



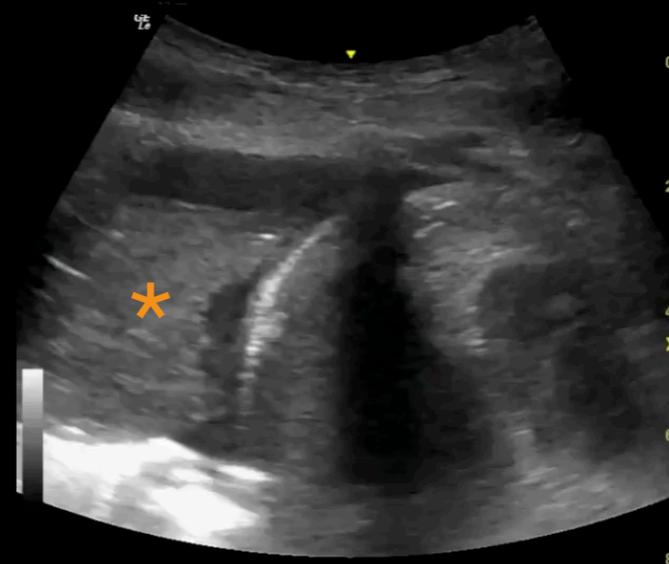
3+B-Lines



confluence



subpleural changes



hepatization

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Where to learn more:

Courses:

