National Lung Cancer Screening Program: Essentials in pulmonary nodule management and risk factors

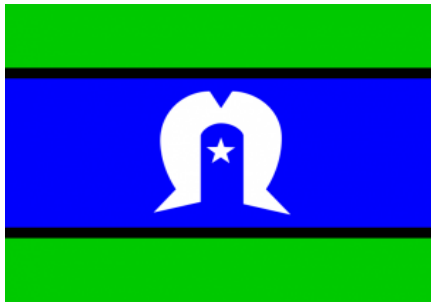
Tuesday, 6 May 2025

The content in this session is valid at date of presentation

Acknowledgement of Country

North Western Melbourne Primary Health Network would like to acknowledge the Traditional Custodians of the land on which our work takes place, The Wurundjeri Woi Wurrung People, The Boon Wurrung People and The Wathaurong People.

We pay respects to Elders past, present and emerging as well as pay respects to any Aboriginal and Torres Strait Islander people in the session with us today.



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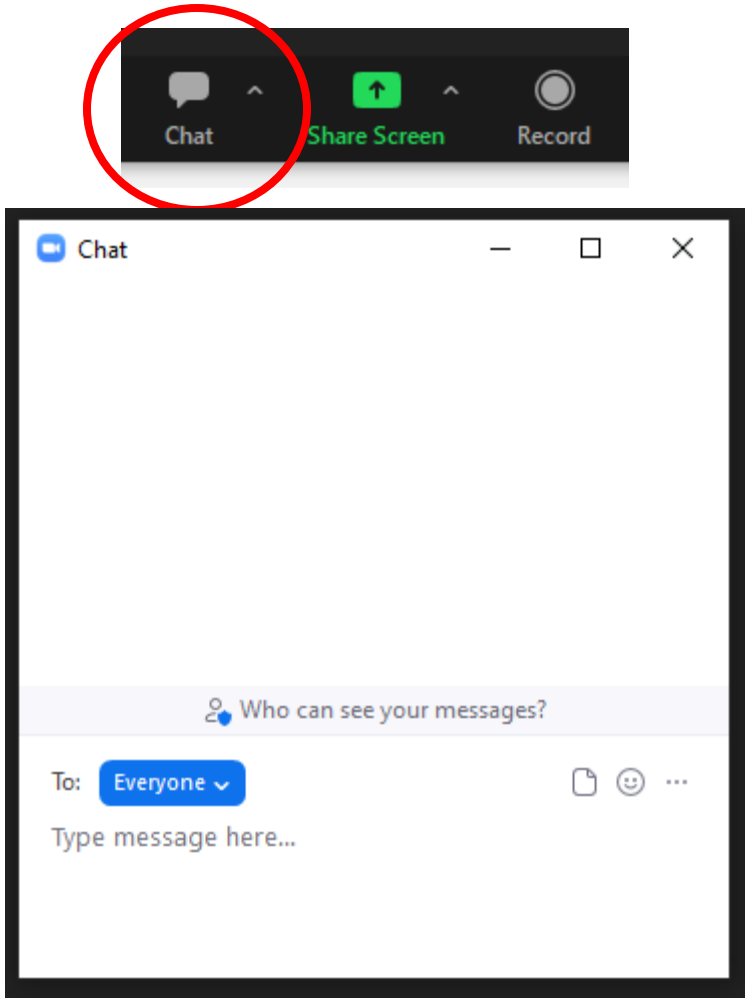

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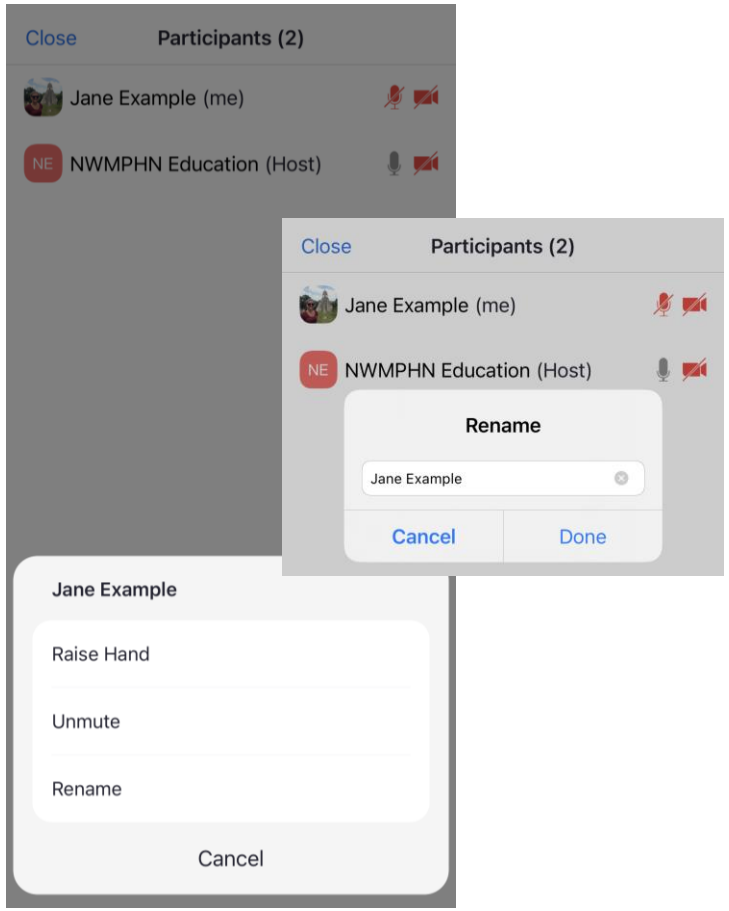
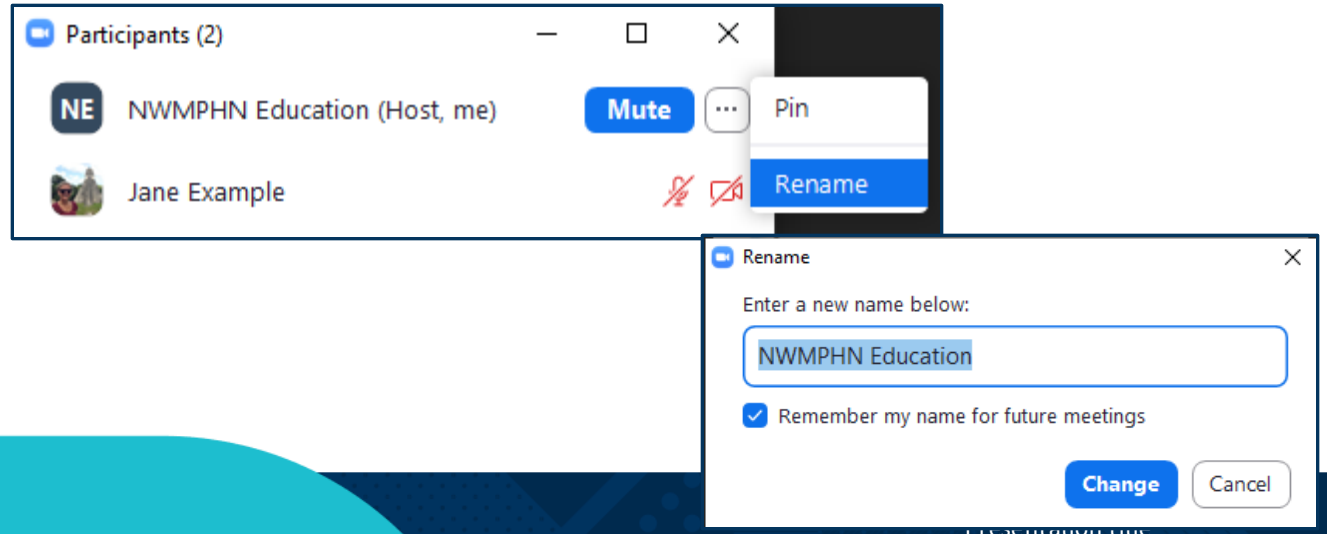




Agenda

Time	Topic
6:30pm-6:35pm	Welcome & Housekeeping
6:35pm-6:40pm	Poll questions
6:40pm-6:50pm	Fundamentals of pulmonary nodule types and risk assessment
6:50pm-7:05pm	Management of non-screen detected pulmonary nodules
7:05pm-7:20pm	Management of screen detected pulmonary nodules
7:20pm-7:40pm	Case studies
7:40pm-7:45pm	HealthPathways Melbourne
7:45pm-7:50pm	Poll questions
7:50pm-8:00pm	Q&A

Speakers

Dr Asha Bonney is a respiratory and sleep physician at the Royal Melbourne Hospital. Her other roles include Senior Research Fellow at the University of Melbourne, respiratory and sleep physician at Eastern Health, and member of the Thoracic Society of Australia and New Zealand Lung Cancer Working Party. She recently completed a PhD in the field of lung cancer screening and is the clinical lead of the Lung Nodule Clinic at RMH and lead of the Lung Nodule and Screening Program at RMH.

Associate Professor Renee Manser is a respiratory and sleep physician at the Royal Melbourne Hospital and Peter MacCallum Cancer Centre. She has a PhD in lung cancer screening and is an honorary Associate Professor in the Department of Medicine, University of Melbourne. She has extensive clinical experience in lung cancer diagnosis and management and is a principal investigator on the International Lung Screen Trial. A/Prof Manser is co-editor for the Cochrane Lung Cancer Review Group and a regular scientific reviewer for the Melbourne Health Human Research Ethics Committee.

Dr Alistair Miller is a respiratory and sleep physician at the Royal Melbourne Hospital and Peter MacCallum Cancer Centre.

Pre-Presentation Poll Questions

Pulmonary Nodules: An overview.

Dr Asha Bonney

North Western Melbourne Primary Healthcare Network Series 2

06/05/2025

The Royal Melbourne Hospital

Overview

- Definition
- Nodule characteristics
- Nodule presentations
- Causes of pulmonary nodules
- Risk factors for lung cancer

Definition

- Circumscribed, typically round, opacity less than or equal to 30mm in average diameter.
  - If >30mm, it is referred to as a mass.

