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Increasing precision in the diagnosis of lung cancer with a multi-marker panel approach for screening and incidentally detected pulmonary nodules

Introduction: Incidental pulmonary nodules are detected on cross sectional imaging performed for many reasons. Artificial intelligence (AI) software may be used to ensure that clinically significant lung nodules receive appropriate follow-up. We studied the impact of a proprietary AI natural language processing tool as a safety net to automate the process of identifying patients with a radiologist reported pulmonary nodule and scheduling guideline consistent follow-up care.

Methods: All computed tomography (CT) scans containing at least part of the lungs performed in the outpatient or emergency room setting between 20-Feb to 19-April-2024 were included. CT radiology reports mentioning a lung nodule or lesion suggestive of malignancy were identified by AI software using natural language processing. All flagged reports were reviewed by the lung nodule service two weeks after nodule identification. Nodules were classified as "appropriately followed" if follow-up imaging, referral to a nodule clinic, or other guideline-consistent care was ordered. Nodules were classified as "not appropriately followed" if no acknowledgement of the reported nodule was documented by the ordering physician in the electronic health record within two weeks of being flagged.

Results: The AI software identified 740 nodules from 5,675 CT scan reports. 525 (71%) nodules were appropriately followed while 215 (29%) were not appropriately followed. Of the 215 nodules without documented follow-up, 190 (88.2%) were > 6mm with 39 (18.4%) > 15mm. Analysis of 389 nodules with mature data revealed that nodules that would have not received follow-up in the absence of the AI software generated 41 additional clinical appointments and 3 procedures.

Conclusions: At a large tertiary center with dedicated chest radiologists, nearly 30% of clinically significant incidental pulmonary nodules would not have been appropriately followed without this safety net. With the AI safety net in place, 2/3 of these patients were successfully scheduled for guideline consistent care.