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IASLC 2026 World
Conference on Lung Cancer

SEPTEMBER 12 – 15, 2026
SEOUL, REPUBLIC OF KOREA

INTRODUCTION

Lung cancer remains the leading cause of cancer-related mortality worldwide. Low-dose computed tomography (LDCT) is an established tool for early detection, but interpretation is time-consuming and observer-dependent.

Artificial intelligence (AI) may improve the accuracy and efficiency of lung cancer screening by supporting pulmonary nodule detection.

METHODS

Design: Retrospective analysis

Population: 1,500 subjects participating in a lung cancer screening program in Kazakhstan (2018–2023)

CT protocol: LDCT <1 mSv

Annotation: Four radiologists with >6 years of experience

Reference standard: Senior expert radiologist

Classification: Lung-RADS 1.1

Independent test set: 1,000 subjects

DISCUSSION AND CONCLUSION

Actionable Take Away Message

- The AI model showed performance comparable to radiologists with <5 years of experience.
- AI may support workflow efficiency and less-experienced radiologists in LDCT screening.
- AI performance was lower than that of experienced radiologists.

Future Direction for Research

- Optimize detection of small and subpleural nodules.
- Validate the model in larger and more diverse populations.
- Evaluate integration of AI into routine LDCT screening workflows.

REFERENCES & ACKNOWLEDGEMENTS

We sincerely thank the Kazakh Institute of Oncology and Radiology (KazIOR) for financial support covering travel expenses associated with participation in WCLC 2026.

We gratefully acknowledge Asfendiyarov Kazakh National Medical University (KazNMU) for providing the opportunity to participate in this international scientific event.

We also thank all colleagues and healthcare professionals involved in the development and implementation of lung cancer screening in the Republic of Kazakhstan for their valuable contribution and support.

RESULTS

The Lung Cancer CT AI model demonstrated 63.4% sensitivity (95% CI: 54.0–72.8%) and 81.6% specificity (95% CI: 79.8–83.4%) for pulmonary nodule detection.

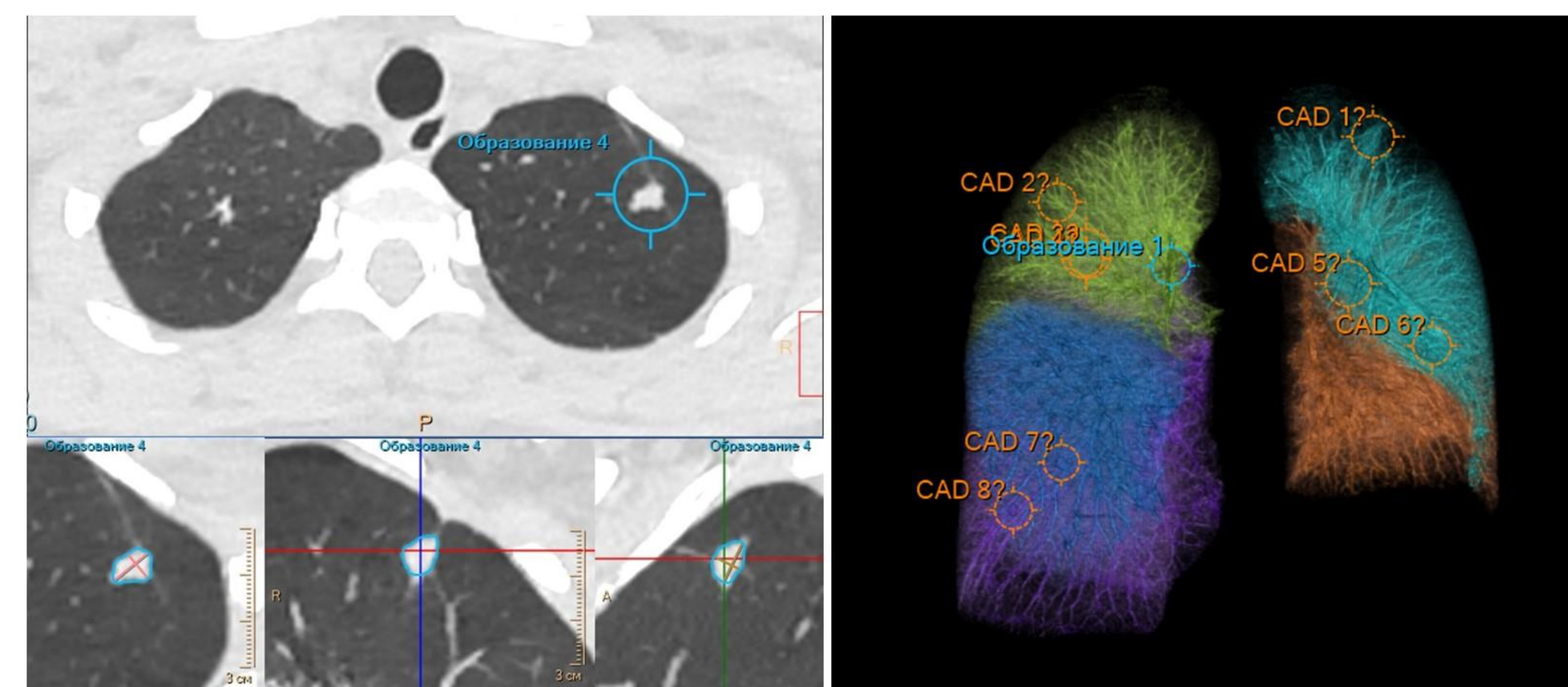
AI performance was comparable to that of radiologists with <5 years of experience (sensitivity 67.1%; specificity 83.8%).

Experienced radiologists achieved higher diagnostic accuracy (94.2% sensitivity; 98.8% specificity).

AI-assisted interpretation reduced reading time and increased the volume of LDCT studies interpreted by radiologists by 38%.

For subpleural nodules, AI performance was lower (40% sensitivity; 82% specificity), particularly for small nodules <10 mm.

Sensitivity for parenchymal nodules was higher for lesions >10 mm (83.3%) compared with those <10 mm (67.8%).



Computer-aided detection (CAD) identified multiple pulmonary nodules on CT images, with corresponding localization on 3D lung reconstructions.