

# PACS/Dictation-Integrated System for Tracking Incidental Pulmonary Nodules in Order to Improve Follow-up and Early Diagnosis of Lung Cancer

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## BACKGROUND

- Incidental pulmonary nodules are routinely encountered on CT examinations ordered at our institution by a diverse population of healthcare providers.
- Some of these incidental nodules may represent early lung cancer.
- A small number of patients are lost to follow-up only to later present with advanced disease with:
  - Limited life expectancy
  - Increased treatment costs
  - Potential litigation issues



## BACKGROUND

- Our department lacked an effective system of documenting and tracking patients with incidental pulmonary nodules to ensure that appropriate and timely follow-up was obtained.
- Our project involved the implementation of a communication system for:
  - Documentation
  - Notification
  - Tracking



## PURPOSE

- To improve the management of pulmonary nodules found incidentally on imaging studies through the implementation of a PACS/Dictation-Integrated system.
- This system would document and monitor patients for appropriate and timely follow-up.



## METHODS - OVERVIEW

1. Creation of a notification system. A pulmonary nodule notification system was created to document incidental pulmonary nodules and to initiate a closed-loop communication.
1. Departmental policy. A departmental-wide policy was instituted on how and when to use the pulmonary nodule communication system.
1. Outcome coordinators. Clinical outcome coordinators within radiology then monitor the sent messages and ensure that appropriate and timely follow-up is obtained.
1. Pulmonary nodule clinic. A pulmonary nodule clinic was also started on the same timeframe by the pulmonologists to provide a referral option for the providers and patients.



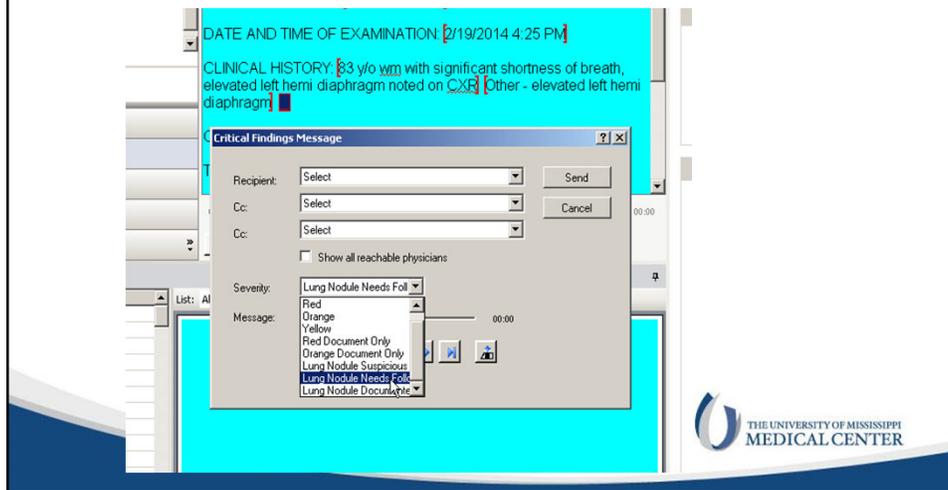
## METHODS - Notification System

- With only one click or voice command, the radiologist creates a voice message that is sent to the ordering provider. Afterwards, the provider's name, date, and time are automatically populated into the imaging report.
- The system contacts the provider via his or her preferred contact method. They must then confirm receipt or create a reply.
- If the radiologist spoke directly to the ordering provider, an option exists to document the communication without sending a voice message (Lung Nodule Documentation).



## METHODS - Notification System

- Screenshot of the Dictation-integrated Critical Communication Software with options for pulmonary nodules.



## METHODS - Policy

- Following the Departmental policy on incidental pulmonary nodules, the radiologists score nodules as either:

Lung Nodule, <u>Needs Follow-up</u>	Lung Nodule, <u>Suspicious for neoplasm</u>
Ordering provider, treatment team, and PCP all contacted: <ul style="list-style-type: none"> <li>- Notified of the finding</li> <li>- <u>Informed if additional imaging needed</u></li> <li>- Provide appropriate <u>surveillance guidelines</u> (Fleischner criteria or NCCN)</li> <li>- Offered option to refer patient to pulmonary nodule clinic</li> </ul>	Ordering provider, treatment team, and PCP all contacted: <ul style="list-style-type: none"> <li>- Notified of the finding</li> <li>- Offered appropriate <u>management options</u>:                             <ul style="list-style-type: none"> <li>- Close imaging follow-up</li> <li>- PET/CT</li> <li>- Biopsy</li> </ul> </li> </ul>

## METHODS - Clinical Coordinators

- Radiology Clinical Outcome Coordinators are notified of each pulmonary nodule message.
- Coordinators monitor patients for documentation in the EMR and follow-up management.
- Escalation policy: For cases where there is a lack of documentation and follow-up in the EMR, recurrent reminders are sent to the clinicians as well as directly to the patient.
- If after 3 months, appropriate surveillance imaging is not ordered, the patient will be contacted by the Radiology Clinical Outcome Coordinators to arrange follow-up care at the pulmonary nodule clinic.



