

ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ

Ξενοδοχείο  
Crowne Plaza  
Αθήνα

31<sup>ο</sup> Έτος

Ημέρες Παθολογίας 2023

"Διλήμματα στην Κλινική Παθολογία"

30 Μαρτίου έως

01 Απριλίου

2023

Δ Ι Ε Ρ Ε Υ Ν Η Σ Η  
Π Ν Ε Υ Μ Ο Ν Ι Κ Ο Υ Ο Ζ Ο Υ Ω Σ  
Τ Υ Χ Α Ι Ο Ε Υ Ρ Η Μ Α

ΕΛΕΝΗ ΚΟΚΚΟΤΟΥ MD, MSc

ΠΝΕΥΜΟΝΟΛΟΓΟΣ

ΟΓΚΟΛΟΓΙΚΗ ΜΟΝΑΔΑ

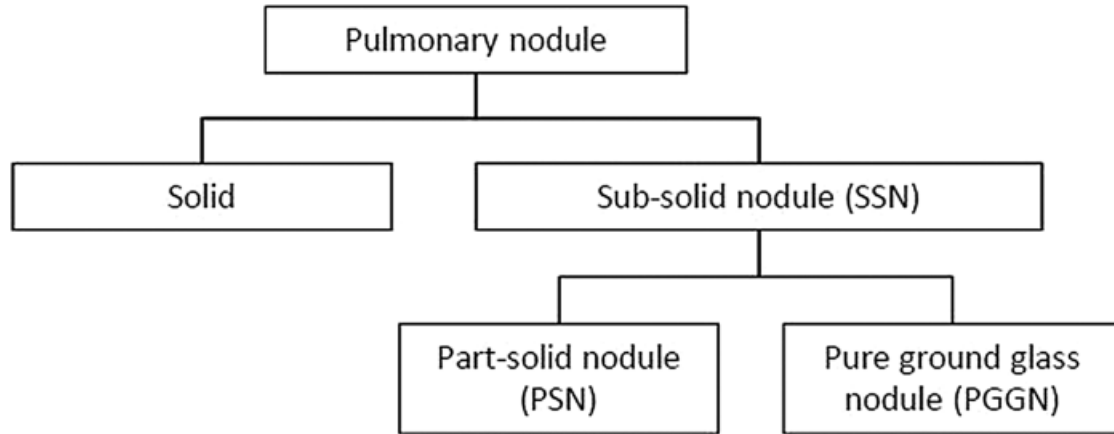
Γ' ΠΑΝΕΠΙΣΤΗΜΙΑΚΗ ΠΑΘΟΛΟΓΙΚΗ ΚΛΙΝΙΚΗ

ΝΝΘΑ «Η ΣΩΤΗΡΙΑ»





# PULMONARY NODULE



**Figure 5** Classification of pulmonary nodules.

Pulmonary nodule

Focal, rounded opacity  $\leq 3$  cm diameter, mostly surrounded by aerated lung, including contact with pleura, but without potentially related abnormalities in the thorax

Sub-solid nodule (SSN)

A part-solid or pGGN

Part-solid nodule (PSN) (b)

A focal opacity that has both solid and ground-glass component  $\leq 3$  cm diameter

pGGN (c) (synonymous with non-solid nodule)

A focal ground-glass opacity  $\leq 3$  cm diameter that does not obscure vascular pattern

