National Lung Cancer Screening Program: Additional findings detected during lung cancer screening

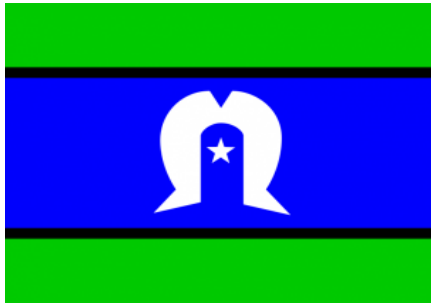
Tuesday, 12 August 2025

The content in this session is valid at date of presentation

Acknowledgement of Country

We 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.



Housekeeping – Zoom Meeting

All attendees are muted

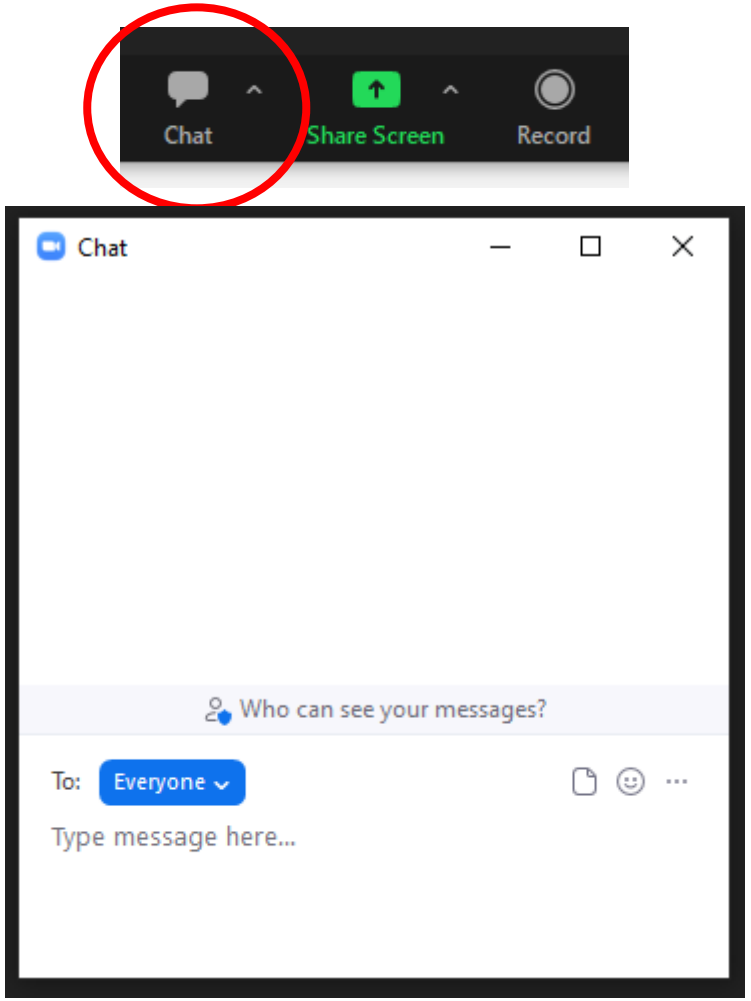
Please keep your microphone on mute

Please ask questions via the Chat box

This session is being recorded

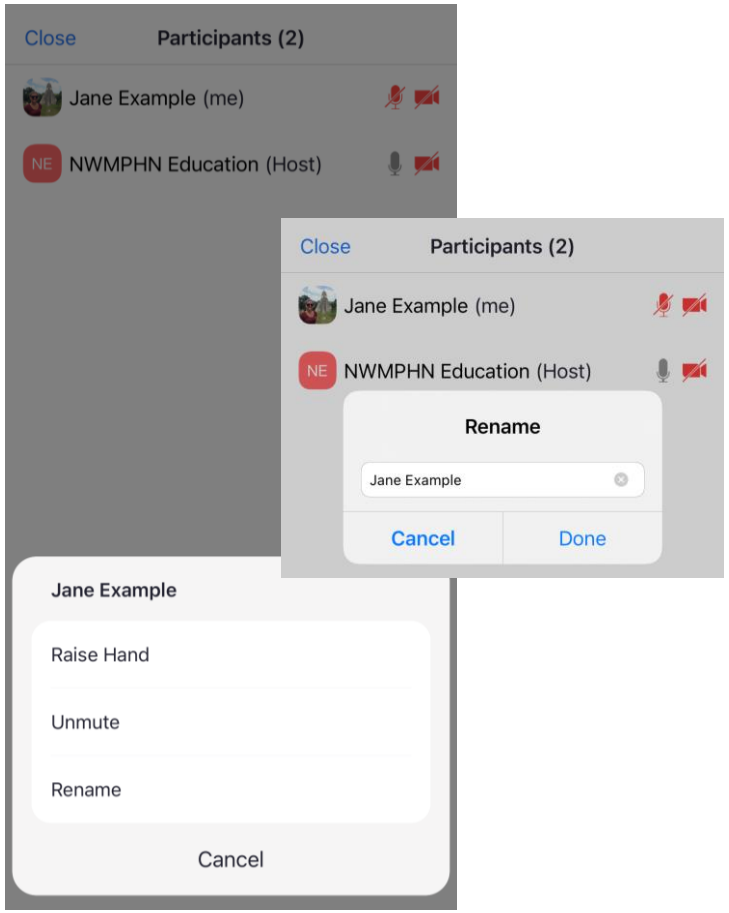
Please ensure you join the session using the name you registered with so we can mark your attendance

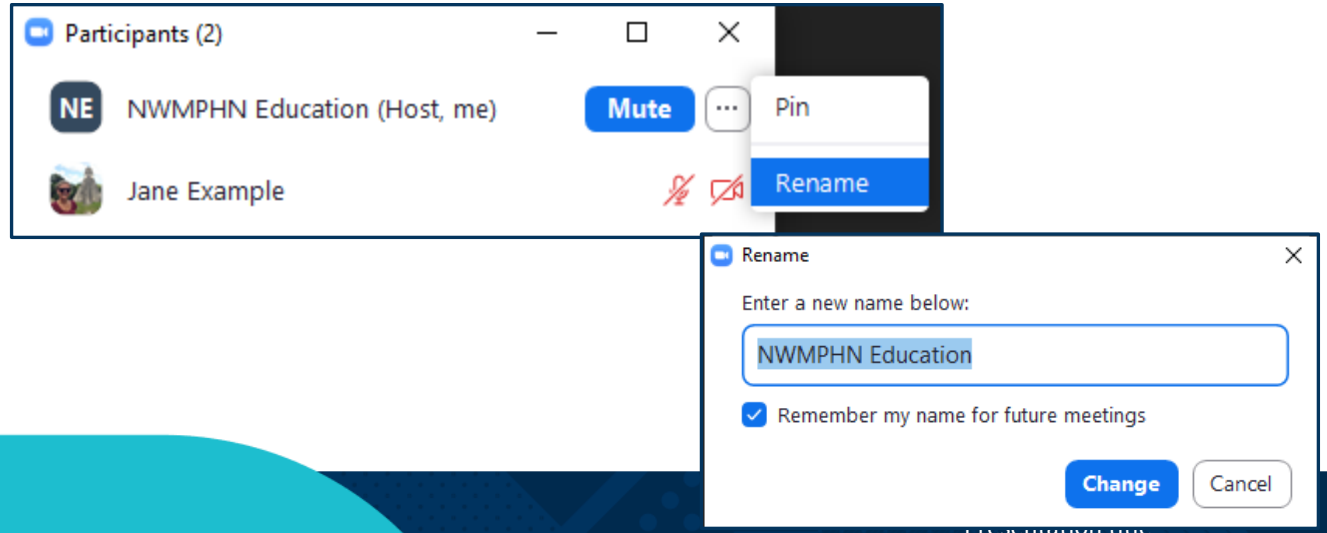
Certificates and CPD will not be issued if we cannot confirm your attendance



How to change your name in Zoom Meeting

1. Click on ***Participants***
2. **App:** click on your name
   Desktop: hover over your name and click the 3 dots
   Mac: hover over your name and click *More*
3. Click on ***Rename***
4. Enter the name you registered with and click
   Done / Change / Rename





Agenda

Time	Topic
6:30pm-6:35pm	Welcome & Housekeeping *Dr Sue Hookey*
6:35pm-6:40pm	Pre presentation poll *Dr Asha Bonney*
6:40pm-6:50pm	Overview of additional findings with review of case studies Dr Asha Bonney
6:50pm-7pm	Coronary artery calcification *Dr Kai Leong*
7pm-7:10pm	Emphysema *Dr Renee Manser*
7:10pm-7:20pm	Interstitial lung abnormalities *Dr Alistair Miller*
7:20pm-7:30pm	Communicating with patients of additional findings *Dr Sue Hookey*
7:30pm-7:35pm	Post presentation poll *Dr Asha Bonney*
7:35pm-7:40pm	RMH referral pathways *Dr Asha Bonney*
7:40pm-7:50pm	HealthPathways presentation *Dr Hashinee Weraduwage*
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.

Dr Kai Leong is a highly skilled multi-modality cardiac imaging specialist. He graduated with honours in medicine and surgery from the University of Melbourne in 2009 and completed his postgraduate training at the Royal Melbourne Hospital, including dual qualification in general medicine and cardiology, followed by an echocardiography fellowship. Awarded an EACVI/ESC grant, he pursued advanced imaging training in cardiac MRI and CT at Imperial College NHS Healthcare Trust and the Royal Brompton Hospital, London. Reflecting his expertise in advanced cardiac imaging, Dr. Leong is a fellow of the American Society of Echocardiography (FASE), European Association of Cardiovascular Imaging (FEACVI) and the Society for Cardiovascular Magnetic Resonance (FSCMR).

Pre-Presentation Poll Questions

Additional Findings: An overview

Dr Asha Bonney

The Royal Melbourne Hospital

Overview

- Definitions
- Frequency of additional findings
- Reporting of additional findings
- Additional findings guideline
- Cases

Additional or incidental findings

- Actionable vs non-actionable

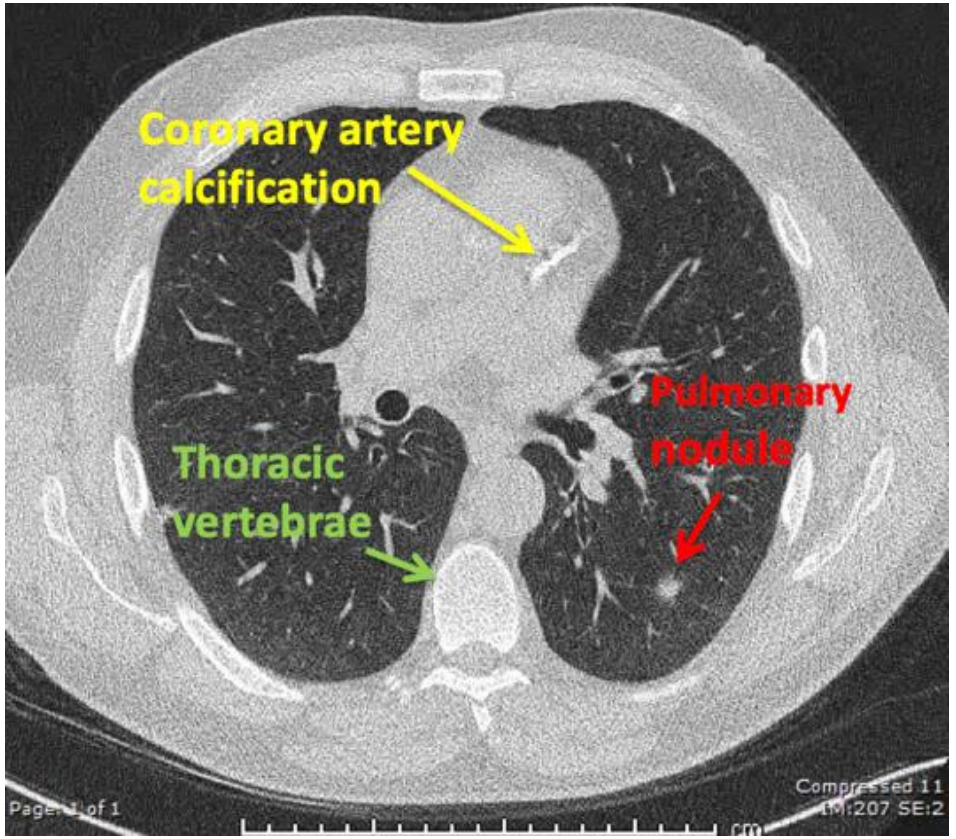


Figure 1. LDCT (Axial view)

Frequency

- Additional findings are common
  - Over 94% of participants in the Cleveland Clinic Lung Cancer Screening Program.
  - 73% of Australian and Canadian International Lung Screen Trial participants.
  - 16/17309 (0.39%) National Lung Screening Trial participants had extrathoracic cancers detected on LDCT.

Morgan L, et al. Ann Am Thorac Soc. 2017.
Bonney A, et al. MJA. 2025.
Nguyen XV, et al. JACR. 2017

Finding type	Australia
Total number of people	2099
Pleura	
Actionable	22/2093 (1.1%)
Non-actionable	166/2093 (7.9%)
Normal	1905/2093 (91.0%)
Interstitial lung abnormality	
Actionable	101/1970 (6.3%)
Non-actionable	18/1970 (1.1%)
Normal	1497/1970 (92.6%)
Airways	
Abnormal	683/2079 (32.9%)
Normal	1396/2079 (67.1%)
Emphysema	
Present	1186/2097 (57.0%)
Absent	911/2097 (43.4%)
Emphysema (by grade)	
Trivial (< 5%)	407/1186 (34.3%)
Mild (5–25%)	518/1186 (43.7%)
Moderate (> 25% to 50%)	186/1186 (15.7%)
Marked (> 50% to 75%)	52/1186 (4.4%)
Severe (> 75%)	12/1186 (1.0%)
Not recorded	11/1186
Coronary artery calcification	
Present	1396/2080 (67.1%)
Absent	684/2080 (32.9%)
Coronary artery calcification (by grade)	
Mild	803/2080 (38.6%)
Moderate	425/2080 (20.4%)
Severe	168/2080 (8.1%)

Bonney A, et al. MJA. 2025.

Variations in reporting

Table 2. Prevalence of incidental findings on 2,199 lung cancer screening exams between December 2013 and January 2018

	N (Column %)	Imaging Site	
		University *N* (Column %)	Community Partner *N* (Column %)
Number of exams	2,199 (100)	886	1,313
Number of exams with incidental finding	874 (39.8)	540 (60.9)	334 (25.4)
One incidental finding reported	583 (26.5)	308 (34.7)	275 (20.9)
Two or more incidental findings reported	291 (13.2)	232 (26.2)	59 (4.5)
Aortic aneurysm	41 (1.9)	24 (2.7)	17 (1.3)
Coronary artery calcification	481 (21.9)	256 (28.9)	225 (17.1)
Mass	91 (4.1)	50 (5.6)	41 (3.1)
Adrenal	17 (0.8)	10 (1.1)	7 (0.5)
Kidney	18 (0.8)	9 (1.0)	9 (0.7)
Liver	24 (1.1)	9 (1.0)	15 (1.1)
Thyroid	16 (0.7)	10 (1.1)	6 (0.5)
Pancreas	5 (0.2)	3 (0.3)	2 (0.2)
Breast	5 (0.2)	5 (0.5)	0 (0)
Other	6 (0.3)	4 (0.5)	2 (0.2)
Incidental lung finding	262 (11.9)	228 (25.7)	34 (2.6)
Lymphadenopathy	18 (0.8)	10 (1.1)	8 (0.6)
Other clinically significant abnormality	111 (5.0)	76 (8.6)	35 (2.7)

Jassen K, et al. Ann Am Thorac Soc. 2019.

Examples from the NLCSP

Additional Findings:

Actionable additional findings:

Lungs: n/a
*Emphysema:
*Interstitial lung abnormality:
*Bronchiectasis:
*Diffuse cystic lung disease:
*Diffuse nodular lung disease:
Pleura: n/a
*Pleural effusion, thickening or mass:
*Bilateral calcified pleural plaques:
Mediastinum: n/a
*Lymph nodes:
*Other:
Cardiovascular: n/a
* Coronary artery calcified plaque:
*Aortic valve calcification:
*Pericardial effusion:
*Thoracic aorta dilatation:
*Pulmonary artery dilation:
Abdomen: n/a
*Liver lesion:
*Diffuse liver disease:
*Kidney lesion:

*Adrenal lesion:
*Abdominal aortic aneurysm:
*Pancreas mass or cyst:
Thyroid: Yes 8mm calcified nodule on the right
*Thyroid nodule:
*Multinodular goitre:
Breast: n/a
*Breast lesion:
*Axillary lymphadenopathy:
Bone: n/a
*Reduced bone density:
*Vertebral compression fracture:
Other: n/a

Conclusion:

Screening category and management: Category 1, 24 month LDCT
Nodule Summary: No significant nodules.
Actionable additional findings summary: Thyroid ultrasound should be considered
Other comments:

ADDITIONAL FINDINGS

Actionable additional findings from this study: yes

Lungs: n/a.

Pleura: n/a.

Mediastinum: n/a.

Cardiovascular: yes. Mild coronary artery calcification

Abdomen: n/a.

Thyroid: n/a.

Breast: n/a.

Bone: n/a.

Other: n/a.

CONCLUSION

Mild coronary artery calcified plaque. Clinical review. Consider lifestyle

The Royal Australian and New Zealand College of Radiologists

ANZSTR
Australian and New Zealand Society of Thoracic Radiology

NATIONAL LUNG CANCER SCREENING PROGRAM

Additional Findings Guidelines

Abdomen			
Liver lesion	*Nodule < 1 cm* – do not report *Simple cyst (homogeneous, and well defined, and ≤ 20 HU)* – do not report *Lesion ≥ 1 cm, not a simple cyst (HU > 20)* – report	Refer for liver ultrasound.	American College of Radiology Lung Cancer Screening CT Incidental Findings Quick Reference Guide. (1) ERS/ESTS/ESTRO/ESR/ESTI/EFOMP statement on management of incidental findings from low dose CT screening for lung cancer. (2)
Diffuse liver disease	*Liver attenuation < 40 HU or more than 10 HU lower than spleen* – report "hepatic steatosis" *Nodular contour and volume redistribution (enlarged caudate and/or left lobes)* – report "suspected cirrhosis"	*Hepatic steatosis:* Clinical review. Manage metabolic risk factors. Refer to National MAFLD guidelines. Consider referral to gastroenterologist or hepatologist. *Suspected cirrhosis*: Clinical review. Refer to gastroenterologist or hepatologist.	American College of Radiology Lung Cancer Screening CT Incidental Findings Quick Reference Guide. (1) MAFLD Consensus Statement Working Group. Recommendations for the assessment of metabolic dysfunction associated fatty liver disease (MAFLD) in primary care: a consensus statement. (9) Expert opinion (GESA and ARGANZ)

Case 1

- 50 yo M
  - Nil known medical history
  - Asymptomatic
  - Ex-tobacco smoker- >30pyh
  - CAT 1 NLCSP result

a.

