

Work Up and Care Escalation of Abnormal Findings in Lung Cancer Screening Programs

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Disclosures

- Nothing to disclose

Objectives

- Review which Lung RADS categories require possible procedural action
- Discuss a multidisciplinary lung nodule program
- Review diagnostic procedures
- Review diagnostic algorithms and guidelines

LCS Categories that Require Evaluation Beyond CT

Suspicious Findings for which additional diagnostic testing is recommended	4A	Solid nodule(s): ≥ 8 to < 15 mm (≥ 268 to < 1767 mm ³) at baseline OR growing < 8 mm (< 268 mm ³) OR new 6 to < 8 mm (113 to < 268 mm ³)	3 month LDCT; PET/CT may be used when there is a ≥ 8 mm (≥ 268 mm ³) solid component	5-15%	2%
		Part solid nodule(s): ≥ 6 mm (≥ 113 mm ³) with solid component ≥ 6 mm to < 8 mm (≥ 113 to < 268 mm ³) OR with a new or growing < 4 mm (< 34 mm ³) solid component			
		Endobronchial nodule			
Very Suspicious Findings for which additional diagnostic testing and/or tissue sampling is recommended	4B	Solid nodule(s) ≥ 15 mm (≥ 1767 mm ³) OR new or growing, and ≥ 8 mm (≥ 268 mm ³)	Chest CT with or without contrast, PET/CT and/or tissue sampling depending on the *probability of malignancy and comorbidities. PET/CT may be used when there is a ≥ 8 mm (≥ 268 mm ³) solid component. <i>For new large nodules that develop on an annual repeat screening CT, a 1 month LDCT may be recommended to address potentially infectious or inflammatory conditions</i>	> 15%	2%
		Part solid nodule(s) with: a solid component ≥ 8 mm (≥ 268 mm ³) OR a new or growing ≥ 4 mm (≥ 34 mm ³) solid component			
	4X	Category 3 or 4 nodules with additional features or imaging findings that increases the suspicion of malignancy			

How to choose the right next step

The Multidisciplinary Nodule Conference

ACCP/ATS/ACR Recommendations for comprehensive thoracic program

- Must include clinicians with expertise in:
 - Lung nodule management
 - Performance of nonsurgical biopsies
 - Performance of minimally invasive surgical biopsies
 - Lung cancer treatment
- Track nodule management from identification through management
- Collect data from initial radiographic abnormality through diagnosis, treatment, outcomes