Solid component

The part of a nodule that obscures the underlying bronchovascular structure

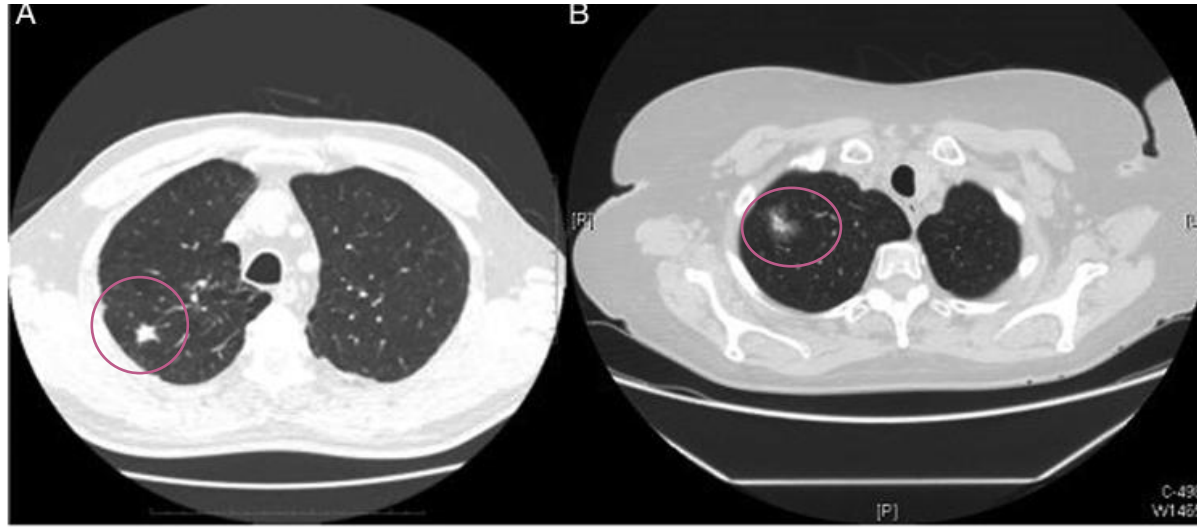
Ground glass

Opacification that is greater than that of the background but through which the underlying vascular structure is visible

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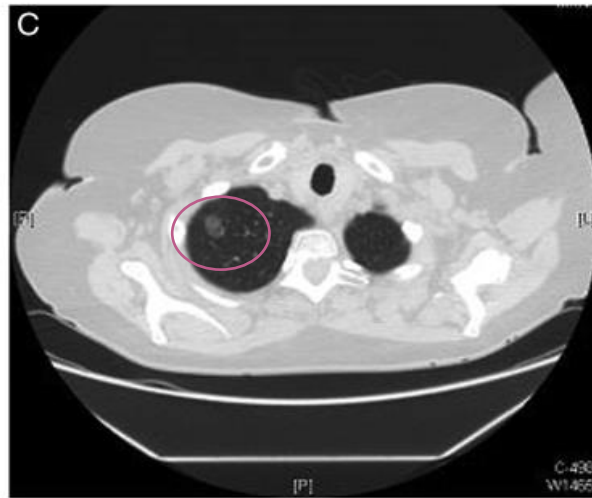
pGGN, pure ground-glass nodule.