Mild CAC

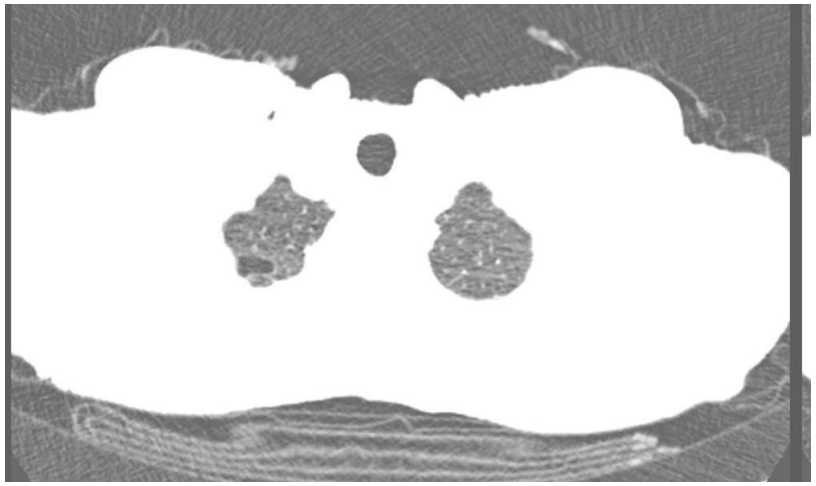
VS

Severe CAC

Chiles C, et al. Radiology.2015

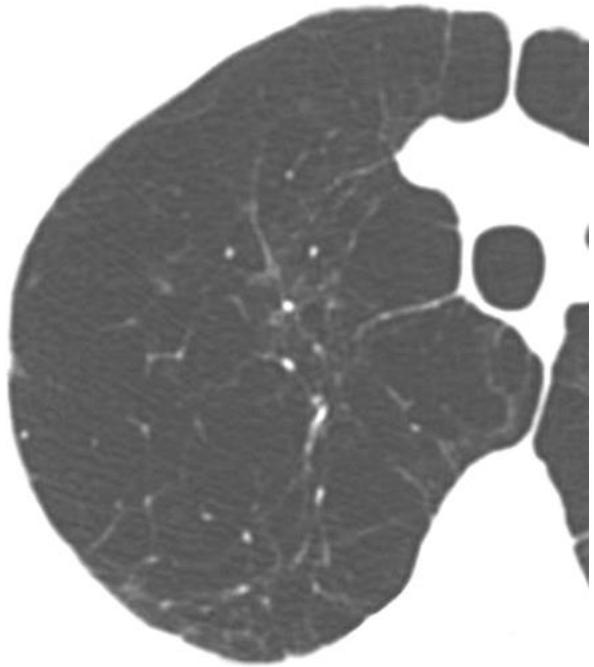
Case 2

- 65 yo F
  - Documented diagnosis of asthma, on PRN salbutamol
  - Mild exertional dyspnoea for >10 years
  - Current active tobacco smoking ~10/day, >30pyh
  - CAT 2 NLCSP result



Wisselink HJ, et al. European Journal of Radiology. 2023

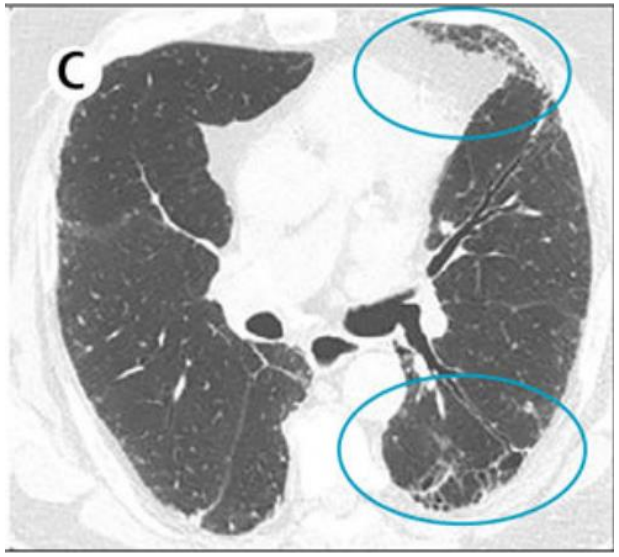
Mild VS Severe



Kaddouri BE, et al. Radiology. 2020.

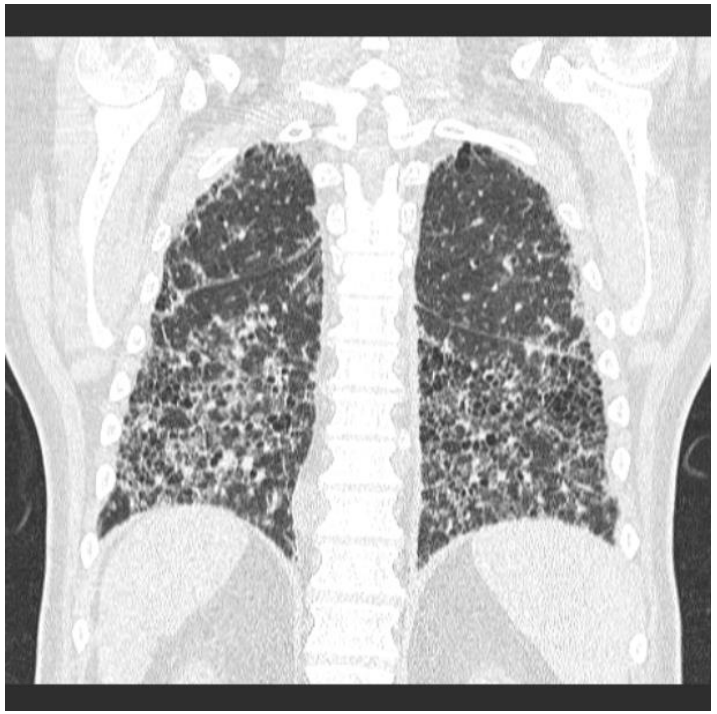
Case 3

- 70 yo M
- Asymptomatic
- Ex-tobacco smoker >30 pyh
- Medical history: hypertension, hyperlipidaemia, osteoarthritis
- CAT 1 NLCSP result



Hatabu et al, Lancet Respir Med. 2020.

Subpleural fibrosis VS Usual interstitial pneumonia pattern



Radiopedia.org

Conclusions

- Additional findings are common
  - However, most are not clinically significant
  - Structured reporting and adherence to guidelines are key
- Importance of informed consent
  - Possibility of having an additional finding
  - Not all additional findings may be reported
- There is an opportunity to significantly improve health outcomes by recognising and addressing additional findings appropriately

2

Coronary Artery Calcification: Background, utility and practical guidance

Dr Kai Leong

Imaging Cardiologist

FASE, FEACVI, FSCMR

Strong smoking and CVD relationship

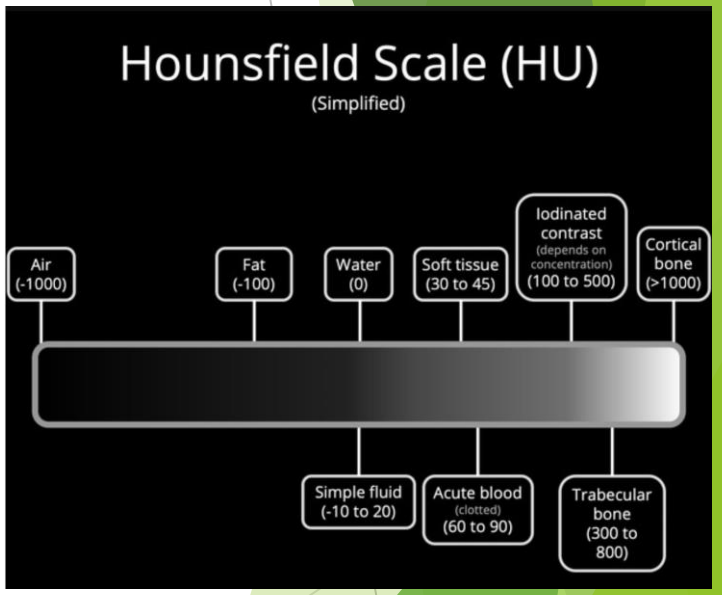
- Lung ca screening eligibility
  - 50-70 years
  - ≥30 pack year history
  - Asymptomatic
- Significant relationship between smoking and cardiovascular disease (CVD)
  - 11.5% of CVD burden in Australia attributable to smoking (AIHW, 2015)
  - Up to 3X higher CVD mortality in current vs never smokers (Banks E et al, 2019)
    - In middle age cohort, 38% of male and 34% of female CV mortality attributable to smoking
- Dose dependence
  - Vs non-smokers - Current smoker 1.7X more likely to develop coronary disease and 2.5X more likely to have an infarct (Banks E et al, 2019)
  - Smoking up to 14 cigs/day 2X cardiac death risk
  - Smoking >25 cigs/day 5X cardiac death risk

Large burden of unrecognised coronary disease

- 2015 USA
  - 7.1 million non-contrast chest CTs (NCCT) performed
  - Another 7-10 million NCCT if USPSTF lung cancer guidelines capture all eligible patients
- 340 million USA population vs 27 million Australian population
  - ? 1.4 million potential opportunistic/incidental CAC that can be assessed in Australia

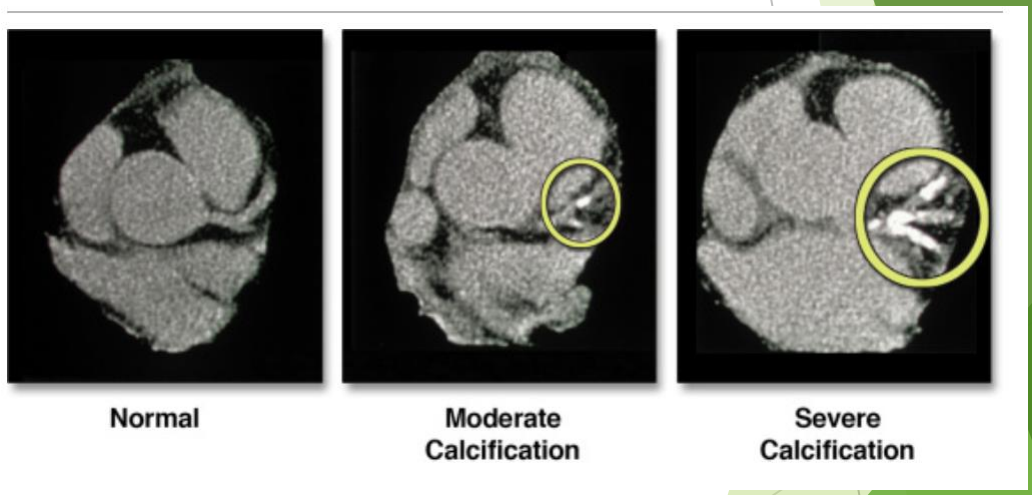
Calcium scoring technique

- Non-contrast limited ECG gated chest CT
- Low radiation dose
  - ~0.5 mSv vs 0.1 mSv CXR and 3 mSv natural background radiation
- Quick – no preparation, 3-5 s breath hold
- Non-MBS, out of pocket cost ~$200
- Agatston method
  - Lesion marked as coronary calcium if >130 HU attenuation
  - Area of ≥ 3 adjacent pixels (≥ 1 mm2)
  - Score = area of calcium X max calcium HU density (scored 1-4)



Calcium scoring technique

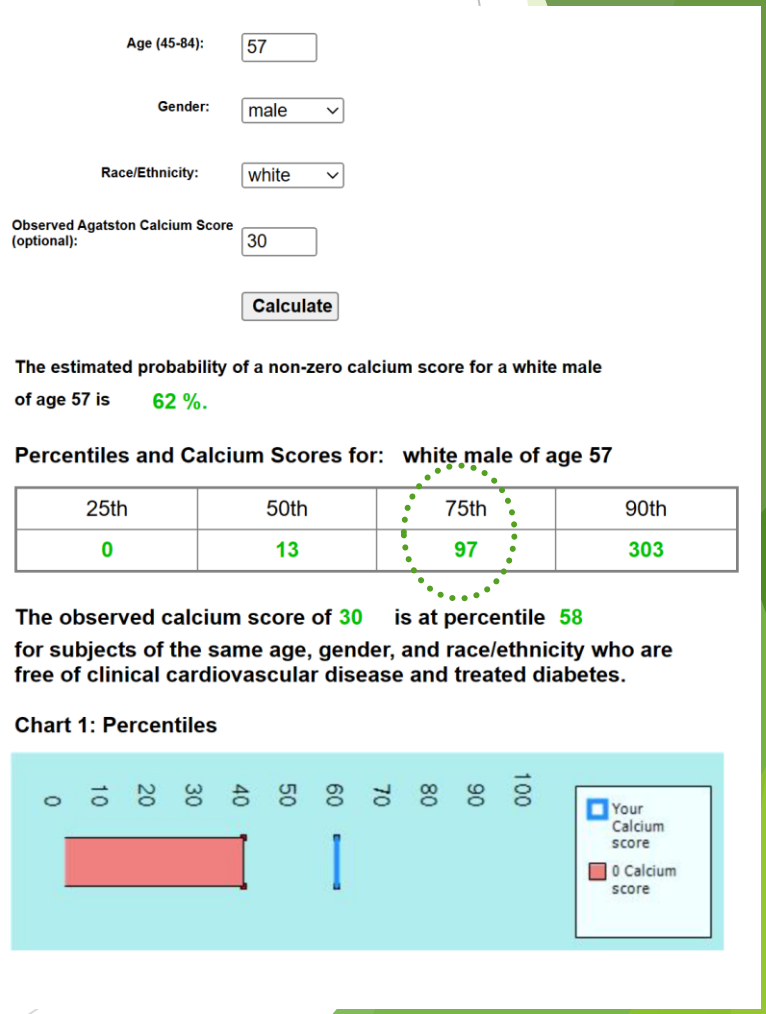
- All coronary lesions ‘marked’ by reader to give a numerical total score
- Risk categories based on score
  - 0 AU – Very low
  - 1-99 AU – Low
  - 100-399 AU – Moderate
  - ≥400 AU – High
  - ≥1000 AU – Very high



Hecht H, JACC CVI 2015

MESA ranking

- Comparison of patient's calcium score to age, gender and ethnicity matched asymptomatic subjects (~6100 in MESA cohort)
- ≥75th percentile = premature atherosclerosis for patient demographic = high risk regardless of score



Age (45-84): 57

Gender: male

Race/Ethnicity: white

Observed Agatston Calcium Score (optional): 30

Calculate

The estimated probability of a non-zero calcium score for a white male of age 57 is 62 %.

Percentiles and Calculation Scores for: white male of age 57

25th	50th	75th	90th
0	13	97	303

The observed calcium score of 30 is at percentile 58 for subjects of the same age, gender, and race/ethnicity who are free of clinical cardiovascular disease and treated diabetes.

Chart 1: Percentiles

Technical differences between ‘coronary calcium score’ and non-contrast CT chest

	Lung ca screening (NCCT)	Ca score
ECG gating	N	Y
Tube voltage	100-120 kVp	120 kVp
Scan mode	Helical	Prospective
Recon slice thickness	1-1.25 mm	3 mm

- Technical differences but generally good agreement (Kappa 0.8-0.9) at 1.25 mm slice thickness for NCCT

Coronary calcium grading on NCCT

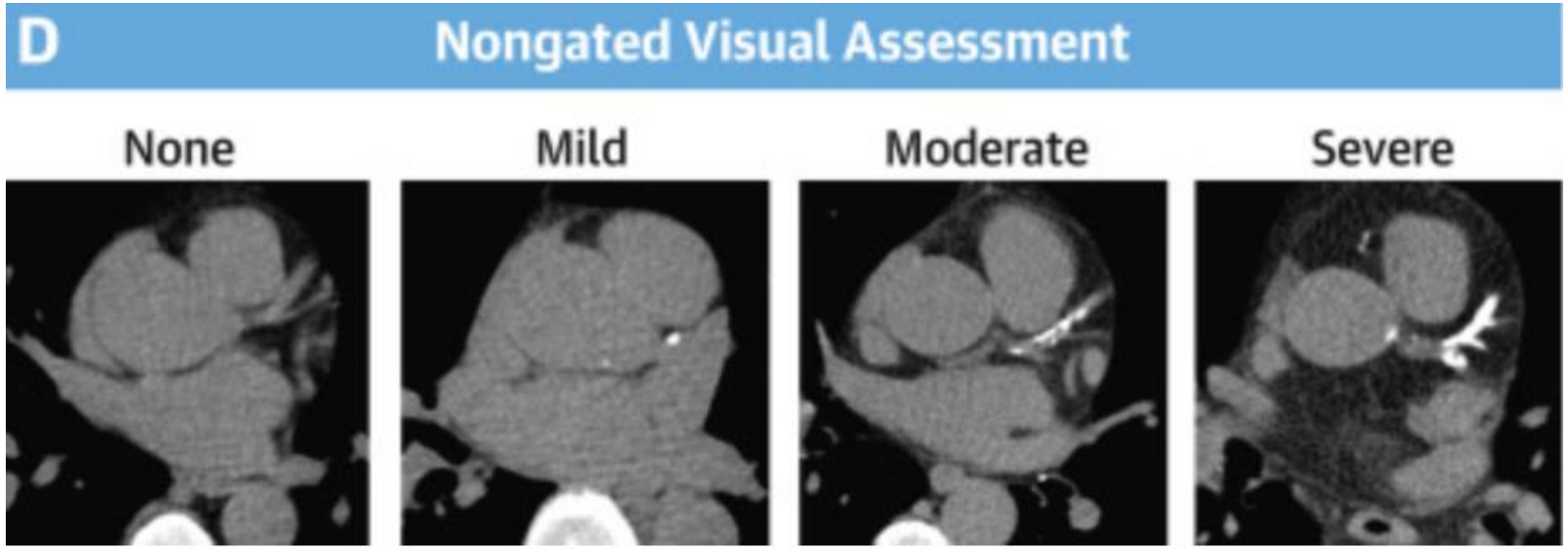
- Ordinal scoring
  - 4 arteries – left main, LAD, LCx and RCA
  - Each artery given a score from 0 to 3
    - 0=No CAC,1=mild (<1/3 length), 2=moderate, 3=severe (>2/3 length)
    - Three score categories – 0, 1-3, ≥ 4
- Visual estimate
  - “Eyeball” assessment
  - No CAC, mild, moderate and severe
  - Lower but still good agreement (kappa 0.7-0.8) between visual assessment and Agatston scoring

Prognostic value of coronary calcium on NCCT

- National Lung Screening trial (Chiles C et al, 2015 Radiol)
  - 6 year followup
  - 2.5% all cause mortality if no incidental CAC
  - 12% if high burden of CAC

- 8782 smokers 40-85 years (Shemesh J et al, 2010 Radiol)
  - 6 year followup
  - Compared to no CAC, moderate plaque burden ($\geq$4 on 12 point ordinal scale) had 2 fold higher risk of CV mortality (5% absolute all cause mortality)

