

# A Nurse Practitioner's Experience in the Development and Implementation of a Lung Cancer Screening Program

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Author's disclosures of conflicts of interest are found at the end of this article.

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## Abstract

Lung cancer screening with low-dose computed tomography of the chest is now a service covered by the Centers for Medicare and Medicaid Services and most private insurers. However, providers may experience many barriers that could prevent them from offering lung cancer screening to eligible patients. Advanced practitioners are uniquely positioned to provide lung cancer screening within a formal screening program. Our nurse practitioner-led lung cancer screening program was developed to address these barriers, and to provide evidence-based access to care for a high-risk patient population.

**L**ung cancer is the second most common cancer in men and women and the leading cause of cancer-related deaths. Each year, more people die from lung cancer than breast, colon, and prostate cancers combined (American Cancer Society, 2018). The American Cancer Society estimated that for 2018 there will be roughly 234,030 new cases of lung cancer and around 154,050 deaths related to lung cancer. Part of the reason that lung cancer is so deadly is that it often does not cause symptoms until it has reached a later stage. The 5-year survival rate for early-stage non-small cell lung cancer (NSCLC) is 55%; however, only 16% of lung cancers are diagnosed

at an early stage. For later-stage lung cancers, the 5-year survival rate is only 4% (Howlader et al., 2016).

To impact the overall survival rates for lung cancer, it needs to be detected early when there are potentially curative treatment options such as surgery or radiation (Howington, Blum, Chang, Balekian, & Murthy, 2013). Although surgery remains the standard of care for early-stage NSCLC, stereotactic body radiation therapy (SBRT) may offer comparable survival rates in patients who carry a high surgical risk.

## SCREENING FOR LUNG CANCER

The National Lung Screening Trial, published in *The New England Journal*

*of Medicine* in 2011, showed a 20% reduction in lung cancer mortality among high-risk patients screened with annual low-dose computed tomography (LDCT) of the chest vs. annual chest x-ray. In 2013, the US Preventive Services Task Force (USPSTF) recommended (grade B) annual LDCT for high-risk lung cancer patients (Humphrey et al., 2013).

Under the current Patient Protection and Affordable Care Act, private insurance companies participating in health insurance exchanges are mandated to provide coverage for services with a USPSTF grade B or higher recommendation with no cost-sharing (American College of Radiology, 2014). This was a major advance in the battle against lung cancer. In 2014, some commercial insurance plans started covering LDCT screening of the chest. On February 5, 2015, the Centers for Medicare and Medicaid Services (CMS) determined that there was sufficient evidence to support the use of LDCT of the chest for lung cancer screening for Medicare recipients with no out-of-pocket costs if certain criteria were met. These criteria include age 55 to 77, asymptomatic for signs of lung cancer, at least a 30-pack-year smoking history, current smoker or one who has quit within the past 15 years, and the individual receives a written order for a screening LDCT during a face-to-face shared decision-making (SDM) visit (Jensen, Chim, Ashby, Hermansen, & Hutter, 2015).

### LUNG CANCER SCREENING EXPERIENCE OF A REGIONAL CANCER CENTER

In November 2015, we launched our Comprehensive Lung Cancer Screening Program at the Alan B. Pearson Regional Cancer Center in Lynchburg, Virginia. Our cancer center is part of Centra Health, a not-for-profit regional health system comprised of four hospitals with more than 6,400 employees, 300 employed providers and physicians, and a medical staff of nearly 600. Centra Health provides care in 64 locations, serving over 380,000 people throughout central and southern Virginia, which is a geographic area roughly the size of the state of New Jersey. The program is a partnership between the cancer center and the thoracic surgery program, and was developed and led by a thoracic surgery nurse practitioner (NP) who has an extensive background in surgical oncology.

Advanced practitioners, including nurse practitioners (especially those with an oncology background), are well equipped to lead a lung cancer screening program. Inherent to NP practice is the concept of guidance and coaching on many levels, including a holistic approach to health promotion and disease prevention. Nurse practitioners are uniquely positioned to guide patients through lung cancer screening, which can be potentially stressful for patients who already may feel that they have caused their lung cancer by smoking.