Solid nodule

Part-solid nodule



Pure ground glass nodule



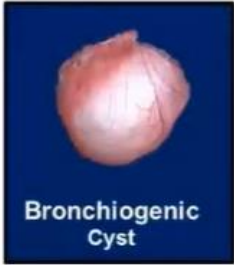


## SPN BENIGN CONDITIONS

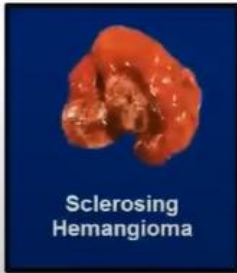
### DEVELOPMENTAL CAUSES



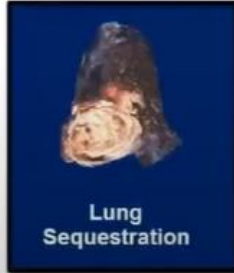
Chondroid Hamartoma



Bronchiogenic Cyst

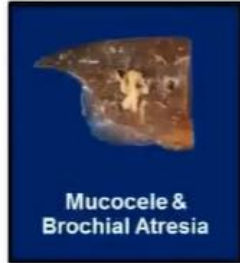


Sclerosing Hemangioma



Lung Sequestration

### CONGENITAL CAUSES



Mucocele & Bronchial Atresia



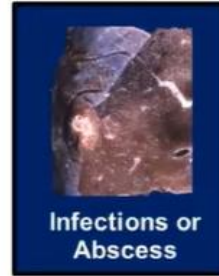
Telangiectasias



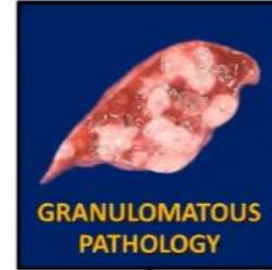
AV-Malformations

## SPN BENIGN CONDITIONS

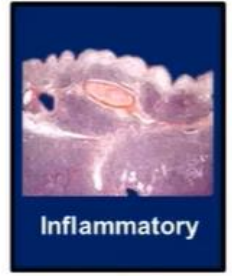
### ACQUIRED ETIOLOGY



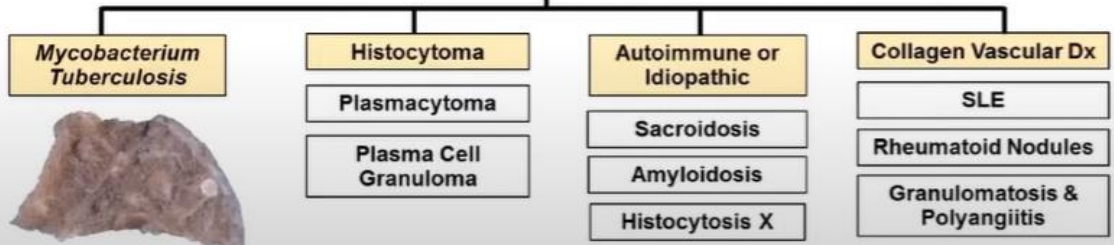
Infections or Abscess



GRANULOMATOUS PATHOLOGY



Inflammatory





## SPN MALIGNANT CONDITIONS

- NSCLC
  - Adenocarcinoma
  - Squamous Cell Carcinoma
  - Adenosquamous Carcinoma
  - Large Cell Carcinoma
- Small Cell Carcinoma
- Carcinoid NE Tumors
- Metastatic Lesions