Practical approach

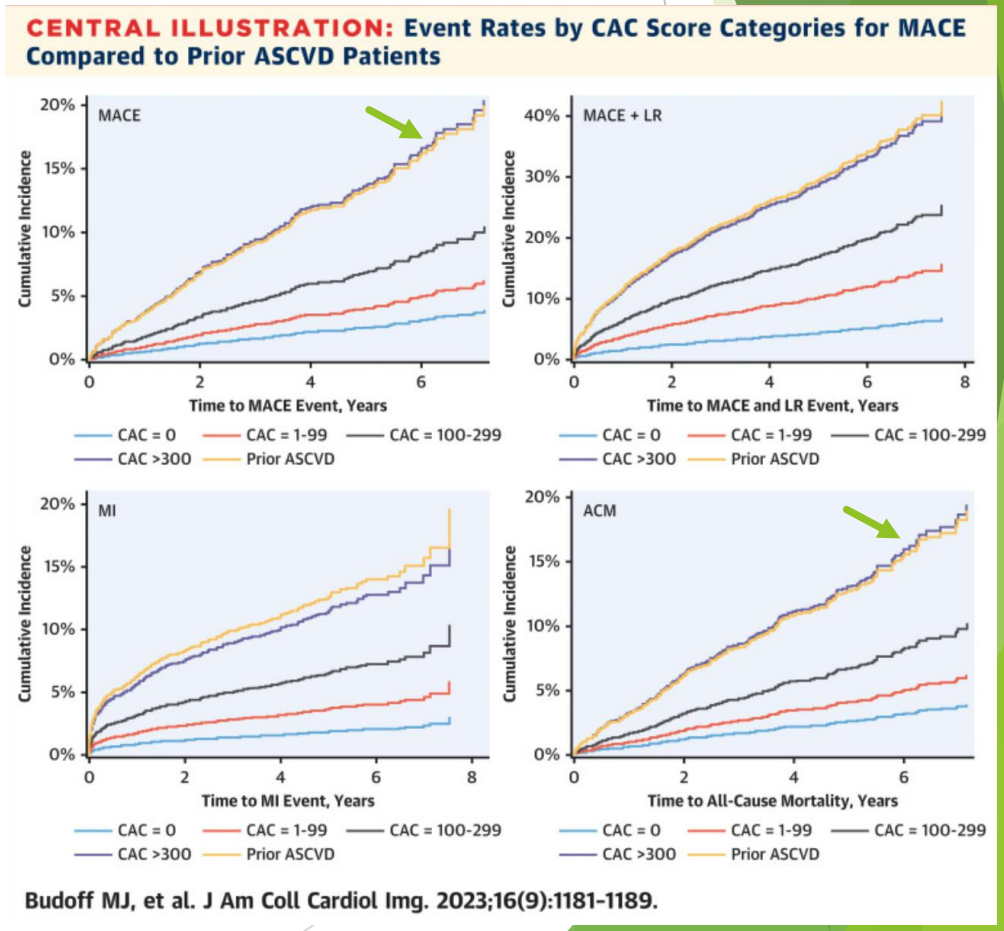


Parsa S et al, 2024 JACC

- Likely that lung cancer reports will mainly provide a “visual estimate” grade rather than ordinal score
  - None ≈ Ca score 0AU
  - Mild ≈ Ca score <100AU
  - Moderate ≈ Ca score 100-399AU
  - Severe ≈ Ca score ≥400AU

Calcium score >300 AU (Visual “moderate” grade)

- CONFIRM registry
  - 4511 patients without known CAD vs 438 with established CAD
  - 4 Ca score categories – 0, 1-99, 100-299, >300
  - Patients with Ca score of >300 AU had same MACE risk as patients with established CAD



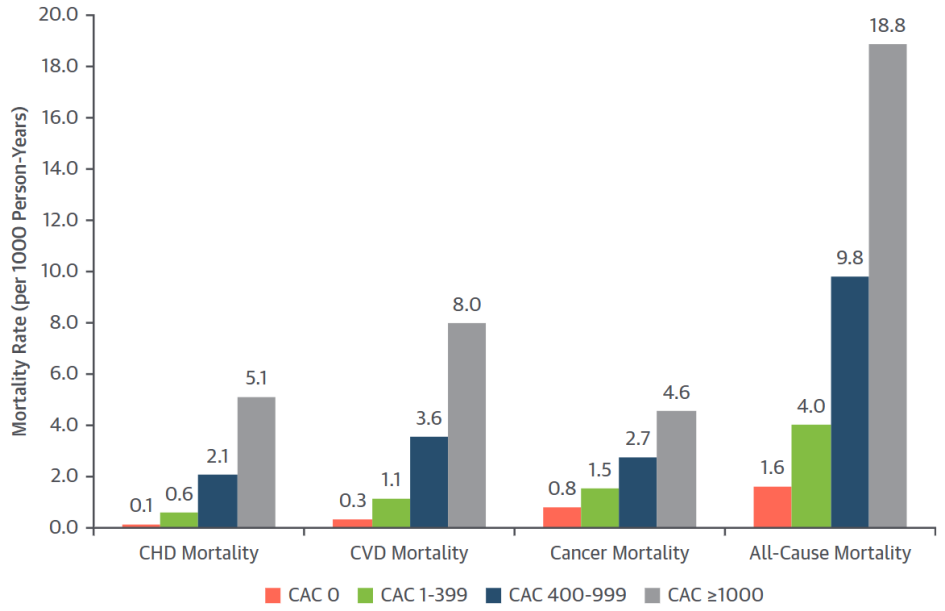
Calcium score ≥1000 AU (Visual “severe” grade)

- Unique very high risk category
- CAC consortium – 66,636 asymptomatic patients
  - 2869 with Ca score ≥1000
  - Significantly increased risks of cardiac, cancer and all cause mortality
  - Increased aortic, aortic and mitral valve calcification

Long-Term All-Cause and Cause-Specific Mortality in Asymptomatic Patients With CAC ≥1,000

Results From the CAC Consortium

FIGURE 1 Mortality Rate Per 1,000 Person-Years for CVD, CHD, Cancer, and All-Cause Mortality by CAC Score Group

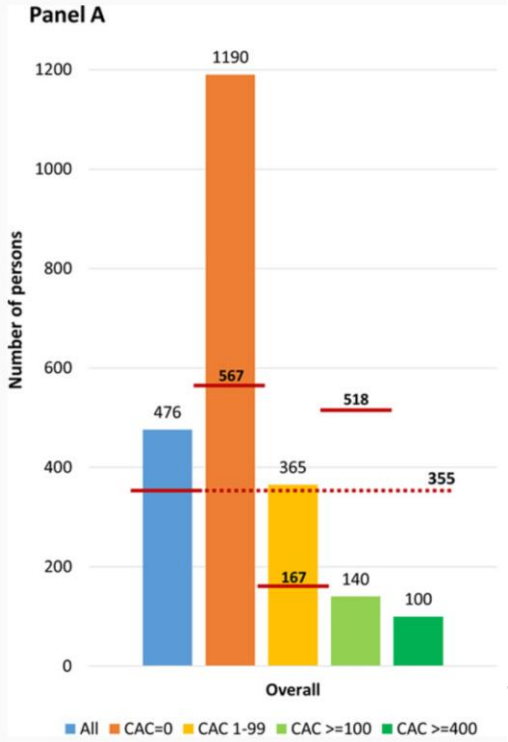


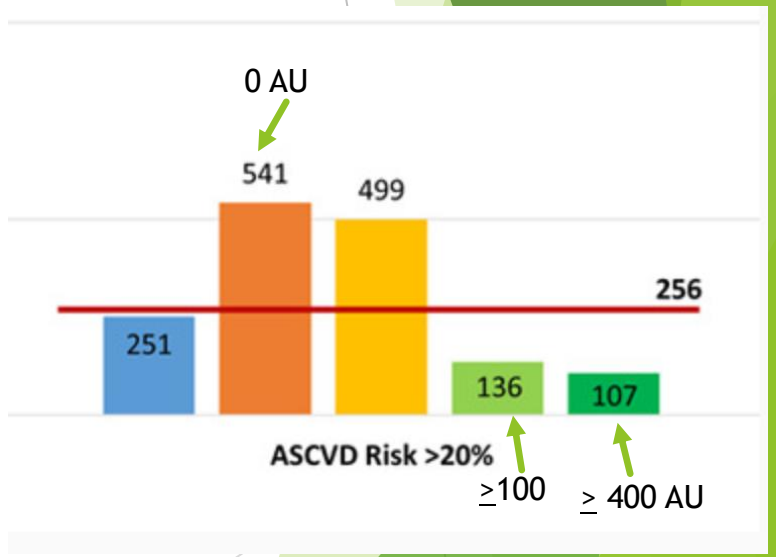
Calcium scoring and primary prevention

- Ca score > 300 – similar MACE risk as patient with known CAD (Budoff M et al, JACC 2023)
- ?lower Ca score threshold for aspirin
  - 6470 MESA patients
  - 5 year NNT and NNH for aspirin
  - Ca score categories 0, 1-99, ≥100, ≥400 AU
  - Clinical risk categories <5%, 5-20%, >20%
- If ≥ 100 AU, aspirin **net benefit**
  - NNT_5 140 vs NNH_5 355
- If clinical risk >20% but Ca score 0, aspirin **net harm**
  - NNH_5 256 vs NNT_5 541

Coronary Artery Calcium for Personalized Allocation of Aspirin in Primary Prevention of Cardiovascular Disease in 2019

The MESA Study (Multi-Ethnic Study of Atherosclerosis)

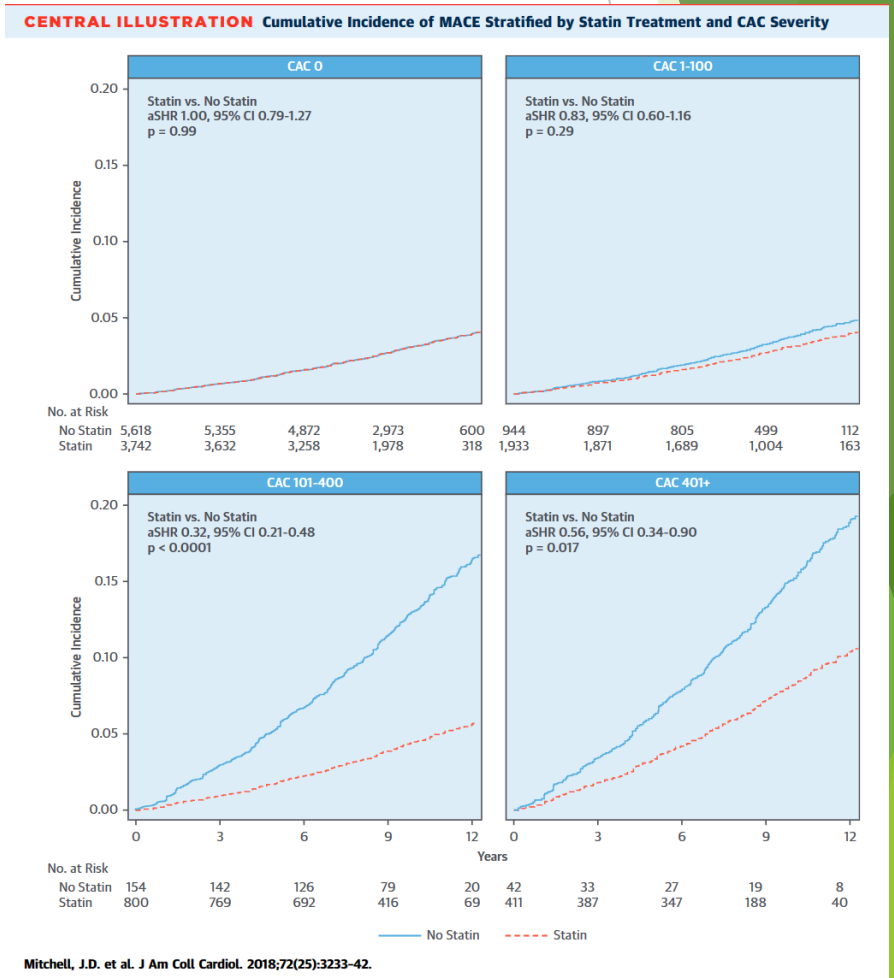




Circulation
Volume 141, Issue 19, 12 May 2020; Pages 1541-1553
https://doi.org/10.1161/CIRCULATIONAHA.119.045010

Calcium scoring and primary prevention statin

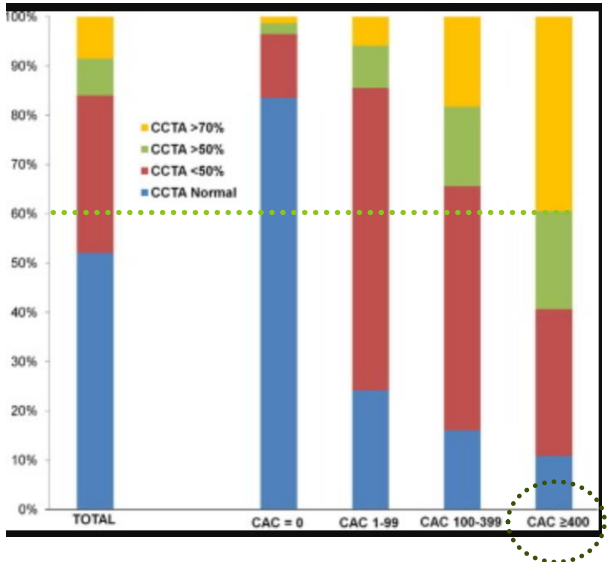
- 13644 patients (mean age 50 years) followed for median 9.4 years
- If Ca score 1-100 AU, NNT 100
- If Ca score >100, NNT 12

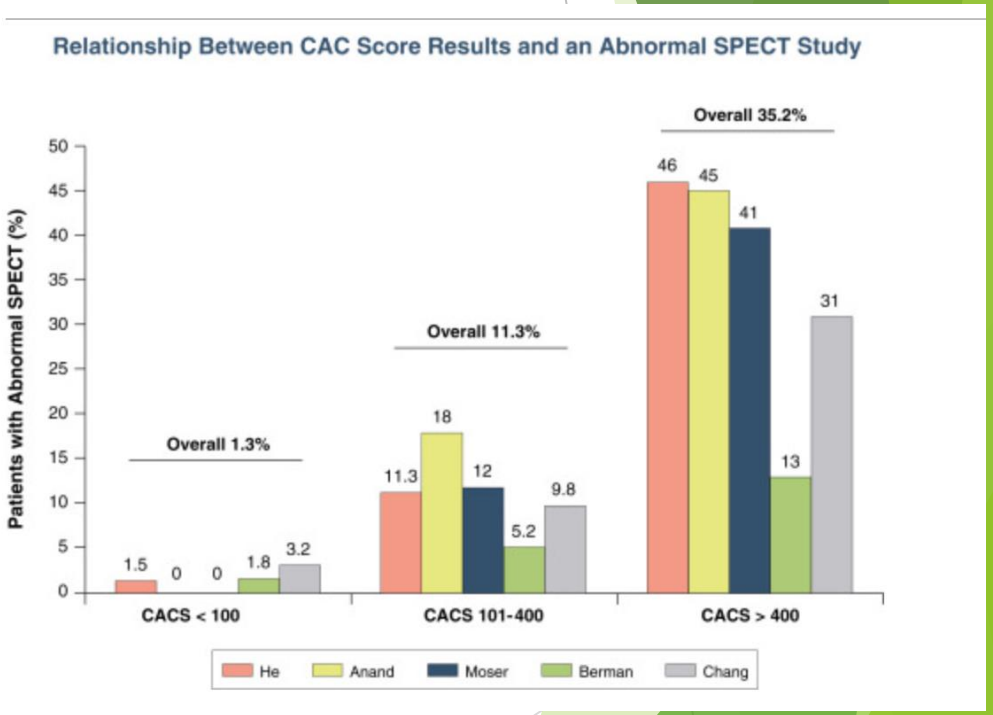


Mitchell, J.D. et al. J Am Coll Cardiol. 2018;72(25):3233-42.

Trigger for functional/stress testing

- No Ca score threshold that mandates stress testing
- >55% Australians sedentary (ABS 2022)
- Reasonable to consider if Ca score ≥ 400 AU
  - **Symptomatic** patients with Ca score ≥400 AU
    - ~40% have a significant lesion (≥70% stenosis)





Asymptomatic patients - incidence of abnormal MPI 35.2% if Ca score >400 AU

Hacker and Becker, 2011 J Nucl Cardiol

Practical approach to management

- Overall management strategy no different to typical asymptomatic high vascular risk patient in general practice setting -> specialist involvement not mandatory for all cases

- Visual “moderate” grade
  - Approximates Ca score 100-399AU
    - Benefit for primary prevention aspirin and statin

- Visual “severe” grade
  - Approximates Ca score ≥400AU
    - May be reasonable to consider functional testing

- Consider cardiology referral if positive functional testing
  - Otherwise aggressive risk factor management (HTN, lipids, weight etc.)

3

NLCSP: Incidental findings Emphysema

Dr Renee Manser

The Royal Melbourne Hospital

Resources

- National Asthma Council Australia. The spirometry handbook for primary care. Melbourne; National Asthma Council Australia: March 2023

- Yang et al COPD-X Handbook: Summary clinical practice guidelines for the management of chronic obstructive pulmonary disease (COPD). Milton, Queensland: Lung Foundation Australia.

- Global Initiative for Chronic Obstructive Lung Disease. Pocket Guide to COPD, Diagnosis, Management, and Prevention. A Guide for Health Care Professionals 2025 Edition. www.goldcopd.org

- O'Dowd et al. European Respiratory Journal 2023 62 (4). ERS/ESTS/ESTRO/ESR/ESTI/EFOMP statement on management of incidental findings from low dose CT screening for lung cancer

Finding	Reporting recommendation	Management recommendation for reported findings	Reference/source
Lungs			
Emphysema	*Mild (< 25% of lung volume), moderate (25-50%) or severe (> 50%)* – report *Panlobular* - report	Clinical review. Refer to Lung Foundation Australia COPD-X Handbook.	American College of Radiology Lung Cancer Screening CT Incidental Findings Quick Reference Guide. (1) ERS/ESTS/ESTRO/ESR/ESTI/EFOMP statement on management of incidental findings from low dose CT screening for lung cancer (2) Expert opinion (ANZSTR, RACGP, and TSANZ).

National Lung Cancer Screening Program: Additional Findings Guidelines Version One
The Royal Australian and New Zealand College of Radiologists

3 Incidental findings in the International Lung Screen Trial substudy of incidental findings during low-dose comp lung cancer screening in Australia (five sites) and Canada (one site), 2016–2021, by country

Finding type	Australia	Canada	p*
Total number of people	2099	2304	
Pleura			< 0.001
Actionable	22/2093 (1.1%)	5/2304 (0.2%)	
Non-actionable	166/2093 (7.9%)	55/2304 (2.4%)	
Normal	1905/2093 (91.0%)	2244/2304 (97.4%)	
Interstitial lung abnormality			< 0.001
Actionable	101/1970 (6.3%)	2/2304 (0.1%)	
Non-actionable	18/1970 (1.1%)	66/2304 (2.9%)	
Normal	1497/1970 (92.6%)	2236/2304 (97.0%)	
Airways			< 0.001
Abnormal	683/2079 (32.9%)	534/2274 (23.5%)	
Normal	1396/2079 (67.1%)	1740/2274 (76.5%)	
Emphysema			< 0.001
Present	1186/2097 (57.0%)	1192/2304 (51.7%)	
Absent	911/2097 (43.4%)	1112/2304 (48.3%)	
Emphysema (by grade)			
Trivial (< 5%)	407/1186 (34.3%)	834/1192 (70.0%)	
Mild (5–25%)	518/1186 (43.7%)	244/1192 (20.5%)	
Moderate (> 25% to 50%)	186/1186 (15.7%)	80/1192 (6.7%)	
Marked (> 50% to 75%)	52/1186 (4.4%)	25/1192 (2.1%)	
Severe (> 75%)	12/1186 (1.0%)	7/1192 (0.6%)	
Not recorded	11/1186	2/1192	

Incidental findings in the International Lung Screening Trial

- Australian cohort
- 57% had emphysema reported
- In 78% of those with emphysema this was trivial or mild.