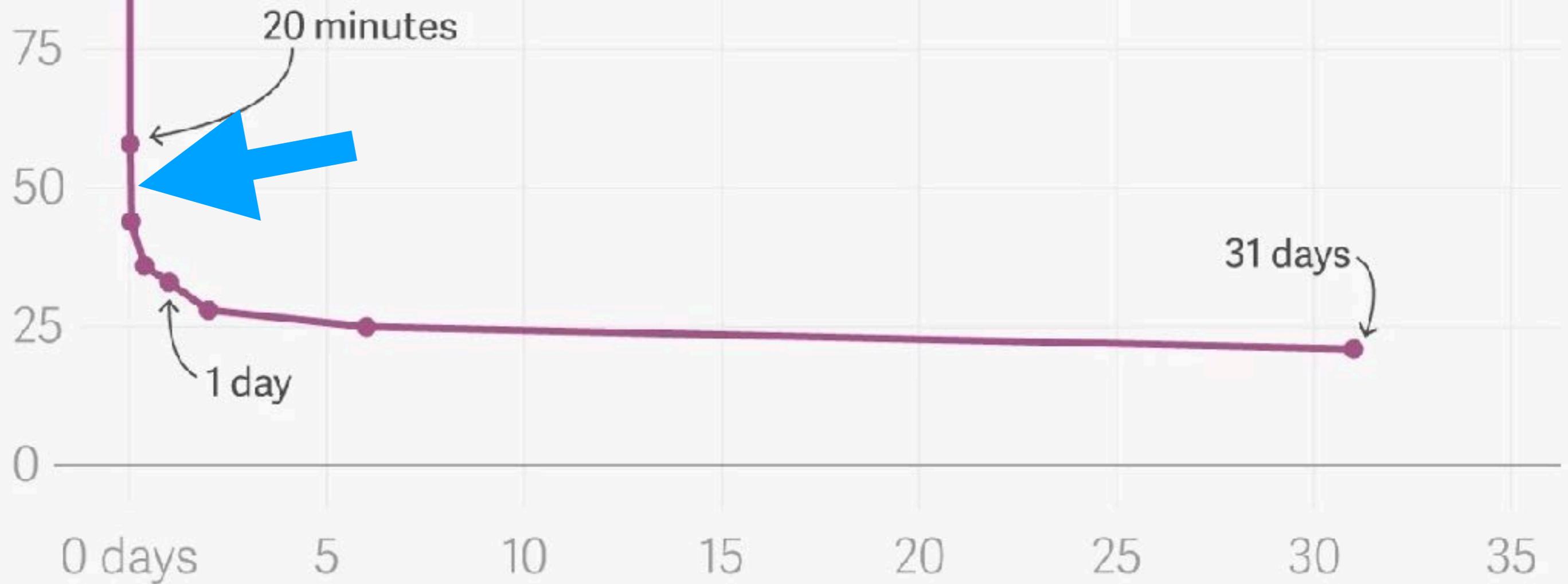
House.UBCCPD.ca

EDECourse.com

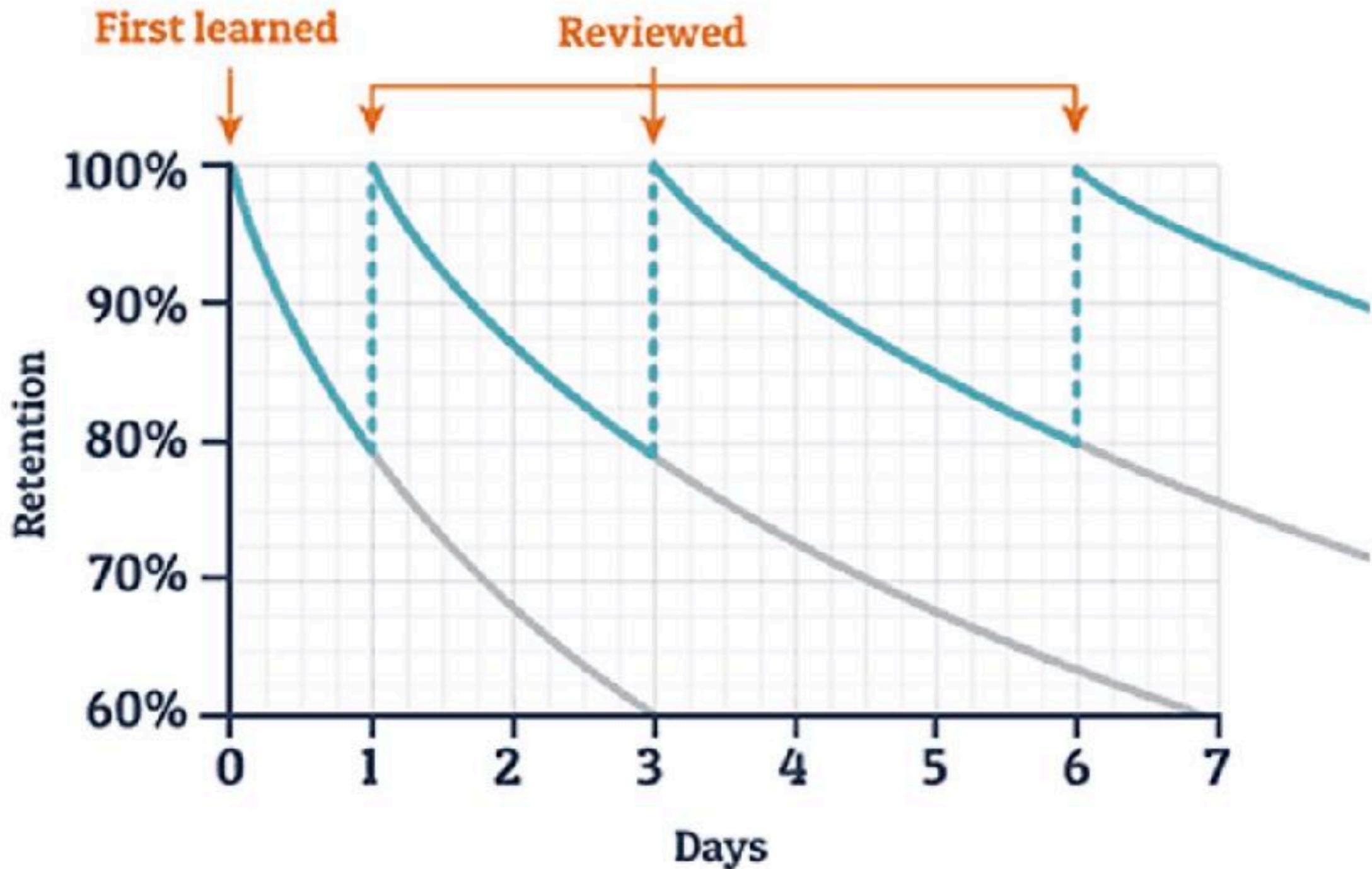
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100% of information retained



Spaced Repetition



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EchoGuidedLifeSupport.com

^
& retain

To “Not-forget”

BC PoCUS Rounds

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jonathan@ruralultrasound.com