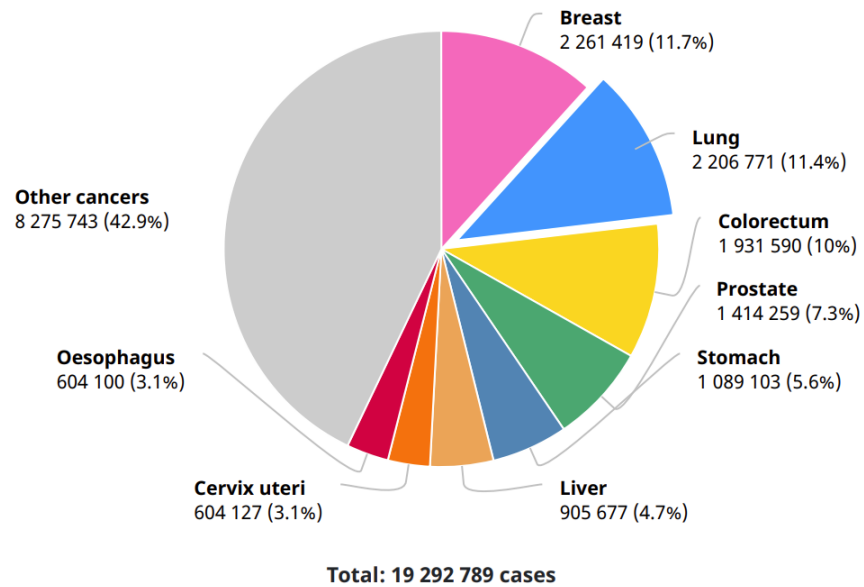




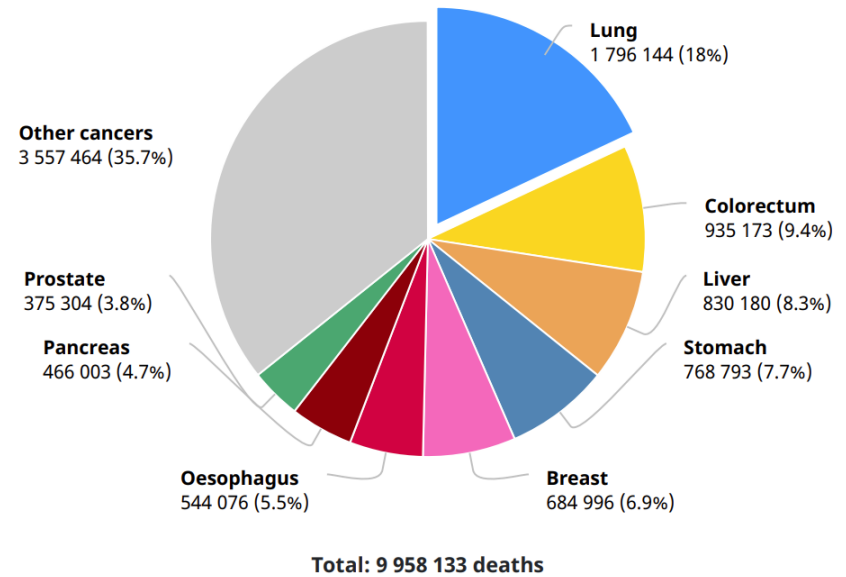
# Lung

Source: Globocan 2020

Number of new cases in 2020, both sexes, all ages



Number of deaths in 2020, both sexes, all ages



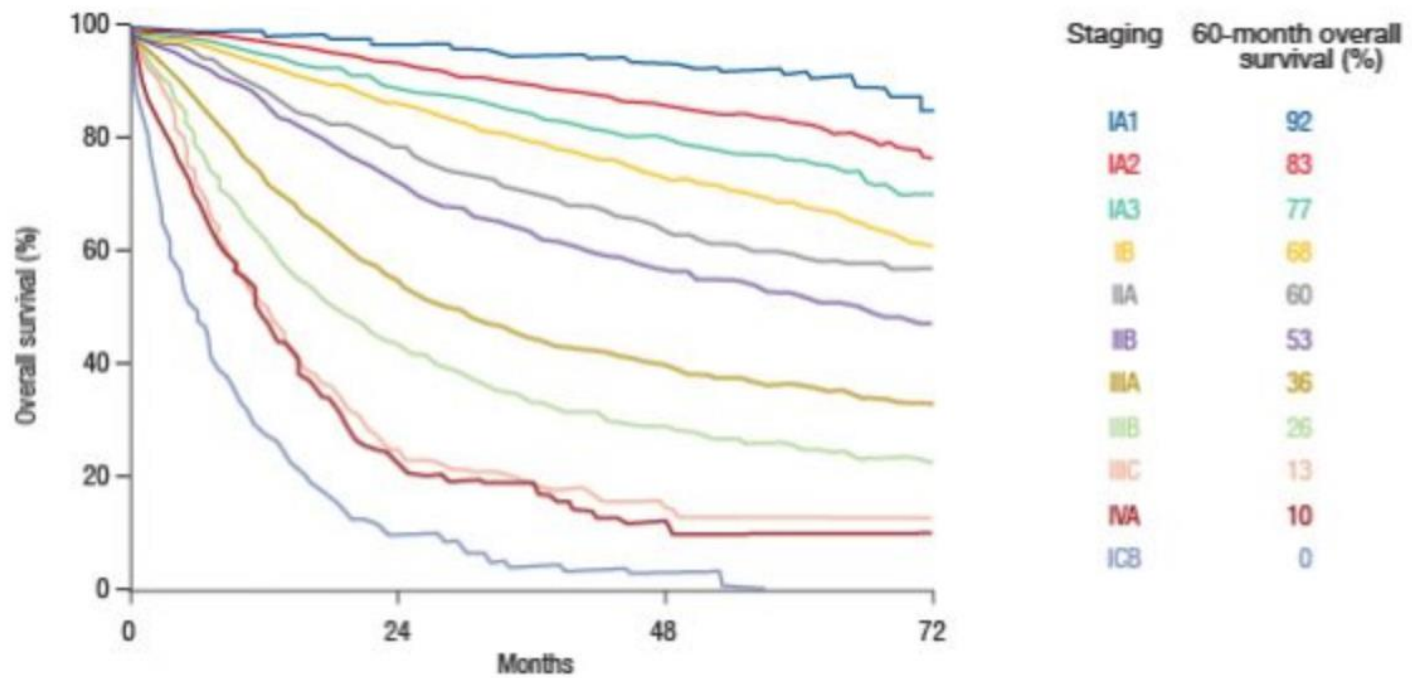
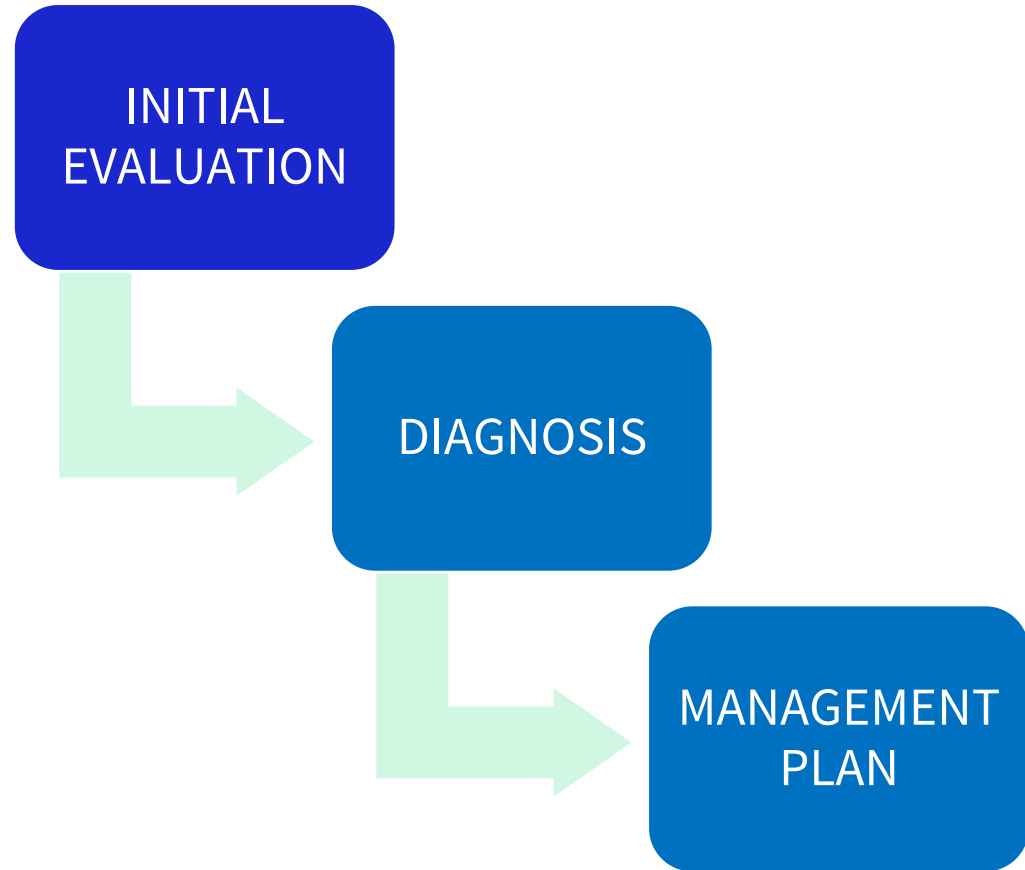


