American College of Radiology
ACR Appropriateness Criteria®

Radiologic Management of Thoracic Nodules and Masses

Variant 1: Middle-aged patient (35–60 years old) with an incidental 1.5-cm lung nodule. The lesion was smooth. No associated adenopathy. No known risk factors for lung cancer.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
FDG-PET/CT whole body	Usually appropriate		☢☢☢☢ 10-30 mSv		7	n/a	0	0	0	0	0	0	0	0	0
Percutaneous lung biopsy	Usually appropriate		N/A	N/A	7	n/a	0	0	0	0	0	0	0	0	0
Follow-up imaging only	May be appropriate		N/A	N/A	6	n/a	0	0	0	0	0	0	0	0	0
Surgical lung biopsy/resection	Usually not appropriate		N/A	N/A	3	n/a	0	0	0	0	0	0	0	0	0
Conservative management (do nothing)	Usually not appropriate		N/A	N/A	1	n/a	0	0	0	0	0	0	0	0	0

Variant 2: Middle-aged patient (35–60 years old) who had a CT pulmonary angiogram that was negative for pulmonary embolism but that demonstrated an incidental 1.5-cm lung nodule. The lesion was smooth. No associated adenopathy. Patient has a 70 pack/year smoking history and evidence of significant COPD on chest CT.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
FDG-PET/CT whole body	Usually appropriate		☢☢☢☢ 10-30 mSv		8	n/a	0	0	0	0	0	0	0	0	0

Percutaneous lung biopsy	Usually appropriate		N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0
Surgical lung biopsy/resection	May be appropriate		N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
Follow-up imaging only	Usually not appropriate		N/A	N/A	2	n/a	0	0	0	0	0	0	0	0	0
Conservative management (do nothing)	Usually not appropriate		N/A	N/A	1	n/a	0	0	0	0	0	0	0	0	0

Variant 3: Middle-aged patient (35–60 years old) with a newly diagnosed colon carcinoma. Three pulmonary nodules, ranging up to 2 cm in diameter, noted on staging CT of the chest. At least 1 of the lesions demonstrates a lobulated appearance.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
FDG-PET/CT whole body	Usually appropriate		☢☢☢☢ 10-30 mSv		8	n/a	0	0	0	0	0	0	0	0	0
Percutaneous lung biopsy	Usually appropriate		N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0
Follow-up imaging only	Usually not appropriate		N/A	N/A	3	n/a	0	0	0	0	0	0	0	0	0
Surgical lung biopsy/resection	Usually not appropriate		N/A	N/A	3	n/a	0	0	0	0	0	0	0	0	0
Conservative management (do nothing)	Usually not appropriate		N/A	N/A	1	n/a	0	0	0	0	0	0	0	0	0

Variant 4: Young adult patient (20–35 years old) with 1.0-cm smooth-walled noncalcified lung nodule seen on CT after minor motor vehicle trauma. No known risk factors for lung cancer.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Follow-up imaging only	Usually appropriate		N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0
Percutaneous lung biopsy	Usually not appropriate		N/A	N/A	3	n/a	0	0	0	0	0	0	0	0	0
FDG-PET/CT whole body	Usually not appropriate		☢☢☢☢ 10-30 mSv		3	n/a	0	0	0	0	0	0	0	0	0
Surgical lung biopsy/resection	Usually not appropriate		N/A	N/A	2	n/a	0	0	0	0	0	0	0	0	0
Conservative management (do nothing)	Usually not appropriate		N/A	N/A	1	n/a	0	0	0	0	0	0	0	0	0

Variant 5: Middle-aged patient (35–60 years old) with persistent 1.5-cm ground-glass nodule noted on an initial CT scan and a follow-up 3-month CT scan. No smoking history and no recent respiratory infection.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Percutaneous lung biopsy	Usually appropriate		N/A	N/A	7	n/a	0	0	0	0	0	0	0	0	0
Surgical lung biopsy/resection	May be appropriate		N/A	N/A	6	n/a	0	0	0	0	0	0	0	0	0
FDG-PET/CT whole body	May be appropriate		☢☢☢☢ 10-30 mSv		5	n/a	0	0	0	0	0	0	0	0	0
Follow-up imaging only	May be appropriate		N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
Conservative management (do nothing)	Usually not appropriate		N/A	N/A	1	n/a	0	0	0	0	0	0	0	0	0

