

Developing a Successful LDCT Program in a Comprehensive Community Cancer Center



Screening helps providers detect earlier stage malignancies in at-risk patients

Lung cancer is one of the leading causes of death in both men and women in the United States. The American Cancer Society estimates that lung cancer is responsible for 155,870 deaths each year—84,590 men and 71,280 women.¹ Research also shows that each year more people die of lung cancer than of breast, prostate, and colon cancer combined.¹ The number of lung cancer cases continues to rise annually, and the rates of survival remain relatively low.² In the United States, the five-year survival rate for lung cancer is currently 18 percent, which could be due to the lack of symptoms during the early stages and a lack of an effective screening test until recently.³ Although controversy continues to exist regarding the effectiveness of low-dose computed tomography screenings (LDCT), recent research conducted by the National Lung Cancer Screening Trial showed a 20 percent decrease in lung cancer mortality with the use of annual LDCT screenings.⁴

Though LDCT screenings have become a critical tool in detecting earlier stage malignancies before symptoms even appear, there has been a consistent need for a comprehensive program to help decrease lung cancer mortality rates. A critical part of implementing such a program is providing an environment that supports patients—an environment free from the traditional stigma associated with smokers.

The Lefcourt Family Cancer Treatment & Wellness Center

Lung cancer continues to be the leading cause of cancer deaths in Bergen County, N.J. According to a Bergen County Public Health Profile Report, 11.4 percent of Bergen County residents are smokers and 14.6 percent of New Jersey residents are smokers.⁵ In an effort to reduce these statistics and provide a support

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environment for these individuals, Englewood Health created the Lefcourt Family Cancer Treatment and Wellness Center.

In March 2014, the Lefcourt Family Cancer Treatment & Wellness Center implemented an LDCT program with the help and guidance of chief of radiology, Mark Shapiro, MD. The Radiology Department and the Lefcourt Family Cancer Treatment and Wellness Center worked diligently to develop a program to:

- Target identification of patients appropriate for LDCT in primary care offices

- Follow these patients in terms of repeat scans or other follow-ups (our nurse navigator ensured that our patients had the proper follow-ups in a timely manner)
- Upgrade our computed tomography (CT) and scanner equipment to optimize dose and radiation exposure.

The eligibility criteria used at the institution mirrored the patient eligibility criteria posted on the American College of Radiology’s (ACR) Lung Cancer Screening website.⁶ In order for an individual to be evaluated within our LDCT screening program, the individual must be between the ages of 55 and 80, be asymptomatic, have a 30 pack-year or greater history of smoking, and be a current smoker or have quit within the last 15 years.⁷ Nodules detected on the LDCT were then assigned a Lung-RADS clinical risk category based on ACR guidelines. As depicted in Table 1, below, the guidelines categorize patients based on the presence, size, and nature of nodules. Patients were screened prior to their first LDCT to make sure that they met all eligibility criteria.

Three scanners are used to perform the LDCT screenings: the GE Lightspeed VCT, Toshiba Aquilion, and Toshiba Prime. These scanners were chosen for use by the program because they can enhance patient safety utilizing low-dose radiation while providing high-quality CT images.

After patients appropriate for LDCT were identified, their results were then analyzed to assess the outcomes of the program thus far. Our analysis consisted of 823 patients who were seen between March 2014 and June 30, 2018. Patients were grouped into two categories: new and existing patients. New patients had never been to the institution prior to their LDCT screening;

existing patients had been to the institution prior to their scan but had never received an LDCT chest screening previously. Grouping patients into these distinct categories allowed for the ability to keep track of the number of new patients we were receiving and measure the success of our LDCT program. There has been a total of 17 new patients in 2015, 34 new patients in 2016, and 92 patients in 2017.

The Cancer Center team was able to establish a prospective database examining multiple parameters, such as evolution of change in Lung-RADS classification, histology of tumors, follow-up rates, and overall success of the program.

Provider Buy-In and Staff Education

In 2014 physicians from Thoracic Medical Oncology, Radiology, Pulmonology, Thoracic Surgery, and Primary Care were recruited to guide the development of the LDCT program. This multi-disciplinary approach ensured that the program had support from a wide range of disciplines.

Written awareness materials were sent out to referring physicians which included:

- Flyers
- PowerPoint presentations
- Additional educational information on the medical center’s website and newsletter
- Email reminders
- Educational information presented by physicians during grand rounds
- A “Shine a Light” community engagement event dedicated to patients with lung cancer.