Figure: Overall survival according to the 8th Edition IASCL staging proposals [2]





# MANAGEMENT OF PULMONARY NODULE: STEPS







**Table 1.** Recommendations for the follow-up of solid and subsolid nodules by various major medical organizations.

Guideline	Fleischner Society					American College of Chest Physicians				British Thoracic Society	
Publication year risk assessment	2017 Clinical judgment and validated risk model					2013 Clinical judgment and validated risk model				2015 Brock model	
Nodule multiplicity	single		Multiple <sup>3</sup>			Single and multiple <sup>4</sup>				Single and multiple <sup>4</sup>	
Nodule Type	Initial size	Low	high	Low	high	Initial size	Low	high	Initial size	< 10%	≥ 10%
Solid nodule	< 6 mm	No FU	Optional FU at 12 mo	No FU	Optional FU at 12 mo	≤4 mm	Optional FU	FU at 12 mo If no change, no FU	< 5 mm	No FU	No FU
	6-8 mm	FU at 6-12 mo If no change, then 18-24 mo			FU at 3-6 mo If no change, then 18-24 mo	5-6 mm	FU at 12 mo. If stable, no FU	FU 6-12 mo. If stable, FU 18-24 mo	5-6 mm	CT FU at 1 yr If stable, discharge on basis of volumetry; FU 1 yr on basis of 2D non-automated diameter value If not stable, VDT> 600 d: discharge & For VDT 400-600 d: consider CT surveillance or biopsy, & for VDT 400 ≤; further work up and definitive management	
	> 8 mm	FU at 3 mo, PET/CT, or tissue sampling				> 8 mm	<b>Low risk:</b> CT surveillance or FDG-PET <b>Low to intermediate risk:</b> PET or functional imaging <b>High risk:</b> biopsy or surgical referral		> 8 mm	CT surveillance as same recommendations for 6-8 mm	PET-CT with risk assessment using Herder model <10% of risk: CT surveillance 10-70% of risk: biopsy >70% of risk: surgical resection or nonsurgical treatment
Ground-glass nodule	< 6 mm	No FU			FU at 3-6 mo If no change, then at 2 and 4 yr	≤ 5 mm		No FU	≤ 5 mm		No FU
	≥ 6 mm	FU CT at 6-12 mo to confirm persistence, then CT every 2 yrs until 5 yr			FU at 3-6 mo subsequent management based on the most suspicious nodule	> 5 mm		Annual LDCT surveillance for ≥ 3 yr	> 5 mm	Annual LDCT x 4 yr	FU LDCT at 3 mo to confirm persistence Consider FU CT, biopsy, nonsurgical treatment or resection
Part-solid nodule	< 6 mm	No FU			FU at 3-6 mo If no change, then 2 and 4 yr, FU at 3-6 mo	≤ 8 mm		Repeat LDCT at 2, 12, 24 mo.	Any	Repeat LDCT at 1, 2, and 4 yr	Repeat LDCT, biopsy, or surgical resection
	≥ 6 mm	FU CT at 3-6 mo to confirm persistence, if unchanged and solid component < 6 mm, annual CT x 5			subsequent management based on the most suspicious nodule	> 8 mm		Repeat LDCT at 3 mo, If persistent: PET-CT, biopsy, or resection			