### Barriers to Lung Cancer Screening

There are many challenges that may be faced by providers who are new to lung cancer screening that may negatively impact their willingness to provide this screening for patients. A major challenge is understanding the CMS documentation requirements to ensure reimbursement, documentation that will prevent the patient from having to pay out of pocket for the LDCT. The CMS requires that a face-to-face SDM visit take place before the patient receives an LDCT for lung cancer screening. This SDM visit may be furnished by a physician, physician assistant, NP, or clinical nurse specialist, and must be documented following specific guidelines in the patient's medical record (Table 1). It may be difficult for providers to adequately perform an SDM visit during a 15-minute visit in which they are already addressing the patient's other medical problems. As lung cancer screening is relatively new, many providers' offices and radiology departments are not aware of the proper billing and coding requirements, which can result in non-payment for the LDCT. The CMS requires that the actual LDCT order contain specific information to ensure reimbursement (Table 2).

Another barrier to care is that there is more than one guideline to follow for lung cancer screening. For Medicare recipients, providers should follow CMS guidelines, which are slightly different from the USPSTF guidelines that private insurers may follow. As with any screening, there will be incidental findings, both intra- and extrapulmonary, that are detected. Providers may feel uncomfortable managing these findings. Lung cancer screening is not a one-time test. It requires annual LDCT, which creates the potential for patients to

**Table 1. Centers for Medicare and Medicaid Services Eligibility Criteria for Lung Cancer Screening With Low-Dose Computed Tomography**

- Age 55–77 years;
- Asymptomatic (no signs or symptoms of lung cancer);
- Tobacco smoking history of at least 30 pack-years (1 pack-year = smoking 1 pack per day for 1 year; 1 pack = 20 cigarettes);
- Current smoker or one who has quit smoking within the last 15 years; and
- Receives a written order for LDCT lung cancer screening that meets the following criteria:
  - » *For the initial LDCT lung cancer screening service:* a beneficiary must receive a written order for LDCT lung cancer screening during a lung cancer screening counseling and shared decision-making visit, furnished by a physician (as defined in Section 1861(r)(1) of the Social Security Act) or qualified nonphysician practitioner (meaning a physician assistant, nurse practitioner, or clinical nurse specialist as defined in §1861(aa)(5) of the Social Security Act). A lung cancer screening counseling and shared decision making visit includes the following elements (and is appropriately documented in the beneficiary’s medical records):
    - Determination of beneficiary eligibility including age, absence of signs or symptoms of lung cancer, a specific calculation of cigarette smoking pack-years; and if a former smoker, the number of years since quitting;
    - Shared decision-making, including the use of one or more decision aids, to include benefits and harms of screening, follow-up diagnostic testing, over-diagnosis, false positive rate, and total radiation exposure;
    - Counseling on the importance of adherence to annual lung cancer LDCT screening, impact of comorbidities and ability or willingness to undergo diagnosis and treatment;
    - Counseling on the importance of maintaining cigarette smoking abstinence if former smoker; or the importance of smoking cessation if current smoker and, if appropriate, furnishing of information about tobacco cessation interventions; and
    - If appropriate, the furnishing of a written order for lung cancer screening with LDCT.
  - » *For subsequent LDCT lung cancer screenings:* the beneficiary must receive a written order for LDCT lung cancer screening, which may be furnished during any appropriate visit with a physician (as defined in Section 1861(r)(1) of the Social Security Act) or qualified nonphysician practitioner (meaning a physician assistant, nurse practitioner, or clinical nurse specialist as defined in Section 1861(aa)(5) of the Social Security Act). If a physician or qualified nonphysician practitioner elects to provide a lung cancer screening counseling and shared decision-making visit for subsequent lung cancer screenings with LDCT, the visit must meet the criteria described above for a counseling and shared decision-making visit.

*Note.* LDCT = low-dose computed tomography. Information from Jensen, Chim, Ashby, Hermansen, & Hutter (2015).

fall through the cracks if there is not a dedicated system to follow these patients. Screening for lung cancer is also very anxiety-provoking for patients, as there continues to be a strong stigma associated with lung cancer. These are just a few examples of some of the most common barriers to care that exist with lung cancer screening. Having a centralized program led by an NP with an oncology background can bridge many of these barriers while providing quality, evidence-based care.