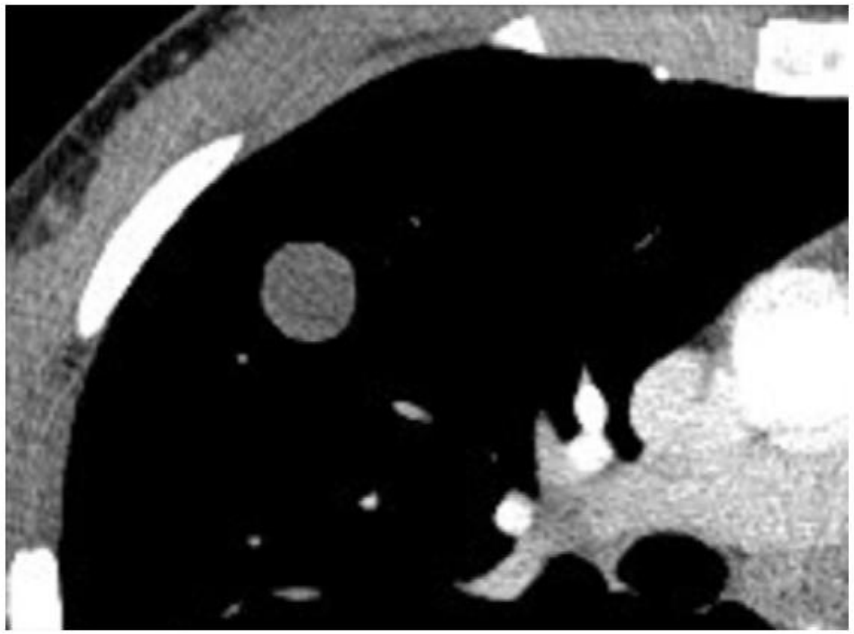


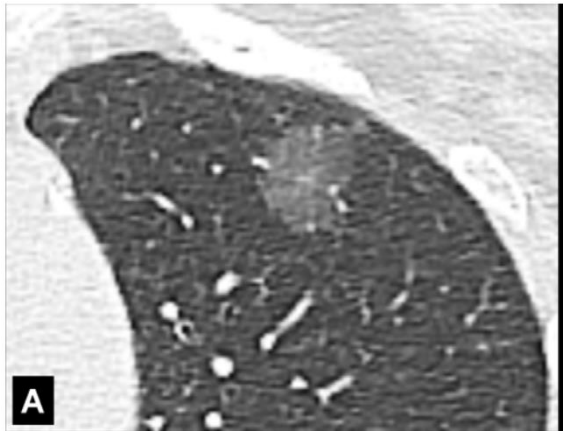
Figure 92: Nodule: Transverse CT image of the right upper lobe shows a round, well-defined, solid soft tissue nodule.

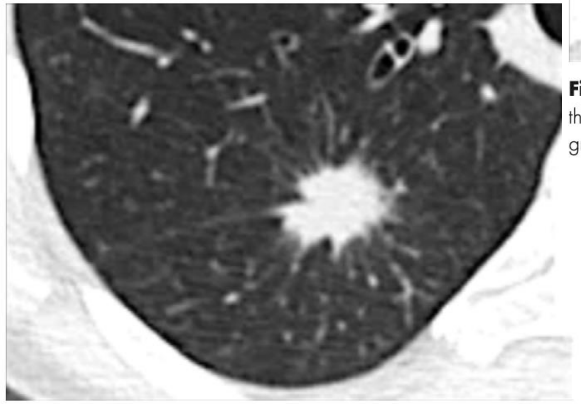
click to return to page 9

1. Bankier AA et al. Radiology . 2024.

Nodule Characteristics

- **Shape and margin**: round, flat, elongated, irregular (spiculated or lobular)
- **Attenuation and structure:** solid, part-solid, non-solid, cystic, calcified, containing fat or air
- **Location:** peribronchovascular, centrilobular, fissural, perifissural, pleural, subpleural, peripheral vs central, endobronchial





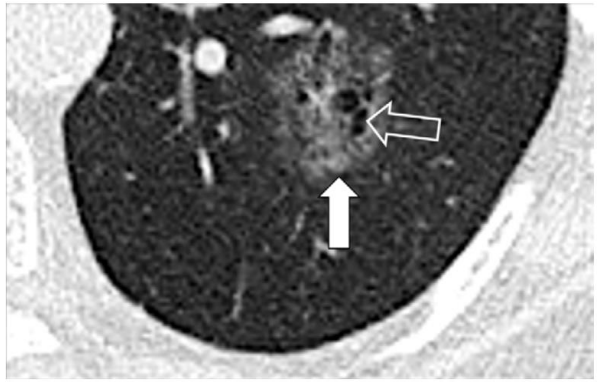
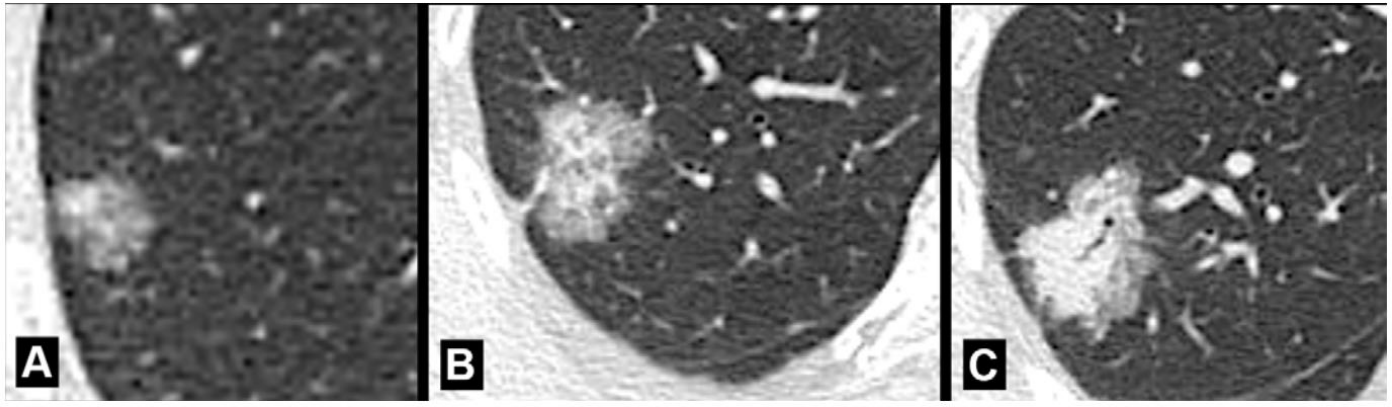


Figure 103: Nodule, complex morphology: Transverse CT image of the left lower lobe shows a complex nodule with cystic (open arrow) and ground-glass (solid arrow) components. ***click to return to page 9***



1. Bankier AA et al. Radiology . 2024.

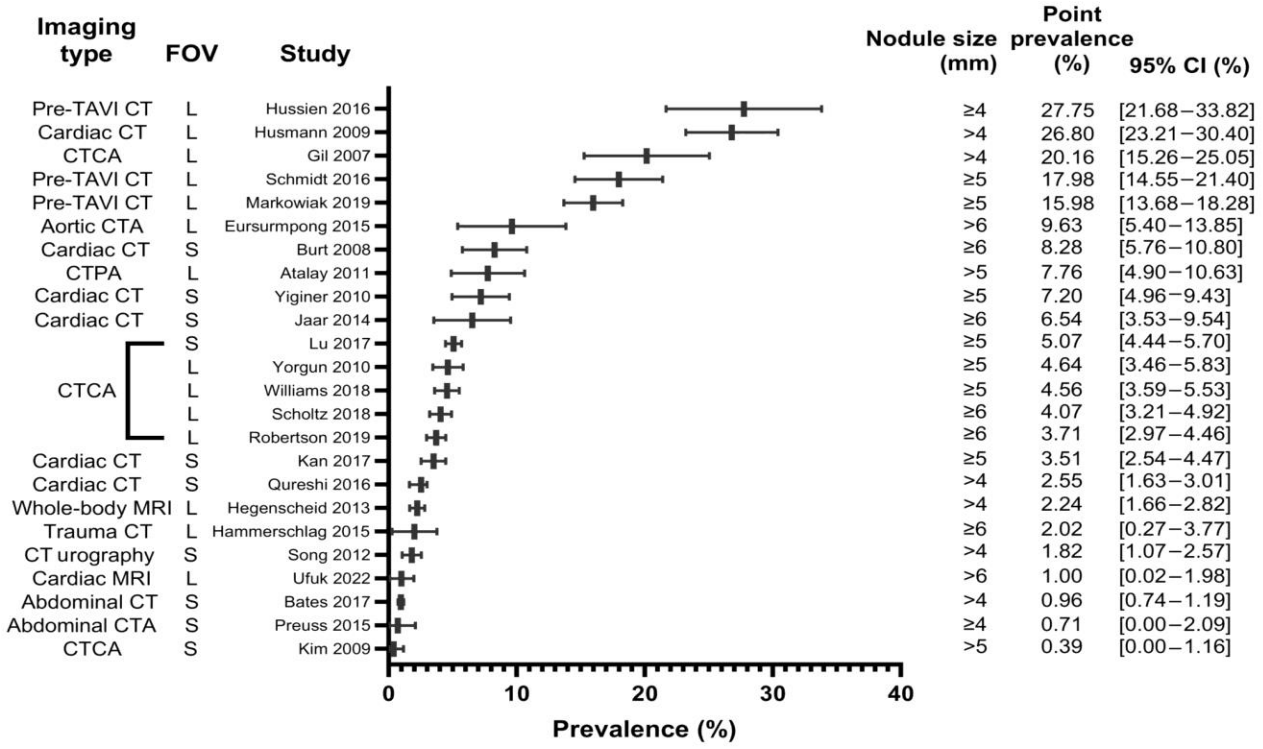
Lung nodule presentations

- Incidental- asymptomatic
  - 211% increase in the number of CT chest scans performed (2001-2019) in Australia

Table 1. Frequency of Chest CT Imaging and Positive Chest CT Scans, Scan-Level Data 2006 to 2012

Year	Total Members (*N*)	Chest CT Scans Performed (*n*)	Positive Chest CT Scans [*n (% of Scans)*]	Time at Risk for Scanning* (*Person-Years*)	Chest CT Scans Performed† [*Rate per 1,000 Person-Years (95% CI)*]
2006	2,623,719	46,663	11,172 (23.9)	2,288,046	20.4 (20.2 –20.6)
2007	2,673,078	50,571	13,645 (27.0)	2,342,118	21.6 (21.4–21.8)
2008	2,672,351	55,264	15,171 (27.5)	2,369,685	23.3 (23.1–23.5)
2009	2,663,055	60,430	17,250 (28.5)	2,375,472	25.4 (25.2, 25.6)
2010	2,698,679	63,036	19,420 (30.8)	2,412,059	26.1 (25.9–26.3)
2011	2,822,145	68,411	20,346 (29.7)	2,540,580	26.9 (26.7–27.1)
2012	2,916,094	71,206	21,766 (30.6)	2,635,220	27.0 (26.8–27.2)
2006–2012 Total‡	19,069,121	415,581	118,770 (28.6)	16,963,179	24.5 (24.4–24.6)

Prevalence of pulmonary nodules detected incidentally on noncancer-related imaging: a review



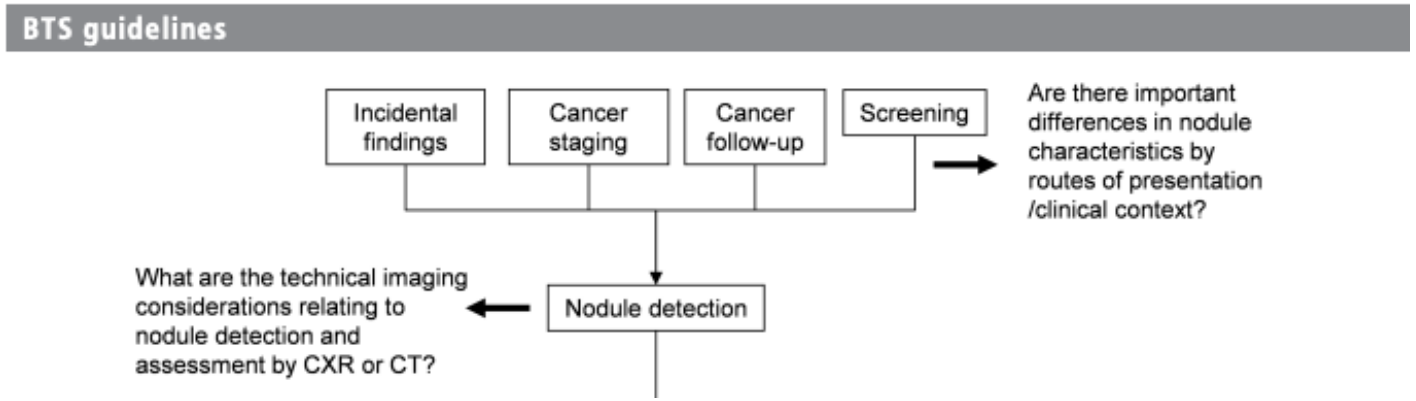
1. Das A, et al. IMJ. 2024.
2. Gould MK, et al. AJRCCM. 2015.
3. Youens D, et al. BMJ open. 2022.

