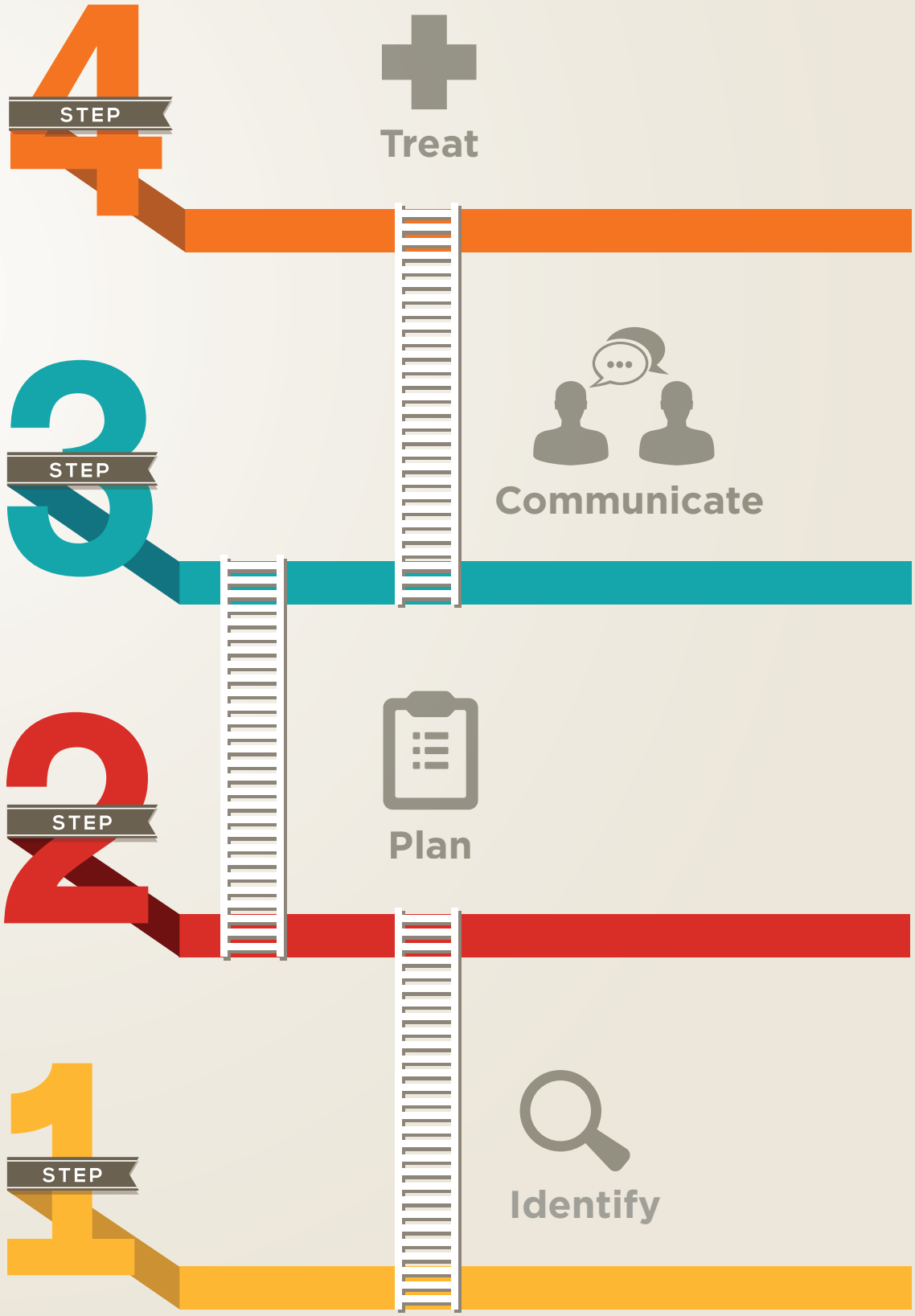
4
STEP
Treat
3
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Communicate
2
STEP
Plan
1
STEP
Identify

