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The Australian National Lung Cancer Screening Program: A Radiologist's Perspective

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ABSTRACT

On July 1, 2025, Australia commenced screening eligible participants in a ground-breaking health initiative with the launch of a national lung cancer screening program (NLCSP). Designed for individuals at high risk, this program aims to promote early detection and improve both survival rates and treatment outcomes. Radiology will serve as a cornerstone of the program's success. This article provides a comprehensive overview from the radiologist's perspective.

1 | Introduction

In 2022, the Australian Health Minister announced a $263.8 million commitment to establish a national lung cancer screening programme [1]. This initiative marks the first new cancer screening programme introduced in Australia in almost 20 years, following the implementation of breast (1991), cervical (1991) and bowel cancer (2006) screening programmes. Lung cancer is the 5th most common cancer diagnosis in all Australians; however, unlike the other top 5 cancers, 42% are diagnosed at stage IV [2] (Figure 1). The primary goal of the lung cancer screening programme is to facilitate the early detection of lung cancer, enabling a shift to earlier stages of disease and thereby improving overall survival rates and treatment outcomes (Figure 2).

This initiative presents an exciting opportunity to address the needs of high-risk populations; however, it is not without its challenges, particularly those specific to the Australian context where access and equity concerns—specifically, ensuring that high-risk populations can effectively access the screening service—pose significant complexities that must be addressed.

Lung cancer screening programs were introduced in the United States in 2013, following the 2011 findings of the National Lung Screening Trial (NLST), which showed a 20% reduction in lung cancer mortality among high-risk individuals compared to X-ray screening [3]. While adopting the US guidelines may seem like a straightforward approach, Australia faces unique challenges, including its vast geography, specific high-risk groups such as Aboriginal and Torres Strait Islander peoples, and budgetary considerations. Consequently, a tailored screening program has been developed to address the distinct needs of the Australian population.

The first priority of any screening program is to minimise harm to participants while carefully weighing the risks and benefits. Radiologists play a pivotal role in both the technical and interpretive aspects of the program. Key considerations for radiologists in lung cancer screening include minimising radiation exposure, standardising scanning techniques and reporting practices, and reducing the occurrence of false positive results, which can lead to unnecessary interventions, patient anxiety and potential morbidity.

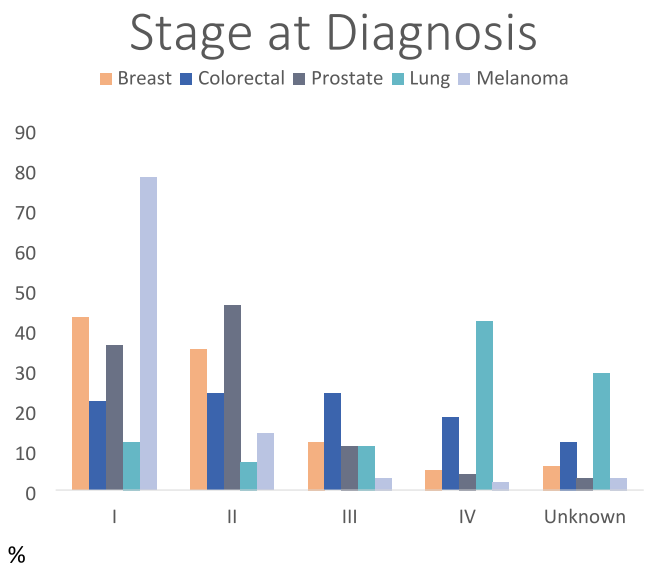

FIGURE 1 | Cancer Australia 2020. Report on the lung cancer screening enquiry.

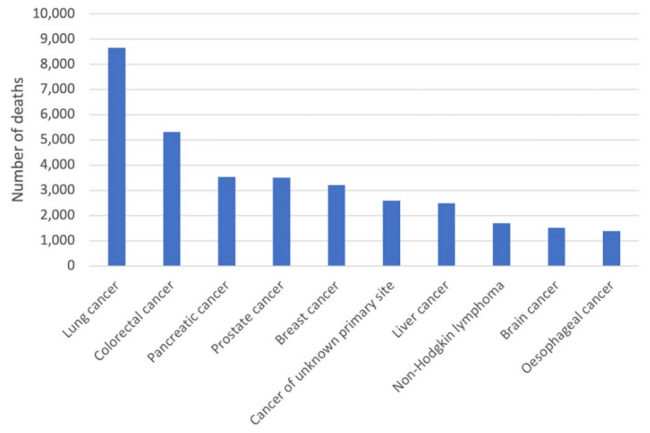

FIGURE 2 | Cancer Australia. Estimated number of cancer deaths (2020).