Table 1. ACR Assessment Categories (Condensed)

Category Descriptor	Category	Management
No nodules; definitely benign nodules	1	Annual screening in 12 months
Nodule with very low likelihood of becoming malignant	2	Annual screening in 12 months
Probably benign nodules with a low likelihood of becoming active cancer	3	Six-month follow-up scan
Suspicious findings	4A	Three-month follow-up scan or PET/CT CT/PET/tissue sampling
	4B	
	4X	

PET = positron emission tomography.

To further increase buy-in, referring physicians were contacted first and asked whether they were comfortable with us scheduling their patient for an LDCT screening if they were not already scheduled. This type of outreach allowed referring physicians to become part of the process rather than excluding them from their patient’s care. It allowed them to continue to be the patient’s advocate and first point of care.

Presentations during grand rounds were delivered on several different occasions by the chief of radiology, thoracic medical oncologists, and surgical oncologists. These sessions, along with physician educational dinners, were geared toward educating our internal physician community about the screening program benefits. To keep track of patient information, nurse practitioners developed an LDCT tracker in Excel to document patient demographic information, referring physician information, dates of scans, and follow-up information.

Physician champions also held educational dinners during which they told their peers about the program benefits for their patients. They showed National Lung Cancer Screening Trial data and details on the internal referral process. Education was not limited to dinners; it also included an annual symposium focused on lung cancer and lung cancer screenings.

Our physician referrals came from physicians within a variety of specialties. As seen in Figure 1, below, a large part of referrals came from pulmonary and internal medicine physicians. There was also a significant number of referrals from nephrology, infectious disease, hematology oncology, gastroenterology, and cardiology.

An important part of program implementation was educating the call center staff on eligibility requirements and scheduling procedures. Having the staff trained and comfortable with scheduling patients under this program made the process of recruiting new patients easier and more efficient.

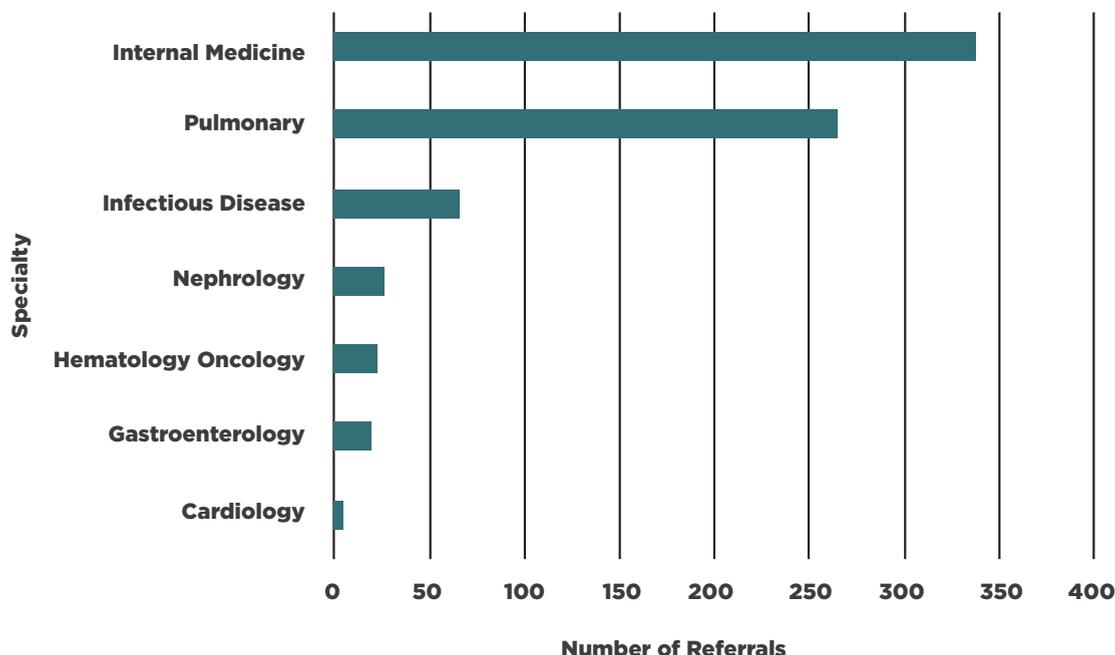
As the patient population continued to grow, an oncology patient navigator was appointed to oversee the patient follow-up spreadsheet and be responsible for contacting physicians and patients with follow-up information in addition to their existing responsibilities.