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Development & Evolution of an Incidental Lung Lesion Program

Unexpected radiologic findings in the lungs (incidental lung lesions) on a diagnostic CT pose a risk of lack of follow-up and follow through for patients. (Note: incidental findings can be defined as "any abnormality not related to the illness or causes that prompted the diagnostic imaging test."[1])

This risk is particularly true for patients presenting in the Emergency Department (ED), where ED visits often result in discharge rather than hospitalization after a work-up. The challenges facing hospitals:

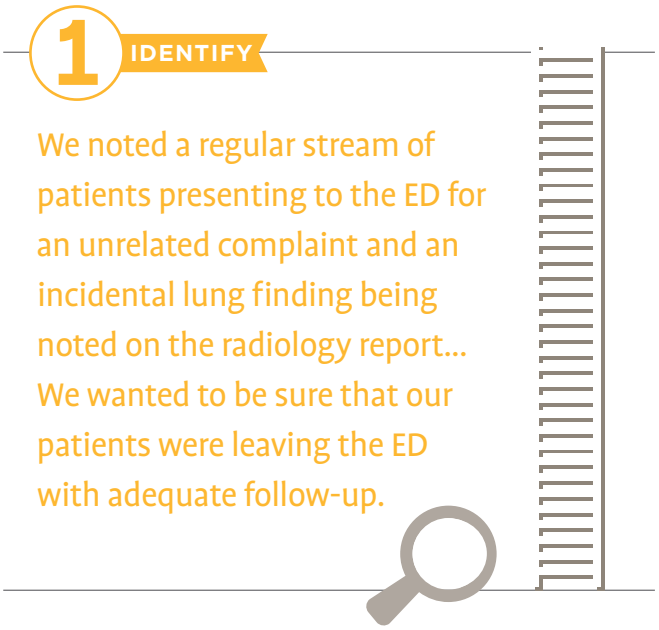
- Identifying the incidental lung lesion and the significance of the finding
- Developing the necessary follow-up plan
- Communicating this information to both the patient and his or her primary care provider (PCP).

