The U.S. Preventative Services Task Force (USPSTF) recommends annual lung cancer screening for adults who have no signs or symptoms of lung cancer but who are at high risk for developing the disease because of age and smoking history. Based on this recommendation and studies from the National Institute of Health (NIH), Intermountain Healthcare established the Lung Cancer Screening Program with the support of the Oncology Clinical Program, the Division of Pulmonology and Critical Care Medicine, and Department of Imaging. This Screening Program facilitates annual screening (and more frequent diagnostic testing when indicated) for patients who meet criteria for high risk of developing lung cancer.

**Why Focus ON SCREENING?**

- **Lung cancer is common.** According to the American Cancer Society (ACS), nearly 225,000 cases of lung cancer are diagnosed annually. The ACS estimates that nearly 160,000 people will die from lung cancer in 2014 (about 27% of all cancer deaths). Currently, more than half of patients diagnosed already have widespread disease. Only 15% are diagnosed at an early stage.

- **Most high-risk patients can be identified through a simple history.** About 85% of lung cancer diagnoses are related to or caused by smoking, and the risk increases with smoking duration and frequency. The risk of lung cancer also increases with age, with most lung cancer occurring in patients 55 and older. In addition, several other risk factors increase the risk for lung cancer and make patients eligible for screening.

- **Screening high-risk patients with low-dose CT (LDCT) reduces mortality.** The National Lung Screening Trial (NLST) found a 20% reduction in deaths from lung cancer among current or former heavy smokers who were screened with low-dose helical CT versus those screened with a chest x-ray. NLST

- **LDCT successfully identifies other abnormalities, leading to appropriate treatment.** The NLST found that screening with LDCT identified a clinically significant abnormality not suspicious for lung cancer more than 3 times more often than chest x-ray. Overall, all-cause mortality was reduced by 6.7%.

**WHY THE NEED FOR AN ORGANIZED PROGRAM?**

We know that lung cancer screening results in false positives, but a careful diagnostic pathway limits harm to patients by reducing unnecessary procedures that may themselves result in complications. About 75% of patients screened for lung cancer will have a normal CT, and up to 25% will have a “positive finding.” However, more than 95% of these “positive findings” are benign and are usually resolved with further imaging only. Fewer than 5% of patients with a positive CT will be diagnosed with cancer. Proceeding through this careful diagnostic pathway limits harm to patients and results in early treatment when appropriate.

Intermountain’s Oncology Clinical Program, Division of Pulmonology and Critical Care Medicine, and Department of Imaging developed the Lung Screening Tracking System (LSTS) to track lung cancer screening for patients who meet the criteria defined on page 3. A regional nurse navigator (NN) uses the system to track and communicate with patients, schedule annual appointments, and send follow-up letters with results. Communication letters are stored and printed from within the LSTS.
HELPING PATIENTS QUIT
Throughout the process, encourage patients to quit smoking. These tools and resources can help your patients quit:
- Intermountain’s Quitting Tobacco booklet (see page 4 for ordering directions)
- Quit for Life Program: 866-784-8454, quitnow.net
- Freedom from Smoking: ffsonline.org
- Smokefree: 800-QUIT-NOW, smokefree.gov
- utah.quitnet.com
- cdc.gov/tobacco
- nicotine-anonymous.org
- www.tobaccofreeutah.org

ALGORITHM NOTES
(a) Identifying patients. Primary care providers (PCPs) are responsible for identifying patients for the program. In the future, patients will also be able to call and request consideration for the program.
(b) Pack year. A “pack year” is smoking an average of 1 pack of cigarettes per day for 1 year. A person could have a 30 pack-year history by smoking 1 pack a day for 30 years or 2 packs a day for 15 years. A high-risk patient is defined as having a history of 30 pack years or more or 20 pack years plus an additional risk factor (defined below). NCCN
(c) Additional risk factors:
- Documented radon exposure
- Occupational carcinogen exposure
- Personal history of lung cancer, COPD, and pulmonary fibrosis
- Family history of lung cancer
(d) Referral to the program:
- PCPs: Call the nurse navigator in your region:
  - UCR: Patricia Kruger, 801-507-3969
  - USR: Jodi Allred, 801-357-3767
  - UNR: Noreen Wynn, 801-387-7918
  - SWR: Deb Christensen, 435-688-5092 or Katie Wahler, 435-688-5071
- The nurse navigator validates that the patient is appropriate for the Screening Program and enters the patient’s information into the Lung Screening Tracking System (LSTS).
(e) Patients who don’t meet criteria. If patients request screening but don’t meet the criteria, they will be referred back to the PCP.