Variant 6: Elderly patient (>80 years old) with multifocal <2cm pure ground-glass opacities (no solid component) after chest CT recommended from an abnormal coronary CT examination. No smoking history and no recent respiratory infection.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Follow-up imaging only	Usually appropriate		N/A	N/A	7	n/a	0	0	0	0	0	0	0	0	0
Conservative management (do nothing)	May be appropriate		N/A	N/A	4	n/a	0	0	0	0	0	0	0	0	0
Percutaneous lung biopsy	May be appropriate		N/A	N/A	4	n/a	0	0	0	0	0	0	0	0	0
FDG-PET/CT whole body	Usually not appropriate		☢☢☢☢ 10-30 mSv		3	n/a	0	0	0	0	0	0	0	0	0
Surgical lung biopsy/resection	Usually not appropriate		N/A	N/A	2	n/a	0	0	0	0	0	0	0	0	0

Variant 7: Middle-aged patient (35–60 years old) with a 2-cm smooth-walled lung nodule containing fatty elements by Hounsfield attenuation noted on CT. No prior imaging or risk factors for lung cancer.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Conservative management (do nothing)	May be appropriate		N/A	N/A	6	n/a	0	0	0	0	0	0	0	0	0
Follow-up imaging only	May be appropriate		N/A	N/A	6	n/a	0	0	0	0	0	0	0	0	0
FDG-PET/CT whole body	Usually not appropriate		☢☢☢☢ 10-30 mSv		2	n/a	0	0	0	0	0	0	0	0	0

Percutaneous lung biopsy	Usually not appropriate		N/A	N/A	2	n/a	0	0	0	0	0	0	0	0	0
Surgical lung biopsy/resection	Usually not appropriate		N/A	N/A	2	n/a	0	0	0	0	0	0	0	0	0

Variant 8: Middle-aged patient (35–60 years old) with known multiple pulmonary nodules from metastatic cancer. All lesions but 1 have regressed on the current chemotherapy regimen.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Percutaneous lung biopsy	Usually appropriate		N/A	N/A	7	n/a	0	0	0	0	0	0	0	0	0
FDG-PET/CT whole body	May be appropriate		☢☢☢☢ 10-30 mSv		6	n/a	0	0	0	0	0	0	0	0	0
Bronchoscopic biopsy (repeat biopsy)	May be appropriate		N/A	N/A	6	n/a	0	0	0	0	0	0	0	0	0
Follow-up imaging only	May be appropriate		N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
Surgical lung biopsy/resection	May be appropriate		N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
Conservative management (do nothing)	Usually not appropriate		N/A	N/A	2	n/a	0	0	0	0	0	0	0	0	0

Variant 9: Elderly patient (>60 years old) with a positive purified protein derivative (tuberculin) test and abnormal chest radiograph. On CT scanning, bulky (up to 3 cm) mediastinal adenopathy is noted throughout the mediastinum (pretracheal, subcarinal, aortopulmonary window). The nodes do not demonstrate calcifications or necrosis. No associated pulmonary nodules.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Endoscopic/bronchoscopic biopsy	Usually		N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
	appropriate														
Percutaneous mediastinal biopsy	May be appropriate		N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
Surgical mediastinal biopsy/resection	May be appropriate		N/A	N/A	4	n/a	0	0	0	0	0	0	0	0	0
Follow-up imaging only	Usually not appropriate		N/A	N/A	2	n/a	0	0	0	0	0	0	0	0	0
Conservative management (do nothing)	Usually not appropriate		N/A	N/A	1	n/a	0	0	0	0	0	0	0	0	0