Literature Review

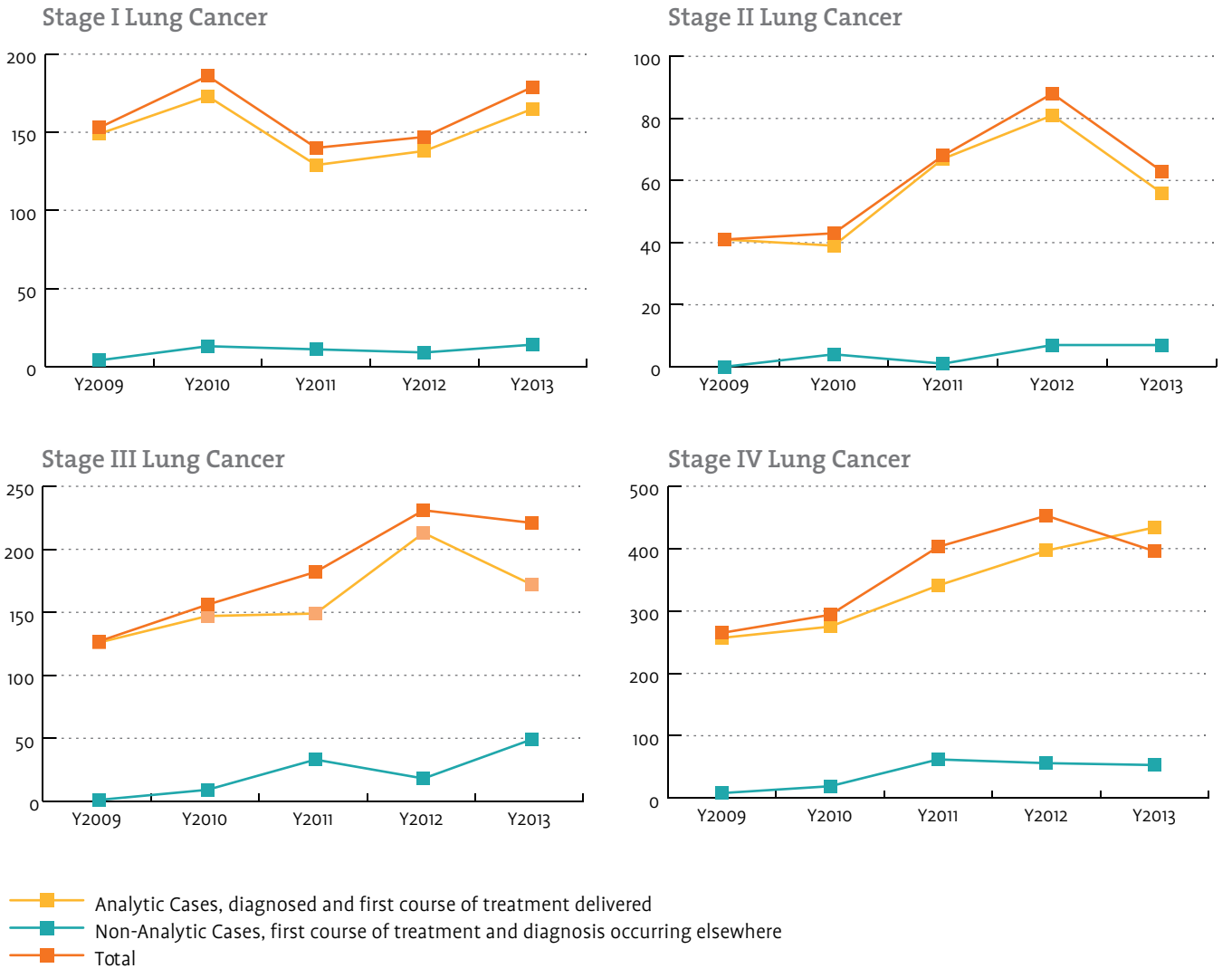
Little research has been done on the occurrence, clinical significance, additional diagnostic testing for, and clinical outcomes of patients with incidental findings. Although incidental findings can occur with other diagnostic imaging, CT provides a wider field of view with greater organ and tissue visualization, resulting in a higher probability of occurrence of additional findings. With this advanced imaging technology, hospitals must now improve how they identify these patients and how they communicate with these patients and their referring physicians to ensure appropriate proper follow-up.

Incidental lung lesions can be noted in the lung bases captured on an abdominal CT for a patient with gastrointestinal symptoms or in 10 to 20 percent of individuals undergoing cardiac CT examination.[2] Indications for CT scans have evolved from a set of differentials not necessarily associated with a lung lesion, therefore an unexpected radiologic notation of a lung nodule is at risk of being overlooked by the ordering PCP or not followed up on by the patient. The greatest concern is that an incidental lung finding on a CT may represent a lung cancer.

When screening the smoking, high-risk population in the National Lung Cancer Screening Trial, 27.3 percent of patients were noted to have an incidence of pulmonary nodules, with 3.6 percent developing a lung cancer diagnosis in the five-year follow-up.[3] Identifying the rates of incidental lung finding occurrence in the general population is more challenging, with reports ranging from 19.8 percent to 56.3 percent.[4-8] The wide variation is due to the type of CT scan performed, the quality of CT technology utilized, radiologist expertise and consistency, and the established system for reporting and following up on findings.