Bonney, A et al. *Incidental findings during lung low-dose computed tomography cancer screening in Australia and Canada, 2016–21: a prospective observational study. Medical Journal of Australia 222* (8) 403-411

USPSTF concludes with moderate certainty that screening for COPD in asymptomatic adults who do not recognize or report respiratory symptoms has no net benefit.

No direct evidence that screening for COPD in asymptomatic persons improved health-related quality of life, morbidity, or mortality.

At most the evidence suggests treatment of COPD in those at the moderate to severe end of spectrum (usually FEV1 <60%) reduces exacerbations but not other outcomes.

Found limited evidence that did not support screening as a means towards improve smoking cessation rates or the uptake of other recommended preventive services

Lin JS, Webber EM, Thomas RG. Screening for Chronic Obstructive Pulmonary Disease: A Targeted Evidence Update for the U.S. Preventive Services Task Force [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2022 May. (Evidence Synthesis, No. 215.). Available from: https://www.ncbi.nlm.nih.gov/books/NBK580644/

2 What are the key steps for diagnosing COPD?

A spirometry result showing fixed ratio of forced expiratory volume in 1 second (FEV_1) / forced vital capacity (FVC) <0.7 after bronchodilator (i.e. post-bronchodilator FEV_1/FVC ratio <0.7) is required for a COPD diagnosis (see step 3).

Step 1. Document patient history

Collect and document patient history of:

- ☐ respiratory symptoms (including exertional breathlessness, cough, sputum, chest infections, or exacerbations)
- ☐ smoking and vaping
- ☐ occupational exposures
- ☐ environmental exposures
- ☐ premature birth
- ☐ childhood respiratory problems
- ☐ asthma
- ☐ age of onset of symptoms
- ☐ family history

Step 2. Perform spirometry

Perform or arrange spirometry for people ≥35 years old with one or more of the following:

- ☐ current or former smoking history
- ☐ new, persistent, or changed cough
- ☐ coughing up mucus or phlegm
- ☐ out of breath more easily than others their age
- ☐ experiencing chest tightness or wheeze
- ☐ experiencing recurrent chest infections
- ☐ have worked in a job that exposed them to dust, gas, or fumes

Note: Haemoptysis, chest pain and weight loss require urgent further investigation.

Key recommendations

2a. Begin with a thorough history and examination for COPD as the first step to diagnosis — III-2

Practice points

- Identify patients who need spirometry using Lung Foundation Australia's 2-minute Lung Health Checklist.
- Share the Lung Health Checklist link with patients so they can fill it out at home, in the waiting room before a clinical consultation, or during a clinical consultation as part of patient history.
- Consider using Health Assessments and Care Plan visits to administer the Lung Health Checklist.
- Consider searching patient lists for those at high risk (for example, people with a smoking history over 35 years old with no past spirometry) or link to a Measuring Outcomes activity audit (as part of continuing professional development).

Yang, et al. 2024. COPD-X Handbook: Summary clinical practice guidelines for the management of chronic obstructive pulmonary disease (COPD). Milton, Queensland: Lung Foundation Australia.

Other groups recommend case finding in those with risk factors

(GOLD 2021, COPD–X 2024)

RCT – early diagnosis and treatment of COPD and asthma

Case-finding method to identify adults in the community with respiratory symptoms without diagnosed lung disease.

Intervention group were referred to a pulmonologist and COPD educator –following evidence-based guidelines.

-majority had moderate or mild AO

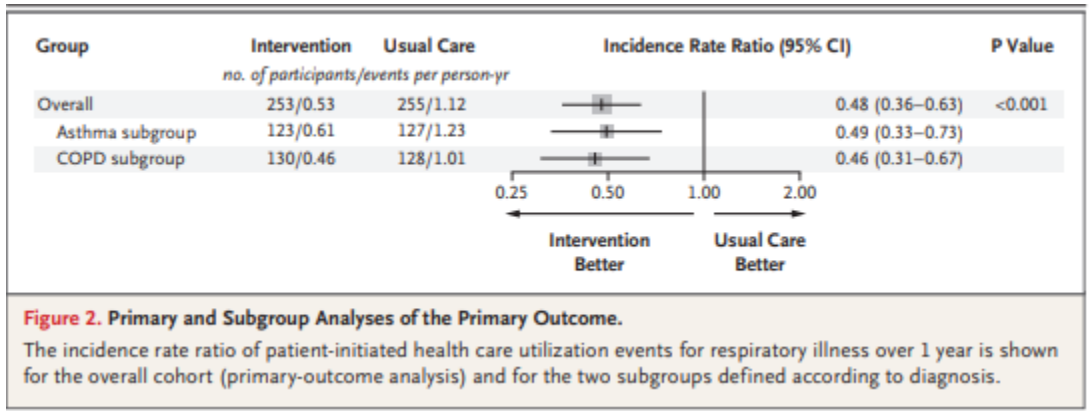


Figure 2. Primary and Subgroup Analyses of the Primary Outcome.
The incidence rate ratio of patient-initiated health care utilization events for respiratory illness over 1 year is shown for the overall cohort (primary-outcome analysis) and for the two subgroups defined according to diagnosis.

Aaron et al. Early Diagnosis and Treatment of COPD and Asthma - A Randomized, Controlled Trial. N Engl J Med. 2024 Jun 13;390(22):2061-2073.

Emphysema ≠ COPD

- The presence of emphysema should not be used to diagnose COPD
- Radiologically diagnosed emphysema may predict hospital admissions and mortality.
- Emphysema can be used as a predictor of lung cancer risk and can be used to stratify screening nodule management protocols.
- **It is unclear how the identification of emphysema on CT screening influences outcomes.**
- Reporting recommendations vary- e.g. ERS statement on incidental findings recommend reporting moderate to severe emphysema

O'Dowd et al. European Respiratory Journal 2023 62 (4). ERS/ESTS/ESTRO/ESR/ESTI/EFOMP statement on management of incidental findings from low dose CT screening for lung cancer

COPD definition

Chronic obstructive Pulmonary Disease is a heterogenous lung condition characterised by chronic respiratory symptoms (dyspnoea, cough, sputum production and/or exacerbations) due to abnormalities of the airways (bronchitis, bronchiolitis) and/or alveoli (emphysema) that cause persistent, often progressive, airflow obstruction.

Spirometry showing the presence of post bronchodilator FEV1 <0.7 is **mandatory** to establish the diagnosis of COPD

Cannot be diagnosed on the basis of symptoms or chest x-ray.

Global Initiative for Chronic Obstructive Lung Disease. Pocket Guide to COPD, Diagnosis, Management, and Prevention. A Guide for Health Care Professionals 2025 Edition www.goldcopd.org

Emphysema is defined as the permanent enlargement of airspaces distal to the terminal bronchiole with destruction of alveolar walls

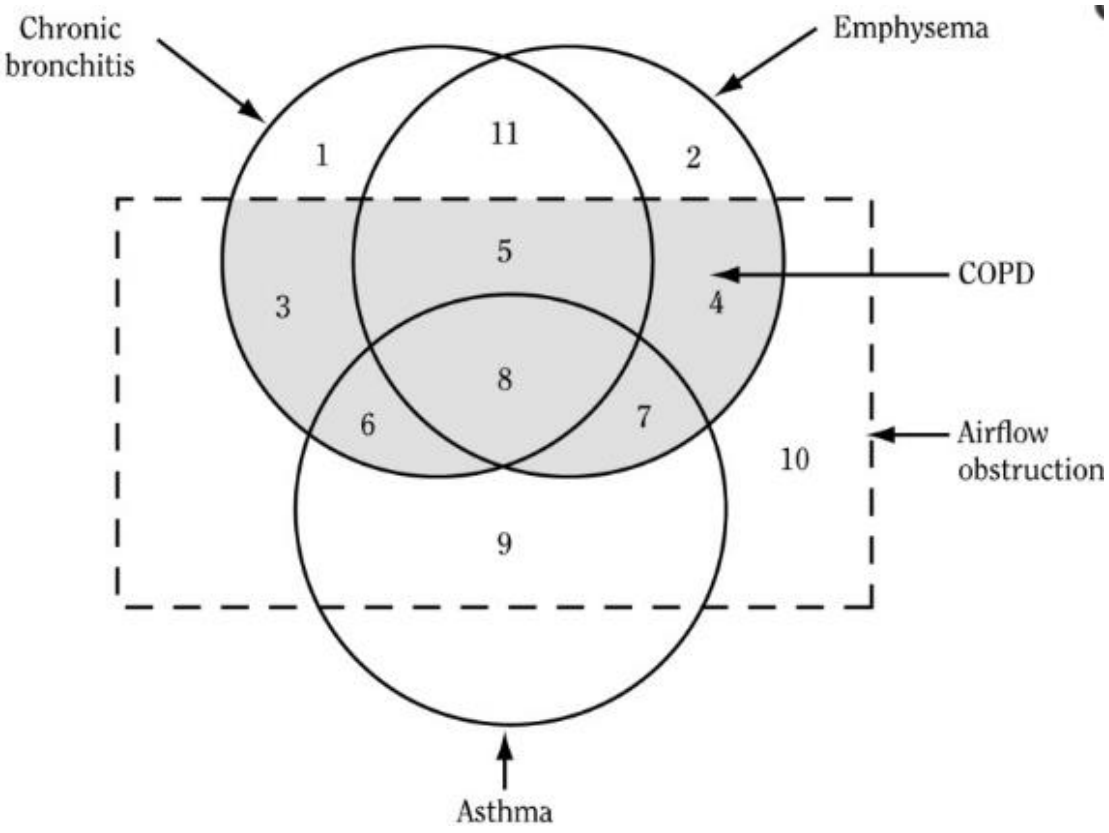
Mild < 25% of lung volume

Severe > 50% of lung volume

Hansell DM, et al. Fleischner Society: glossary of terms for thoracic imaging. Radiology 2008; 246: 697–722

Chronic bronchitis

Cough and sputum production for at least 3 months for 2 or more consecutive years.



American Thoracic Society. Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. American Journal of Respiratory and Critical Care Medicine. 1995;152(5 Pt 2):S77–S121

Spirometry to diagnose COPD

Measure FEV1/FVC ratio
Pre bronchodilator

FEV1/FVC
≥ 0.7

Not COPD

*Measure bronchodilator response in those with significant symptoms, low FEV1

Post bronchodilator FEV1/FVC

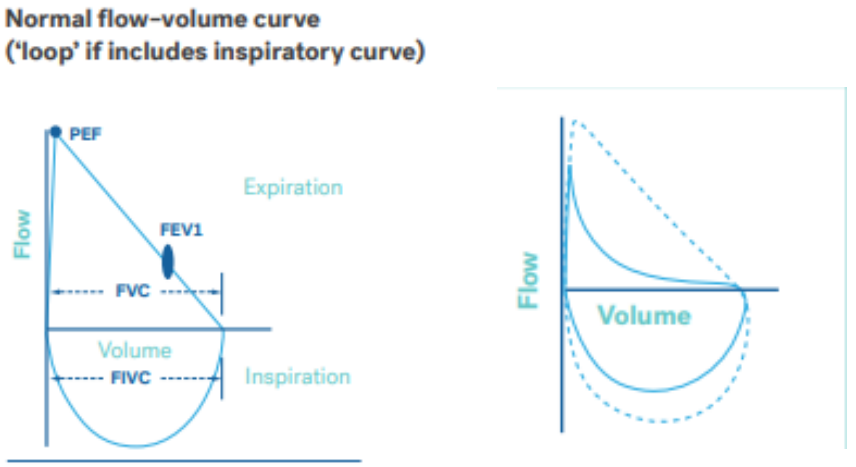
FEV1/FVC
< 0.7

Confirmed COPD

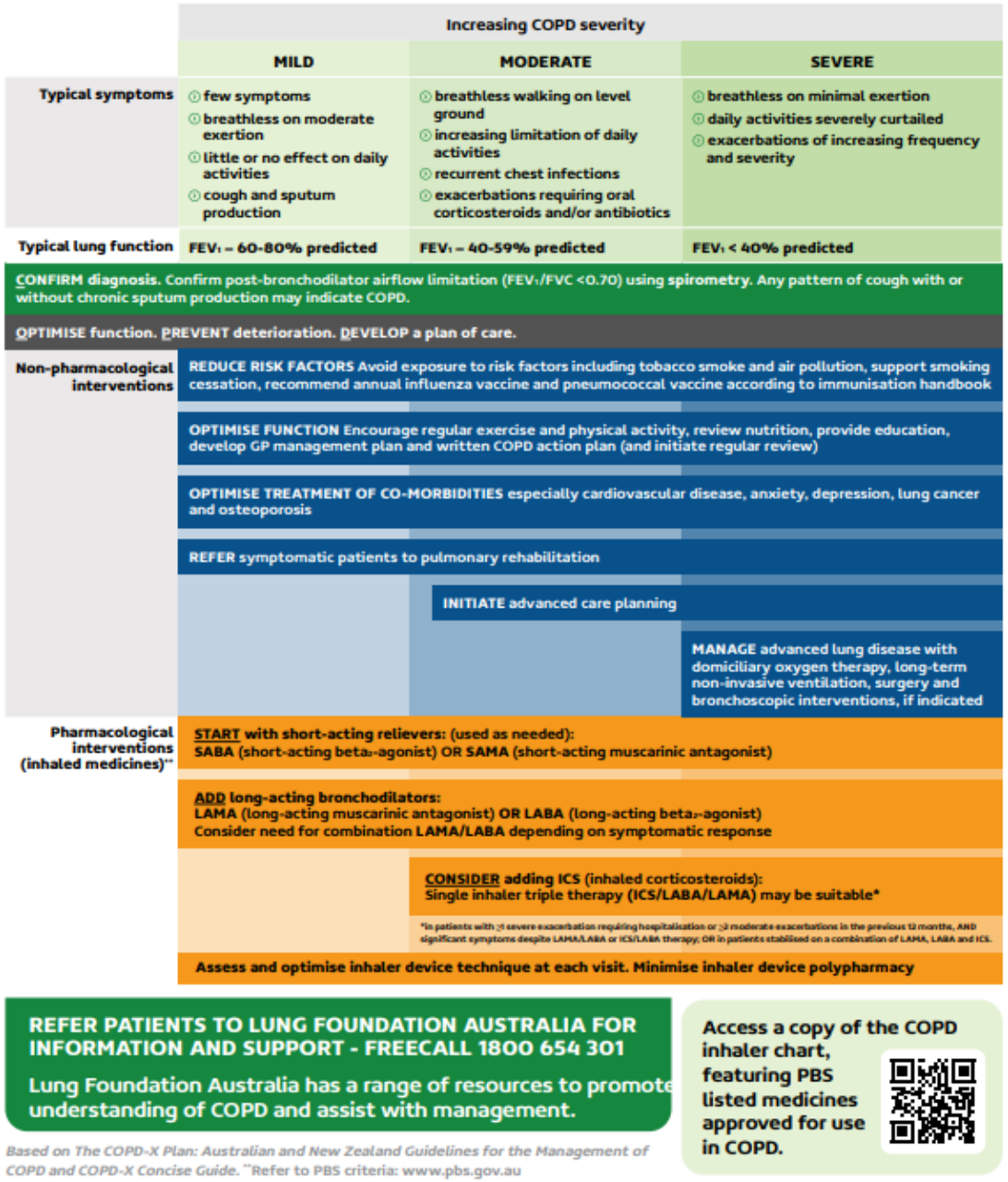
FEV1/FVC
≥ 0.7*

Asthma suggested if large increase in post bronchodilator FEV1 e.g. > 15% and 400 mls
-correlate with symptoms

*Consider repeat spirometry at later date in those who do not meet criteria but have a low FEV1, or significant symptoms or flow response to bronchodilator



STEPWISE MANAGEMENT OF STABLE COPD



The management strategy of stable COPD should be predominantly based on the assessment of symptoms and history of exacerbations.

Global Initiative for Chronic Obstructive Lung Disease. Pocket Guide to COPD, Diagnosis, Management, and Prevention. A Guide for Health Care Professionals 2025 Edition
www.goldcopd.org

Yang et al COPD-X Handbook: Summary clinical practice guidelines for the management of chronic obstructive pulmonary disease (COPD). Milton, Queensland: Lung Foundation Australia.

Modified Medical Research Council (mMRC) dyspnoea scale

Grade 0 = Only breathless with strenuous exercise

Grade 1 = Breathless when hurrying on the level or walking up slight hill

Grade 2 = Walk slower than people of the same age on the level because of breathlessness, or has to stop for breath when walking at own pace on level.

Grade 3 = Stops for breath after walking about 100 metres or after a few minutes on the level

Grade 4 = Too breathless to leave house or breathless with dressing/undressing.

Mahler DA, Wells CK. Chest 1988; 93 (3)

COPD Assessment Test: CAT

Used in GOLD guideline to assess symptoms and in management algorithm
Along with exacerbation history

Score > or =10

Questionnaire to measure impact of COPD on wellbeing and daily life.