After screening hundreds of patients, the program relied heavily on a premed student from Ramapo College of New Jersey to build an Access database from the original Excel spreadsheet and work closely with navigation to send monthly follow-up letters to remind patients of their annual exams. The student was also responsible for updating the database weekly with new patient and follow-up scan information. In 2017 we updated the Access database to capture any nodules found and applicable follow-up information and included a portion in which we can document whether the patient was presented at our bimonthly cancer conference (a Commission on Cancer accreditation requirement).

In addition to direct referrals from providers, Lefcourt reached out directly to the community by promoting the LDCT program during National Smoke Out Day in November, posting ads in local newspapers and on social media. One full day of CT machines was reserved for free lung screenings (regardless of insurance coverage). Twenty patients were scheduled for scans on Smoke Out Day in 2016 and 30 were scheduled for scans on Smoke Out

(continued on page 65)

Figure 1. Physician Referral to Low-Dose Program by Specialty





Englewood Health, Main Campus, Englewood, N.J.



Christina P. Laird, MBA, administrative director and Jolynne Guidotti, MSN, BSN, OCN, oncology patient navigator, Lefcourt Family Cancer Treatment and Wellness Center at Englewood Health, review the Access database built to track LDCT screening patients.

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Day in 2017. This yielded one newly diagnosed cancer each Smoke Out Day.

Data and Results

A total of 1,087 scans were conducted. As a result of the continued success of the LDCT program, the highest number of patients was seen in 2017. A major goal was to identify frequency of pulmonary nodules. Of the scans, 487 showed the presence of pulmonary nodules. These nodules were found in 376 out of 823 patients (45.7 percent).

Using ACR guidelines,⁷ 48 out of 823 patients were classified as high-risk individuals (4A, B, X; 5.83 percent). Table 2, below, reveals that most of the studied scans showed results that categorized patients as either Lung-RADS 1 or Lung-RADS 2 (low risk). These low-risk results totaled 89 percent of the total scans.

Table 3, below, demonstrates the histopathological characteristics of the tumors found, including cancer type and staging. Within the study period, 10 malignancies were found. These malignancies included one squamous cell carcinoma, five adenocarcinomas, one non-small cell carcinoma, one lymphoma, and two unknown types.

The youngest patient with a malignancy was 60 years of age, and the oldest patient was 77. Additionally, 7 of the 10 malignancies were found in males. The malignancies were found in different locations—three were found in the right lower lobe, two in the right upper lobe, two in the left lower lobe, and three in multiple sites. Case IV showed metastatic cancer originating in the lung and migrating to the lymph nodes. Case VII showed metastatic malignancy originating in the lung and migrating to

Table 2. Results of LDCT Scans

Lung-RADS	Number of Scans	Percentage of Total Scans
1	639	58.9
2	327	30.1
3	73	6.72
4	48	4.41

Table 3. Histopathology of Malignancies

Case	Type of Cancer	Location	Gender	Age	Stage	Treatment
I	Squamous cell carcinoma	Right lower lobe	M	66	IIIA	Surgery Radiation Chemotherapy
II	Adenocarcinoma	Right upper lobe	F	69	IIIA	Surgery Chemotherapy
III	Adenocarcinoma	Right upper lobe	M	74	IA	Surgery
IV	Metastatic non-small cell carcinoma	Multiple sites	M	75	IIIB	Chemotherapy
V	Adenocarcinoma	Left lung	M	77	IIIA	Surgery
VI	Adenocarcinoma	Right lower lobe	F	77	IA	Surgery Radiation
VII	Metastatic adenocarcinoma	Multiple sites	M	69	IV	Surgery Radiation
VIII	Metastatic lymphoma	Multiple sites	M	68	IIIA	Chemotherapy
IX	N/A ^a	Right lower lobe	F	60	N/A ^a	N/A ^a
X	N/A ^a	Left lower lobe	M	73	N/A ^a	N/A ^a

^aDetails of malignancy not available because patient was treated at another institution.



LDCT machine at the Lefcourt Family Cancer Treatment and Wellness Center.