Figures 1–4. Cancer Registry: Division by Lung Cancer Stage of Diagnosis Review



The Henrico Doctors' Hospital Experience

When Henrico Doctors' Hospital reviewed its cancer registry data, we noted a large number of lung cancer patients being diagnosed with later stage disease (see Figures 1-4, above). Next we reviewed the locations and referral patterns of patient presentation, which led us to the Emergency Department. We noted a regular stream of patients presenting to the ED for an unrelated complaint and an incidental lung finding being noted on the radiology report. Often the ED visit was due to gastrointestinal or abdominal symptoms and the physician ordered an abdominal CT or X-ray. Our medical staff was concerned about the potential for patients to get lost in the transition. We wanted to be sure that our patients were leaving the ED with adequate follow-up. To do so, we would need to develop quality and process improvement protocols to create a follow-up loop for these patients.

In emergency departments across the nation, follow-up after an ED visit can be very time intensive and is an area of high liability.[9] Although most hospitals have put measures into place

to ensure primary care physicians receive copies of reports of diagnostic workups performed in the ED and a discharge summary, gaps in care and communication can occur, placing patients at risk.[10] Many steps must be completed to ensure PCPs receive the information necessary to adequately follow-up and care for their patients (see Table 1, below).

As Henrico Doctors' Hospital reviewed its current ED experience with incidental lung findings found on CT scans, we realized that there was variation in both the frequency of findings and follow-up. Although ED notes documented that patients with incidental findings were informed about the need to follow up with their primary care provider for possible further testing, when our nurse navigator contacted patients, many either reported hearing this information for the first time or did not have a sense of urgency or seriousness for follow-up.

When the nurse navigator reached out to PCPs regarding findings noted in a patient's report, physicians were grateful for the call. On occasion PCPs acknowledged not having noted the incidental finding as they were focused on the diagnostic results. Literature reports of follow-up are consistently low regardless of the patient population reviewed retrospectively; some reports indicate only 20 percent of patients having follow-up.[11,12]

Program Goals

At the same time that we were looking to improve the processes in the Emergency Department, our multidisciplinary lung cancer

2 PLAN

The high-quality CT technology allowed our physicians to identify smaller and smaller lesions, so the lung cancer team established a set of goals to improve both the patient experience and communication with primary care physicians. Being part of a large healthcare system, we decided to implement these changes at one hospital, refine our processes, and then move the changes into our imaging centers and sister hospitals.

Table 1. Necessary Elements for Emergency Department-PCP Communication

PATIENT RESPONSIBILITY	ED PHYSICIAN/STAFF	PRIMARY CARE PHYSICIAN/STAFF
Inform ED of correct PCP name	Notify PCP of ED visit	Inform ED physician of past medical history
Inform ED of complete past medical history	Call or fax diagnostic reports and discharge summary to PCP office and ensure receipt of summary	Inform ED physician of patient's baseline
Inform ED of presenting signs and symptoms	Review discharge instructions with patient, including follow-up expectations	Review results and discharge summary from ED visit and schedule timely follow-up
Follow up with PCP as recommended by ED physician	If information is obtained after patient discharge from ED, call or fax results to PCP	Notify patient of scheduled follow-up visit and ensure compliance
Comply with recommendations for follow-up testing	Notify patient of results and follow-up expectations	

Table 2. Recommendations for Follow-up and Management of Nodules Smaller than 8mm Detected Incidentally at Non-screening CT[13]

NODULE SIZE (MM)*	LOW-RISK PATIENT†	HIGH-RISK PATIENT‡
≤4	No follow-up needed§	Follow-up CT at 12 mo; if unchanged, no further follow-up¦
>4–6	Follow-up CT at 12 mo; if unchanged, no further follow-up¦	Initial follow-up CT at 6–12 mo then at 18–24 mo if no change¦
>6–8	Initial follow-up CT at 6–12 mo then at 18–24 mo, dynamic contrast-enhanced	Initial follow-up CT at 3–6 mo then at 9–12 mo and 24 mo if no change
>8	Follow-up CT at around 3, 9, and 24 mo, dynamic contrast-enhanced CT, PET, and/or biopsy	Same as for low-risk patient

Note—Newly-detected indeterminate nodule in persons 35 years of age or older.