8 questions with 5 point likart scale

Cough
Sputum/mucus production
Chest tightness
Breathlessness
Impact on daily activities, sleep and energy

Jones PW, et al. Development and first validation of the COPD Assessment Test. Eur Respir J. 2009 Sep;34(3):648-54

Underdiagnosis and misdiagnosis of COPD are common throughout the world

Table 1 *Prevalence, under- and over-diagnosis of COPD*

Continent	Country	Gender M:F	Age years	Prevalence (self-reported)	Prevalence (spirometry)	Under-diagnosis	Over-diagnosis	Year of data collection
North America	USA	55:45 [12] 57:43 [14] 48:52 [24] 96:4 [42]	40–79 [12] 55–75 [14] ≥45 [24]	18% [14]	10–21% [12]	12% [24]	48% [42]	1988–1994 [24] 2001 [14] 2003–2007 [42] 2007–2010 [12]
	Canada	45:55 [15]	≥40	8.9%	17%	14%	5.1%	2007–2011
Europe	Austria	55:45 [22]	≥40		26%	95% [17]		2004–2006
	Finland	51:49 [37]	21–70		5.4–9.4%		60%	1995–1996
	Italy	47:53 [21] 49:51 [39]	≥14 [21] >25 [39]	2.8% [21]	11–18% [39]			1998–1991 [39] 2009 [21]
	Netherlands	48:52 [16]	≥40		3%			2000–2007
	Norway	50:50 [30] 38:62 [43]	47–78 [30] ≥40 [43]		9% [30]	66% [30]	26% [43]	1992–1993 [30] 2009–2010 [43]
	Spain	47:53 [35]	40–80		10.2%	73%		2006–2007
	Sweden	48:52 [22]	≥40	12%	10–16%	71%		2004–2006
	Austria	55:45 [22]	≥40		26%	95%		2004–2006
	Finland	51:49 [37]	21–70		5.4–9.4%		60%	1995–1996
Oceania	Australia	53:47 [44]	>55 [44]		19% [13]		31% [44]	2008 [44]
Africa	Nigeria	39:61 [51]	≥40	0.3%	7.7%			
	Malawi	39:61 [53] 42.1:57.9 [52]	≥30 ≥18		13.6% 4.3%			
	Cameroon	0:100 [54]	≥40		1.6%			2012
	Uganda	49.5:50.5 [50]	≥30		16.2%			2012
	South Africa	48:52 [57] 37:63 [87]	≥55 ≥40	11.2%	23.8%			2012
South America	Mexico	39.8:60.2 [63]	40–84	6.03%	20.6%	86.2%	40%	2008
	Peru	49.3:50.7 [62] 49.2:50.8 [88]	≥35 ≥35	0.4% 0.1%	6% 4.8%			2010

Systematic review (Perret et al) estimated that 14 to 26% of symptomatic smokers attending primary care with spirometry confirmable COPD was not documented in health records.

Under utilisation of spirometry

Limited access to spirometry

Errors in spirometry testing

Misinterpretation of spirometry in primary care

Variations in COPD/spirometry definitions-thresholds

Smoking and elevated BMI-increased risk of misdiagnosis

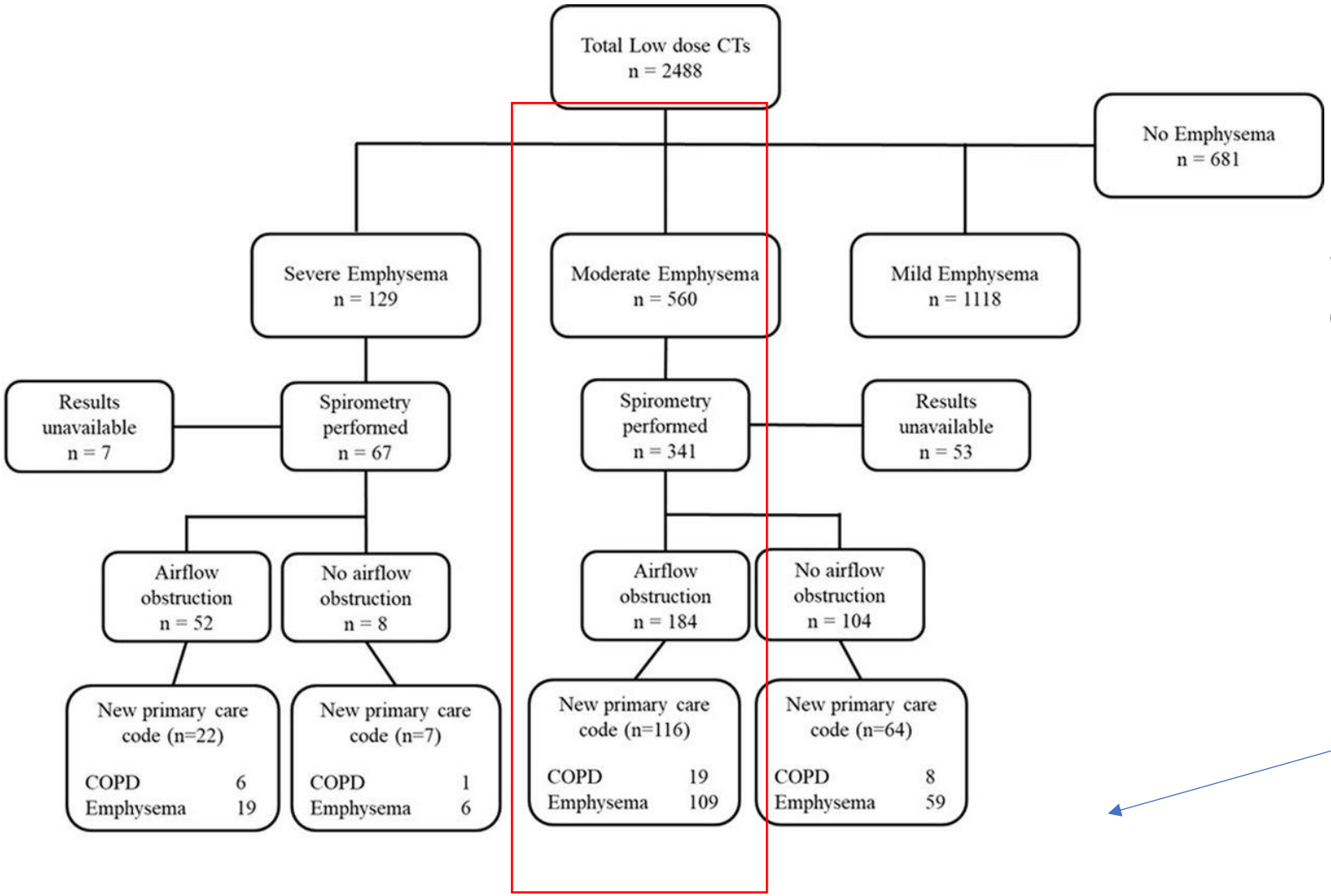
Perret J,*BMJ Open Respiratory Research* 2023;**10:**e001478.

The term overdiagnosis is often used but in this context usually refers to misdiagnosis due to 'false positive' clinical diagnoses not supported by appropriately performed or interpreted spirometry and usually associated with inappropriate use of medications.

Ho et al. Under- and over-diagnosis of COPD: a global perspective. Breathe (Sheff). 2019 Mar;15(1):24-35

Ward T, Cole L, Rai S*, et al* Emphysema identified during lung cancer screening: an opportunity to intervene or just another incidental finding? *Thorax* 2023;**78:**A220.

Corby THLC (targeted lung health check) programme
-NHS



73% had emphysema on CT, mostly mild

- Spirometry can identify people with undiagnosed COPD
- Identification of emphysema on CT may lead to primary care COPD and emphysema diagnosis irrespective of airflow obstruction- ? Inappropriate therapy

Of the 236 (combined severe and moderate emphysema groups) with airflow obstruction 57% had no prior diagnosis of COPD, based on search of primary care records before and after the study

Conclusions

- Emphysema is common in this population
- Emphysema may or may not be associated with COPD (and vice versa)
- The presence of symptoms such as breathlessness, cough and sputum production should be assessed with spirometry regardless of the results of CT scans
- Spirometry is required to confirm the diagnosis of COPD
- Once COPD is confirmed, guidelines emphasise the importance of symptoms and history of exacerbations in directing further pharmacotherapy.

4

Interstitial lung abnormalities

Dr Alistair Miller

The Royal Melbourne Hospital

Non-emphysema additional findings

- Interstitial lung abnormalities
- Bronchiectasis
- Diffuse cystic lung disease
- Diffuse nodule lung disease

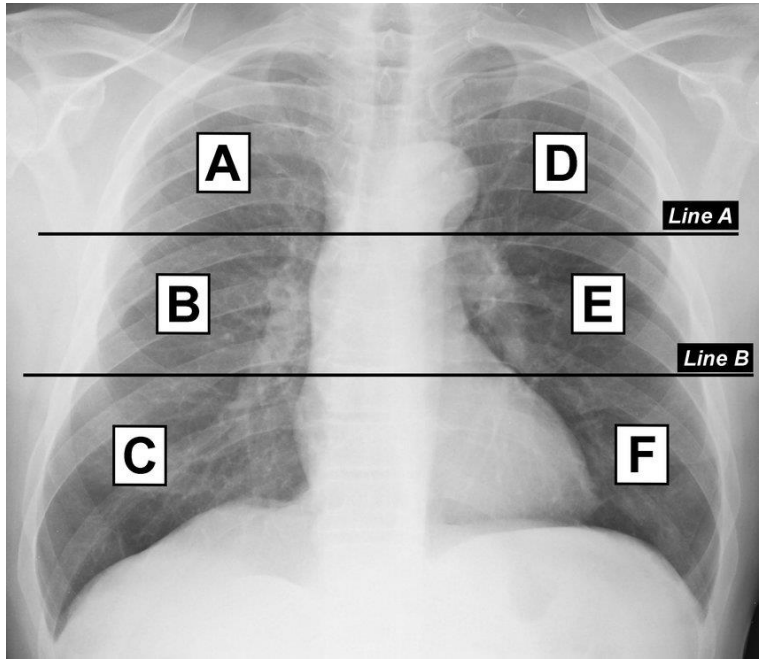
Interstitial lung abnormalities (ILAs) - Fleischner society position paper 2020

- A purely radiological description
- Bilateral CT findings **potentially** compatible with an Interstitial Lung Disease
  - found with no pre-existing suspicion for an ILD*
- Present in 4-9% smokers and 2-7% of non-smokers
  - 6.3% in ILST
- Does not imply presence or absence of symptoms

H. Hatabu et al. Lancet Respir Med 2020
A. J. Podolanczuk,et al. Am J Respir Crit Care Med 2025
A. Bonney, et al. Med J Aust 2025

ILA characterisation – what are they?

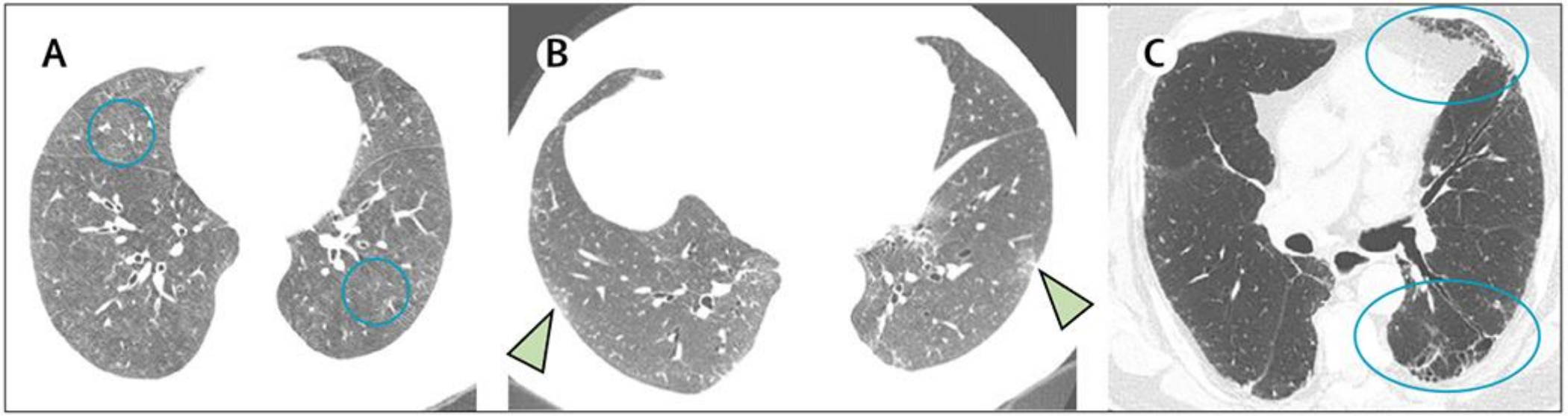
- Non-dependent abnormalities
- Affecting more than 5% of one of 6 lung zones
- Further sub-categorised
  - Position – sub-pleural / non-sub-pleural
  - Whether or there is evidence of fibrosis



H. Hatabu et al. Lancet Respir Med 2020

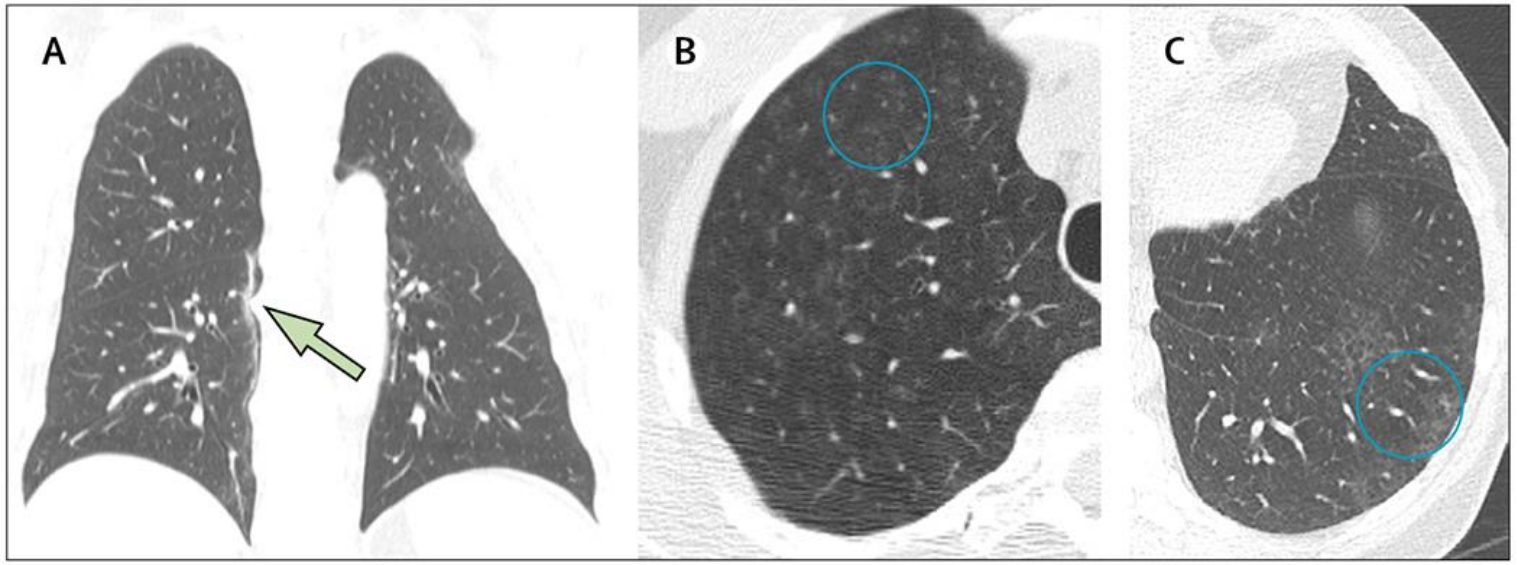
Changes that may represent an ILA

- Ground-glass or reticular abnormalities,
- Lung distortion: traction bronchiectasis and honeycombing
- Non-emphysematous cysts



H. Hatabu et al. Lancet Respir Med 2020

ILA characterisation – what is it not?



- Not synonymous with sub-clinical ILD

- Changes found on screening high risk groups (eg CTDs) are not ILAs as a suspicion was present at the time of the CT*

H. Hatabu et al. Lancet Respir Med 2020

Significance

- Range of prognosis
  - Non sub-pleural GGO/reticulation —> sub-pleural UIP pattern fibrosis
  - ILAs in lower lobe, presence of traction or honeycombing more likely to progress

- In Framingham cohort ~6% progressed
  - Associated with doubling of FVC decline (60 vs 30mL/yr – vs ~200 for IPF)

- Generally associated with an increased mortality – particularly fibrotic features
  - In excess of that expected with progression to ILD

- Associated with increased cancer-related mortality
  - Substantially higher risk of RT-pneumonitis and drug-related pneumonitis

H. Hatabu et al. Lancet Respir Med 2020

Risk factors

- Older age
- Male sex
- Cigarette smoking or other inhalational exposures
- Increased copies of minor allele of MUC5B promoter
- Exposure to IO/chemo
- Thoracic radiotherapy
- Thoracic surgery

Management within the NLCSP

- Management recommendations are in the context of ongoing enrolment in the NLCSP
- The program recommends all ILAs (affecting more than 5% of a region) are reported
- Management is delineated by the presence of high risk features
  - Sub-pleural reticulation, traction bronchiectasis or honeycombing

→Present: clinical review, HRCT (with prones), Respiratory

→Absent: clinical review, repeat scan as per program

Summary

- Up to 1 in 10 CTs will have Interstitial Lung Abnormalities reported
- Some represent early or asymptomatic ILD
- Fibrotic features associated with
  - Progression and development of ILD
  - Mortality
  - Malignancy
- Clinical assessment is first step
  - Presence of high risk features should prompt HRCT and review with Respiratory service

5

Communicating with patients about additional findings and uncertainty

Dr Sue Hookey

Director, General Practice Liaison, RMH

Medical Educator, RACGP Training Program

The Royal Melbourne Hospital

GP’s essential role & communication skills

- Identifying eligible patients for screening
- Supporting informed consent and expectations
- Managing the follow-up when incidental findings are detected

- These findings may include: Benign lung nodules, Coronary artery calcification, Emphysema, Thyroid /adrenal lesions
-similar to communication skills in e.g. breast, cervical & prostate screening, incidental gallstones, cysts

- Sharing uncertainty & challenging information with Pts you know

Why communication matters

- Additional findings can turn screening into an anxious time
- patients often hear call back for appt and think cancer
- communication skills are clinical tools
- reduce distress, build trust, and ensure shared understanding of the next steps

Choose calm, reassuring language

- **frame findings as part of proactive health screening, not an urgent problem.**

Additional Findings– The 4 A's Framework

1. Acknowledge

- Recognise the patient's emotional response:
- "I understand this might sound alarming, and it's okay to feel concerned."

2. Assess

- Clarify what the patient already understands or is imagining:
- "Have you heard the term 'X eg nodule' before?" "What comes to mind when you hear that?"

3. Advise

- Deliver a calm, accurate summary, in simple language:
- "These are actually quite common. Most of the time, they don't mean anything serious." "This finding doesn't look suspicious, but we'll keep an eye on it & follow the guidleines."

4. Arrange

- Outline the next steps clearly:
- "We'll arrange a follow-up in X months to check for any changes."
- "If needed, we'll involve a specialist. But most of the time, no further treatment is required."

You have an additional finding….Use the 3 R’s

1. Reassure

- “These findings are actually very common and most are harmless.”

2. Risk-frame

- “Based on your scan and your background, your risk is low.”
- “We’re following guidelines that are designed to catch anything serious early.”