Lungs visualized using an LDCT machine.

the liver. Case VIII showed metastatic lymphoma migrating to the bone marrow and lungs (see Table 3, page 65).

With respect to pathologic staging, 3 out of 10 were noted to be stage III. There were also two primary adenocarcinomas that were found to be stage I. Three of the 10 malignancies were found to be non-lung primary and resulted in treatments such as chemotherapy and radiation. The last two malignancy stages were unknown because these patients were treated at another institution.

Although nodules were found in 45.7 percent of patients, only 25 biopsies needed to be performed. The details of these biopsies are noted in Figure 2, below.

Lessons Learned

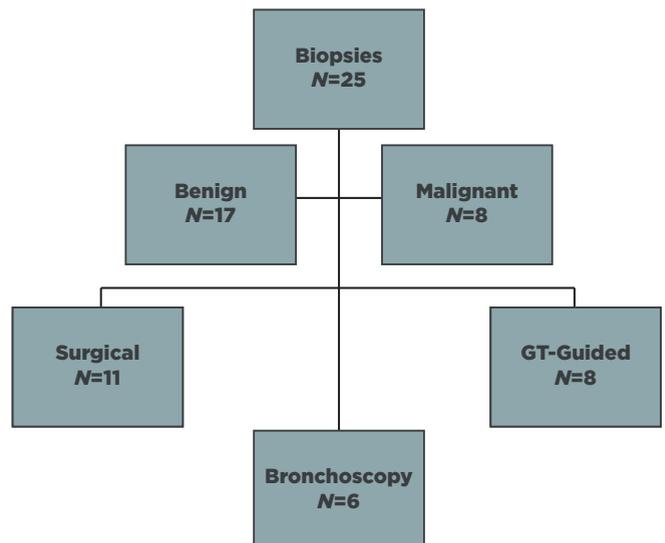
Implementing an LDCT program at Englewood Health has not only resulted in institutional growth, but has also provided us with valuable lessons from which other medical centers can learn.

First, it is critical to realize the importance of physician education. Because physicians are the ones referring patients and initiating the process of the scans, it is imperative to start with educating physicians on the importance and value of LDCT screenings.

Physician champions also play a large role in educating the rest of the physician population. Dr. Shapiro, chief of radiology, is one such physician with a champion role in our LDCT program. As soon as Dr. Shapiro reviews a suspicious nodule, he immediately calls the primary physician. This simple action creates a sense of urgency and allows for follow-up to be done in a timelier manner.

To recruit physician champions, it is imperative for administrators to provide incentives to potential recruits. Administrators

Figure 2. Results of High-Risk Nodule Evaluation



can develop physician champions by forming disease management teams, developing educational symposiums, hosting annual meetings, and bringing in visiting experts in the field. These activities can bring candidates to the forefront.

Another important part of building a successful LDCT program is making it convenient for physicians to refer new patients. To address this area, we implemented pre-made prescription pads that were sent out to physician offices and included in every follow-up letter to patients.

A valuable lesson learned is the importance of advertising to the community directly. National Smoke Out Day has become a success within the LDCT program at Englewood Health because we were able to reach out to the community directly through local newspapers. Through this event, the volume of patients being scanned annually for lung cancer has increased. Additionally, being open seven days a week has made it convenient for patients to schedule scans.

Collecting data proved to be a critical part of the overall process. Before the implementation of the Access database, most of the low-dose data was kept within an Excel sheet. This sheet would be filled out after the patient had come in for the scan and would include all patient demographics and scan results. Although this allowed for an organized system for tracking patients, it was not an effective system for keeping up with follow up scans. The implementation of the Access database has allowed for a much more organized and effective way of tracking patients and keeping up to date with follow up scans. The current protocol for collecting data first includes pulling a weekly report through Epic, the hospital's healthcare software system. This report includes all patients that have received an LDCT and includes all scan results along with patient information. The patients are then inputted individually into the Access database.

Lastly, becoming an accredited institution is vital. Patients search for the best accredited institutions for their care, and becoming accredited by the ACR in December 2015 has helped in the growth of the LDCT program. 

Christina Laird, MBA, is administrative director of cancer center operations, and Kaleen Kassem, BS, is a research intern at The Lefcourt Family Cancer Treatment and Wellness Center at Englewood Hospital and Medical Center, Englewood, N.J.

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