* Average of length and width.
† Minimal or absent history of smoking or other known risk factors.
‡ History of smoking or other known risk factors.
§ The risk of malignancy in this category (<1%) is substantially less than that in a baseline CT scan of an asymptomatic smoker.
¦ Non-solid (ground-glass) or partly solid nodules may require longer follow-up to exclude indolent adenocarcinoma.

program was reviewing community needs and the experience of our patients. The high-quality CT technology allowed our physicians to identify smaller and smaller lesions, so the lung cancer team established a set of goals to improve both the patient experience and communication with primary care physicians. Being part of a large healthcare system, we decided to implement these changes at one hospital, refine our processes, and then move the changes into our imaging centers and sister hospitals.

Fortunately, we had experience in developing a network connecting our mammography centers across 75 miles, and we used that experience to consider what we could construct across our Emergency Departments. For example, mammography dictation is standardized through specific software, which in turn triggers nurse navigator involvement. Using this same concept, our team developed the following initial goals:

1. Establish an automated system to identify patients with incidental findings on CT scans.
2. Connect automatically every incidental finding to the thoracic oncology nurse navigator/nurse practitioner.
3. Communicate with every patient having an incidental finding in the ED, confirming the patient's knowledge of the incidental finding and the follow-up plan.
4. Communicate with every referring provider whose patient had an incidental finding in the ED, ensuring that the provider was informed about the incidental finding.

Development Process

Initially in the pilot facility ED, staff set aside imaging reports for the thoracic oncology nurse navigator/nurse practitioner to review. After review, if a finding was noted by the radiologist, the thoracic oncology nurse navigator would reach out to the patient's PCP to ensure he or she was aware of the report. If a PCP was not identified in the ED note, the thoracic oncology nurse navigator would reach out to the patient to inform him or her of a finding that required follow-up and help the patient connect with a PCP who could then oversee the necessary follow-up. (At the start of the pilot, about 35 percent of patients did not have an identified PCP).

Next, cancer center leadership developed a multispecialty Thoracic Advisory Board made up of the:

- Thoracic oncology nurse navigator
- Cancer center leadership
- A thoracic surgeon
- A pulmonologist
- A radiologist
- A radiation oncologist
- A medical oncologist
- An information technologist.

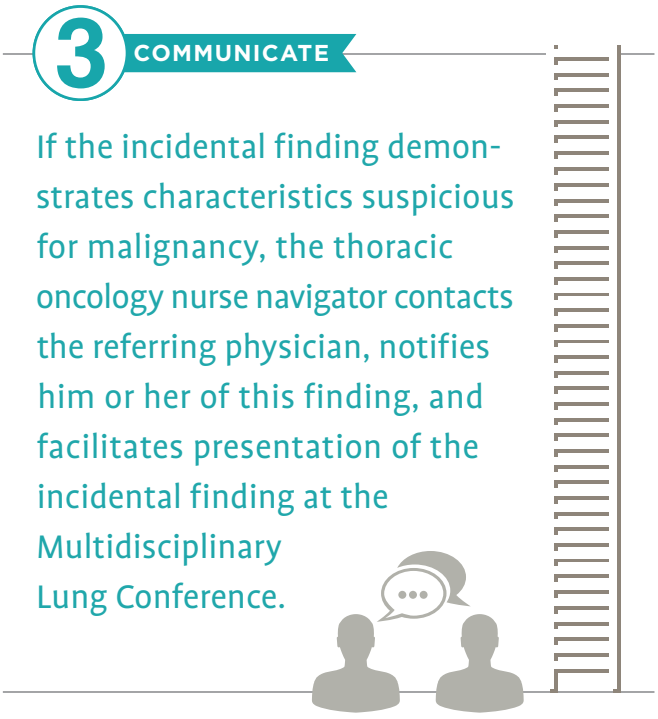
The Thoracic Advisory Board would ensure quality within the Thoracic Oncology Program by:

- Reviewing hospital registry data
- Establishing quality metrics
- Developing a program and process to ensure that incidental findings were identified and followed up according to Fleischner's Guidelines (Table 2, page 64).[13] The Thoracic Advisory Board agreed that these standards and guidelines would provide a framework and structure necessary to guide the PCP and ensure quality in follow-up recommendations based on the patients' risk. (The Fleischner Society developed its guidelines in 2005 to provide recommendations for follow-up and management of pulmonary nodules detected on non-screening CT scans. Fleischner's Guidelines direct the recommended follow-up of identified nodules based on the patients' risk.)[13]

Using key search terms that are within the radiology report or impression, our IT&S (Information, Technology & Systems) created a way to identify patients who require further follow-up. Initially, to ensure that the thoracic oncology nurse navigator was alerted to all CT scans with incidental findings, radiologists agreed to use the key phrase "Recommend dedicated Chest CT" in the body of the report or in the impression to trigger the need for follow-up. However, after implementation, the thoracic oncology nurse navigator noted that while this phrase may alert the PCP to order additional imaging, there was no way for the thoracic oncology nurse navigator to know what actions (if any) were taken. Our hospital wanted feedback that all patients were being appropriately followed for their incidental findings.

The Thoracic Advisory Board next decided to use the search terms "nodule" and "Fleischner," and IT&S used these key search terms to create a non-procedural report that was pulled from the electronic health record. These reports spool to the thoracic oncology nurse navigator's printer each morning for review. After further experience with these search terms, the thoracic oncology nurse navigator determined that the key search term "nodule" was not capturing actual incidental findings, but instead pulling in reports where the term nodule had been used by the radiologist indicating "no nodules present."

Based on this new data, the Thoracic Advisory Board decided to continue to use the key search term of "Fleischner" and to create a phrase within the powerscribe dictation system entitled "cc Nurse Navigator." This would allow radiologists to alert the thoracic oncology nurse navigator of the need for further follow-up. The powerscribe feature within the dictation system simplified the process for radiologists, allowing them to check a box during dictation to insert this phrase into the dictated imaging report so that the information would be pulled into the non-procedural report. Once this process was established, we rolled out this quality improvement measure at each hospital facility and outpatient imaging center. The nurse navigators at each location were trained to review the non-procedural reports and imaging studies, the Fleischner Society Guidelines, and recommendations for follow-up.



Radiologist Role

To ensure the capture of all incidental findings, radiologists were actively engaged in the process. The challenge for our radiology group is that it is comprises more than 50 radiologists across our healthcare network. At the pilot hospital alone, each month 8 to 10 radiologists rotate the reading of the imaging studies. The radiologist is crucial in deciding whether or not an image is normal or requires follow-up. The radiologists' recommendations are naturally influenced by the knowledge that many incidental findings are insignificant and they are trying to balance unnecessary testing for a disease that might cause morbidity and mortality, along with its own risks, emotional burdens on the patient, and related costs.[1] We used email communications, information presented at the routine radiologist meetings, and signage at each radiologist work station to continuously educate all radiologists about the incidental lung lesion quality improvement initiative.

Nurse Navigator/Advanced Practice Role

An advanced practice nurse serves as the thoracic oncology nurse navigator and is able to assess risk, suggest evidence-based interventions, and facilitate collaboration between the hospital and

physicians in the community.

The thoracic oncology nurse navigator reviews an average 10 to 15 search-criteria-generated reports weekly. If incidental findings are noted, she completes a thorough search of the available patient history to help determine risk.[3] The National Lung Screening Trial (NSLT) and the National Comprehensive Cancer Network (NCCN) have both identified risk factors to use to categorize individuals by risk.[14] As noted in earlier studies, applying patient history and risk factors to the incidental findings helps the thoracic oncology nurse navigator determine a level of significance for follow-up.[1,2]

The risk factors that should be utilized to determine risk are age, smoking history, work exposures, personal history, and family history. Often this information is incomplete in the ED record and the thoracic oncology nurse navigator is unable to determine risk status. Fleischner Society recommendations are used for individuals older than age 35 to determine appropriate follow-up based on the size of the lung nodule identified on the CT scan and the individual's risk factors. The thoracic oncology nurse navigator reviews these abnormal scans with a member of the multidisciplinary lung team—either a pulmonologist or thoracic surgeon. Because risk factors are often not readily available to the team, letters are mailed to the patient's primary care physician or ordering physician to notify them of the incidental finding and allow them to further assess the patient's risk and final determination of needed follow-up.