Lung nodule presentations 2

- Symptomatic
  - Most don’t have any!
  - Cough, haemoptysis, chest pain, dyspnoea or wheeze, fatigue, weight loss, fevers or recurrent infections.
- Screening
- Staging of other cancers

Table 6 Lung nodule and cancer prevalence in series of incidentally detected nodules and screening trials

	Studies (n)	Patients (n)	Nodule prevalence (%), mean (range)	Lung cancer prevalence (%), mean (range)
Incidental	11[3 5 7 13–18 31 32]	11 683	13 (2–24)	1.5 (0–4.0)
Screening	21[4 6 8-12 19–30 34 35]	116 300	33 (17–53)	1.4 (0.5–2.7)



1. Callister MEJ, et al. Thorax 2015.

Aetiology

- Primary lung cancer
  - Precursor lesions
- Metastatic disease
- Infections e.g tuberculosis, fungal infections, abscess
- Sarcoidosis
- Necrobiotic pulmonary nodules
- Benign tumours e.g. hamartomas, lipomas
- Arteriovenous malformation
- Scarring
- Anatomical structures- e.g. lymph nodes

Table 5 Prevalence of lung nodules and cancer by geographical area

Geographical area	Studies (n)	Patients (n)	Nodule prevalence (%), mean (range)	Lung cancer prevalence (%), mean (range)
N America	16	83 825	23 (2–53)	1.7 (0–4.0)
Europe	13	29696	29 (8–53)	1.2 (0.2–2.4)
East Asia	2	14 362	35.5 (35–36)	0.54 (0.50–0.57)
UK	1	100	14	N/A

1. Callister MEJ, et al. Thorax 2015.

Table 1 | Common risk factors for lung cancer

Risk factor	Relative risk	Strategies to mitigate risk	Refs.
Smoking	10–40	National and global public awareness and education campaigns, tobacco taxes and policies supported by the WHO Framework Convention for Tobacco Control	52,53,57,60
Second-hand smoke	1.2–1.3	National policies to reduce smoking in public places	61,63
Biomass fuels	1.2–4.9	Woodstove change-out programmes	35–37,68,69
Arsenic	1.02–1.20 depending on degree of exposure	Arsenic removal systems, substituting high-arsenic water with water from other sources	72–78,80
Radon	1.15–1.38	National radon action plans to increase the extent of radon testing, increase radon mitigation and encourage radon-resistant construction	81,82,84,85
Asbestos	1.14–7 depending on degree of exposure	National and international asbestos bans	87–89,93
Diesel exhaust	1.1–1.4	International programmes designed to reduce diesel emissions internationally (such as the Diesel Emissions Reduction Act Program in the USA)	95–98,197
Chronic obstructive pulmonary disease	2–6	Smoking mitigation strategies (see above)	99,100
HIV	2–5	Large-scale education efforts on HIV infection prevention strategies and HIV infection treatment	105–111
Red meat	1.36 per 50 g/day	National nutritional education efforts	116,117
Fruit and vegetable consumption	0.86 (highest versus lowest intake)	National nutritional education efforts	119

Risk Factors for Lung Cancer

- Tobacco smoking
  - Cannabis smoking
  - ?E-cigarettes
- Environmental exposures
  - Ambient air pollution
- Genetic factors- first degree relatives
- Diet and exercise
- Non-malignant lung disease: tuberculosis, chronic obstructive pulmonary disease, interstitial lung disease

1. Leiter A, et al. Nature Reviews Clinical Oncology. 2023.

Incidental pulmonary nodule management

Alistair Miller

North-Western Melbourne Primary Healthcare Network Series 2

06/05/2025

The Royal Melbourne Hospital

Aims for this session

- Which nodules are we talking about?
- How do we think about risk for these nodules?
- What recommendations exist for surveillance?

Which nodules are we talking about

- Found on imaging performed when nodules wasn’t the primary question
- Not on a screening examination
- No associated attributable symptoms
- No associated lymphadenopathy
- No clearly high risk features

Risk assessment for nodules

- Size
  - Bigger nodules have higher malignancy risk
  - <6mm have malignancy risk <1%
- Type
  - Part-solid > solid > ground glass
- Characteristics
  - Spiculation; position; multiplicity

Risk assessment for nodules

- Growth
  - Increase over time increases risk of malignancy
  - ~1.5mm is considered significant change

- Change
  - Development of a solid component
  - Development of spicules

Incidental nodules outside screening programs are often in people at low risk for lung cancer

- Balance of risk of allowing growth/spread vs excess scans
- Scanxiety
- Access

JAMA Internal Medicine | Original Investigation

Projected Lifetime Cancer Risks From Current Computed Tomography Imaging

Rebecca Smith-Bindman, MD; Philip W. Chu, MS; Hana Azman Firdaus, MPH; Carly Stewart, MHA; Matthew Malekhedayat, BS; Susan Alber, PhD; Wesley E. Bolch, PhD; Malini Mahendra, MD; Amy Berrington de González, DPhil; Diana L. Miglioretti, PhD

- Massive increase in CT use
- Highest risk when children scanned at <1 year
- Adults scanned between 50 and 59 have most attributed cancers
- Estimated to be responsible for 5% of new cancers

There are a range of guidelines targeting different populations

- Fleischner (2017)
  - Non-screen detected nodules
- British Thoracic Society guidelines (2015)
  - Any nodule
- American College of Chest Physicians (2013)
  - Incidentally detected nodules
- LungRADs (2022)
  - Screen detected nodules

Fleischner Society Guidelines provide safe and accessible nodule management

- Nodule management guidelines initially published 2005

- Update for sub-solid nodules 2013

- Most recent version published 2017**
  - People 35 years and older
  - Incidentally detected
  - Not immunocompromised
  - No history of cancer

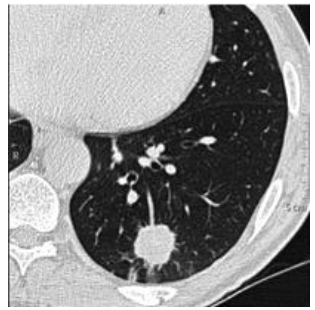
Fleischner Society Guidelines - conditions

- Individual risk
  - Presence of chronic lung disease
  - Smoking history
  - Other inhalational exposures
  - Family history
  - Age
- Nodule measurement
  - Average of long and short dimension
  - Rounded to nearest mm

Surveillance recommendations for solid nodules are divided by patient risk, size and number

A: Solid Nodules*

	Size		
Nodule Type	<6 mm (<100 mm^3)	6–8 mm (100–250 mm^3)	>8 mm (>250 mm^3)
Single			
Low risk†	No routine follow-up	CT at 6–12 months, then consider CT at 18–24 months	Consider CT, PET/CT, or tissue sampling at 3 months
High risk†	Optional CT at 12 months	CT at 6–12 months, then CT at 18–24 months	Consider CT, PET/CT, or tissue sampling at 3 months

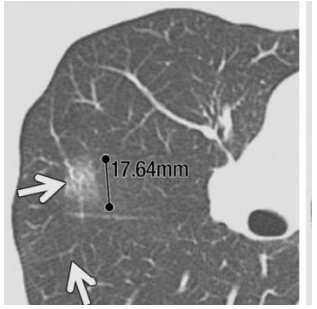


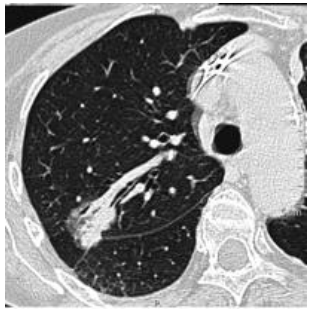
Surveillance is generally determined by the highest risk nodule

A: Solid Nodules*			
Multiple			
Low risk†	No routine follow-up	CT at 3–6 months, then consider CT at 18–24 months	CT at 3–6 months, then consider CT at 18–24 months
High risk†	Optional CT at 12 months	CT at 3–6 months, then at 18–24 months	CT at 3–6 months, then at 18–24 months

Surveillance recommendations for solid nodules are divided character, size and number

B: Subsolid Nodules*		
	Size	
Nodule Type	<6 mm (<100 mm^3)	≥6 mm (>100 mm^3)
Single		
Ground glass	No routine follow-up	CT at 6–12 months to confirm persistence, then CT every 2 years until 5 years
Part solid	No routine follow-up	CT at 3–6 months to confirm persistence. If unchanged and solid component remains <6 mm, annual CT should be performed for 5 years.
Multiple	CT at 3–6 months. If stable, consider CT at 2 and 4 years.	CT at 3–6 months. Subsequent management based on the most suspicious nodule(s).





BTS guideline provides additional risk stratification

- Recommend CT surveillance for small nodules
  - Calculate growth on subsequent scans – volume doubling time

- Use Brock model for risk assessment of nodules >8mm
  - Recommendations of subsequent management according to risk of malignancy

- Requires more information and engaged Thoracic Radiologist

Probability of malignancy following CT (Brock Model)

Patient Characteristics

Age (18-100)* 0

Gender* Select...

Family History of Lung Cancer* No

Emphysema* No

Nodule Characteristics

Nodule size (1-30mm)* 0

Nodule Type* Select...