### Role of the Nurse Practitioner

Our NP is an expert in understanding the CMS and private payer regulations, including the documentation and billing requirements. The NP performs the SDM visit in which smoking cessation counseling is offered to patients who are active tobacco users, as well as continued education for former smokers. The SDM visit is also an opportunity for the NP to discuss other health promotion topics such as diet and exercise. We

**Table 2. Centers for Medicare and Medicaid Services Criteria for Low-Dose Computed Tomography Order**

Written orders for both initial and subsequent LDCT lung cancer screenings must contain the following information, which must also be appropriately documented in the beneficiary’s medical records:

- Beneficiary date of birth;
- Actual pack-year smoking history (number);
- Current smoking status, and for former smokers, the number of years since quitting smoking;
- Statement that the beneficiary is asymptomatic (no signs or symptoms of lung cancer); and
- National Provider Identifier (NPI) of the ordering practitioner.

*Note.* LDCT = low-dose computed tomography. Information from Jensen, Chim, Ashby, Hermansen, & Hutter (2015).

have developed templates for clinic notes and the LDCT order that capture all of the required data elements.

After seeing the patient in clinic, the NP orders the LDCT and directly follows up with the patient by phone with results, usually on the same day to help alleviate anxiety. The patient also receives a results letter via mail. Clinic notes and results are sent to the patient's referring provider. The NP has a strong background in surgical oncology and has spent the past 2 years working in thoracic surgery, specializing in the care of lung and esophageal cancer patients. The NP has also developed a pulmonary nodule program and is therefore well suited to manage all incidental findings that may be found on the screening scans. This includes di-

recting all further workup, procedures, and referrals as needed while ensuring close communication with the primary care provider.

The radiologists use Lung-RADS™ for reporting and management recommendations (Table 3). The NP reviews Lung-RADS™ category 3 findings with the thoracic surgeon. All Lung-RADS™ category 4 findings are presented by the NP at our weekly multidisciplinary thoracic tumor board, which is attended by Thoracic Surgery, Medical and Radiation Oncology, Pathology, Radiology, Pulmonology, Clinical Trials, and thoracic navigators. The NP provides yearly follow-up screening for patients in our program to minimize the chance of patients not returning for their annual LDCT.

**Table 3. Lung-RADS™ Version 1.0 Assessment Categories**

Category	Category descriptor	Primary category	Management
Incomplete	-	0	Additional lung cancer screening CT images and/or comparison to prior chest CT examinations is needed
Negative	No nodules and definitely benign nodules	1	Continue annual screening with LDCT in 12 months
Benign appearance or behavior	Nodules with a very low likelihood of becoming a clinically active cancer due to size or lack of growth	2	Continue annual screening with LDCT in 12 months
Probably benign	Probably benign finding(s). Short-term follow-up suggested; includes nodules with a low likelihood of becoming a clinically active cancer	3	6-month LDCT
Suspicious	Findings for which additional diagnostic testing and/or tissue sampling is recommended	4A	3-month LDCT; PET/CT may be used when there is a $\geq 8$ mm solid component
		4B	Chest CT with or without contrast, PET/CT and/or tissue sampling depending on the probability <sup>a</sup> of malignancy and comorbidities. PET/CT may be used when there is a $\geq 8$ mm solid component
Significant (other)	-	S	-
Prior lung cancer	-	C	-

Note. Release date: April 28, 2014. LDCT = low-dose computed tomography; PET = positron emission tomography. Adapted from American College of Radiology (n.d.).

<sup>a</sup>McWilliams Lung Cancer Risk Calculator available upon request from the authors at [brocku.ca/lung-cancer-risk-calculator](http://brocku.ca/lung-cancer-risk-calculator) or at UptoDate at [uptodate.com/contents/calculator-solitary-pulmonary-nodule-malignancy-risk-brock-university-cancer-prediction-equation](http://uptodate.com/contents/calculator-solitary-pulmonary-nodule-malignancy-risk-brock-university-cancer-prediction-equation)

## Recruitment

Recruiting patients for the screening clinic has been a challenge. The NP worked closely with the marketing department to develop brochures about the screening program. The NP also did several segments on local television to increase awareness around lung cancer screening. Newspaper and magazine advertisements were also employed. The NP also made many visits to primary care offices to meet directly with providers to educate them on lung cancer screening guidelines, and how to refer to the screening clinic. The program is staffed by just a few people who are very familiar with the process, which works to our advantage for ease of referrals for providers. This helps to eliminate inappropriate referrals.

