Initial Experience With a Free, High-Volume, Low-Dose CT Lung Cancer Screening Program

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The National Lung Screening Trial demonstrated a significant mortality benefit for patients at high risk for lung cancer undergoing serial low-dose CT. Currently, the National Comprehensive Cancer Network and several United States–based professional associations recommend CT Lung screening for high-risk patients. In the absence of established reimbursement, the authors modeled and implemented a free low-dose CT lung cancer screening program to provide equitable access to all eligible patients. Elements of the program reported in this article include a decentralized referral network, centralized program coordination, structured reporting, and a patient data management system. The experience and initial results observed in this clinical setting closely match the performance metrics of the National Lung Screening Trial with regard to cancer detection and incidental findings rates. To eliminate health care disparities a vigorous lobbying effort will be needed to expedite reimbursement and make CT lung screening equally available to all patients at high-risk.

Key Words: Lung cancer screening, low-dose chest CT, National Lung Screening Trial, NLST

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BACKGROUND

Lung cancer causes more deaths among men and women in the United States than breast, colorectal, and prostate cancers combined, with approximately 450 people dying from lung cancer every day [1]. Despite continuing advancements in surgery, radiation, and chemotherapy, lung cancer remains a highly lethal disease, with 16% overall 5-year survival only marginally improved from 12% in the 1970s [2]. Although primary prevention (smoking cessation) has saved countless lives by decreasing the rate of smoking from >40% in 1965 to <20% today [3], many former heavy smokers remain at high risk and now represent the largest group of patients diagnosed with lung cancer [4]. In fact, given the large number of former heavy smokers in the aging baby boom population, lung cancer mortality seems poised to rise in the absence of effective secondary prevention (screening) [5].

In 2011, the National Lung Screening Trial (NLST) reported a 20% lung cancer–specific mortality benefit in high-risk current and former heavy smokers who underwent 3 rounds of annual low-dose CT (LDCT) lung screening compared with annual chest radiography [6]. Shortly after publication of the results of this large, National Cancer Institute–sponsored, randomized controlled trial, the National Comprehensive Cancer Network (NCCN) released guidelines recommending annual LDCT lung screening for two specific groups of high-risk individuals meeting stringent criteria [7].

Group 1 (NLST population, NCCN category 1 recommendation—uniform consensus based on high-level evidence):

- 55-74 years old
- At least 30 pack-year smoking history
- Current or former smokers (quit within past 15 years)

Group 2 (NCCN category 2B recommendation—consensus based on lower level evidence):

- >50 years old

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- >20 pack year smoking history
- Current or former smokers (quit for any length of time)
- One additional lung cancer risk factor

Lahey Hospital & Medical Center subsequently tasked a multidisciplinary steering committee to design and implement an NCCN Guidelines®-based CT lung cancer screening program to commence January 9, 2012. The committee included representatives from radiology, pulmonology, radiation oncology, medical oncology, internal medicine, administration, finance, philanthropy, business development, and marketing. In this article, we report the critical elements of our lung cancer screening program and our initial results, and we conclude by highlighting points of discussion about lung screening in general.

PATIENT ACCESS

The most important and vexing decision we made during the conception of our screening program was whether to charge for the screening examinations. Most public and private payers, including CMS, currently do not reimburse for CT lung screening, with a few notable exceptions [8-11].

Self-pay rates for CT lung screening (ranging from $99 to $1,000) create access disparities among high-risk individuals of varying financial means [12]. Out-of-pocket costs also discourage asymptomatic high-risk patients from undergoing recommended screening examinations. These potent economic and psychological barriers may in large part explain the commonly reported low rates of enrollment in existing self-pay LDCT programs. Low-volume screening is potentially ineffective, as 320 individuals need to be screened to save 1 life according to the NLST [6].

To fulfill what we felt was an ethical responsibility to provide equal screening access to all persons at high risk regardless of socioeconomic status and to encourage persons at high risk to present for screening, we decided to offer CT lung screening at no cost to patients until CMS and commercial insurers establish reimbursement on a broad scale. We feel this approach is consistent with the philosophy of the Patient Protection and Affordable Care Act, which seeks to eliminate health care disparities and barriers to preventative services [13]. These considerations are at the core of our Rescue Lung, Rescue Life movement [14]. Our institutional compliance department required that the program fulfill several conditions to be permitted to offer free CT lung screening. Objective patient qualification criteria needed to be established that would be followed without exception. No participant could be billed, not even those with insurance providing coverage for CT lung screening. Finally, at termination of the free offering, it must be stopped for all participants indiscriminately.

BUSINESS CONSIDERATIONS

Detailed business modeling of the program was performed before its inception and presented to senior management for ultimate program approval. The business model requires the availability of downtime on installed base CT scanners. Our PET/CT scanner typically is idle early in the morning, between the injection of radiotracer and scanning of our first patient. During this downtime, the PET/CT scanner can accommodate 5 CT lung screening examinations (25 appointments/week). An additional 10 appointments/week are available late in the day, when outpatient activity at the institution decreases and both technologist staff members and CT scanner capacity become available. To fully serve our patient population, we predicted that we would eventually need approximately 100 to 120 lung screening appointments/week and therefore estimated the cost of adding 1 dedicated 40-hour overnight and weekend shift (1 technologist and 2 technologist aides), which could accommodate as many as 200 additional screening slots per week. We assumed that overnight and weekend scan times would be acceptable to patients, considering the potential benefit of this examination performed at no cost.

Although we do not charge for the initial or annual follow-up screening examinations, workup of any positive findings requiring downstream diagnostic CT examinations, clinical assessment, or intervention is

Table 1. CT lung screening program elements

Item	Purpose
Toll-free number (855-CT-CHEST)	Central acceptance and routing of program-directed patient inquiries
Intake forms	Used by general radiology schedulers to qualify patients and stratify them into one of the two NCCN high-risk groups
Call center script	Explains to callers the importance of being asymptomatic at the time of screening and directs inquiries of those not meeting criteria for screening
FAQ document	Explains what to expect before, during, and after screening; gives the benefits and risks of screening; and provides information on smoking cessation at patients' levels of understanding
Custom database application	Pulls patient-specific data from the RIS to facilitate and manage patient intake, scheduling, and follow-up
Patient letter library	Results-specific, standardized patient notification letters
Program literature	Physician-directed program information literature
Scanning protocols	Low-dose lung cancer screening scanning protocols

Note: FAQ = frequently asked questions; NCCN = National Comprehensive Cancer Network; RIS = radiology information system.