3. Roadmap

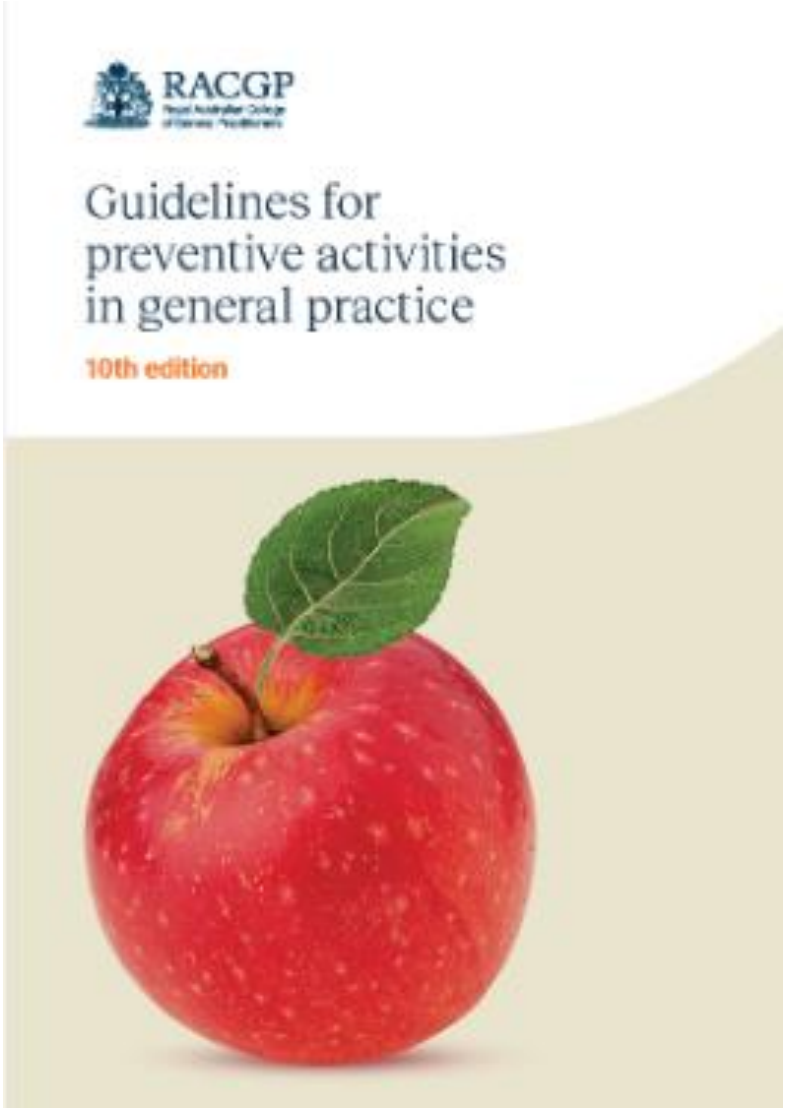
- “Here’s what happens next — we’ll repeat the scan in 12 months.”
- “If anything changes, we’ll involve a specialist.”

Avoid vague language like “We’ll keep an eye on it’ — pts may interpret that as indecision.

Your Role in Navigating Uncertainty

- The truth is — you may not have all the answers immediately. And that's okay.
- Communicate this with confidence, not avoidance: try the 4 As or 3 Rs
- "Right now, we don't have enough information to say what this means. But we have a structured, evidence-based way & guidelines to check it."
- Uncertainty doesn't have to equal anxiety — if you're calm and clear, most patients will feel reassured.
- book a FU appt for further questions/reassurance/health promotion

Remember the “RACGP red book”



Common Patient Concerns – And Your Response

Patient Says	You Might Say
• “Do I have cancer?”	• “This is something the screening picked up that we want to monitor carefully.”
• “What should I do now?”	• “We’ve got a clear plan. I’ll guide you through each step, & there’s support available if you’re worried.” • Health promotion opportunity

Common Patient Concerns – And Your Response

Coronary Artery Calcification

- “Your scan showed some early calcium in your heart arteries. This gives us a chance to review your heart health before symptoms start.”
- FU with cardiovascular risk assessment (e.g., Absolute CVD Risk Calculator), lifestyle advice, +/- pharmacotherapy

Emphysema

- Can be subclinical; may not correlate with symptoms
- “This tells us your lungs have some signs of long-term airspace damage, often related to smoking. Even if you're not feeling symptoms now, we can monitor your lung function over time.”
- Consider spirometry, smoking cessation support, and annual review

Supporting Emotional Safety

- Use trauma-informed and culturally sensitive language:
- Avoid jargon like “lesion” or “mass” without explanation
- Be mindful of Aboriginal and Torres Strait Islander health experiences – offer culturally safe options and interpreters when needed
- Address health literacy: Use diagrams, hand outs, or written summaries
- Offer written or digital summaries of the conversation and next steps — especially for anxious patients or those with lower health literacy.

Key messages

- Incidental findings are a natural part of lung cancer screening
- Your communication can reduce fear and clarify next steps
- Use frameworks like the 4 A’s or 3 Rs to guide discussions
- You know your patient- consider health literacy & cultural considerations

Post-Presentation Poll Questions

6

RMH Referral Pathways

Dr Asha Bonney

The Royal Melbourne Hospital

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

Lung nodules and cancer screening referral pathway

Pilot program and research project

Advice hotline for referrers

Referring health care providers can contact our **lung nodule and lung cancer screening nurse** advice hotline:

- call **0455 409 806**, or
- email rmhlungnoduleandscreeningreferrals@mh.org.au

Outpatient clinic referrals

We offer outpatient clinics (including telehealth) for the following conditions:

- Non-screen detected pulmonary nodules
- High-risk lung cancer screening results requiring Respiratory Physician review linked to a MDT
- Actionable respiratory additional findings detected on lung cancer screening LDCT as part of the National Lung Cancer Screening Program. Please refer to National Lung Cancer Screening Program additional findings guideline for relevant conditions.

This referral pathway **does not accept** referrals for non-respiratory additional findings detected on the lung cancer screening or additional findings detected on non-lung cancer screening LDCTs.

If further guidance is required, please contact our advice hotline on **0455 409 806** or at rmhlungnoduleandscreeningreferrals@mh.org.au.

For information about appropriate clinics, see our services and clinics list.

https://www.thermh.org.au/services/respiratory-medicine-sleep-disorders/lung-nodule-and-cancer-screening-referral-pathway

The Royal Melbourne Hospital

7

HealthPathways Melbourne National Lung Screening Program

Dr Hashinee Weraduwage – Clinical Editor / GP

HealthPathways Melbourne

melbourne.communityhealthpathways.org

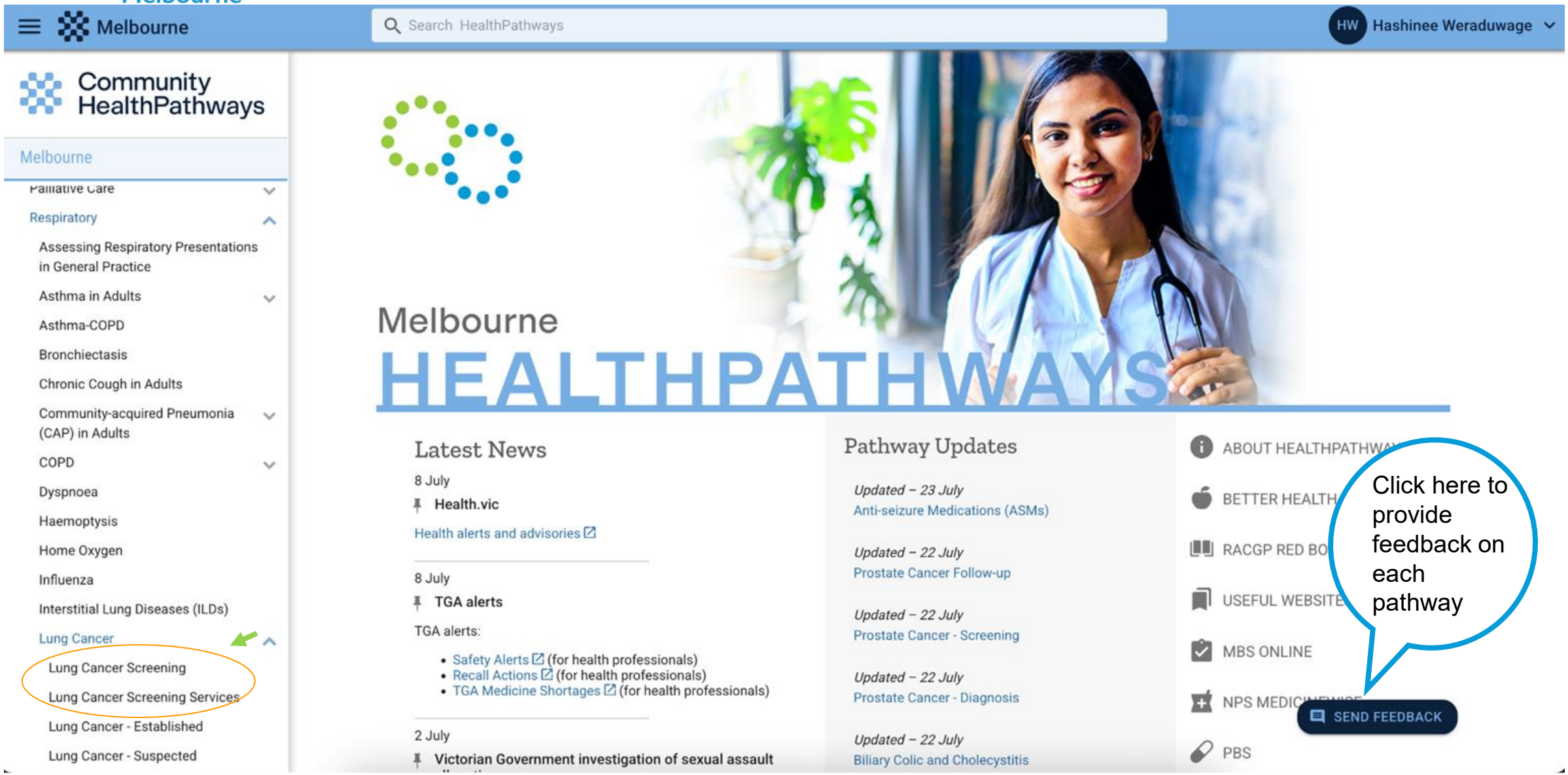
Pathways are written by GP clinical editors with support from local GPs, hospital-based specialists and other subject matter experts

Includes

- **Clinical Pathways**
- **Referral pathways**
- **Other resources (eg: patient handouts)**

- Clear and concise, evidence-based medical advice
- Locally relevant
- Reduce variation in care
- How to refer to the most appropriate hospital, community health service or allied health provider.

Where to find the lung cancer suite:



Other respiratory pathways

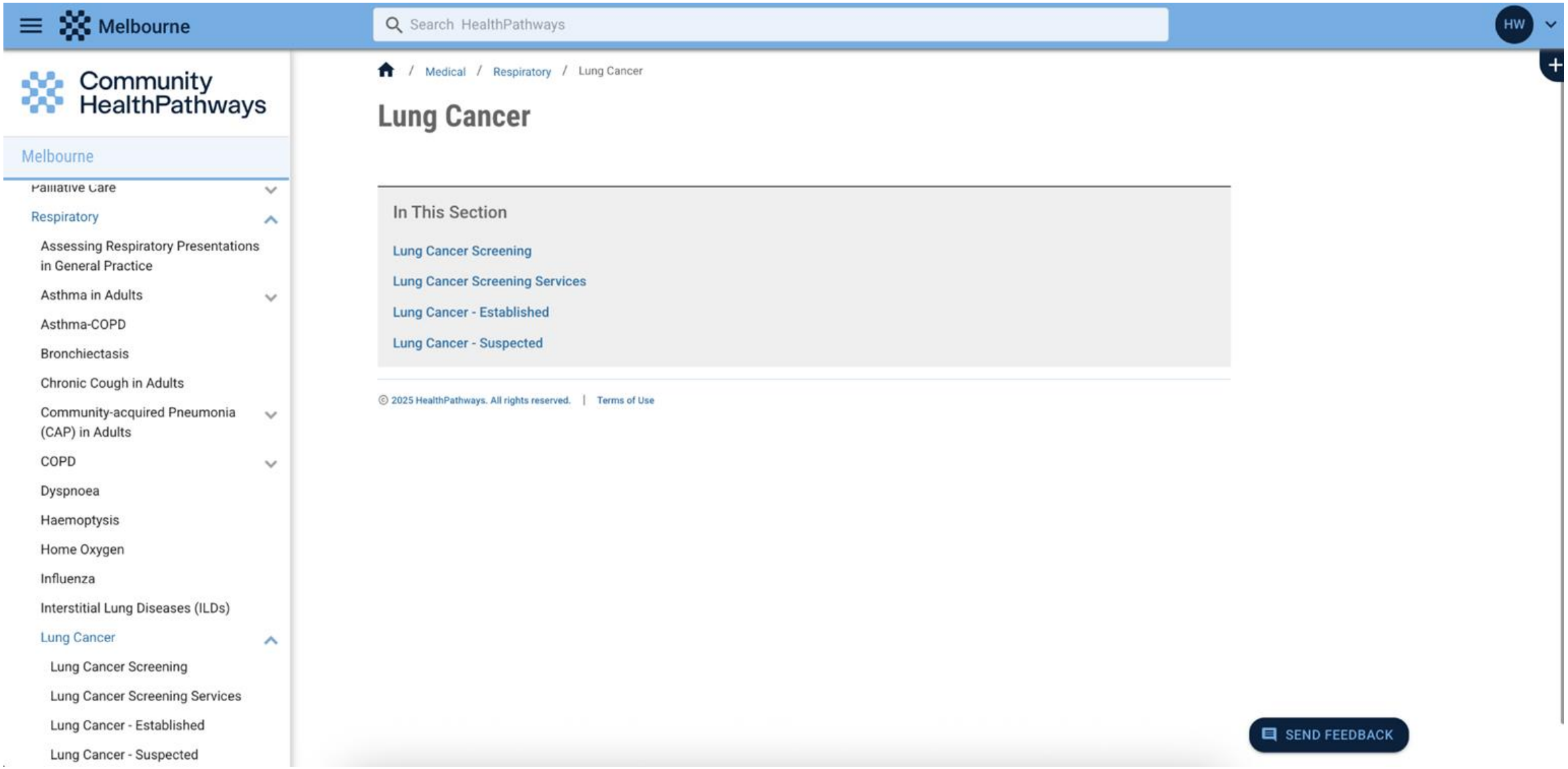
Clinical pathways

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

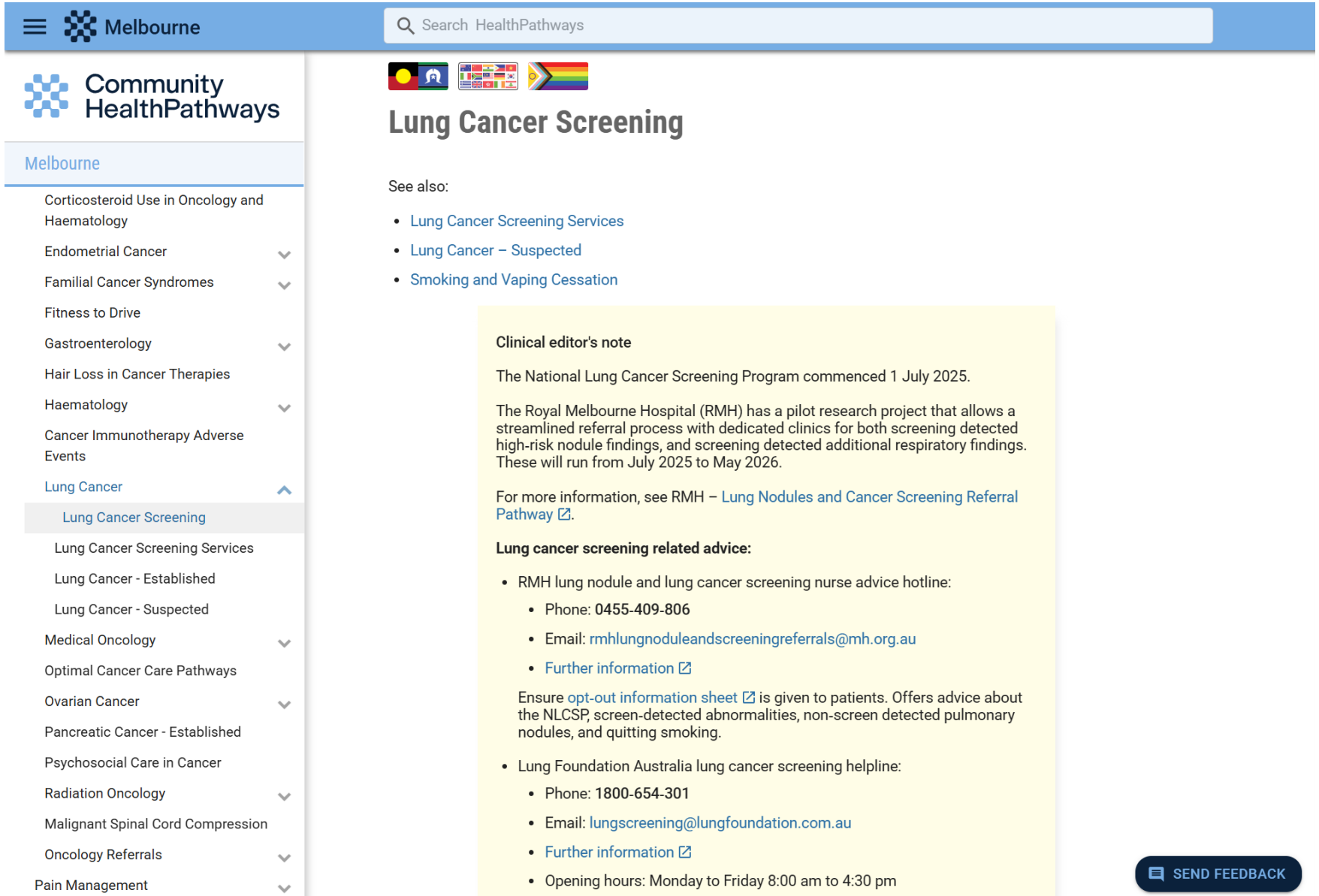
Referral pathways

- Lung Cancer Screening Services
- Acute Respiratory Referral or Admission (Same-day)
- Non-acute Respiratory Referral (> 24 hours)
- Radiology Services and Advice
- Lung Function Testing
- Pulmonary Rehabilitation
- Home Oxygen Referral