ALGORITHM: CANDIDATE SELECTION

<table>
<thead>
<tr>
<th>Potential patient for program (a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient age 55–80?</td>
</tr>
<tr>
<td>no</td>
</tr>
<tr>
<td>yes</td>
</tr>
<tr>
<td>Current smoker OR quit &lt;15 years ago</td>
</tr>
<tr>
<td>no</td>
</tr>
<tr>
<td>yes</td>
</tr>
<tr>
<td>≥20 pack year smoking history?</td>
</tr>
<tr>
<td>no</td>
</tr>
<tr>
<td>yes</td>
</tr>
<tr>
<td>Additional risk factor(s) present?</td>
</tr>
<tr>
<td>no</td>
</tr>
<tr>
<td>yes</td>
</tr>
<tr>
<td>≥30 pack year smoking history?</td>
</tr>
<tr>
<td>no</td>
</tr>
<tr>
<td>yes</td>
</tr>
<tr>
<td>Does the patient have health problems that limit life expectancy or ability or willingness to have surgery?</td>
</tr>
<tr>
<td>no</td>
</tr>
<tr>
<td>yes</td>
</tr>
<tr>
<td>Patient not a candidate for this program. (e)</td>
</tr>
</tbody>
</table>

Screening Process Cycle Begins
(see Screening Process algorithm on next page)

Note: Intermountain experts analyzed recommendations from the USPSTF and the National Comprehensive Cancer Network (NCCN) (and others) to develop this algorithm. It represents a combination of these guidelines.

Who participates in the Lung Cancer Screening Program?
In general, a nurse navigator (NN) facilitates and coordinates the screening process. For other incidental findings, the NN coordinates with other specialists. The NN enters patients into the Lung Cancer Tracking System (LCTS), mails letters to the patient, and follows up. In addition, the following team members may be involved:
- Primary care physician (PCP). Identifies patients qualified for screening.
- Radiologist. Performs the screens and diagnostic tests (if applicable). Reads the scans and enters the information into the Enterprise Data Warehouse (EDW).
- Pulmonary clinics. Evaluate and treat patients with abnormal CT results.
- Thoracic oncologists. Evaluate and treat patients with lung cancer.
- Support staff. Office managers, administrative team members, and so on schedule appointments and submit results in the EDW.
ALGORITHM NOTES

(a) Risk classification:
• Low risk or normal: Annual LDCT
• Intermediate risk: Diagnostic CT in 3 or 6 months
• High risk or other: Immediate follow up in appropriate clinic

(b) Letters in the Lung Screening Tracking System (LSTS). The NN prints the letters directly from the LSTS.
• Normal Result (A)
• 3-Month Return (B)
• 6-Month Return (C)
• Immediate Nodule Center (D)
• Immediate Other (E)
• Annual Reminder (F)
• Follow-up Reminder (G)
• Second Reminder (H)

(c) Some patients may reenter the Screening Program (e.g., if an abnormality identified on CT is diagnosed as benign).

(d) Criteria for Screening Program.
Patients in queue should be continually reassessed to ensure that they meet the program criteria. Patients should no longer be followed when they:
• Have not smoked for 15 years
• Develop health problems that significantly limits life expectancy or the ability or willingness to have curative lung surgery
• Pass age 80

Follow-up queue
Patients in the follow-up queue fall into 1 of the following categories. Patients move in and out of the Screening Process Cycle above as applicable:
• Low risk or normal: Patients continue to receive annual screening LDCT until they no longer meet the criteria or have an abnormal screen.
• Intermediate risk group: Patients are flagged for follow up in 3 or 6 months, depending on screening LDCT result. A diagnostic CT is performed at 3 or 6 months. At that time, the patient is reassessed. The patient may move back into annual screening or be referred for further testing or treatment.
• High risk or other: Patients are referred to the appropriate clinic for appropriate diagnostic tests and treatments. They may return to annual screening if appropriate.
RESOURCES AND REFERENCES

Intermountain patient resources

Clinicians can order Intermountain patient education booklets and fact sheets for distribution to their patients from Intermountain’s Online Library and Print Store, i-printstore.com. Call 801-442-3186 for ordering information.

Fact sheets:
- Lung Cancer Screening
- Secondhand Smoke and Your Child’s Health
- E-Cigarettes: Questions and Answers

Other patient education:
- Quitting Tobacco: Your journey to freedom

Krames patient resources

To find and print Krames HealthSheets at your desktop:

1. Open the Patient Education Library page by typing PEN in your address bar (within the Intermountain network).
2. Click the KRAMES On-Demand button.
3. Type “lung cancer” or “smoking” in the search bar. A list of the applicable materials appear.

Pertinent Krames materials will also appear in the iCentra EMR as suggested patient education items.

Provider resources

To find this process and its reference list, clinicians can go to intermountainphysician.org/clinicalprograms and select Lung Problems from the topic list on the right side of the screen.

This process model presents a model of best care based on the best available scientific evidence at the time of publication. It is not a prescription for every physician or every patient, nor does it replace clinical judgment. All statements, protocols, and recommendations herein are viewed as transitory and iterative. Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base.

REFERENCES