Nodule in Upper Lobe* No

Nodule Count* 0

Spiculation* No

Calculate

Brock Model Probability:

Probability of malignancy following CT (Brock Model)

Patient Characteristics

Age (18-100)* 65

Gender* Female

Family History of Lung Cancer* No

Emphysema* Yes

Nodule Characteristics

Nodule size (1-30mm)* 15

Nodule Type* Solid

Nodule in Upper Lobe* Yes

Nodule Count* 1

Spiculation* Yes

Calculate

Brock Model Probability: 49.8%

Probability of malignancy following CT (Brock Model)

Patient Characteristics

Age (18-100)*	65
Gender*	Female
Family History of Lung Cancer*	No
Emphysema*	No

Nodule Characteristics

Nodule size (1-30mm)*	5
Nodule Type*	GroundGlass
Nodule in Upper Lobe*	No
Nodule Count*	1
Spiculation*	No

Calculate

Brock Model Probability: 0.6%

Recommendations

- Always consider incidental findings when discussing scans

- Small nodules can be safely monitored according to established guidelines
  - Fleischner Society guidelines are a sensible and straightforward option covering most circumstances

- Assessment of change is crucial – comparison to previous
  - Acquire any previous imaging performed for comparison

Screen detected nodule management

Renee Manser

North-Western Melbourne Primary Healthcare Network Series 2

06/05/2025

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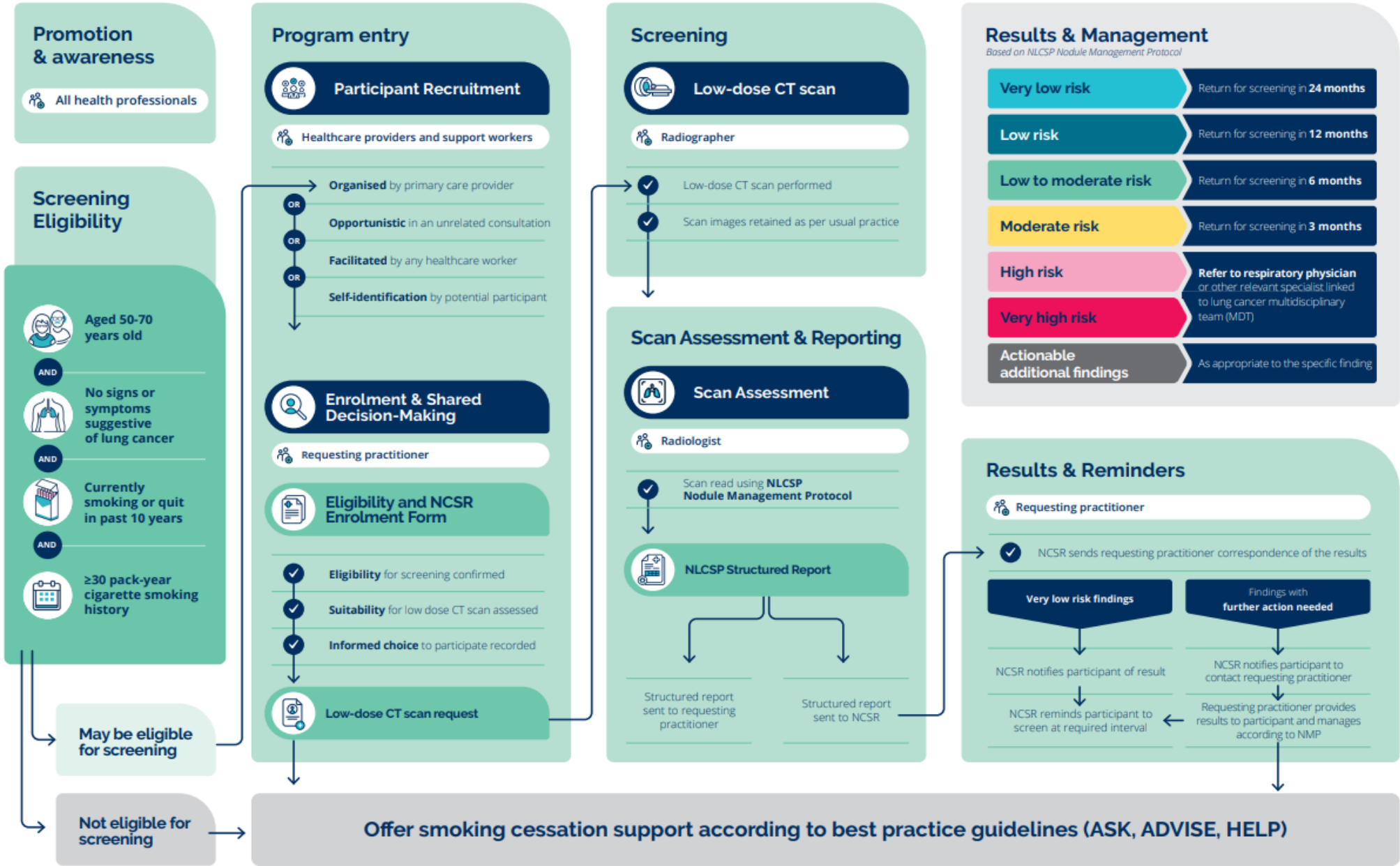
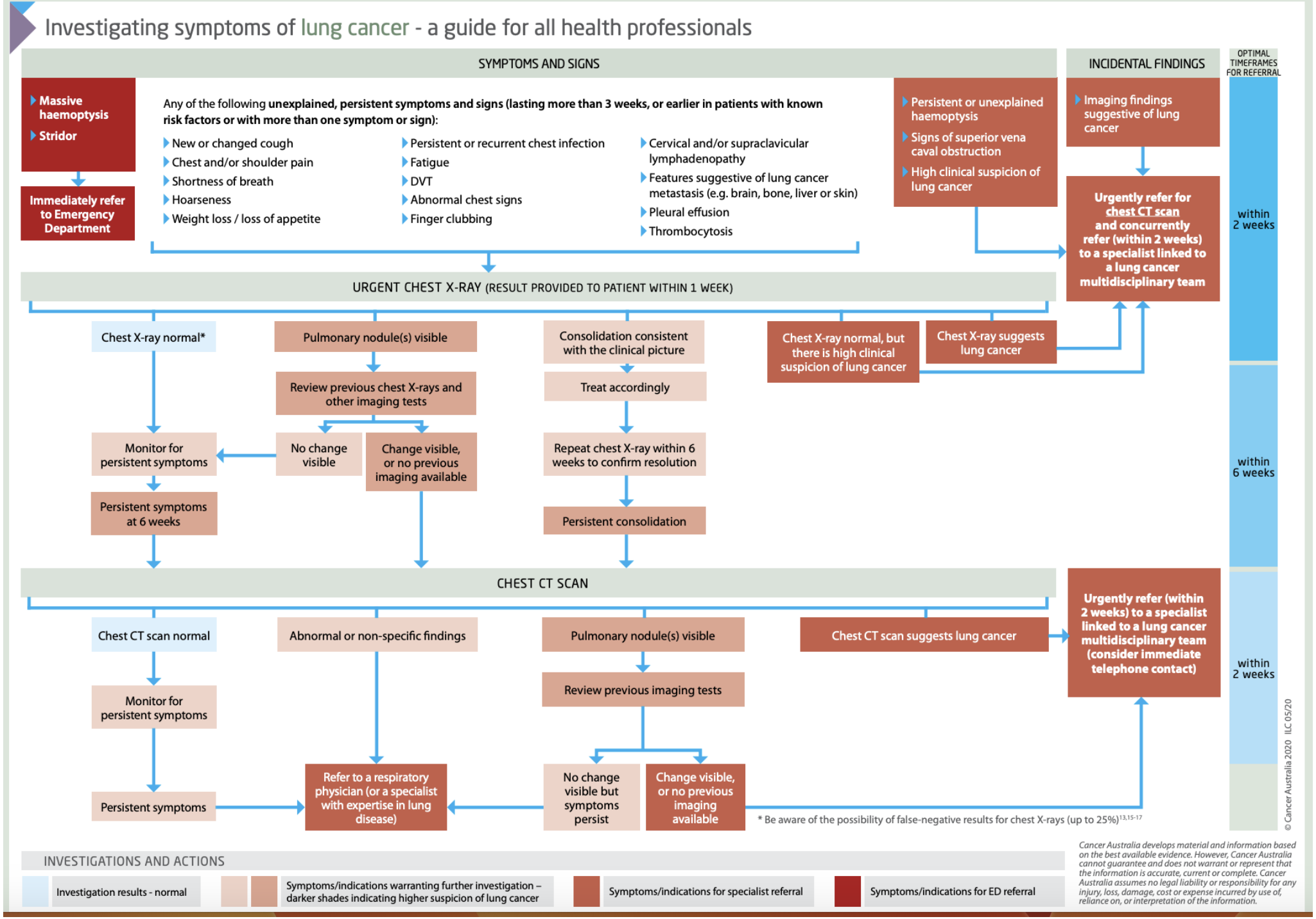
Overview of the National Lung Cancer Screening Program Pathway

Figure 1: National Lung Cancer Screening Pathway



NCSR- National Cancer Screening Register
NMP- Nodule Management Protocol



A guide for all health professionals May 2020.

Based on the best available evidence and expert consensus.

Australian Government Cancer Australia
Endorsed by multiple organisations including Lung Foundation

https://www.canceraustralia.gov.au/sites/default/files/2025-04/investigating-symptoms-of-lung-cancer-islc-guide-updated-for-nlcsp-10-jul-2024.PDF

National Lung Cancer Screening Program Nodule management Protocol

NLCSP nodule management protocol has been developed by Department of Health (Commonwealth Government) in collaboration with Cancer Australia, RANZCR and ANSTR with some of the key resources used listed below:

PanCan nodule risk calculator
(McWilliams et al N Engl J Med 2013; 369:910-919)

-Family history – sibling, child or parent with lung cancer* provided at time of request for scan
-Maximum axial diameter for nodule
-Count all nodules for nodule count
-Spiculate has specific definition