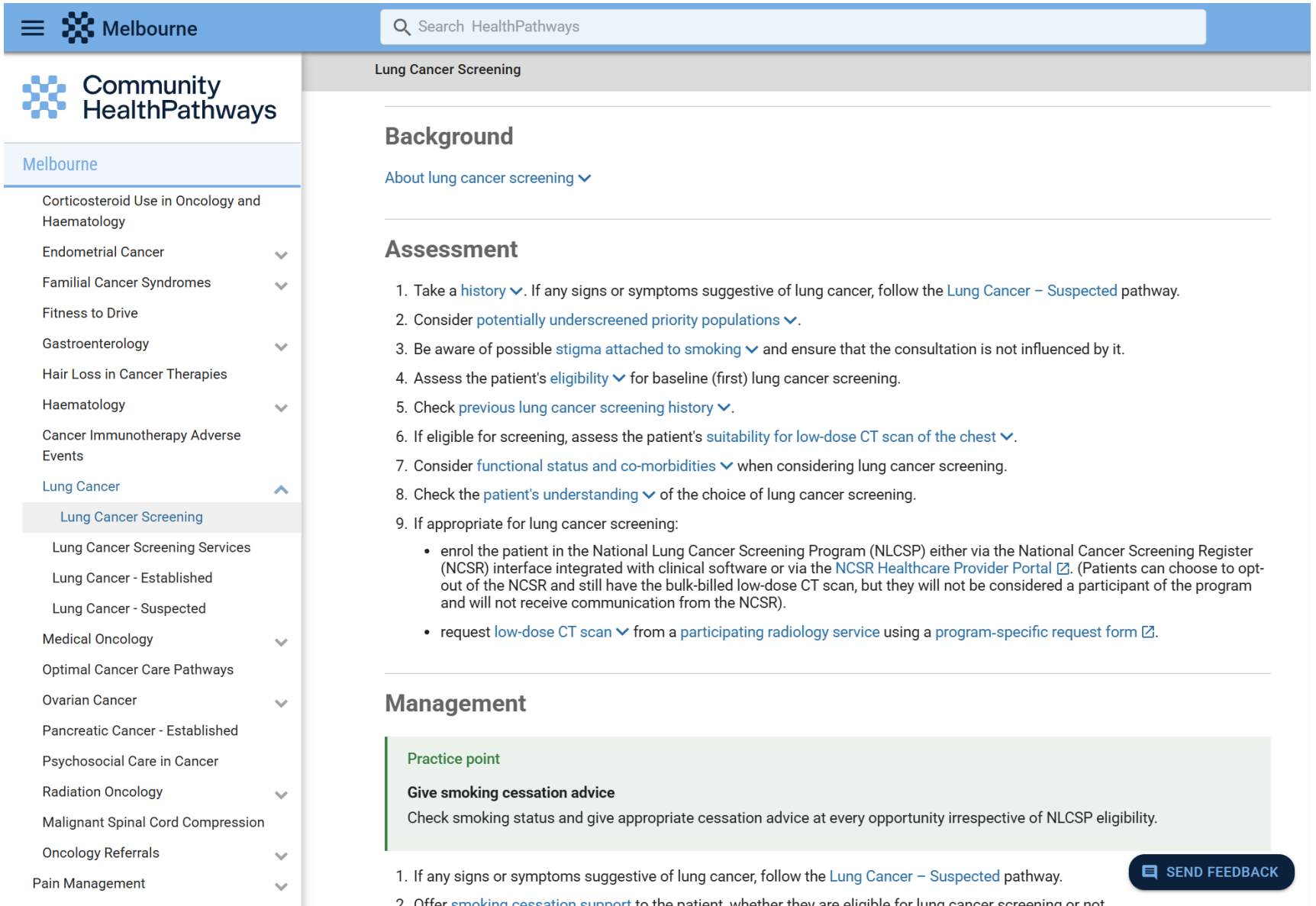
Lung cancer pathways



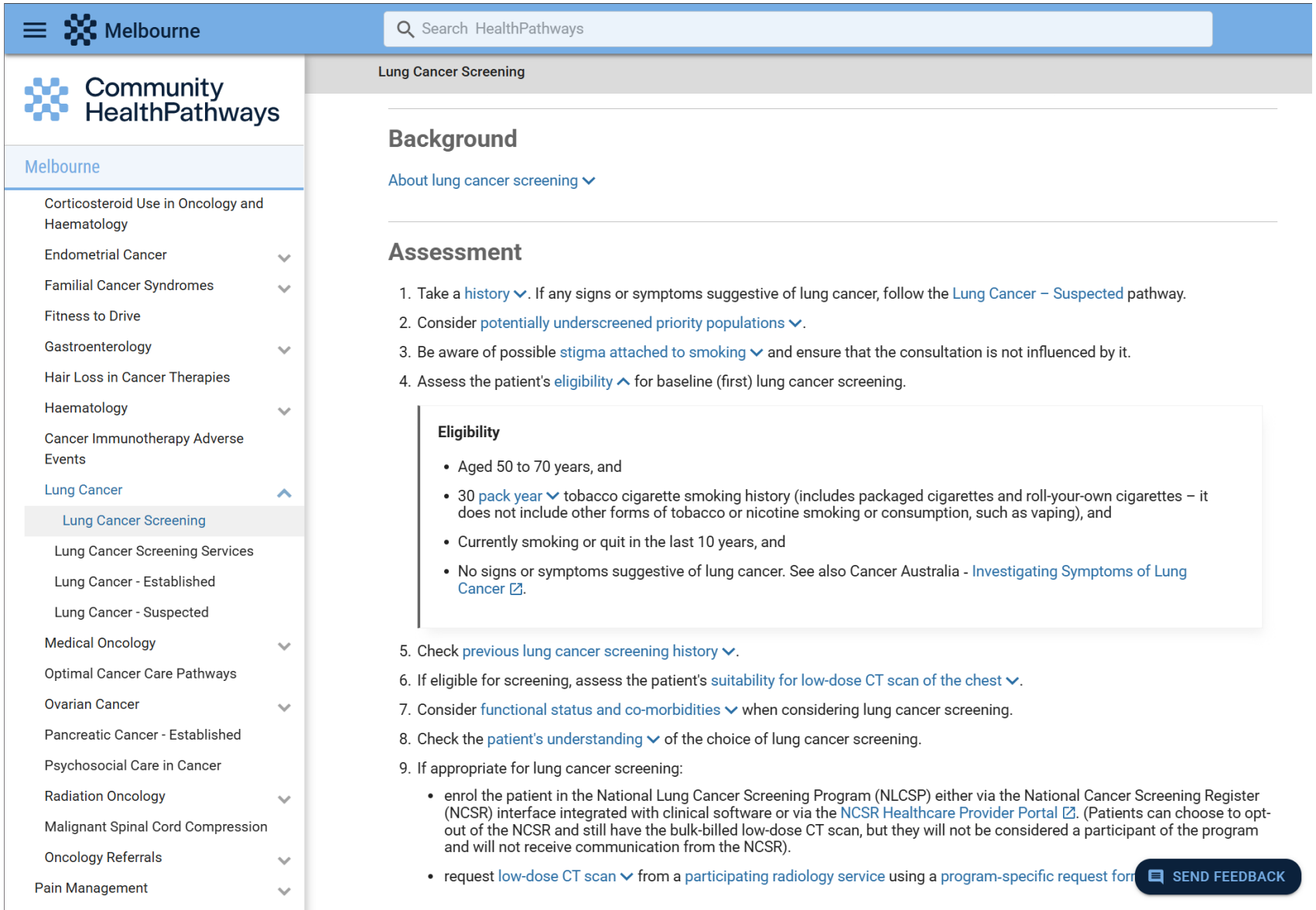
Using HealthPathways to navigate the NLCSP



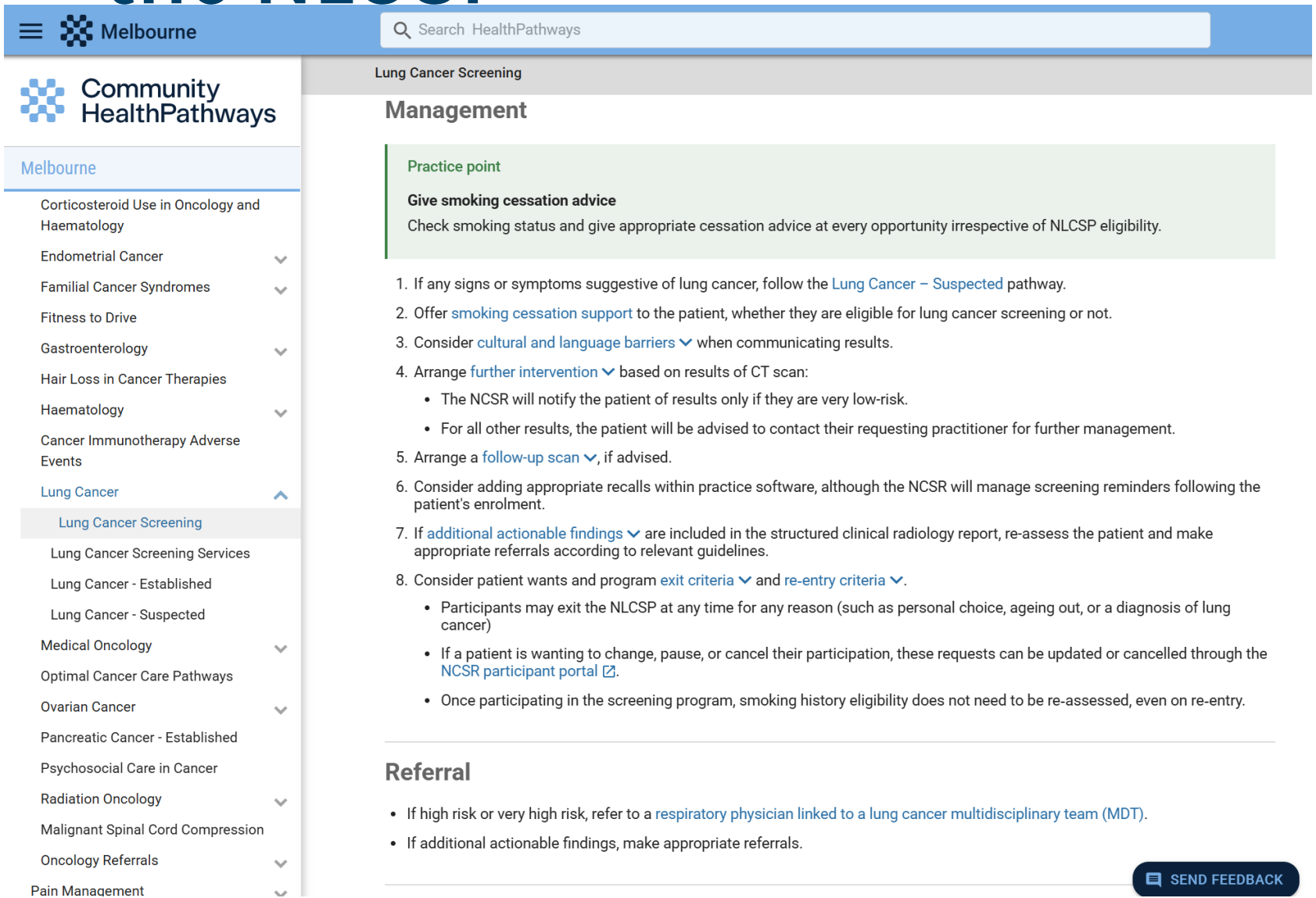
Using HealthPathways to navigate the NLCSP



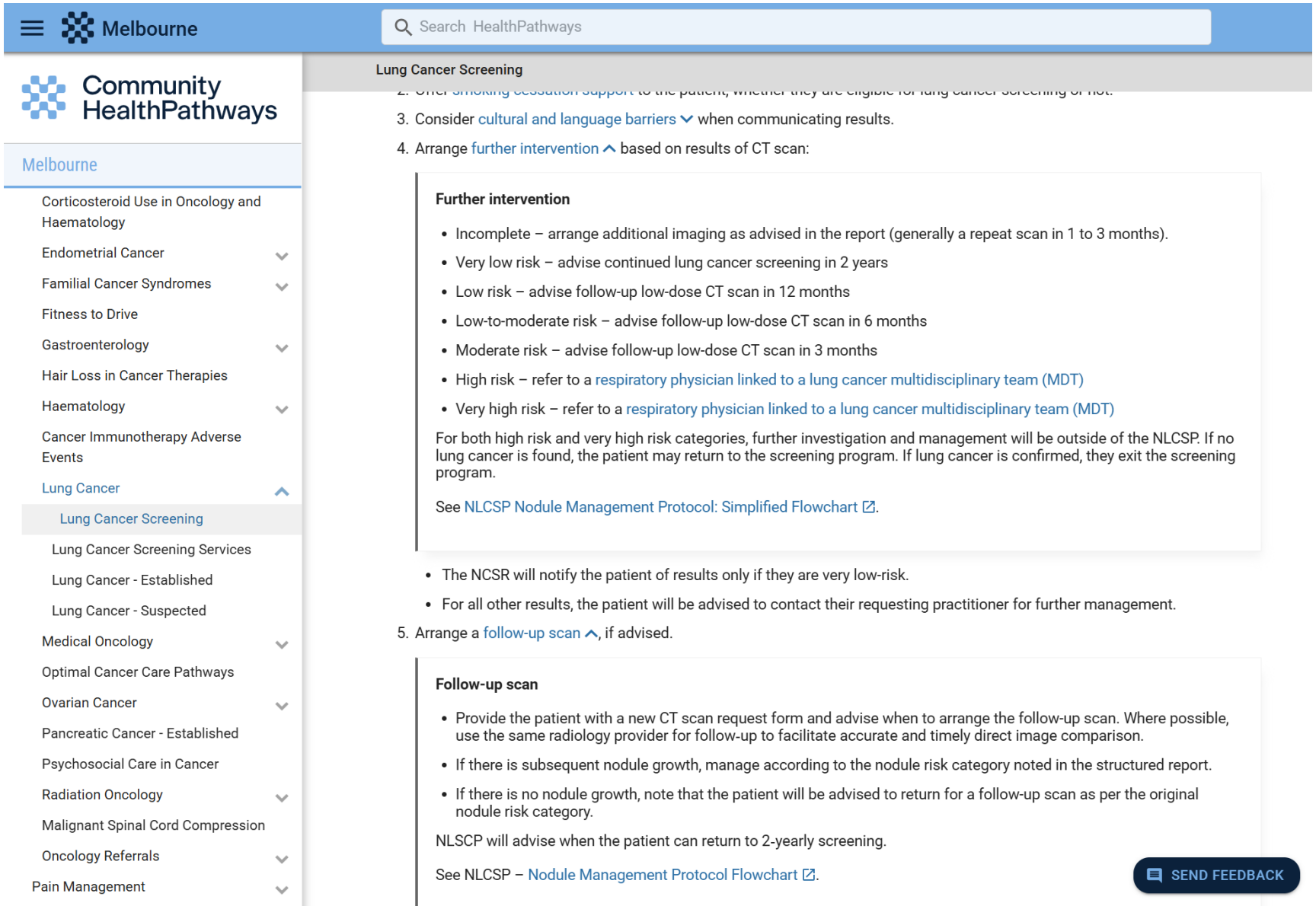
Using HealthPathways to navigate the NLCSP



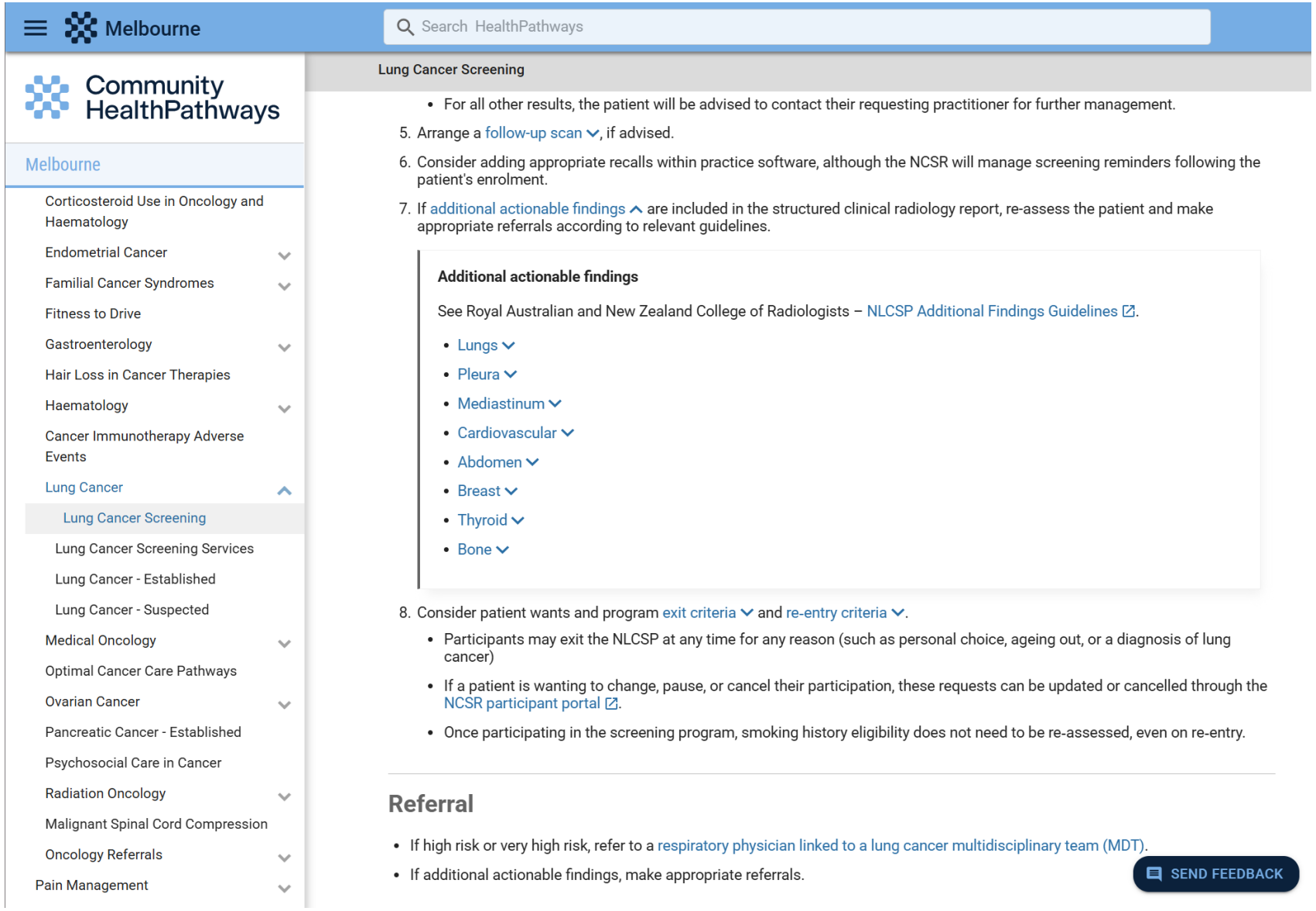
Using HealthPathways to navigate the NLCSP



