

# Unexpected pulmonary nodule, focused screening for lung cancer

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### ABSTRACT

After the National Lung Screening Trial outcomes, lung cancer screening programmes have spread more widely in the US. We set out to examine the cost effects of the advanced registered nurse practitioner-led programmes for pulmonary nodule clinics, tobacco cessation services, and screening for lung cancer and other tobacco-related diseases. Programme run by a nurse practitioner. Expenses for professional services, professional procedures, and facility charges for both outpatient and inpatient procedures were questioned during encounters. Using data tables and the national Medicare conversion factor, revenue was normalized. A Thoracic Surgery and Interventional Pulmonology Division, as well as a

healthcare system, may benefit from nurse practitioner-led programmes of lung cancer screening, incidental pulmonary nodules, and tobacco-cessation services. The cost directly related to the compensation (and benefits) of a nurse practitioner at the current national median annual wage may be neutral or negative within some programmes. The division and institution, however, may reap the greater financial advantage. The review of newly discovered diseases and subsequent evaluations tend to be related to this possible additional revenue.

**Key Words:** Etiological; Undernutrition; *pleural disease*; *Interventional pulmonology*.

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### INTRODUCTION

The National Lung Screening Trial's publication has ushered in a new era of hope for lung cancer early detection and treatment. Other lung cancer-screening trials have not been able to achieve the relative decrease in lung cancer mortality and reduction in overall mortality that was shown with low-dose computed tomography. New zeal has been generated for the creation and implementation of the Lung Cancer Screening Program as a result of the publication of these results and subsequent endorsements by important medical societies and governmental organizations (LCSP). The framework for programme creation was laid by federal and medical society best practice recommendations, but nothing has been written about the established LCSP's financial impact to date. A number of distinct LCSP models have been published, however there are no studies that compare them. The implementation of a centralized programme with an emphasis on smoking addiction and tobacco-related illnesses,

as well as incidental pulmonary nodules and lung cancer screening, could potentially improve the program's clinical and financial outcomes. The creation of an integrated clinic run by an Advanced Registered Nurse Practitioner (ARNP) may provide the personnel, experience, and infrastructure needed to optimize and streamline patient management. A programme concentrating on quitting smoking and identifying diseases linked to tobacco use was created by the Division of Thoracic Surgery and Interventional Pulmonology at the Swedish Cancer Institute. In line with this model, distinct but frequently converging clinics have emerged for incidental pulmonary nodules, tobacco cessation counselling and treatment, and lung cancer screening. Both our own healthcare system and other healthcare systems refer patients to these clinical programmes. The purpose of this study was to outline our financial experiences in relation to the creation of ARNP-led programmes for Lung Cancer Screening, Incidental Pulmonary Nodules, and Tobacco Cessation

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Counseling and Treatment Services within the Division of Thoracic Surgery and Interventional Pulmonology. All patients who had been initially assessed for the Incidental Pulmonary Nodule Clinic, Lung Cancer Screening, and Tobacco Cessation Services underwent a retrospective evaluation. Seattle, Washington-based The Cancer Institute is a nonprofit tertiary referral center. Within the outpatient and inpatient facilities of the hospital system, physicians who are both privately hired and those who work for the hospital practice medicine. An ARNP serves as the program's primary outpatient clinical care provider, professional billing, and administrative management. She has additional training in tobacco treatment and is currently employed within the division at full-time equivalent. The programmer is housed within the combined Division of Thoracic Surgery and Interventional Pulmonology. Our program's (and subsequent clinics') management is overseen by an ARNP under the direction of an interventional pulmonologist and a general thoracic surgeon. Patients within our system could be referred to any of the programmers using our EMR, and patients outside of it might be referred using faxed paper forms. Patients were booked for an initial appointment with the ARNP upon the receipt of a referral. A scheduler called the patients who had been recommended for lung cancer screening to go over the eligibility requirements, and if all of the screening criteria were satisfied, an appointment for a shared decision-making meeting with the ARNP was set. Patients who were referred for incidental lung nodules, smoking cessation/counseling, or both were booked for an appointment with the ARNP right away. If the history was compatible with current or past tobacco abuse, a full assessment of all systems was collected during the initial office visit with an emphasis on identifying any signs or symptoms of respiratory illnesses, vascular difficulties, heart disease, and tobacco-related cancer. A thorough physical examination from head to toe was then performed, including checks of the carotid, oropharynx, heart, lungs, abdomen, and lower extremities. The screening programmer handled the discovery of clinically alarming findings related to thoracic surgery by making the proper recommendations to the supervising specialties. Non-thoracic clinical and radiographic findings were addressed by informing the patient of the seriousness and acuity of the findings, then communicating with them and referring them back to their primary care physician for continuity of treatment and guided follow-up. Prices for outpatient Evaluation and Management (E&M) codes, professional fees for procedures (Current Procedural Terminology [CPT]), and facility charges for procedures/operations were questioned in encounters (Diagnosis-Related Group [DRG] and Ambulatory Payment Classification). When necessary, relative value units (RVUs) linked to encounters were abstracted. The Centers for Medicare & Medicaid Services (CMS) statistics were used to determine revenue after collecting billable data. RVUs were applied against the national conversion factor to determine the estimated Medicare revenue for E&M and physician procedure revenue. Every penny of an ARNP's revenue was reduced in accordance with CMS regulations. The DRG weights from the final rule multiplied by the national operating and capital standard federal payment rates were used to compute facility revenue for inpatient DRGs. Ambulatory revenue was determined using the Health Care Common Procedure Coding System code and the Outpatient Prospective Payment System payment by rate. The programmer analyzed every revenue that was directly connected to