## METHODS - Lung Nodule Clinic

- A lung nodule clinic was created and is staffed by a nurse and a pulmonologist.
- For each notification, the clinic nurse will contact the treatment team within 1 week to offer diagnostic guidelines and/or arrange referral to the pulmonary nodule clinic.



## METHODS - Other

- Missing providers. If a provider is missing from the communication system database, there is an option to send a voice message to the Results Coordinator. The coordinator will then be responsible for relaying the message to the provider and updating the system with the provider's contact information.
- High turnover areas or shift workers. In areas of the hospital with shift workers or high turnover of providers (ED, ICU, etc.), messages are sent to a pre-designated Clinical Outcome Coordinator representing that group of providers. The coordinator is then responsible for relaying the message to the appropriate team and confirming receipt.



## RESULTS

- Since implementation in February 2014, there has been an excellent acceptance and utilization of the notification system for lung nodules by our radiologists.
- Currently, we are averaging 90 total pulmonary nodule messages per month.
- All of the messages created in the system are being followed by our clinical outcome coordinators.



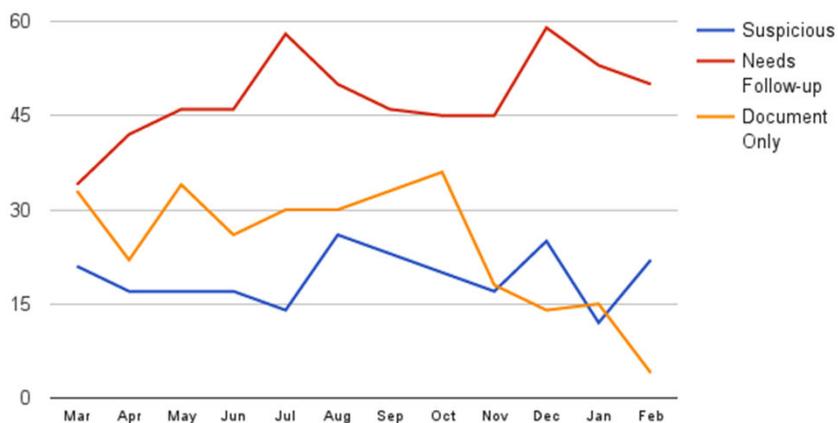
## RESULTS

- Several providers have created a care coordination position designating someone responsible for receiving the pulmonary nodule messages and scheduling follow-up appointments with pulmonologists or the pulmonary nodule clinic.
- Since implementation in February 2014, there has been no reported missed diagnosis of lung cancer in a patient with a previously identified lung nodule due to lost patient follow-up.



## RESULTS

Lung Nodule Notification Messages by Type (2014-2015)

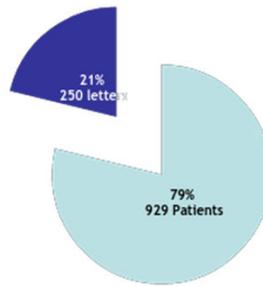


## RESULTS

- Out of 1,179 Lung Nodule Messages, approximately 250 letters have been mailed to patients because appropriate follow-up had not yet been completed (21% needing follow-up).

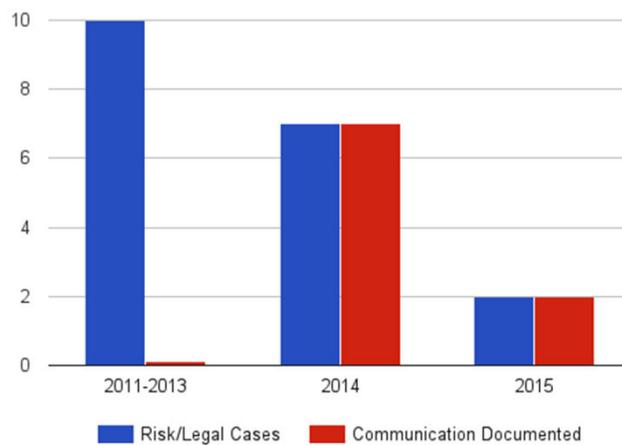
### 1,179 Lung Nodule Messages

■ Appropriate Follow-up Obtained ■ Letters Sent to Patients due to incomplete Follow-up



## RESULTS

### Risk/Legal Cases and Communication Documentation



## CONCLUSIONS

- Implementing a PACS-Integrated tracking system for documenting and following incidental pulmonary nodules can minimize communication failures and decrease the number of patients lost to follow-up.
- Additionally, closed-loop communication of pulmonary nodules and other critical imaging findings also improved significantly by simple observation, i.e. "Hawthorne effect".
- Department-wide utilization of the system required creation of clinical outcome coordinators to manage documentation and ensure appropriate follow-up of the pulmonary nodule messages.



## CONCLUSIONS

- Appropriate lung nodule follow-up guidelines and radiologist report recommendations alone do not reliably ensure adequate follow-up and management. The addition of a notification system providing closed-loop communication in conjunction with follow-up tracking by clinical outcome coordinators offered the best management and follow-up strategies in our Institution.
- The communication and follow-up tracking model presented here can easily be replicated and implemented in other hospitals and healthcare organizations.



## THE FUTURE

- The next phase of our system aims to integrate the communication software directly with our electronic medical record (EMR) in order to automate the process for documentation and follow-up of pulmonary nodules as well as other incidental and critical findings.