Possible Diagnostic Procedures

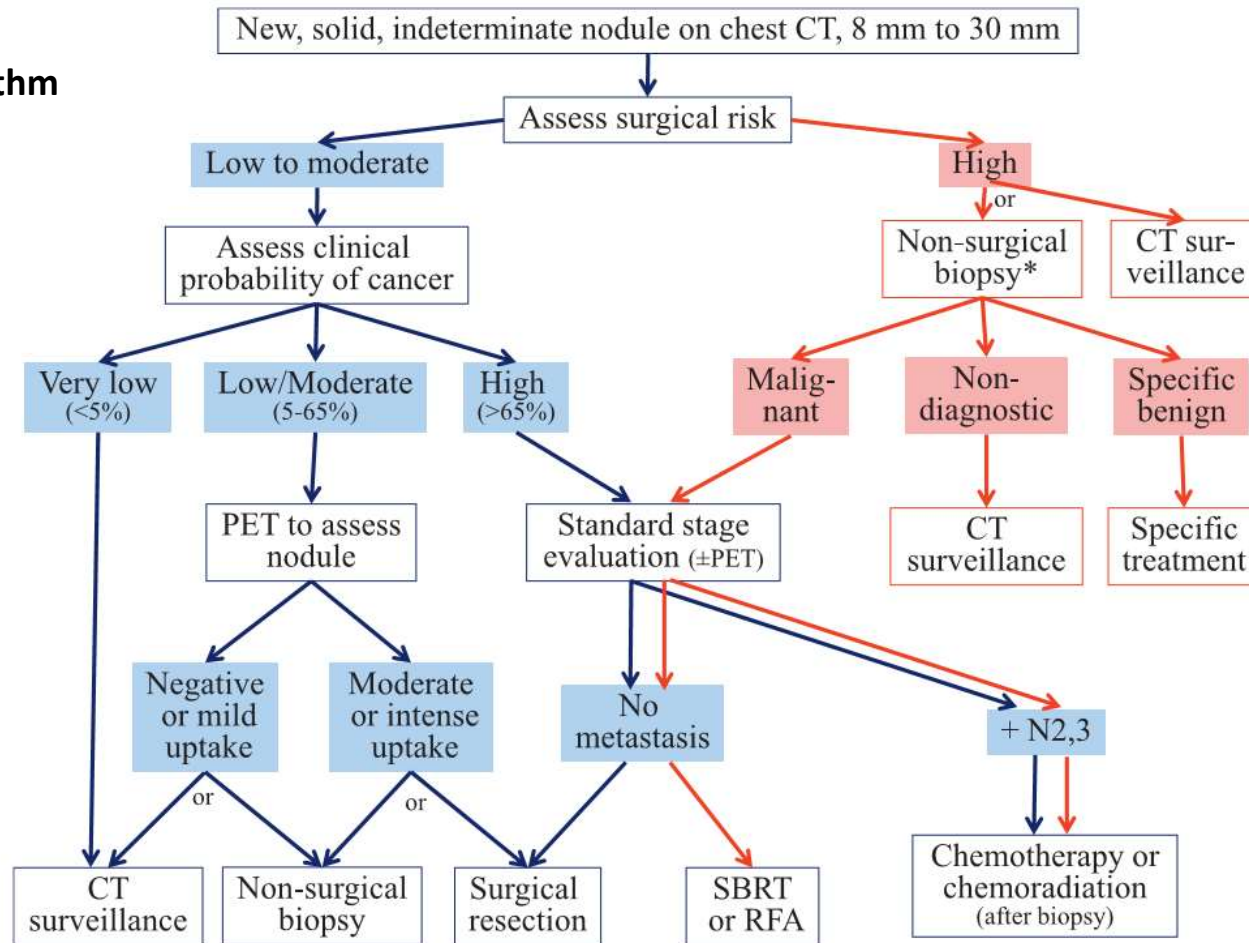
Procedure	Description	Preferred in Patients With
Surgical biopsy (VATS/RATS)	Video or Robot assisted thoroscopic wedge resection and/or lobectomy	Early stage cancers Good lung function Minimal comorbidities
Transthoracic Needle Biopsy (TTNB)	Percutaneous needle biopsy through chest wall to nodule under CT guidance	Peripheral nodules Minimal emphysema High risk patients
Bronchoscopy with Radial Endobronchial Ultrasound (R-EBUS)	Flexible bronchoscopy with peripheral ultrasound probe guidance to identify lesion	Peripheral nodules near or within airways Surgical and non-surgical candidates Intermediate risk patients
Navigation with bronchoscopy	Flexible bronchoscopy or percutaneous biopsy with virtual/electromagnetic guidance	Peripheral lesions Surgical and non-surgical candidates Intermediate risk patients
Bronchoscopy with Linear EBUS (L-EBUS)	Flexible bronchoscope with attached ultrasound to identify structures along large airways	Central lesions Mediastinal and lymph node biopsies (staging)