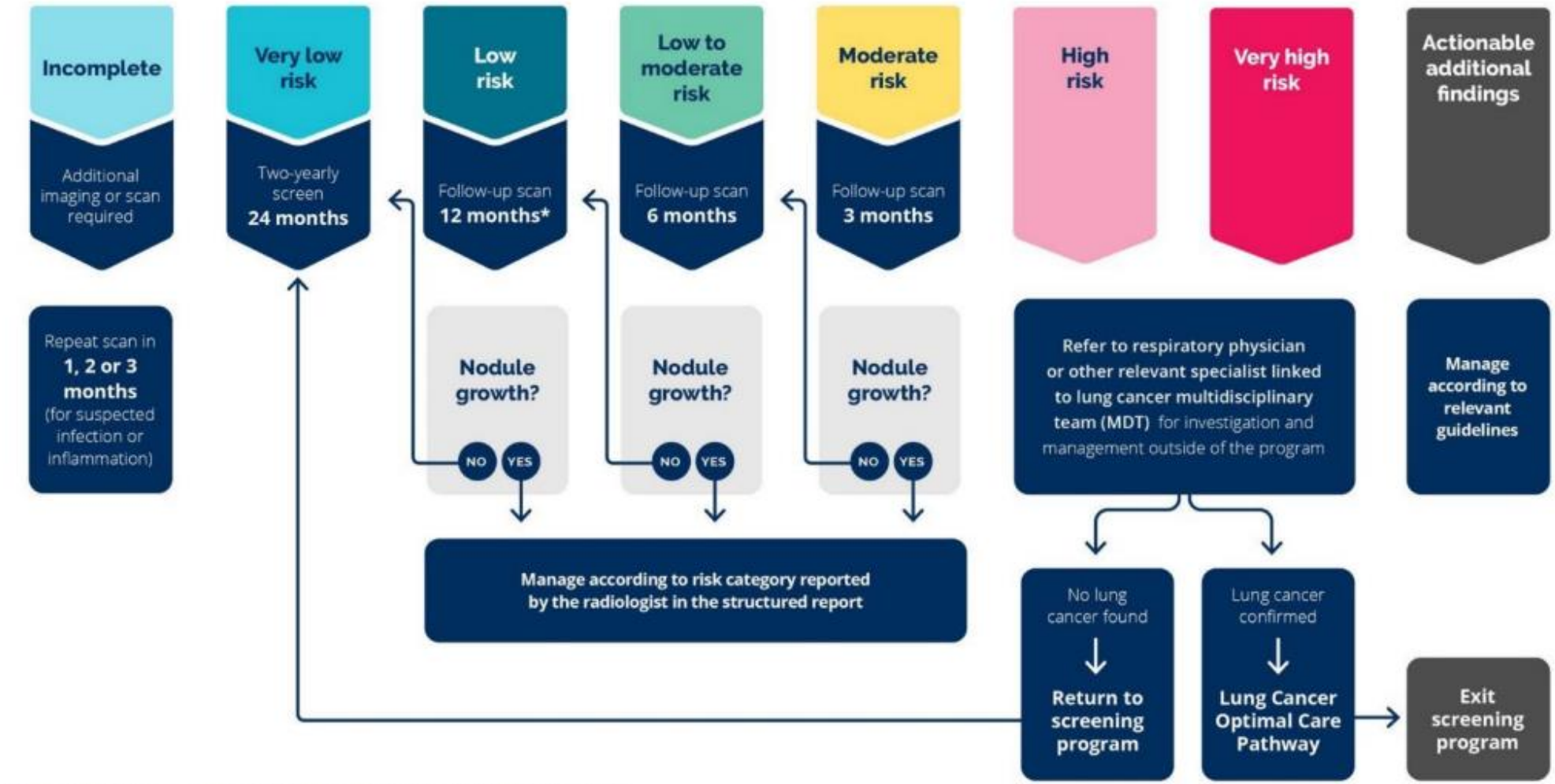
ILST study nodule protocol
(Lim KP, et al. Protocol and Rationale for the International Lung Screening Trial. Ann Am Thorac Soc. 2020 Apr;17(4):503-512).

Lung-CT Screening Reporting & Data System (Lung-RADs®)
(by the American College of Radiology Lung-RADs® Committee: E Kazerooni, DR Aberle, WC Black, MK. Gould, A Leung, BJ McKee, RF Munden, D Yankelevitz)

National Lung Cancer Screening Program Nodule management Protocol

Risk based on scan results	Recommendation	Interval LDCT or Referral
Normal or very low risk	Stay in the screening program	24 month CT
Low to moderate risk	Stay in the screening program	Repeat scan at 3 or 6 or 12 months depending on risk level
High to very high risk	Referral to Respiratory Physician linked to a lung cancer MDT	

Simplified NLCSP Nodule Management Protocol flowchart



*Low risk participants require two 12 month scans before extending to 24 months.

Category descriptor	Findings	Management	Category
Incomplete	Findings suggestive of an inflammatory or infectious process	1-, 2-, or 3-month LDCT	0
Very low risk	No lung nodules	24-month LDCT	1
	Baseline nodule with PanCan risk <1.5% excluding airway nodules and atypical pulmonary cysts		
	Nodule with benign features: • Complete, central, popcorn, or concentric ring calcifications • Fat-containing		
	Juxtapleural nodule: • 524 mm^3(<10 mm) AND • Solid; smooth margins; and oval, lentiform, or triangular shape		
Low risk	Baseline nodule with PanCan risk 1.5% to < 6% excluding airway nodules and atypical pulmonary cysts	12-month LDCT	2
	Airway nodule, subsegmental		
Low to moderate risk	Baseline nodule with PanCan risk 6% to < 10% excluding airway nodules and atypical pulmonary cysts	6-month LDCT	3
Moderate risk	Baseline nodule with PanCan risk 10% to < 30% excluding airway nodules and atypical pulmonary cysts	3-month LDCT	4
	Airway nodule, segmental or more proximal		
	Atypical pulmonary cyst: • Thick-walled cyst OR • Multilocular cyst		
High risk	Baseline nodule with PanCan risk ≥ 30% excluding airway nodules and atypical pulmonary cysts	Refer to Respiratory Physician linked to a lung cancer multidisciplinary team	5
Very high risk	Further features or imaging findings that increase suspicion for lung cancer	Refer to Respiratory Physician linked to a lung cancer multidisciplinary team	6
Actionable additional findings	Clinically significant or potentially clinically significant findings unrelated to lung cancer will be described with appropriate recommendations	As appropriate to the specific finding	A

Standardised reporting of scans

PanCan does not cover airway nodules and atypical pulmonary cysts which have therefore been incorporated into this nodule management algorithm to supplement the use of the PanCan.

Category	Expected proportion based on ILST data*	Baseline scan	Interval LDCT or Referral
Category 1 Very low risk	79%	No nodules PanCan nodule risk <1.5% Benign nodules	24 month CT
Category 2 Low risk	12%	PanCan nodule risk 1.5% to <6%	12 month CT
Category 3 Low to moderate risk	6.1%	PanCan nodule risk 6% to <10%	6 month CT
Category 4 Moderate risk		PanCan nodule risk 10% to <30%	3 month CT
Category 5 High risk	1.4%	PanCan nodule risk > 30%	Referral to respiratory physician linked to a lung cancer MDT
Category 6 Very high risk	1.5%	Additional findings that increase suspicion such as lymphadenopathy	Referral to respiratory physician linked to a lung cancer MDT

*Bonney et al. *Health Qual Life Outcomes* 22, 10 (2024).

NLCSP nodule management protocol has been developed by Department of Health (Commonwealth Government) in collaboration with Cancer Australia, RANZCR and ANSTR

Follow up scans: stepped management

PanCan does not apply to subsequent scans

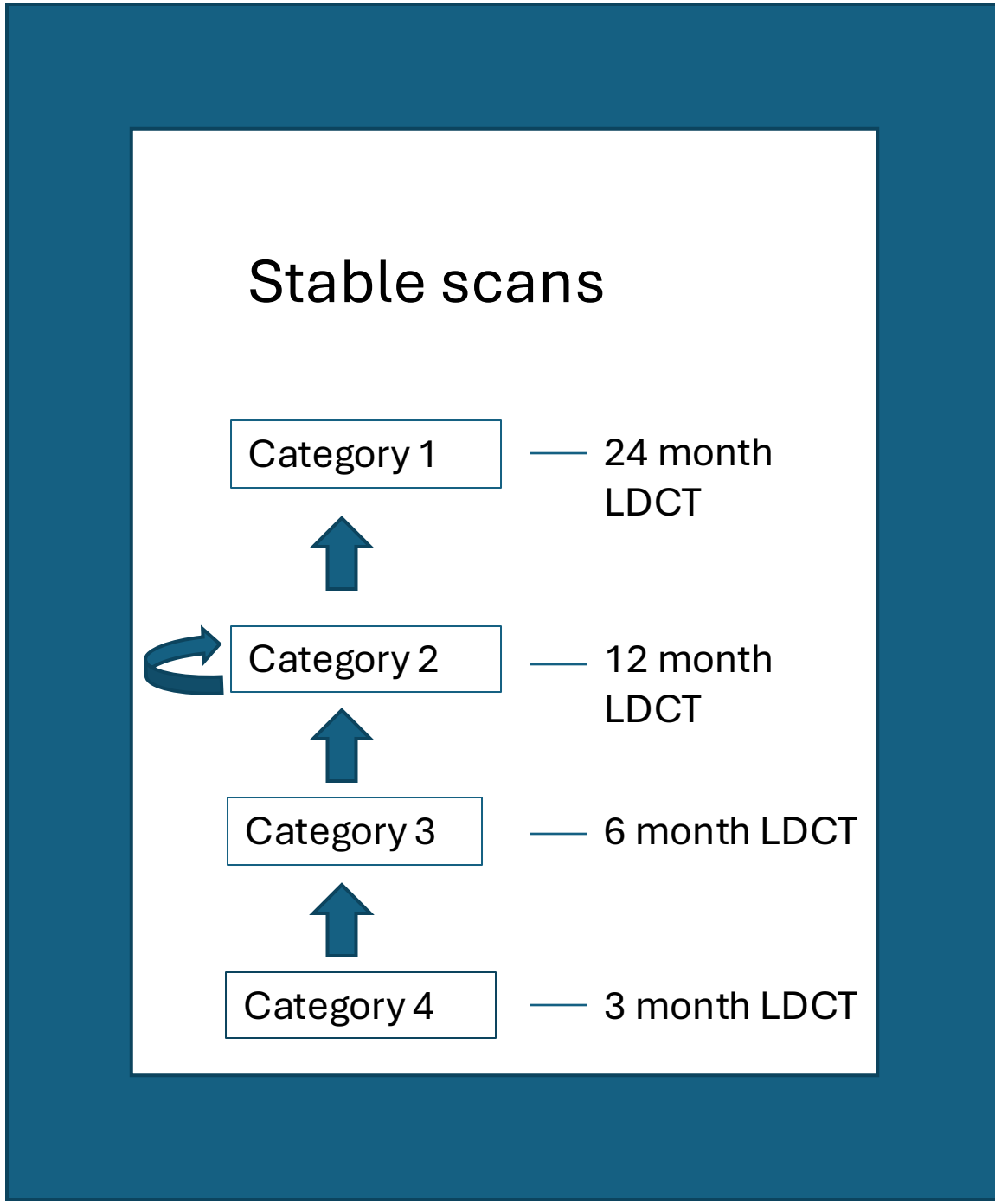
Results will also be classified into categories 1 to 6 *based on*

