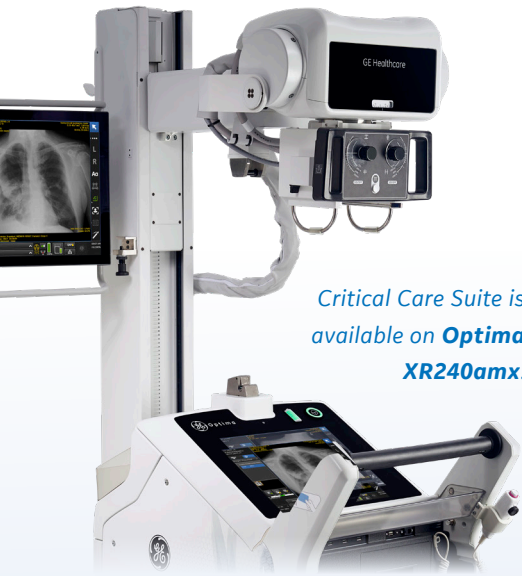# GE Artificial Intelligence (AI) Pneumothorax (PTX) Study
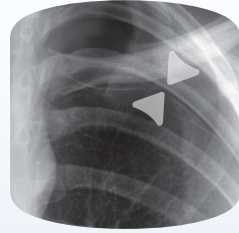*results from a stand-alone algorithm performance evaluation study*

PTX is a critical condition that needs urgent diagnosis and potentially a life saving intervention – unfortunately a diagnosis is sometimes delayed or even missed, **resulting in *$569 million*[1] per year in USA medical error cost**. GE Healthcare is **developing AI solutions** to detect and help prioritize critical cases such as PTX.

*Critical Care Suite is available on **Optima XR240amx**.*

AI detected a subtle Pneumothorax (PTX) missed in the radiology report.

Small left apical PTX with plural line near rib edge.

RADIOLOGIST REPORT	AI Result
No PTX and/or shift of midline structure is evident.	Suspicious for PTX.

GE AI CLINICAL STUDY

Clinically Challenging Validation Dataset

804 Frontal chest x-ray images collected from two North American hospitals, ground truth determined by board certified radiologists.
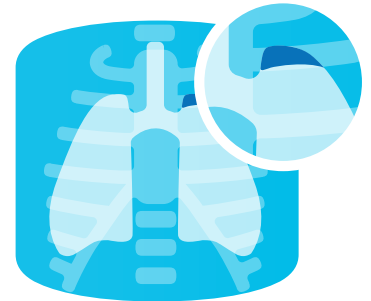
19% Low   **66%** Moderate   **15%** High

TECHNICAL DIFFICULTY[2]

25% Co-morbidities, mimic cases, subtle PTX findings

CLINICAL DIFFICULTY[3]

STUDY RESULTS[4]

PTX AI Algorithm Detection Accuracy

Algorithm's ability to correctly classify a case **with or without PTX** was measured using sensitivity and specificity.

Specificity
94%

Sensitivity
84%
large & small PTX

96% large PTX   **75%** small PTX

Positive predictive value (PPV)

Probability that a case with **a positive test** *result as identified by the algorithm* **actually has a PTX**.

35% PPV   **99%** NPV
4% PTX prevalence[5]

Negative predictive value (NPV)

Probability that a case with **a negative test** *result as identified by the algorithm is* **truly free of a PTX**.

69% PPV   **97%** NPV
15% PTX prevalence[5]

1. Bos JVD et al (2011) The $17.1 Billion Problem: The Annual Cost Of Measurable Medical Errors. Health Affairs. 30 (4) https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2011.0084
2. For technical difficulty each image was rated using the following scale derived from Ley-Zaporozhan J, Shoushtari H, Menezes R, Zelovitzky L, Odedra D, Jimenez-Juan L, et al. (2018) Enhanced pneumothorax visualization in ICU patients using portable chest radiography. PLoS ONE 13(12): e0209770. https://doi.org/10.1371/journal.pone.0209770
3. For clinical difficulty each image was categorized based on the presence of challenging co-morbidities/pneumothorax mimics from Armstrong, P. (2000). Pleura and Pleural Disorders. In M. Houston (ed.). Imaging of Diseases of the Chest. (3rd ed.). (pp. 763-775). London, UK: Mosby
4. Data on File GE Healthcare 510k K183182
5. Yarmus, Lonny, and David Feller-Kopman. "Pneumothorax in the critically ill patient." Chest 141.4 (2012): 1098-1105.