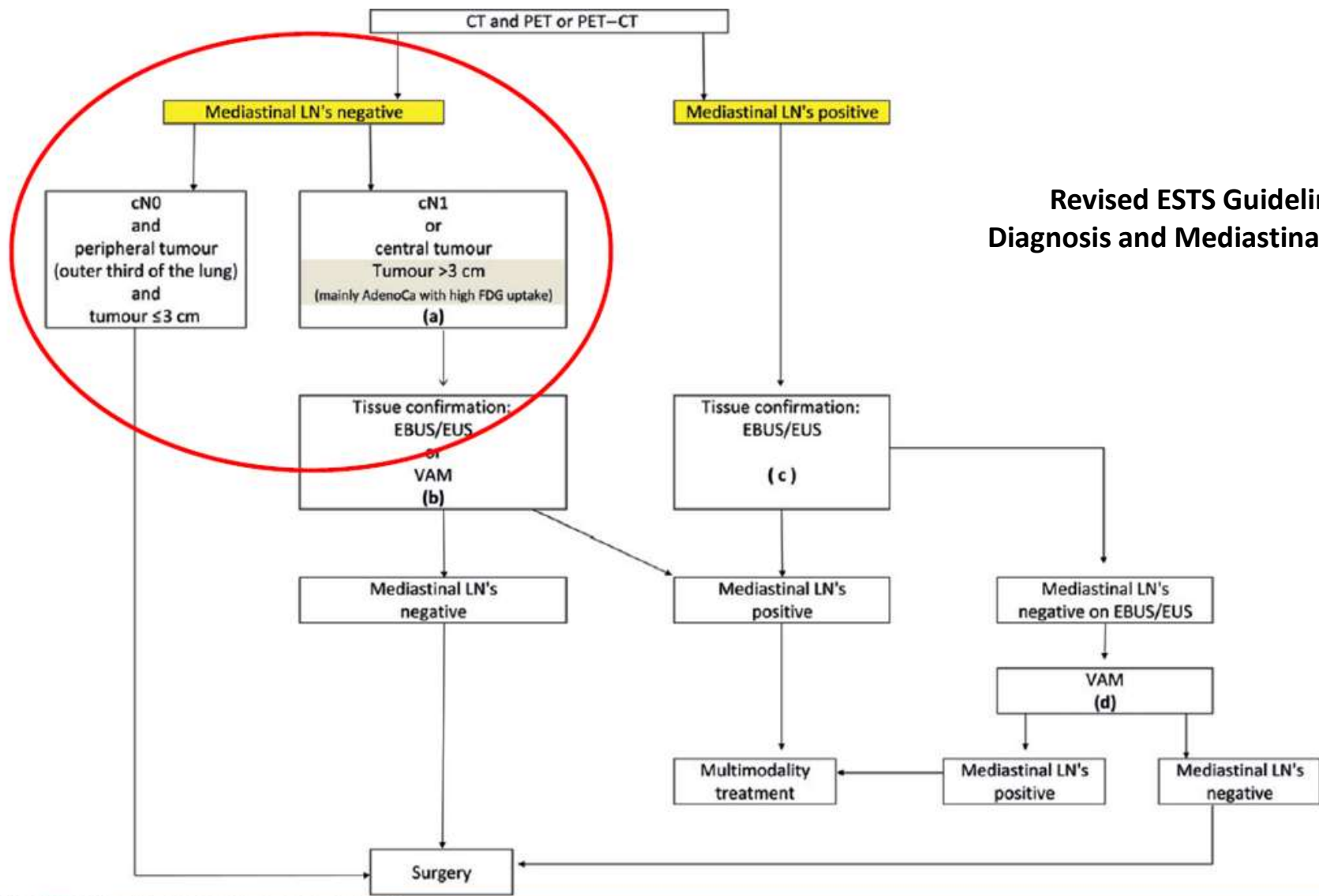
Diagnostic Procedure Pros/Cons

Procedure	Potential Benefits		Potential Harms	
	Outcome	% Frequency	Outcome	% Frequency
Surgical wedge resection	<ul style="list-style-type: none"> Prompt, definitive diagnosis Avoid inconvenience and potential complications of nonsurgical biopsy, if malignant Reassurance if specific benign diagnosis established Proceed to lobectomy if frozen section reveals malignancy Acquisition of tissue for molecular testing 	96-100	<ul style="list-style-type: none"> Physical complications Persistent air leak Pneumonia Death Worsened lung function (short term) Unnecessary surgery if nodule turns out to be benign disease Uncertain benefits of surgery if very-slow-growing tumor 	5 3-5 1-8 0.5 Varies Varies
Bronchoscopy with biopsy	<ul style="list-style-type: none"> Definitive preoperative cancer diagnosis in many cases Fluoroscope-guided EBUS, ENB ± VBN guided Reassurance if specific benign diagnosis established Acquisition of tissue for molecular testing 	~ 30 60-90	<ul style="list-style-type: none"> Physical complications Bleeding Any pneumothorax Death May still require surgery if biopsy result is nondiagnostic or shows cancer False negative biopsy results False positive biopsy results 	2-5 2-4 <<1 30-70 Rare
CT scan-guided needle lung biopsy	<ul style="list-style-type: none"> Definitive preoperative cancer diagnosis in many cases ≤ 15 mm > 15 mm Reassurance if specific benign diagnosis established Acquisition of tissue for molecular testing 	~ 70-80 ~ 90	<ul style="list-style-type: none"> Physical complications Bleeding Any pneumothorax Pneumothorax needing chest tube Death May still require surgery if biopsy is non-diagnostic or shows cancer False negative False positive 	1 15 6-7 <<1 10-30 Rare
Radiologic surveillance (serial CT ± PET scans)	<ul style="list-style-type: none"> Avoid physical complications Discovering other incidental findings that are clinically important 		<ul style="list-style-type: none"> Radiation exposure Other incidental findings that prompt evaluation but turn out to be of little clinical significance Psychologic toll of uncertainty (eg, moderate to severe distress) Overdiagnosis of indolent cancers Delayed cancer diagnosis and treatment, with uncertain effect on outcomes 	24
No further evaluation	<ul style="list-style-type: none"> Avoid physical complications Avoid radiation exposure Avoid overdiagnosis of indolent cancers that do not need treatment 		<ul style="list-style-type: none"> Psychologic toll of uncertainty Delayed or missed cancer diagnosis 	

Gould MK, Donington J, Lynch WR, et al. Chest 2013; 143:e93S-12S.

CHEST SPN Algorithm





**Revised ESTS Guidelines
Diagnosis and Mediastinal Staging**

Guidelines for Diagnosis and Staging of NSCLC

- Since 2013/2014 – ACCP, ESTS, NCCN guidelines have recommended minimally invasive diagnosis and staging via bronchoscopy and EBUS for all of the following patients:
 - Lesion 3cm or greater
 - Central primary lesion
 - Lymph node enlargement (1cm or greater) on CT or PET/CT
 - Non-surgical candidates with lesion <3cm or peripheral

Silvestri G et al. Chest. 2013;143:e211s-250s.

De Leyn P et al. EurJ CardiothoracSurg. 2014;45(5):787-98.

Questions?