- nodule characteristics –solid, part solid and non-solid
- nodule growth

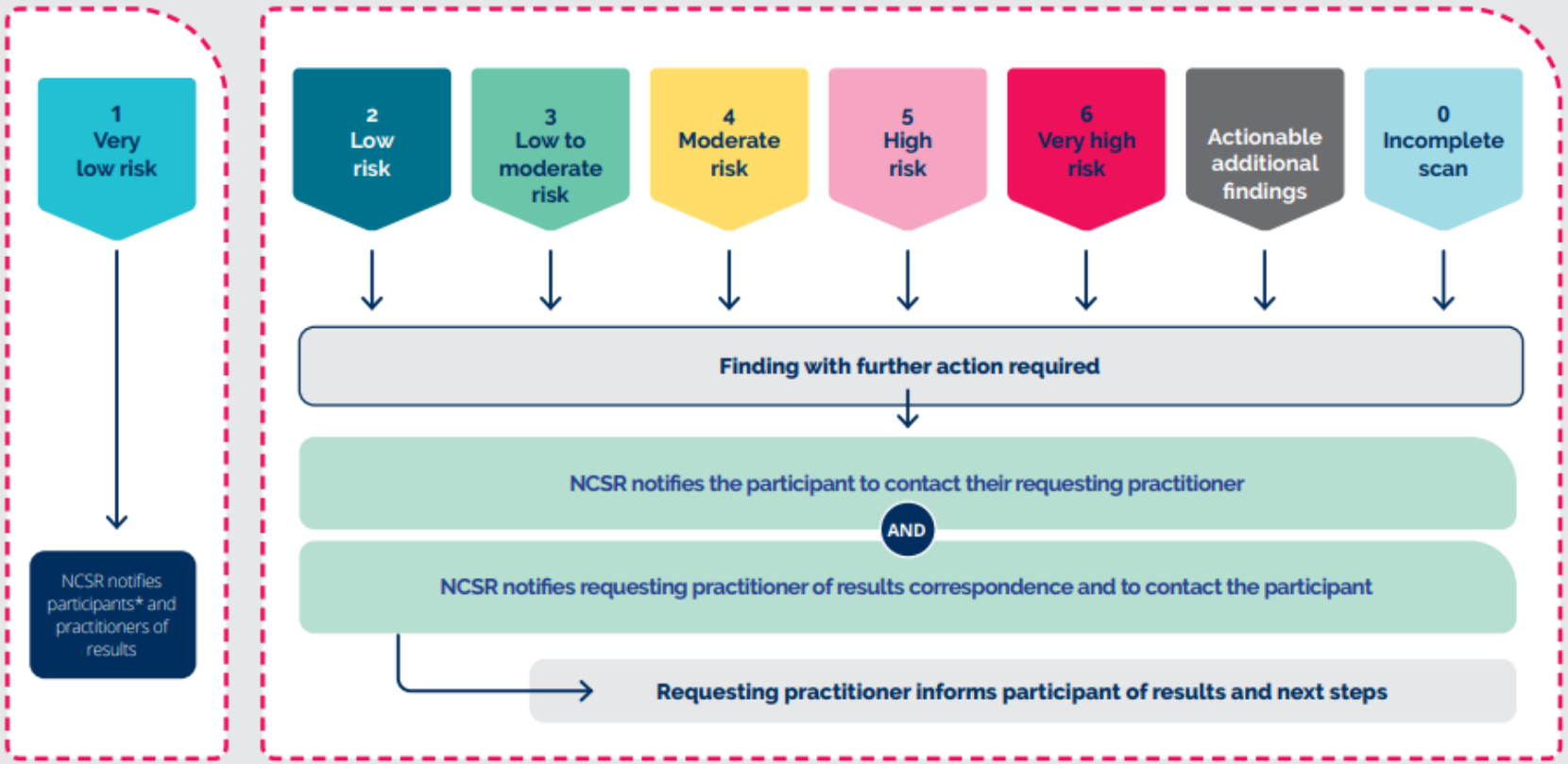
Stable scans - may move down a category in stepwise fashion

Growth may move up one or more categories depending on nodule characteristics and size.
E.g. a previously 6 mm (low or moderate risk) nodule which is now 8 mm (growing) would move to category 5 (high risk) with referral recommended.

Growth defined based on volume or diameter

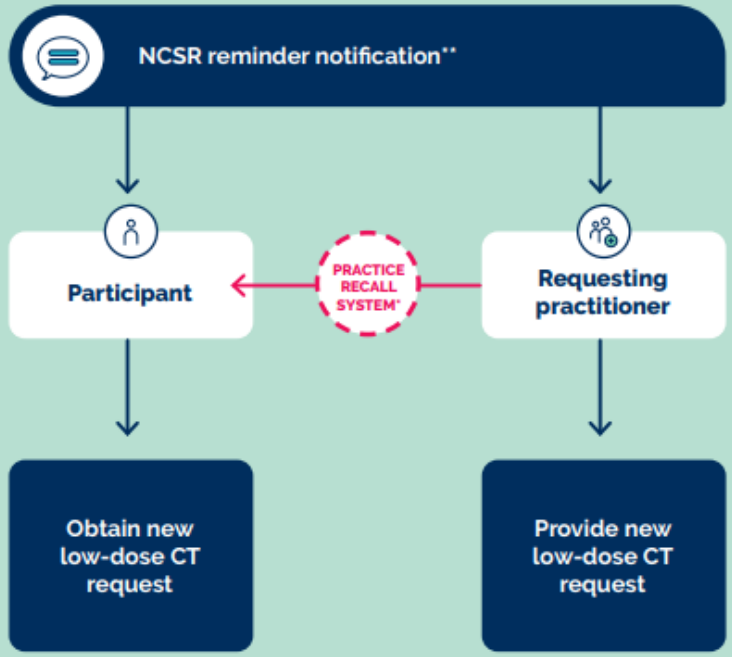


Results communication of low-dose CT scan outcomes and next steps



* All participant-facing communication from the NCSR should align with participant nominated communication preference e.g. letter, SMS/text message, etc.

Screening reminders at recommended intervals



*Healthcare providers are encouraged to use existing patient recall and reminder processes to remind participants when they are due for screening

Lung nodules

Lung cancer screening uses a low-dose computed tomography (CT) scan to look for any small lumps, called nodules. If you have any small lumps on your lungs, it may or may not be cancer but should be investigated or monitored.

- Lung nodules are very common.
- Lung cancer screening may find nodules in up to half of the people screened.
- Most nodules are not related to cancer.
- Often, nodules are areas of scarring from past lung infections.
- Nodules are not likely to cause any symptoms.
- A person may have several nodules.
- Having several nodules is not necessarily more serious than having just one.
- If you have no significant findings the NCSR will remind you to rescreen in two years.

If nodules are found on your screening low-dose CT scan, a follow-up low-dose CT scan may be recommended. This could be after 3, 6 or 12 months. You will get a reminder when it is time to see your doctor, who will provide you with a low-dose CT scan referral for the follow-up scan.

If a nodule grows or changes, your doctor may refer you to a specialist for further investigation or you may require follow-up scans more frequently. If you are referred to a specialist they may arrange for you to have further tests.

If a nodule is found to be lung cancer without any signs or symptoms, it is very likely that screening has found it early. This means it can be more easily treated.

Findings not related to lung cancer

The scan can also see other parts of the body, in the lower neck, chest, and upper abdomen. Sometimes this can show things either in the lungs (something other than cancer, such as emphysema) or outside of the lungs (such as heart disease). If findings not related to lung cancer are found, the National Cancer Screening Register will encourage you to see your doctor to discuss if further tests are needed.

The radiologist reporting your scan will review all parts of the body that can be seen. Changes with no effect on your short-term or long-term overall health may not be in the report. This includes normal 'wear and tear'. All findings not related to lung cancer that may affect your overall health will be reported.

Discussing these other findings with your doctor may improve your overall health. Without screening, you may not have been aware of conditions that may have impacted your health.

Symptoms to look out for

It is normal to feel worried when participating in a cancer screening program. It can be an anxious time waiting for scans and getting the results. Please talk with your doctor about any worries or concerns that you have.

Screening is not suitable for anyone with unexplained persistent symptoms, including those below. These people need different tests.

If you have any of these symptoms, even if your last screening test was very low risk or you are between scans, please talk to your doctor right away.

- **A new or changed cough**
- **Coughing up blood**
- **Being short of breath for no reason**
- **Getting very tired**
- **Unexplained weight loss**
- **Chest or shoulder pain that does not go away**

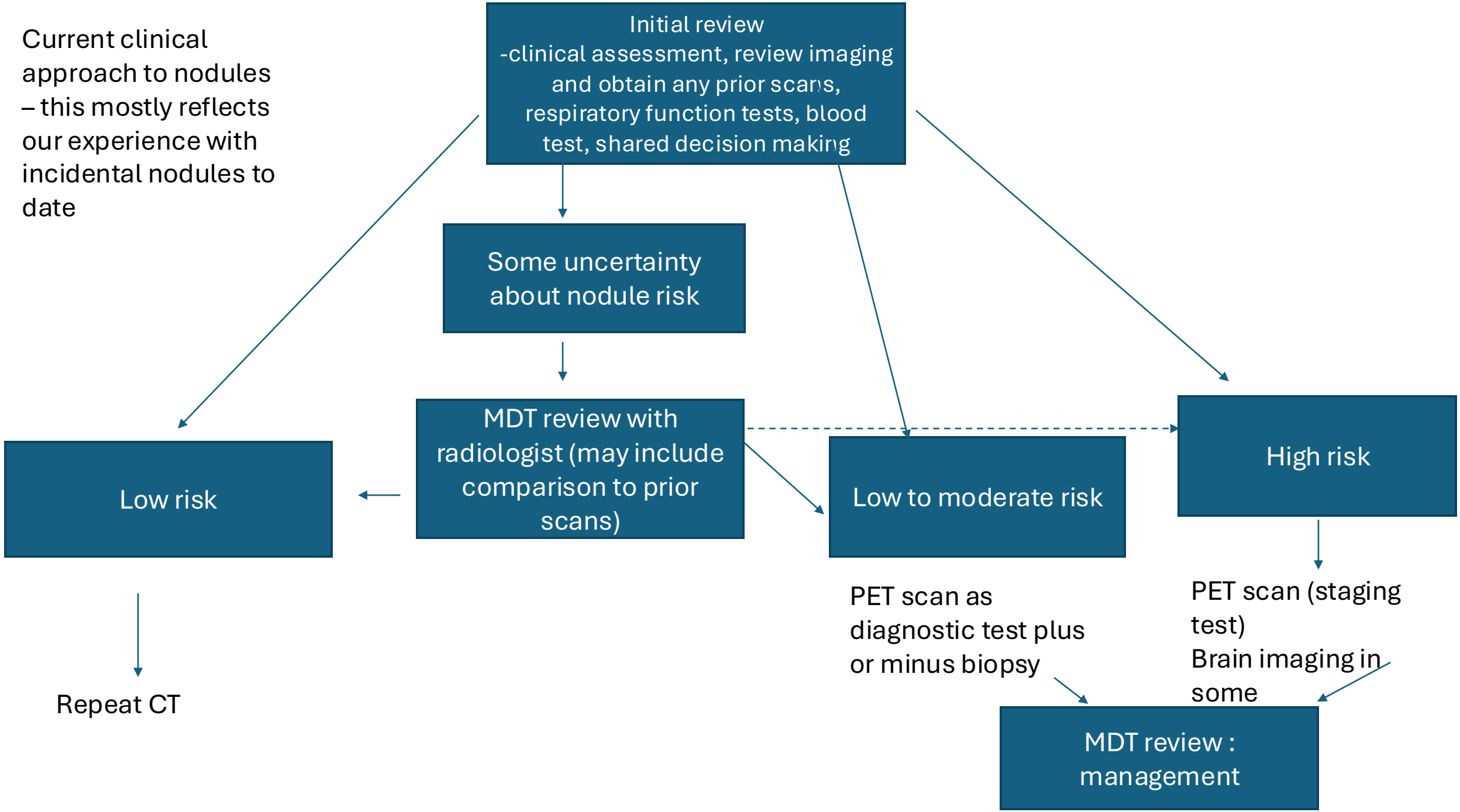
Participant information sheet regarding lung nodules

What does my result mean and what happens next?

