

Promoting Follow-up of Incidental Findings

A Practical Model for Managing HL7 Workflow of Incidental Pulmonary Nodule Imaging

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Introduction

While there has been extensive discussion about the need for **automated radiology incidental findings tracking** in healthcare, there has been little dialogue or recommendations on how to practically address these concerns. We propose a **model managing HL7 workflow** and provider notification for pulmonary nodule incidental findings intended to pair with natural language processing (NLP) systems.

Materials & Methods

This quality improvement (QI) initiative was undertaken at a southeastern academic medical center interpreting 1.2M imaging exams annually in response to quality monitoring that revealed **< 25% rates of follow-up for incidental findings**. To address this problem, a multidisciplinary group of radiologists, clinical informaticists, applications specialists, and business analysts was formed to provide expert guidance. Fleischner Society Guidelines, American College of Radiology (ACR) Closing the Recommendations Follow-Up Loop measures, and application logic governing NLP system-to-EMR communication were leveraged to develop an **HL7-based workflow for incidental pulmonary nodule follow-up** (Figure 1).^{1,2} To demonstrate feasibility, QI workflow was deployed over 1 year, starting on October 30, 2021.

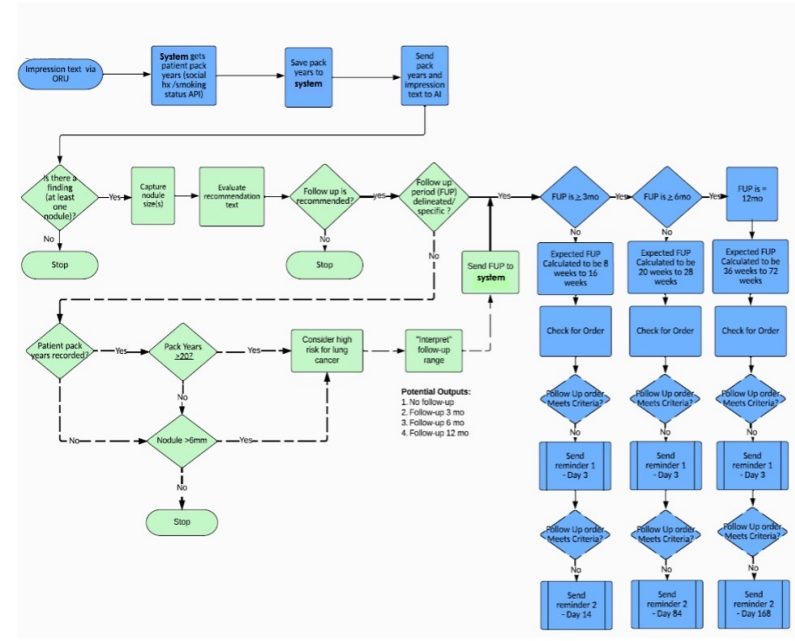


Figure 1 – Pulmonary nodule logic for HL7 follow-up order workflow based on Fleischner Society Guidelines for Incidental Pulmonary Nodule Recommendations, American College of Radiology (ACR) Closing the Recommendations Follow-Up Loop measure set, and application logic governing NLP system to EMR communication.

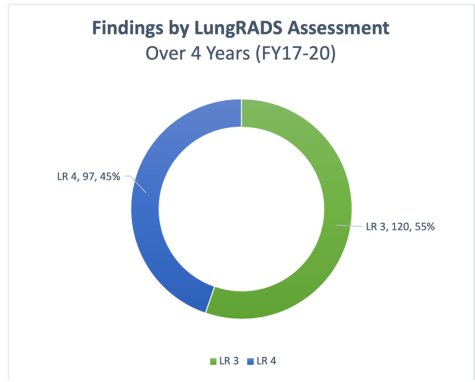


Figure 2 – Manually tagged Lung Cancer Screening patients requiring a follow-up for abnormal pulmonary nodule (LR3 or 4) outside the normal lung cancer screening pathway (LR2 – benign, LR1 – negative, LR0 – incomplete) over 4 years.

Results

This workflow identified 2,233 incidental pulmonary nodules over 1 year (CT 1,564, x-ray 130, MR 145, NM 243, US 152) across all care settings (1,354 outpatients, 672 emergency, 123 urgent care, 85 inpatient), representing a **MORE THAN 4,100 % increase in findings capture (n = 54 vs n = 2,233; P < 0.001)** over the accepted standard manual report flagging by a Screening Services Coordinator.

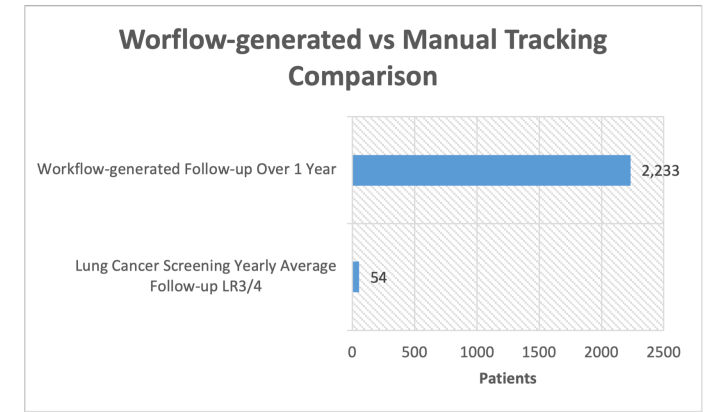


Figure 3 – Comparison of Workflow-generated follow-up over 1 year with average follow-up LR3/4 tagged exams using manual workflow resulting in a more than 4,100% increase in tagged cases for follow-up.

Conclusion

Building tracking systems is an opportunity to improve care quality by addressing process gaps. The presented safety net workflow is associated with increased pulmonary nodule identification. This HL7 logic can help hospitals meet ACR-issued Closing the Recommendations Follow-Up Loop measures, which encourage adoption of tracking and reminder systems for actionable incidental findings.

REFERENCES

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