An Australia and New Zealand Society of Thoracic Radiology (ANZSTR) NLCSP working group was established, representing the Royal Australian and New Zealand College of Radiologists (RANZCR), to oversee the design of the program, with a particular focus on its radiological components. This significant undertaking presented an opportunity for ANZSTR to expand its membership within the College to include representatives from both the public and private sectors across all states, fostering a more inclusive and collaborative approach. An expression of interest (EOI) attracted an overwhelming response from over 60 radiologists across the country, marking the largest EOI the College has ever received. This expansion has been instrumental in the development of guidelines and educational materials critical to the success of the NLCSP. To support this effort, six subcommittees were formed, each tasked with developing specific materials. These subcommittees were: Program, Technical, Reporting and Template, Additional Findings, Artificial Intelligence, and Education and Training.

This article will provide a comprehensive review of lung cancer screening from the radiologist's perspective, examining key considerations including workplace readiness, the impact on workflows, technical aspects of low-dose computed tomography (LDCT) scanning, LDCT interpretation, the integration of advanced technologies, alignment with the National Cancer Screening Registry (NCSR), and the role of education and multidisciplinary collaboration in patient care.

2 | Access Pathways and Eligibility Assessment

The primary care physician (GP) serves as the most common point of entry into the screening programme, playing a central role in risk assessment and determining an individual's eligibility and suitability to undertake an LDCT. If a participant is deemed eligible, the GP will issue a referral for an LDCT scan. This form must include essential information, such as confirming the participant's eligibility, family history of lung cancer, baseline or follow-up scan, among other relevant details. A standardised request form is available on the DoHDA (Department of Health, Disability and Ageing) website.

It is strongly encouraged for the participant to be registered with the National Lung Cancer Screening Registry, which will store key patient data, including prior LDCT scan reports, the specialist diagnosis form (outcomes of multidisciplinary team assessment of high and very high risk nodules) and nodule history report (tabulated metrics reported by nodule). The responsibility for patient registration lies with the referring physician.

The CT scan can then be scheduled with a participating radiology provider. To ensure a smooth and streamlined process for the referrer, it is prudent they reach out to their local radiology providers to confirm their participation in lung cancer screening. This visit also provides a key opportunity for the GP to link the individual to a smoking cessation program.

3 | Radiology Practice Requirements

3.1 | Low-Dose CT Scan

Low-dose computed tomography provides adequate image quality for nodule detection while minimising radiation exposure to the individual. Screening must be conducted in accredited facilities that meet the Australian Diagnostic Imaging Accreditation Scheme Standards [4]. Minimum requirements for CT scanners are detailed in the technical guidelines, which also outline a standardised protocol for performing the LDCT. This ensures that radiation dose thresholds are not exceeded and promotes consistency in scan technique. These guidelines are available on the RANZCR website.

The use of artificial intelligence (AI) software is strongly encouraged in lung cancer screening. Unlike breast screening, where double reading is mandatory, this is not the case in lung cancer screening [5]. AI tools can significantly enhance the reporting process and indirectly facilitate a double read. This includes computer-aided detection (CAD) software which identifies and

highlights nodules, in addition to nodule volumetry software for three-dimensional volume measurements and growth rate analysis, including volume doubling time (VDT). Volumetric analysis has been shown to provide more accurate and reproducible measurements compared to traditional manual diameter assessments, to reduce inter-observer variability and improve the overall efficiency of reporting. Volumetry played a pivotal role in the NELSON trial, where it contributed to a reduction in the false positive rate [6, 7].

Local storage capabilities must be carefully considered as there is no centralised storage of CT data for the NLCSP. Therefore, the complete dataset for each study must be retained and stored locally at each individual practice for future reference.

3.2 | Workforce Training

The radiology workforce is already accredited and regulated; therefore, no additional accreditation is required to deliver the screening programme [8]. While there are currently no formal minimum training requirements, it is strongly recommended that all participating radiologists engage in regular educational and workshop opportunities.

A full range of webinars and e-learning modules covering each radiology guideline is freely accessible on the RANZCR website. Radiologists interested in joining the programme are strongly encouraged to view these educational resources.

To ensure consistent management of pulmonary nodules identified via LDCT screening, a dedicated NLCSP Nodule Management Protocol has been established. The protocol promotes uniform interpretation of screening LDCT among radiologists and ensures consistency in interpretation. Tailored to the Australian lung cancer screening programme, the protocol incorporates the Pan-Canadian Early Detection of Lung Cancer Study (PanCan) nodule risk prediction model [9] and Lung-RADS (Lung CT Screening Reporting and Data System) [1, 10], a size and morphology-based system. Necessary modifications were made to Lung-RADS v2022, so that the PanCan model could be incorporated, and the lowest risk screening participants could be assigned 2-yearly follow-up. Given the unique screening context in Australia, specific training opportunities have been, and will continue to be, provided to the radiology workforce, including interactive workshops and national conferences.

Radiographers will also require training in LDCT scan acquisition within the screening setting, as well as in the integration and use of any CAD and volumetry software implemented in the program.

3.3 | Nodule and Lung Cancer Multidisciplinary Team Meetings (MDT)

A multidisciplinary team for lung cancer and a dedicated nodule clinic are essential components of any lung cancer screening program. As a participating radiology provider in the NLCSP, it is crucial to establish a referral pathway for nodules classified as category 5 or 6, indicating a high-risk nodule or suspicion of lung cancer respectively. The nodule guidelines recommend 'referral to a respiratory physician linked to a thoracic malignancy team' for such cases.

