

Breath by byte: AI in pulmonary imaging

Sahitya Niranjali Manikumar^{1*}

1. Emergency Physician, Kauvery Hospital, Chennai, India

Correspondence to: Ankur Masani

*Emergency Physician, Kauvery Hospital, Chennai, India.

Email: drankurmasani@gmail.com

DOI: XXX

Background: Chest radiography is one of the most commonly performed imaging investigations worldwide due to its affordability, portability, and widespread availability. It plays a critical role in the early detection and management of thoracic diseases, particularly in emergency and resource-limited settings. However, delays in reporting and interpretation persist globally, largely due to a shortage of trained radiologists, which may impact timely clinical decision-making.

Objective: This study aimed to evaluate the role of artificial intelligence (AI) in assisting physicians with the interpretation of chest radiographs for the detection and diagnosis of thoracic pathologies.

Methods: An AI-based chest radiograph interpretation system, developed using deep learning algorithms and trained on 10.7 million chest X-ray images, was assessed. The system is currently deployed in over 90 countries, provides results within 20 seconds, and integrates seamlessly into existing hospital workflows. A pilot study was conducted in the Emergency Department, wherein 100 consecutively acquired chest radiographs were analysed using the AI application. The AI-generated interpretations were compared with gold-standard radiologist reports to assess diagnostic performance.

Results: The AI system demonstrated an overall diagnostic accuracy of 96%. It showed a sensitivity of 100% in identifying normal chest radiographs and a specificity of 96% for detecting abnormalities. The tool provided comprehensive analysis across multiple anatomical regions, including the lungs, pleura, mediastinum, heart, diaphragm, and bony thorax. The system was cost-effective, required minimal integration effort, and functioned as an additional safety mechanism by flagging abnormal radiographs for radiologist review.

Conclusion: AI-assisted chest radiograph interpretation has the potential to serve as a reliable adjunct to clinical practice, particularly in settings with limited radiology resources. By acting as a safety net and prioritising abnormal studies, AI can help reduce reporting delays, minimise missed findings, and enhance overall diagnostic efficiency.

Keywords: Additional safety mechanism, clinical decision making, artificial intelligence, deep learning.