If the incidental finding demonstrates characteristics suspicious for malignancy, the thoracic oncology nurse navigator contacts the referring physician, notifies him or her of this finding, and facilitates presentation of the incidental finding at the Multidisciplinary Lung Conference. The multidisciplinary lung team meets biweekly to discuss cases; review radiologic images, patient presentation, risk factors, and pathology if biopsied; and provide follow-up or treatment recommendations to the referring physician. This forum can also be used for ED patients without a primary care physician. For patients without a PCP, after presentation at the Multidisciplinary Lung Conference, the thoracic oncology nurse navigator notifies the patient about the incidental finding and team recommendations, offers patient education, and helps the patient identify a primary care physician for follow-up.

Next Steps

In hopes of ensuring that all incidental findings are captured, the initial pilot facility has expanded to include all types of CTs, as well as chest imaging, in the non-procedural report. The Thoracic Advisory Board has also expanded the list of key search terms, and is slowly deleting those search terms that prove unnecessary. The thoracic oncology nurse navigator will continue to maintain data reports to show if the expansion of these studies and key search terms provides a larger catchment of incidental lung findings. Further, because some patients who present to the ED do not have a primary care physician, the Thoracic Advisory Board added an additional goal: to consistently provide patients with PCP options and available appointments.

Program Evaluation & Outcomes

Evaluation is ongoing as we continue to refine the search process for automating incidental finding notification.

The quality improvement effort has increased patient volume. We have had positive feedback from our patients, referring physicians, and community urgent care centers, resulting in lung clinic case growth and subsequent diagnostic CT imaging. A major reason for lung clinic growth has been the opportunity to have incidental findings evaluated by the multidisciplinary lung team. Many of the local urgent care centers have included the lung clinic in their standardized orders when CT scans that have been ordered by their physicians result in incidental findings.

Despite the fact that our documentation of patient awareness in discharge paperwork is higher than literature-reported rates of 9.8 to 27 percent, we have found that our patients did not have a sense of urgency about follow-up. We recognize that we need to assist patients with incidental lung lesions to make follow-up appointments and tests and then document that follow-up in their medical record. We continue to work on this issue with our community primary care physicians.

One of the most unexpected findings was the wide variation among our sites in patients without PCPs. At one of our sister hospitals that is in the process of instituting the Incidental Lung

Lesion Program, more than 50 percent of patients in the community use the local urgent care facility as their primary care provider. This scenario poses additional challenges for this particular community.

The cost savings per life-year saved with early detection of lung cancer is estimated at less than $19,000, which is similar to the savings associated with breast, colorectal, and cervical cancer screening.[15] Using Fleischner's Guidelines provides a high level of evaluation since the patient's risk is thoughtfully incorporated.

We realize that we have a significant opportunity to improve the identification process since our incidental rate for all CTs is less than the literature reported rate of 33 percent.[4] This may be due to the search terms we are using, but we are also considering consistency of practice across all of our radiologists. In other words, we need to ensure that the appropriate staff is aware of the Incidental Lung Lesion Program, including the consistent use of Fleischner's Guidelines within the dictations, so that clinical leaders have the opportunity to alert the thoracic oncology nurse navigator about these patients.

The Incidental Lung Lesion Program is a component of our Thoracic Oncology Program. It is a quality patient service that is good for the patient and good for the hospital. Just as low-dose CT lung cancer screening is an access point for people at high-risk, our program is another means for people to be cared for at the earliest possible time, possibly even prior to lung cancer symptoms. OI

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