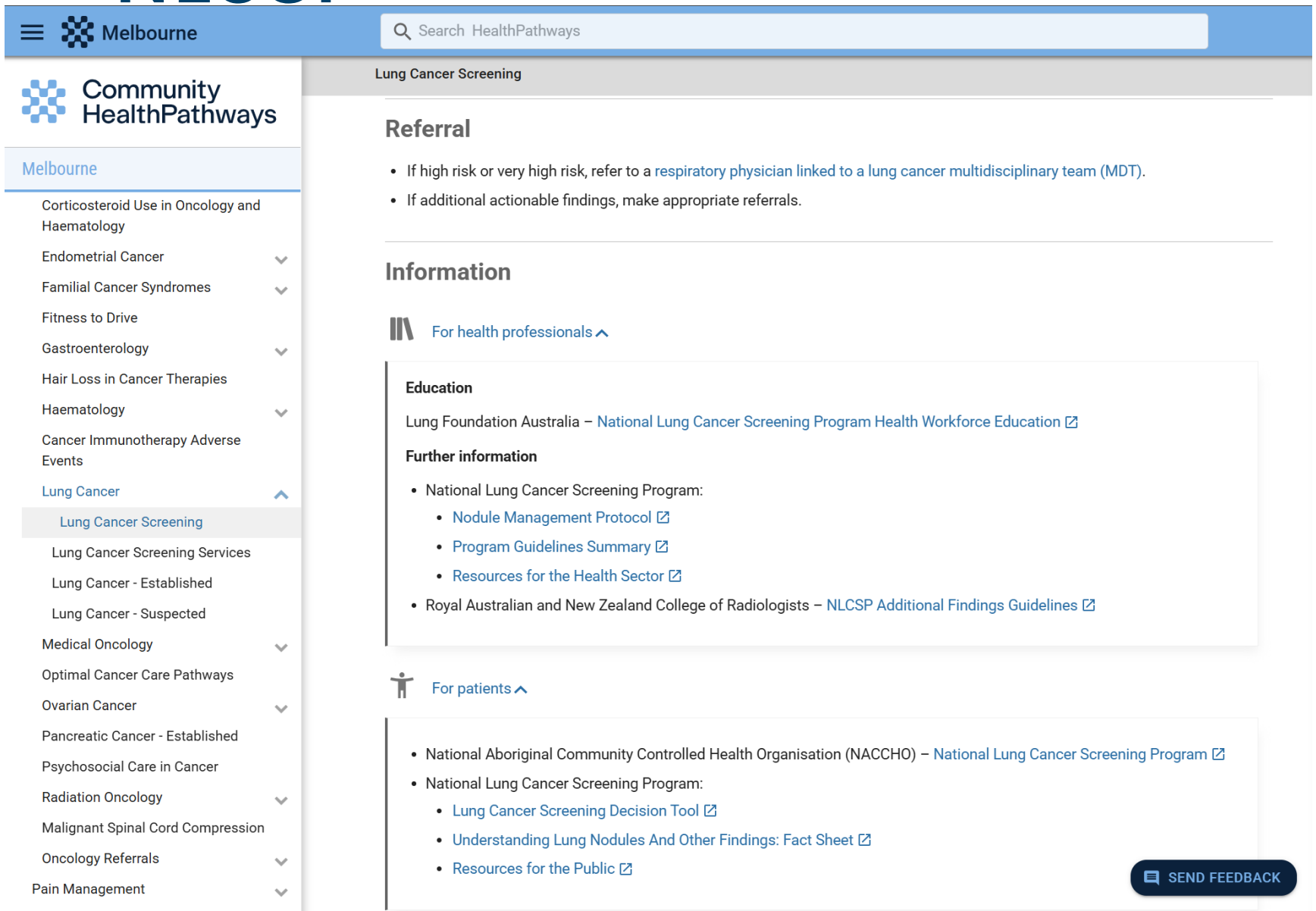
Using HealthPathways to navigate the NLCSP



Using HealthPathways to navigate the NLCSP



Using HealthPathways to navigate the NLCSP



Lung Cancer Screening Services page

Melbourne

Search HealthPathways

Community HealthPathways

Melbourne

- Corticosteroid Use in Oncology and Haematology
- Endometrial Cancer
- Familial Cancer Syndromes
- Fitness to Drive
- Gastroenterology
- Hair Loss in Cancer Therapies
- Haematology
- Cancer Immunotherapy Adverse Events
- Lung Cancer
  - Lung Cancer Screening
    - Lung Cancer Screening Services
  - Lung Cancer - Established
  - Lung Cancer - Suspected
- Medical Oncology
- Optimal Cancer Care Pathways
- Ovarian Cancer
- Pancreatic Cancer - Established
- Psychosocial Care in Cancer
- Radiation Oncology
- Malignant Spinal Cord Compression
- Oncology Referrals
- Pain Management

Lung Cancer Screening Services

See also:

- Lung Cancer Screening
- Non-acute Respiratory Referral (> 24 hours)

Clinical editor's note

The National Lung Cancer Screening Program commenced 1 July 2025.

The Royal Melbourne Hospital (RMH) has a pilot research project that allows a streamlined referral process with dedicated clinics for both screening detected high-risk nodule findings, and screening detected additional respiratory findings. These will run from July 2025 to May 2026.

For more information, see RMH – Lung Nodules and Cancer Screening Referral Pathway.

Lung cancer screening related advice:

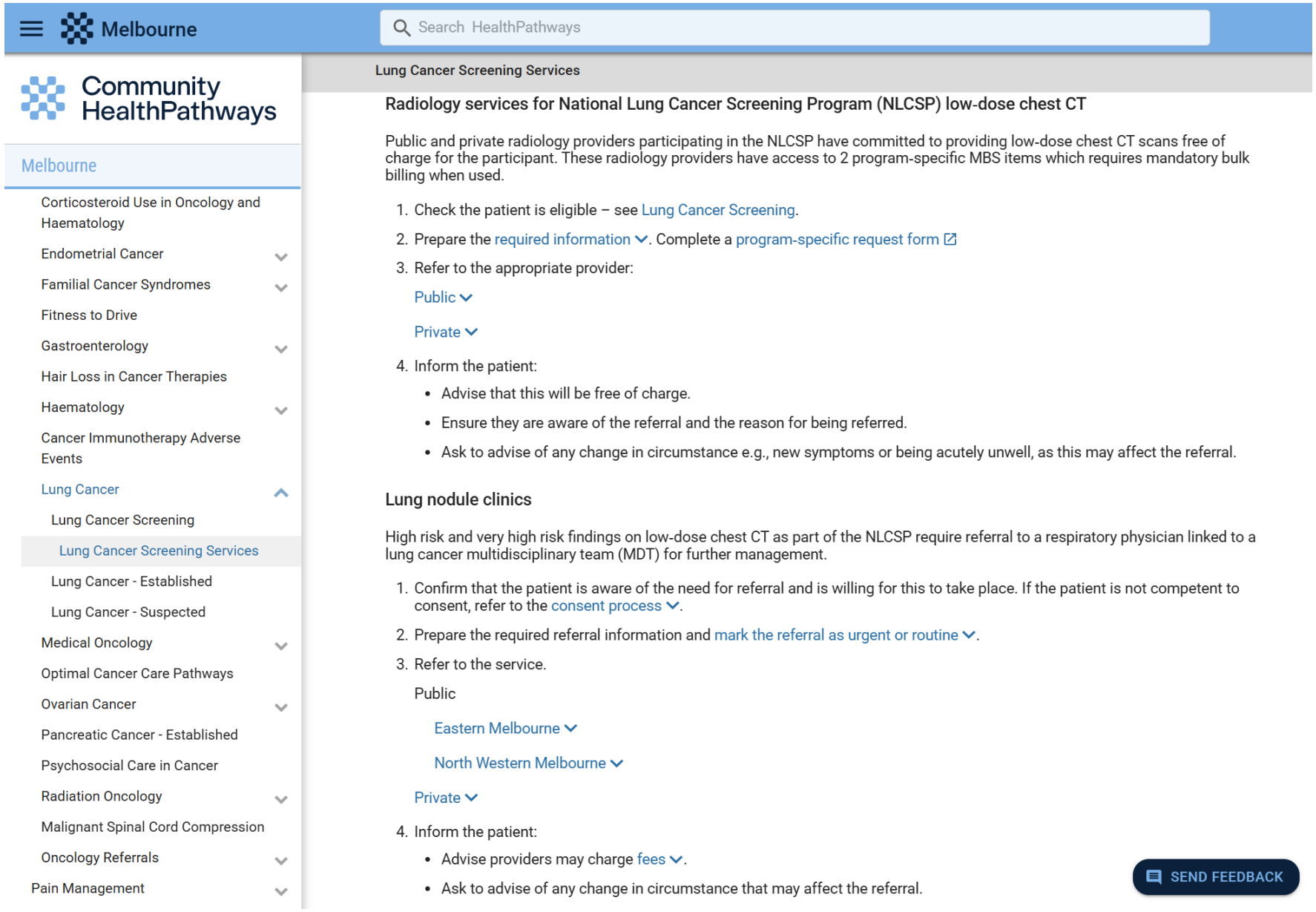
- RMH lung nodule and lung cancer screening nurse advice hotline:
  - Phone: **0455-409-806**
  - Email: rmhlungnoduleandscreeningreferrals@mh.org.au
  - Further information

  Ensure opt-out information sheet is given to patients. Offers advice about the NLCSP, screen-detected abnormalities, non-screen detected pulmonary nodules, and quitting smoking.
- Lung Foundation Australia lung cancer screening helpline:
  - Phone: **1800-654-301**
  - Email: lungscreening@lungfoundation.com.au
  - Further information
  - Opening hours: Monday to Friday 8:00 am to 4:30 pm

  This helpline is for screening information or support for patients or health professionals.

SEND FEEDBACK

Lung Cancer Screening Services page



Melbourne

Search HealthPathways

Community HealthPathways

Melbourne

- Corticosteroid Use in Oncology and Haematology
- Endometrial Cancer
- Familial Cancer Syndromes
- Fitness to Drive
- Gastroenterology
- Hair Loss in Cancer Therapies
- Haematology
- Cancer Immunotherapy Adverse Events
- Lung Cancer
  - Lung Cancer Screening
    - Lung Cancer Screening Services
  - Lung Cancer - Established
  - Lung Cancer - Suspected
- Medical Oncology
- Optimal Cancer Care Pathways
- Ovarian Cancer
- Pancreatic Cancer - Established
- Psychosocial Care in Cancer
- Radiation Oncology
- Malignant Spinal Cord Compression
- Oncology Referrals
- Pain Management

Lung Cancer Screening Services

Radiology services for National Lung Cancer Screening Program (NLCSP) low-dose chest CT

Public and private radiology providers participating in the NLCSP have committed to providing low-dose chest CT scans free of charge for the participant. These radiology providers have access to 2 program-specific MBS items which requires mandatory bulk billing when used.

1. Check the patient is eligible – see Lung Cancer Screening.
2. Prepare the required information. Complete a program-specific request form
3. Refer to the appropriate provider:

   Public

   Private

4. Inform the patient:
   - Advise that this will be free of charge.
   - Ensure they are aware of the referral and the reason for being referred.
   - Ask to advise of any change in circumstance e.g., new symptoms or being acutely unwell, as this may affect the referral.

Lung nodule clinics

High risk and very high risk findings on low-dose chest CT as part of the NLCSP require referral to a respiratory physician linked to a lung cancer multidisciplinary team (MDT) for further management.

1. Confirm that the patient is aware of the need for referral and is willing for this to take place. If the patient is not competent to consent, refer to the consent process.
2. Prepare the required referral information and mark the referral as urgent or routine.
3. Refer to the service.

   Public

   Eastern Melbourne

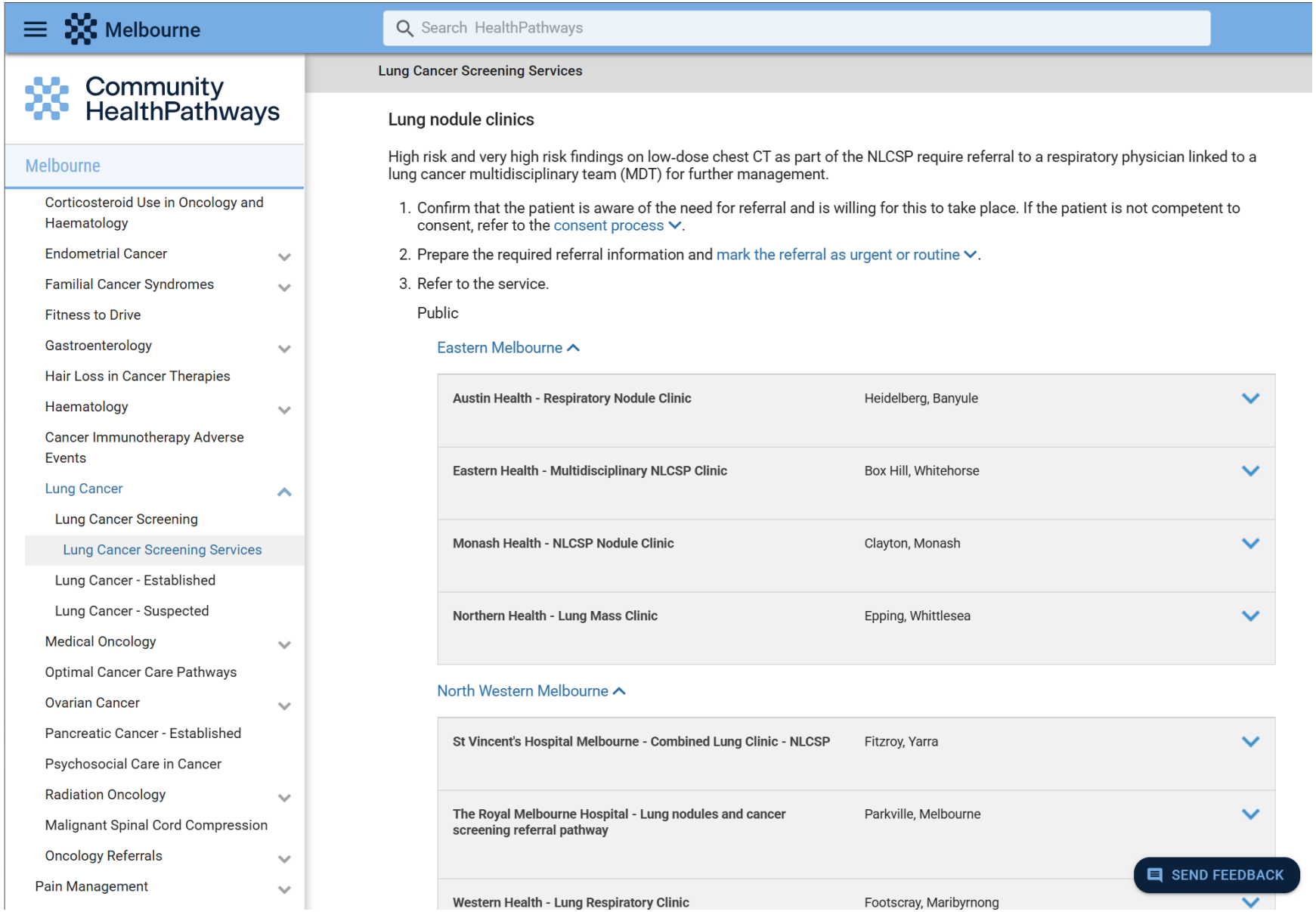
   North Western Melbourne

   Private

4. Inform the patient:
   - Advise providers may charge fees.
   - Ask to advise of any change in circumstance that may affect the referral.

SEND FEEDBACK

Lung Cancer Screening Services page

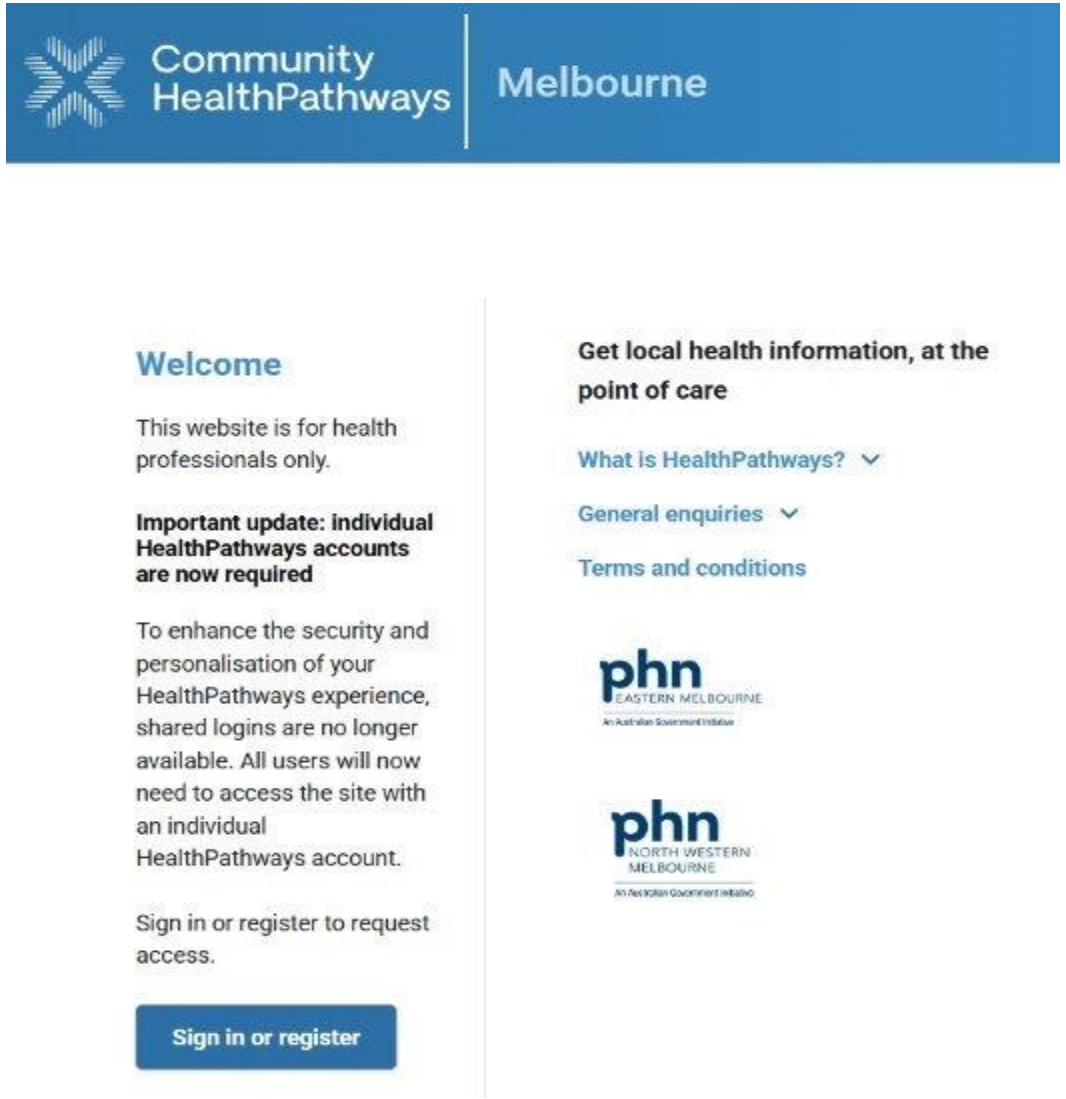


Accessing HealthPathways

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



Questions?

Session Conclusion

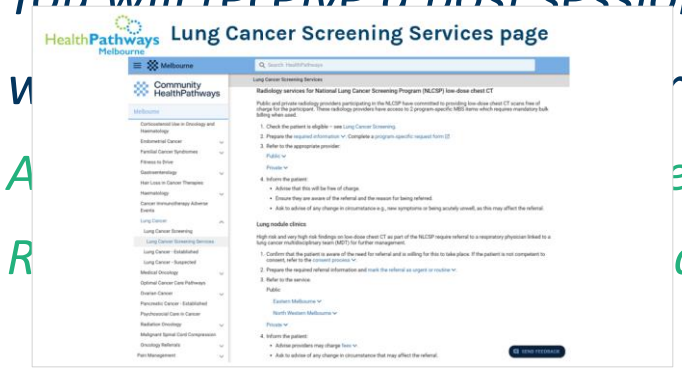
We value your feedback, let us know your thoughts.

Scan this QR code

You will receive a post session email within a week which w rces discussed during this session.

A eceived within 4-6 weeks.

R ded 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/