encounters. All professional billing that the ARNP directly submits was referred to as direct revenue. The term "indirect income" was used to describe billing that took place within our EMR and medical system and that appeared as a direct result of the ARNP visit or suggestion following a visit inside the programmer. Following physician referrals (E&M) and extra tests and procedures (CPT, DRG, and ambulatory payment categorization revenue) from these referrals were noted as examples of indirect revenue. The outpatient clinic is located within the Division of Thoracic Surgery and Interventional Pulmonology itself, with ARNP billing accounting for the majority of this clinic's outpatient business. Although the overall quantity of outpatient revenue continues to be less than that of inpatient revenue, this patient volume indicates an upward tendency in the number of patients enrolled within the programs over the study timeframe. We determined that a Thoracic Surgery and Interventional Pulmonology Division as well as a healthcare system can benefit from additional revenue opportunities offered by a tobacco-related diseases programmer led by ARNPs that includes lung cancer screening, incidental pulmonary nodules, and tobacco-cessation services. Although there are now recommendations for lung cancer screening, the actual programmatic development and implementation vary, perhaps due to prejudices and the resources that are accessible across various institutions and healthcare settings. The employment of a nurse navigator and an automated, structured reporting system that offers an optional or direct referral to a pulmonologist with any questionable findings are two more concepts that have been discussed. Despite using a different undernutrition screening instrument than the one employed in the current investigation (the Mini Nutritional Assessment), a sizable number of lung cancer patients were found to be at risk for undernutrition. There may have been a lower incidence of undernutrition risk than previously thought due to the fact that some lung cancer patients have previously received nutritional counseling. The financial effects of implementing these diverse initiatives inside a health care system or subspecialty practice have not yet been reported, although there are probably theoretical and institutional advantages and disadvantages to these approaches. There are still many unanswered problems regarding lung cancer screening and the development of programmers that are effective (from a clinical, research, and budgetary standpoint). To be recognized as an LCSP (and hence qualify for insurance payment), certain programmatic standards must be met, and many subspecialties are still actively involved in the treatment of patients with disorders associated to tobacco use. The process of lung cancer screening is more specialized and difficult than other cancer screening methods, making it a crucial task that many physicians undertake. Elements essential to successful lung cancer screening, such as shared decision making, are not required of other cancer screening methods. Both in terms of what is now in place and in terms of what may be the ideal programmer configuration, the current organization of LCSP programmers is still unclear. In order to effectively run such a programmer, not just for lung cancer screening but also for tobacco cessation counselling and treatment, an advanced practice clinician is likely, or can be adequately trained. The ability to dedicate the job focus solely to this programmer (potentially in aspects of clinical care, research development/implementation, and financial responsibility) is another benefit of a centralized, ARNP-based model. These other benefits may include a single

location for the delivery of care, regularly accessible consultation with specialists, and regular availability of the model. Although there is currently no data to support this claim, having a central person or programmer coordinate follow-up, tobacco counselling, and the examination of imaging abnormalities may help enhance care coordination and patient outcomes overall. The use of "indirect" or "downstream" sources and cost computations is one of our revenue assessment's limitations. However, based on the analysis of the participants in our study, it appears that the majority of income is "indirect" or "downstream," connected to facility fees from the institution. Although this number has frequently been challenging to determine, it has been mentioned in other aspects of thoracic oncology, such as the advantages of having an end bronchial ultrasonography program. Because it won't be seen immediately in the bottom line of a single clinic, this downstream revenue source will likely continue to have the most financial impact from initiatives like this, therefore it needs to be acknowledged and used wisely by providers looking to get funding for such programs. It's also crucial to remember that the revenue listed below is from the LCSP's early years of operation. We acknowledge that the ARNP may eventually have a favorable financial impact within the division itself on face value, as frequently occurs in other disciplines, depending on how many extra individuals/patients accrue into the programs. Our records of direct revenue should be approximate since patients cannot be seen inside the clinic without an electronic visit and an electronic billing submission (even if it would be a free visit). We made the decision to forgo capturing revenue from radiographic imaging, which could represent a sizeable downstream revenue stream, in light of the fact that patients who receive positive results from the lung cancer screening program almost certainly will also receive additional scans that are directly related to the program. The generalizability of our software continues to be a significant constraint of our explanation. The operational and clinical lead at these clinics for our program is an independently practicing RNP; however, this crucial element of our program might not be practical in other healthcare environments. Our integration of thoracic and interventional surgery inside the same division and workplace, subspecialties that are often split and occasionally compete between medical and surgical departments in many other hospitals, may be another limitation. Another drawback may be the division's choice to use the same referral source for both incidental pulmonary nodule examinations and lung cancer screenings (mainly radiographic evaluation and follow-up imaging). Numerous aspects of care, such as the assessment of risk, the requirement for cocounseling regarding what having a nodule means, and programming for appropriate and timely follow-up imaging, can be somewhat similar because of some similarities in lung cancer screening and incidental pulmonary nodule evaluations (primarily radiographic evaluation and follow-up imaging).