Hospitals participating in the program with an existing lung cancer MDT must assess their current capacities and plan for an increased workload. Some institutions may be able to integrate 'nodule workup' cases into their existing MDT, while others may need to establish a dedicated 'nodule MDT'. This specialised team will be responsible for reviewing suspicious nodules and determining the appropriate management or diagnostic pathway. The establishment of such a team will impact services across multiple specialties, including radiology, respiratory medicine, thoracic surgery, radiation oncology, medical oncology, pathology and palliative care. Some states have initiated planning frameworks to support these demands.

3.4 | Radiology Clerical Staff Requirements and Billing

It is a requirement that every LDCT lung cancer screening report be uploaded to the NCSR. The registry will maintain a national database of all lung cancer screening records with three primary objectives:

1. To allow radiologists access to participants screening reports and identify the location of the previous radiology provider in the instance where the prior study was performed at a different practice.
2. To notify participants when they are due for their next scan.
3. To support audit and research initiatives.

The reports must be submitted to the register through electronic integration of the radiology practice with the NCSR. A transition phase extends until December 31, 2025, to enable post or faxed submission while integration is being completed.

The LDCT report will be sent to both the NCSR and the referring physician. If the report indicates the need for an interval scan or referral to a respiratory physician, the registry will contact the participant with instructions to reach out to their GP. The GP will also receive a reminder from the registry and a report from the radiology provider containing the appropriate recommendation. They are responsible for contacting the participant and initiating the necessary referral.

Clerical staff may be required to access prior reports from the NCSR, source and upload external scans for the reporting radiologist, and schedule eligible participants for their biennial or interval follow-up scans, all the while being mindful of the strict time frames required for follow-up scans.

Two new Medicare Benefits Schedule (MBS) item numbers have been introduced for billing purposes: one for the screening scan performed at baseline and every 2 years, and another for interval or follow-up scans. Radiology practices are required to bulk-bill LDCT scans for the NLCSP with no out-of-pocket fee. The MBS

item numbers come with mandatory reporting requirements, including the use of the NLCSP Nodule Management Protocol [8].

Any practice considering implementing the program will need to account for the potential increase in clerical services required to support the program.

4 | Reporting Guidelines and the Structured Clinical Radiology Report

A standardised reporting template is essential to ensure the accuracy and reproducibility of reports, to document details of every reportable nodule for follow-up imaging and to enable data capture by the NCSR. The NLCSP Structured Clinical Radiology Report is available on the RANZCR website and has been integrated into a number of speech recognition softwares at the vendor level. Radiologists and PACS administrators may also create the template at the user level using the published guideline. Given that each dictation system has its own unique features and functionality—some supporting the inclusion of tables, drop-down menus and macros, while others offer more basic templates—adaptations will be necessary to optimise implementation.

In addition to the need for a robust nodule management protocol, a unique challenge of any lung cancer screening programme is the identification of additional findings during the interpretation of LDCT scans. These findings may include pathologies within the thorax, the lower neck, upper abdomen and bones. The incidence of actionable additional findings has been reported to range from 15% to 19% of all scans [11]. To address this, extensive consultation has been conducted with multiple Australian medical colleges and specialty groups, including The Thoracic Society of Australia and New Zealand, The Cardiac Society of Australia and New Zealand, Abdominal Radiology Group Australia and New Zealand, in addition to referencing established international guidelines from organisations such as the American College of Radiologists (ACR), European Respiratory Society (ERS) and National Health Service (NHS) [12, 13]. A specific Australian guideline has been developed to provide direction on the management of common additional findings.

5 | Quality Framework

RANZCR is collaborating with DoHDA to establish a reporting quality assurance framework in partnership with the NCSR. This will provide radiologists with confidential data on their individual reporting metrics to allow self-monitoring.

6 | Conclusion

The Australian Lung Cancer Screening Program aims to detect lung cancer at its earliest stages, thereby improving outcomes and survival rates. This initiative has only been made possible through the collaboration of numerous stakeholders. Radiology plays a central role in the program, with comprehensive guidelines and frameworks established to ensure that it is both equitable and tailored to meet the diverse needs of Australia's population.

This is an exciting time for thoracic radiology. For the program to operate effectively and efficiently, the active involvement of motivated radiologists is essential. Expert guidelines have been developed to address every aspect of the program, providing radiology practices with the tools and resources needed to participate in this groundbreaking initiative.

Author Contributions

Samantha J. Ellis: conceptualization, writing – original draft, writing – review and editing. **Mark W. McCusker:** writing – review and editing. **Stephen Melsom:** writing – review and editing. **Diane M. Pascoe:** writing – review and editing. **Catherine M. Jones:** writing – review and editing. **Miranda Siemienowicz:** writing – review and editing.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The authors have nothing to report.

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