Variant 10: Elderly patient (>60 years old) with a long >30 pack/year smoking history meeting criteria for low-dose screening CT (LDCT). LDCT demonstrates a 2-cm pulmonary nodule in the lingula. There is mediastinal adenopathy (up to 2 cm) in the pretracheal and subcarinal regions as well as left perihilar (up to 2 cm) adenopathy.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
FDG-PET/CT whole body	Usually appropriate		☢☢☢☢ 10-30 mSv		8	n/a	0	0	0	0	0	0	0	0	0
Endoscopic/bronchoscopic mediastinal biopsy	Usually appropriate		N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0
Percutaneous lung biopsy	Usually appropriate		N/A	N/A	7	n/a	0	0	0	0	0	0	0	0	0
Percutaneous mediastinal biopsy	May be appropriate		N/A	N/A	6	n/a	0	0	0	0	0	0	0	0	0
Surgical pulmonary nodule biopsy/resection	Usually not appropriate		N/A	N/A	3	n/a	0	0	0	0	0	0	0	0	0

Follow-up imaging only	Usually not appropriate		N/A	N/A	2	n/a	0	0	0	0	0	0	0	0	0
Conservative management (do nothing)	Usually not appropriate		N/A	N/A	1	n/a	0	0	0	0	0	0	0	0	0

Variant 11: Middle-aged patient (35–60 years old) with shortness of breath presenting with bilateral hilar adenopathy measuring up to 2 cm, enlarging on serial 3-month imaging. Recent nondiagnostic bronchoscopic biopsy via TBNA. No intraparenchymal pulmonary nodules.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Bronchoscopic biopsy (repeat biopsy)	Usually appropriate		N/A	N/A	7	n/a	0	0	0	0	0	0	0	0	0
FDG-PET/CT whole body	May be appropriate		☢☢☢☢ 10-30 mSv		5	n/a	0	0	0	0	0	0	0	0	0
Follow-up imaging only	May be appropriate		N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
Surgical lung biopsy/resection	May be appropriate		N/A	N/A	4	n/a	0	0	0	0	0	0	0	0	0
Percutaneous lymph node biopsy	Usually not appropriate		N/A	N/A	3	n/a	0	0	0	0	0	0	0	0	0
Conservative management (do nothing)	Usually not appropriate		N/A	N/A	2	n/a	0	0	0	0	0	0	0	0	0

Variant 12: Middle-aged patient (35–60 years old) presenting with a 3-cm lobular mass involving the left pleura associated with rib erosion.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Percutaneous lung biopsy	Usually appropriate		N/A	N/A	8	n/a	0	0	0	0	0	0	0	0	0

FDG-PET/CT whole body	Usually appropriate		☢☢☢☢ 10-30 mSv		8	n/a	0	0	0	0	0	0	0	0	0
Surgical pleural biopsy/resection	May be appropriate		N/A	N/A	5	n/a	0	0	0	0	0	0	0	0	0
Follow-up imaging only	Usually not appropriate		N/A	N/A	1	n/a	0	0	0	0	0	0	0	0	0
Conservative management (do nothing)	Usually not appropriate		N/A	N/A	1	n/a	0	0	0	0	0	0	0	0	0

Appendix Key

A more complete discussion of the items presented below can be found by accessing the supporting documents at the designated hyperlinks.

Appropriateness Category: The panel's recommendation for a procedure based on the assessment of the risks and benefits of performing the procedure for the specified clinical scenario.

SOE: Strength of Evidence. The assessment of the amount and quality of evidence found in the peer reviewed medical literature for an appropriateness recommendation.

- **References:** The citation number and PMID for the reference(s) associated with the recommendation.
- **Study Quality**: The assessment of the quality of an individual reference based on the number of study quality elements described in the reference.

RRL: Relative Radiation Level. A population based assessment of the amount of radiation a typical patient may be exposed to during the specified procedure.

Rating: The final rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Median: The median rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Final tabulations: A histogram showing the number of panel members who rated the procedure as noted in the column heading (ie, 1, 2, 3, etc.).

Additional supporting documents about the AC methodology and processes can be found at **www.acr.org/ac.**