Our service area is vast and predominately rural. Access to care is an issue for many patients. Providers had concerns that patients would not be willing to travel to the clinic as it was so far from their homes. In response to this concern, the NP and thoracic nurse coordinator now travel once a week to the more distant locations to see patients for the face-to-face SDM visit. In many cases, patients are able to get the LDCT the same day, thereby consolidating visits into one trip. Our experience has shown that providers are interested in the program, but need to be reminded occasionally to refer patients for screening. The NP also attended many local health fairs to educate the public regarding lung cancer screening. The NP met with several local case manager groups to discuss how to incorporate lung cancer screening into their wellness programs.

Other challenges with this program include issues with the current electronic medical record (EMR). We have found that a patient's documented smoking history is often not accurate. This can be a deterrent for referring patients to the program as they may appear to not qualify based on what is documented in the EMR. In fact, when patients are questioned in detail about their smoking history, they clearly meet the minimum pack-year history. Our health system is transitioning to a new EMR in the next 12 months. With this new EMR, we will be able to build better templates for documentation, streamline the referral and ordering process, and be able to more accurately query the EMR to identify patients who meet the screening

criteria. We hope to design a best practice advisory within the EMR for patients who may qualify for lung cancer screening.

Another issue this program faced was how to most efficiently track the patients over time. There are software applications available from various vendors, but these were too costly for our small program to purchase. The NP developed a Microsoft Access database to track the screening patients. This database contains detailed information regarding the patient's demographics, smoking history, and risk factors, as well as LDCT results and downstream testing that arose from screening. Ideally, patient tracking software should have the ability to generate results letters, prompt the user when patients are due for their next scan, and upload required data to CMS-approved registries. Our radiology colleagues are responsible for uploading the CMS-required data.

## Effects of the Lung Screening Clinic

The development and implementation of our lung cancer screening program has been a valuable learning experience. As this new service continues to develop nationally, our program too has evolved. To date, we have screened 208 patients (Table 4). Of these, one completely asymptomatic patient was found to have a stage IIIA squamous cell lung cancer. Another patient was found to have a 6.7 cm right hilar mass. These two patients did not have early-stage disease; however, through the expert care and guidance of the NP, they were able to initiate definitive treatment much sooner, which may impact their overall prognoses.

## CONCLUSIONS

In our service area, approximately 17% of the population is African American and 78% is Caucasian. Review of our data shows that only 11% of the patients seen in the screening program were African American compared with 88% who were Caucasian. This variance in race is an area that the NP is planning to focus on to better understand the contributory issues. Clinic volumes continue to slowly grow, especially now that the NP and nurse coordinator are travelling weekly to the more remote locations to see patients and thereby improving access to care.

The Comprehensive Lung Cancer Screening Clinic at the Alan B. Pearson Regional Cancer

Center was named a Screening Center of Excellence by the Lung Cancer Alliance for its ongoing commitment to responsible lung cancer screening. This recognition validates the dedication of our team in improving survival rates in lung cancer while providing patients with the highest quality of care using evidence-based practice.

Future plans for the program include monitoring reimbursement rates for LDCTs performed in the lung screening clinic as compared with those managed by primary care providers. The team will also compare time to treatment for incidental findings, masses, and nodules between the two groups. We anticipate that due to our in-depth knowledge of the nuances related to lung cancer screening, there will be fewer reimbursement issues and faster time to treatment among the patients seen in the Comprehensive Lung Cancer Screening Clinic. It is also anticipated that satisfaction among both patients and referring providers will be high.

The use of lung cancer screening with LDCT remains low despite strong evidence in support of it (Jemal & Fedewa, 2017). This is due in part to the many barriers, real and perceived, among providers. Advanced practitioners can certainly play an important role in overcoming these barriers and improving access to care. The hope is that more advanced practitioner-led programs will be developed to provide this invaluable service to a high-risk, vulnerable patient population. ●

## Disclosure

The author has no conflicts of interest to disclose.

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**Table 4. Patient Characteristics (N = 208)**

Sex	
Male	111 (53%)
Female	97 (47%)
Race	
White	181 (87%)
African American	26 (12.5%)
Native American	1 (< 1%)
Average age at first screening	66 years old
Referral source	
PCP	174 (84%)
Self	34 (16%)
Insurance	
Medicare	132 (63%)
Other	76 (37%)
Current smoker	131 (63%)
Average pack-years	51
Lung-RADS™ category	
Lung-RADS™ Category 1	97 (47%)
Lung-RADS™ Category 2	65 (31%)
Lung-RADS™ Category 3	26 (12.5%)
Lung-RADS™ Category 4	20 (9.5%)

Note. PCP = primary care provider.

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