#### American College of Radiology ACR Appropriateness Criteria<sup>®</sup>

#### **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.

	Appropriateness	005							F	inal '	Fabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
FDG-PET/CT whole body	Usually appropriate		<del>ଷଷଷଷ</del> 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.

	Appropriateness	COL			D. (1				F	'inal '	Tabu	latio	ıs		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
FDG-PET/CT whole body	Usually appropriate		ତତତତ 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.

	Appropriateness	COL			D.C				F	'inal '	Гаbu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
FDG-PET/CT whole body	Usually appropriate		ଷେଷଷ 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.

	Appropriateness	COL			<b>D</b> (1	14.11			F	'inal '	<b>Fabu</b>	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	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		ବ୍ୟତ୍ୟତ 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.

	Appropriateness	COL			<b>D</b> (1				F	'inal '	<b>Fabu</b>	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	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		ବେବେବ 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

	Appropriateness	COL			<b>D</b> (1				F	inal [	Гabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	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 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.

#### 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.

	Appropriateness	COL				26.11			F	inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	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.

	Appropriateness	COF				17.11			F	'inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	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		ଷ୍ଟଷ୍ଟ 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.

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Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	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

	Appropriateness	COL			<b>D</b> (1				F	inal 🛛	[[abu]	latio	ıs		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	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	COL	Adults RRL Peds RRL		Mallar	Final Tabulations										
	Category	SOE		Peus KKL	Rating	Median	1	2	3	4	5	6	7	8	9	
FDG-PET/CT whole body	Usually appropriate		<del>ଷଷଷଷ</del> 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	SOF		D I DDI	<b>D</b> (1		Final Tabulations										
	Category	SOE	Adults RRL	Peds RRL	Rating	Median	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		ଝେଝେଝ 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	COF			D. (*				F	inal '	<b>Fabu</b>	latio	ns		
	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6		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	ଡଡଡଡ 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.