Screening results	Next steps
Incomplete The scan could not be reported for technical reasons and needs to be repeated.	• You will need to re-screen when you get a reminder from the NCSR or your doctor.
Very low risk There were no findings of concern from your scan. Regular screening every 2 years is important to check for changes as you age.	• You will be told there are no significant findings and that you should re-screen in 2 years. • You will get a reminder from the NCSR and/or your doctor when it is time to screen again in **2 years**. • You will need to go back to your doctor in 2 years for your suitability check and get a referral for a low-dose CT scan. Smoking history will not need to be re-assessed.
Low risk A nodule has been found on your scan but you are considered to have a low chance of lung cancer. You will need to have another scan in 12 months time.	• The NCSR will not provide you with your results but will encourage you to speak with your doctor about your results. • The NCSR will remind you when it is time to screen again in **12 months**. • When you get your reminder, you will need to go back to your doctor for your suitability check and get a referral for a low-dose CT scan.
Low to moderate risk or moderate risk A nodule or nodules have been found on your scan that need to be monitored more frequently. Depending on your findings you will need to have another scan in 3 or 6 months time.	• The NCSR will not provide you with your results but will encourage you to speak with your doctor about your results. • The NCSR will remind you when it is time to screen again in **3 or 6 months**. You will need to go back to your doctor for your suitability check and get a referral for a low-dose CT scan.
High or very high-risk One or more nodules have been found that need further investigation. This does not mean that you have cancer. There is a higher risk of lung cancer, so it is important that you attend all follow-ups.	• The NSCR will encourage you to speak with your doctor about your results. The doctor will review the radiology report and refer you to a specialist for further investigation.
Actionable additional findings unrelated to lung cancer The scan can see other parts of the body in addition to the lungs, including the neck, chest and upper abdomen. Sometimes this can show findings either in the lungs (something other than cancer, such as emphysema), or outside of the lungs (something like heart disease). The NCSR will encourage you to see your doctor to discuss next steps.	• Your doctor will talk to you about the need for any further tests and next steps. An additional finding does not necessarily mean you cannot continue in the lung cancer screening program.

Participant information provided regarding interpretation of results

Current clinical approach to nodules – this mostly reflects our experience with incidental nodules to date

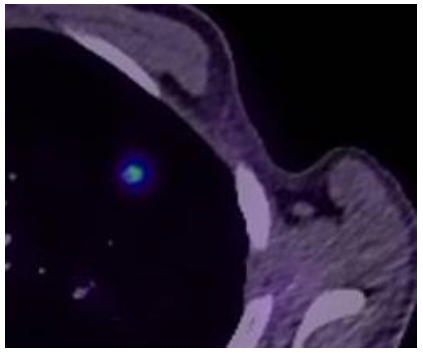


PET scan in the work up of screen detected nodules

Data from COSMOS study 383 nodules

Overall test performance
Sensitivity 64%
Specificity 89%
PPV 85%
NPV 70%

Generally consider PET in nodules 10 mm or greater which are solid or part solid



Performs best for

- Baseline scans sensitivity of 82% and specificity of 92%

- Solid nodules 15 mm or greater -sensitivity of 98% and specificity of 69%

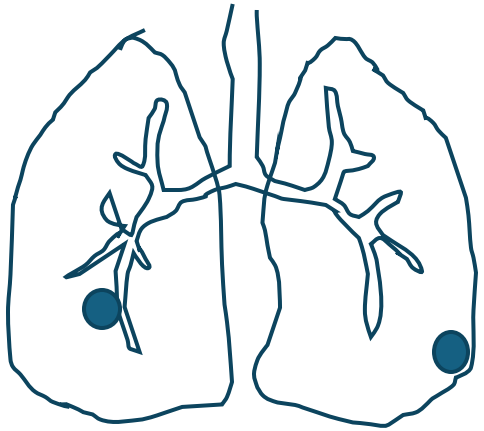
Performance was not as good for subsequent screening rounds or for subsolid nodules -e.g. sensitivity of 22% for non solid nodules and 49% for part solid nodules or for smaller nodules e.g. solid nodules < 10 mm (sensitivity of 51%).

383 nodules, examined by PET-CT over the first 6 years of the COSMOS (Continuous Observation of Smoking Subjects) study
Veronesi et al European Respiratory Journal 2015 45(2): 501-510

Nodule biopsy

Radial EBUS (endobronchial ultrasound)

- Lower diagnostic yield but safer
- Suited to more central lesion
- Advances in bronchoscopy including ultrathin probes and robotic bronchoscopy improving access to more peripheral lesions



CT guided core biopsy or fine needle aspirate

-Higher diagnostic yield but higher complication rate than EBUS
-Less suited to more central lesions

Surgical (VATS)
-Wedge resection
-Sublobar resection
-Lobectomy

-Gold standard diagnosis
-Potential for definitive diagnosis and management in one procedure
-Higher complication rate including mortality risk

Factors influencing choice

- Shared decision making- patient preference, certainty versus risk averse
- Lesion size, location, airway
- Lung function/comorbidity- surgical and biopsy risk
- Local expertise

Systematic Review and MA and network meta-analysis. Balasubramanian et al. Respiratory Review 2024 33(173): 240046

Nodule biopsy

Procedure	Sensitivity for malignant disease	Pneumothorax %	Pneumothorax requiring chest tube	Clinically significant bleeding	Mortality
CT-TBNA	91.2%	16.8%*	1.6%	5.2%	< 1 in 1000
rEBUS	74.4%	0.9%	0.2%	1.4%	< 1 in 1000
VATS wedge resection	100%		Chest tube routine post procedure	Other morbidity e.g. pneumonia, prolonged air leak 5%	0.52%* benign disease in hospital mortality
Lobectomy	100%		Chest tube routine post procedure	2.9 to 9%	1.7% 30 days Danish Lung Cancer Registry

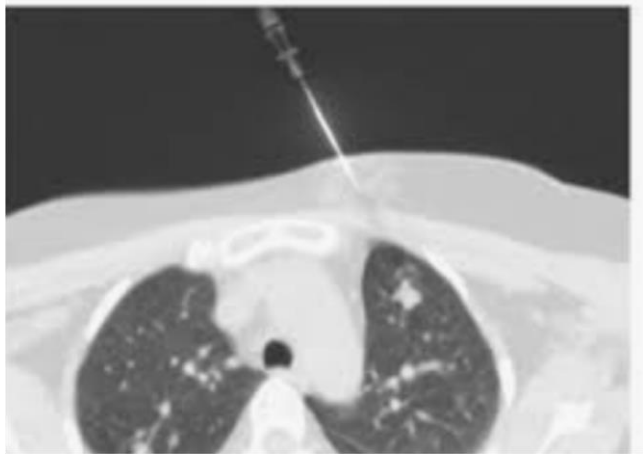
*25% in one meta-analysis and 5.6% requiring chest tube (core biopsy)

West. The Society for Cardiothoracic Surgery in Great Britain & Ireland Third National Thoracic Surgery Activity & Outcomes Report 2018
Systematic Review and MA and network meta-analysis. Balasubramanian et al. Respiratory Review 2024 33(173): 240046
von Bartheld et al. Gastrointest Endosc. 2015 Dec;82(6):1009-15.
Freund MC, et al. BMC Pulm Med. 2012;12:2.
Heerink et al. Eur Radiol. 2017 Jan;27(1):138-148
Anders Green et al, *European Journal of Cardio-Thoracic Surgery*, Volume 49, Issue 2, February 2016, Pages 589–594
Liu et al. International expert consensus on the management of bleeding during VATS lung surgery. Ann Transl Med. 2019 Dec;7(23):712.

Minimising Harms: surgical procedures

Mazzone et al. Screening for Lung Cancer: CHEST Guideline and Expert Panel Report. Chest. 2021 Nov;160(5):e427-e494.

On average 22% of surgical procedures were for benign disease



One study suggests preoperative fine needle aspiration of the lung nodule can significantly reduce the non-malignant surgical resection rate from 25.9% to 7.9%. Sensitivity FNA 96%, false negative 4%.

Barta et al. Lung cancer diagnosis by fine needle aspiration is associated with reduction in resection of nonmalignant lung nodules. Ann Thorac Surg. 2017;103:1795–1801.

Conclusions

Screening scans will be reported in a standardised format using the NLCSP nodule management protocol

Expect the majority of scans reported to be very low risk

Expect approximately 3% of scans to be high or very high risk and require referral to respiratory physician linked to an MDT

Approximately 18% may require an earlier CT at 3, 6 or 12 months and will stay in the screening program (with a small proportion of these likely to need on referral if there is nodule growth).

Participant information on pulmonary nodules and interpreting scan reports is available and will be a useful tools when communicating results.

Pathways are written by GP clinical editors with support from local GPs, hospital-based specialists and other subject matter experts

- clear and concise, evidence-based medical advice
- Reduce variation in care
- how to refer to the most appropriate hospital, community health service or allied health provider.
- what services are available to my patients

Where to find the respiratory suite ?

HealthPathways Melbourne

Draft in progress: National Lung Cancer Screening Program

National Lung Cancer Screening Program

Lead Region Page: Melbourne (lead). No followers yet.

Caution: This page is in development. STYLE-ALIGNED DRAFT PHASE First

See also:

- Lung Cancer - Suspected
- Non-acute Respiratory Referral
- Smoking and Vaping Cessation

Clinical editor's note

From 1 July 2025, the new National Lung Cancer Screening Program (NLCSP) starts for eligible high-risk people aged aged 50 to 70 years who are asymptomatic, using low-dose CT scans.

Background

About National Lung Cancer Screening Program

Assessment

1. Consider priority populations.
2. Check the patient's eligibility at the time of registration to the program:
   - Aged between 50 to 70 years.
   - Asymptomatic.
3. Take a history:
   - Assess for any symptoms of respiratory disease. If the patient has respiratory symptoms, follow the Lung Cancer – Suspected pathway.
   - Assess smoking history, specifically tobacco and cigarette smoking. Vaping and e-cigarettes are not used in risk calculations.
   - Ask about family history of lung cancer and include in the referral – this is used to calculate the patient's risk and guide management.
4. Check the patients suitability – this may be temporary or may change. Reassess prior to each scan.
5. Provide information to the patient about the program. If necessary, provide translated information. Encourage shared decision making and allow patients to make an informed choice on whether to screen. Discussion should include:
   - the benefits of screening.
   - what screening involves, including discussion about low-dose CT scans and the likely outcomes of the scan.
   - how the results will be received.
   - further actions that may be required.
6. Enrol the patient in the National Cancer Screening register.
7. Arrange low-dose CT scan if eligible:
   - Use NLCSP radiology form, or complete a request for screening low-dose CT scan. Specify 'lung cancer screening' and include family history of lung cancer.
   - Radiology offered at no cost to the patient under medicare with participating radiology providers through the NLCSP.
   - Low-dose CT scan be arranged every 2 years, if eligible in the program, or at a frequency determined by any abnormalities found, as discussed in management below.
8. Reassess suitability as required. Once the patient is in the program they will remain in the program – reassessment for eligibility is not required.

Management

1. Discuss results of the low-dose CT scan with the patient. Results are sent to the requesting medical practitioner and the National Cancer Screening Register (through PRODA). Patients will also receive communication with instructions on the next steps.
2. Manage according to scan results:
3. Provide handouts tailored to the patient and their scan results.
4. Discuss smoking cessation if appropriate – see Smoking and Vaping Cessation.
5. Add a recall or reminder for the patient into practice software.
   - Once the patient is in the program they will remain in the program. Reassessment for eligibility is not required, but reassessment for suitability may still be required.
   - Requests to defer or pause participation can be completed by the patient through the participant portal, or by calling the NCSR contact centre.
   - Patients may exit the program at any time. Eligible patients who have exited the program can re-enter if still within the age limit, asymptomatic, and still suitable for low-dose CT scan.
6. For more information about the program, see Department of Health and Aged Care – National Lung Cancer Screening Program Contact.

Referral

f high risk or very high risk CT scan result, refer to a respiratory physician linked to a lung cancer multidisciplinary team.

Information

Relevant and Related Pathways

Relevant Pathways

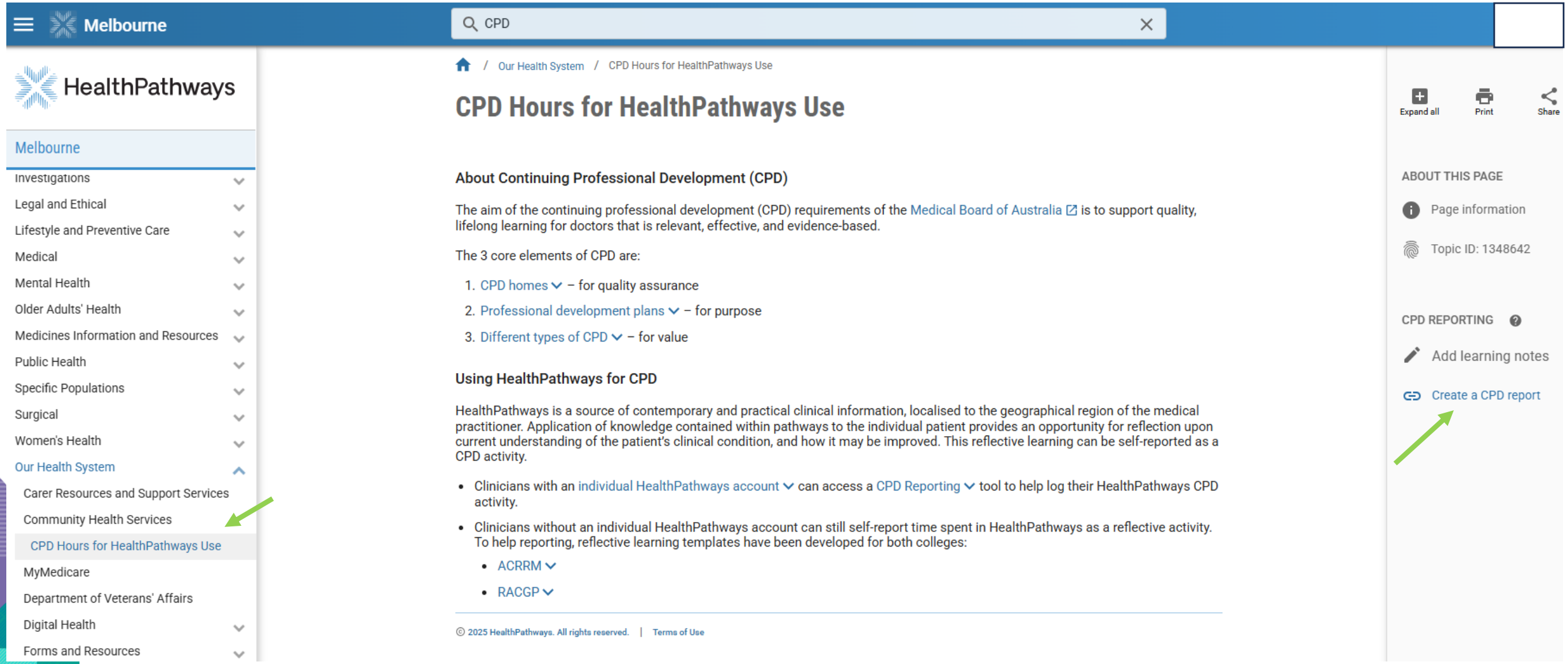
Upcoming Pathway-National Lung Cancer Screening Program
Lung Cancer - Established
Lung Cancer – Suspected
Acute Exacerbation of COPD
Advanced or End-stage COPD
Assessing Respiratory Presentations in General Practice
Asthma in Adults - Acute
Asthma in Adults - Non-acute
Asthma and Pregnancy
Bronchiectasis
Chronic Cough in Adults
COPD Severity Classification
Asthma-COPD
Non-acute COPD
Thunderstorm Asthma

Related Pathways

Acute Respiratory Referral or Admission (Same-day)
Non-acute Respiratory Referral (> 24 hours)
Lung Function Testing
Pulmonary Rehabilitation
Home Oxygen Referral
Sleep Medicine Specialist Assessment
Practice Management Resources
Statewide Referral Criteria for Specialist Clinics
Smoking and Vaping Cessation

CPD Hours for HealthPathways Use

HealthPathways – CPD Hours for HealthPathways Use

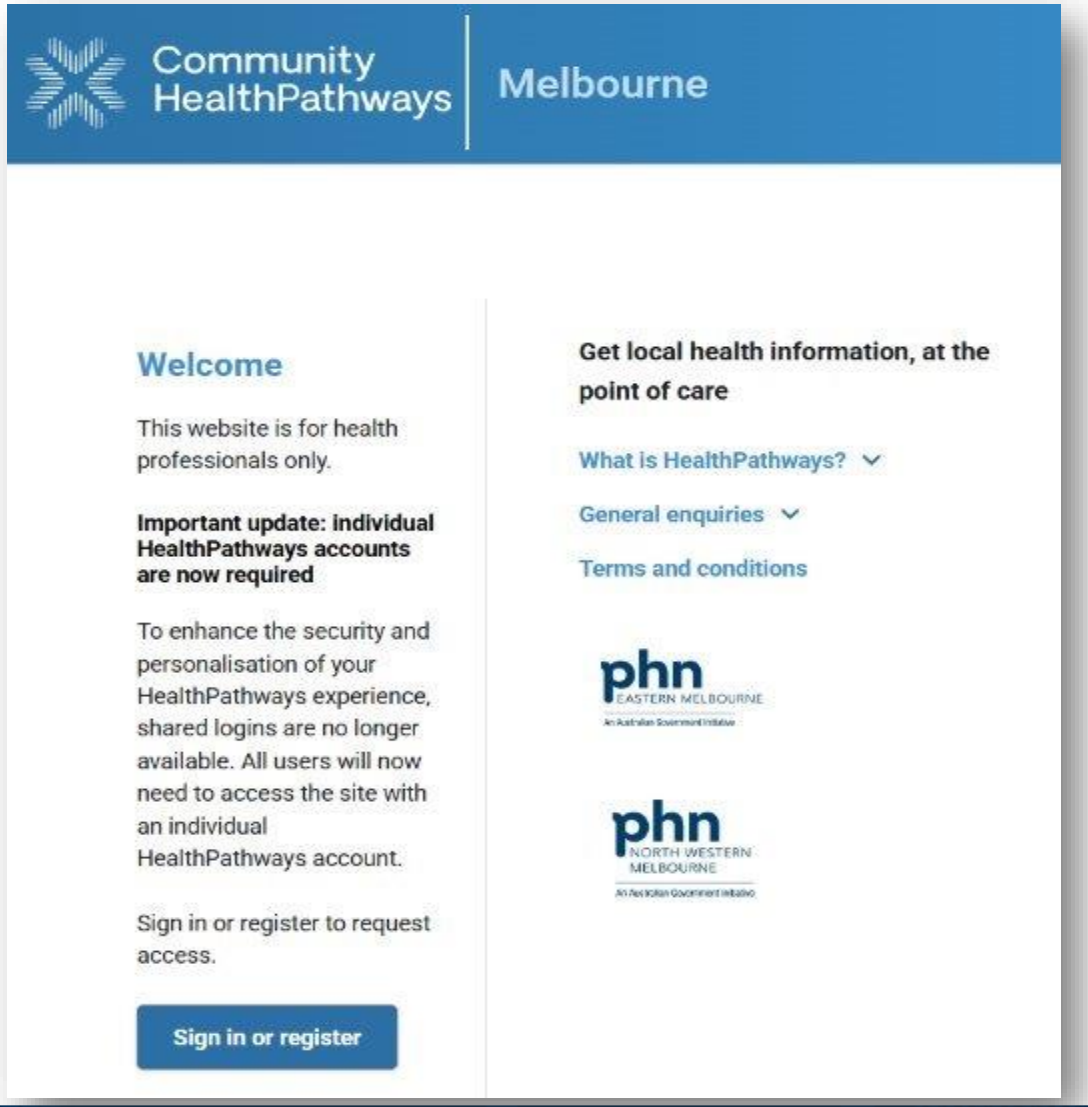


Accessing HealthPathways Melbourne

Please click on the **Sign in or register** button to create your individual account or scan the QR code below.

If you have any questions, please email the team info@healthpathwaysmelbourne.org.au.

melbourne.healthpathways.org.au



HealthPathways Bulletin

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Post-Presentation Poll Questions

NLCSP Resources

Resources for health care providers


GP RESOURCE GUIDE

Contents

Resources for patients


Australian Government

NATIONAL LUNG CANCER SCREENING PROGRAM

For more information about the National Lung Cancer Screening Program:
www.health.gov.au/nlcsp

Quitline 137848

For help to quit smoking:
www.quit.org.au


NATIONAL LUNG CANCER SCREENING PROGRAM

UNDERSTANDING LUNG NODULES AND OTHER FINDINGS

https://www.health.gov.au/our-work/nlcsp/resources

LCS referral process at RMH

- New primary health care educational series
- New lung cancer screening and nodule CNC support
- New lung nodule – nurse-led clinic
- New lung cancer screening – physician-led clinic

The Royal Melbourne Hospital

Questions?

Session Conclusion

We value your feedback, let us know your thoughts.

Scan this QR code

You will receive a post session email within a week which will include slides and resources discussed during this session.

Attendance certificate will be received within 4-6 weeks.

RACGP CPD hours will be uploaded within 30 days.

To attend further education sessions, visit,

https://nwmphn.org.au/resources-events/events/

This session was recorded, and you will be able to view the recording at this link within the next week.

https://nwmphn.org.au/resources-events/resources/