### **Risk factors**

- History of heavy smoking
- Exposure to asbestos, radon or uranium
- Family history of lung cancer
- Older age
- Sex (Females > Males)
- Race (Black and native Hawaiian > White)
- Marginal spiculation
- Upper lobe location
- Multiplicity (<5 nodules increases risk for malignancy)
- Emphysema and pulmonary fibrosis (particularly IPF)





## Fleischner Society 2017 Guidelines for Management of Incidentally Detected Pulmonary Nodules in Adults

### Probability of Malignancy

#### Low (<5%)

Young  
Less smoking  
No prior cancer,  
Small nodule size,  
Regular margins,  
Non-upper lobe

#### Intermediate (5-65%)

Mixture of low  
and high  
probability  
features

#### High (>65%)

Older  
Heavy smoking  
Prior cancer  
Larger size  
Irregular margin  
Upper lobe location


### Notes using 2017 Fleischner guideline for pulmonary nodule management

- Only apply in subjects 35 years or older
- Do not apply in immunocompromised subjects, or patients with a known or suspected malignancy
- The new guideline requires risk-stratification on both patient- and nodule-characteristics, contrarily to the old document that only stratified low- or high-risk subjects






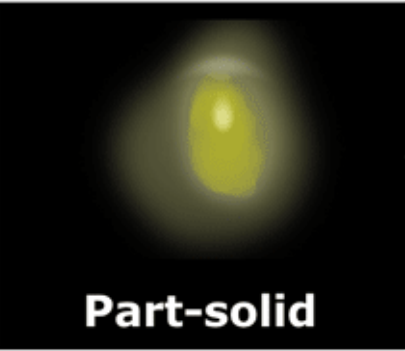

## Fleischner Society 2017 Guidelines for Management of Incidentally Detected Pulmonary Nodules in Adults

Solid	Size	Follow up		
	< 6 mm (<100mm <sup>3</sup> )	Single	Low risk High risk	No routine follow Optional CT at 12 months
		Multiple	Low risk High risk	No routine follow Optional CT at 12 months
	6-8 mm (100-250mm <sup>3</sup> )	Single	Low risk High risk	CT at 6-12 mo, then consider CT at 18-24 CT at 6-12 mo, then CT at 18-24
		Multiple	Low risk High risk	CT at 3-6 mo, then consider CT at 18-24 CT at 3-6 mo, then CT at 18-24
	> 8 mm (> 250mm <sup>3</sup> )	Single	All	Consider CT at 3 mo, PET/CT or Biopsy
		Multiple	Low risk High risk	CT at 3-6 mo, then consider CT at 18-24 CT at 3-6 mo, then CT at 18-24





**Fleischner Society 2017 Guidelines for Management of Incidentally Detected Pulmonary Nodules in Adults**

<b>Subsolid</b>	<b>Size</b>	<b>Follow up</b>
 <b>Groundglass</b>	< 6 mm	No FU indicated
	≥ 6 mm	CT at 6-12 months to confirm persistence, then CT at 3 and 5 years
 <b>Part-solid</b>	< 6 mm	No FU indicated
	≥ 6 mm	CT at 3-6 months to confirm persistence, then annual CT for 5 years
 <b>Multiple</b>	< 6 mm	CT at 3-6 months. If stable CT at 2 and 4 years
	≥ 6 mm	CT at 3-6 months. Subsequent management based on most suspicious nodule

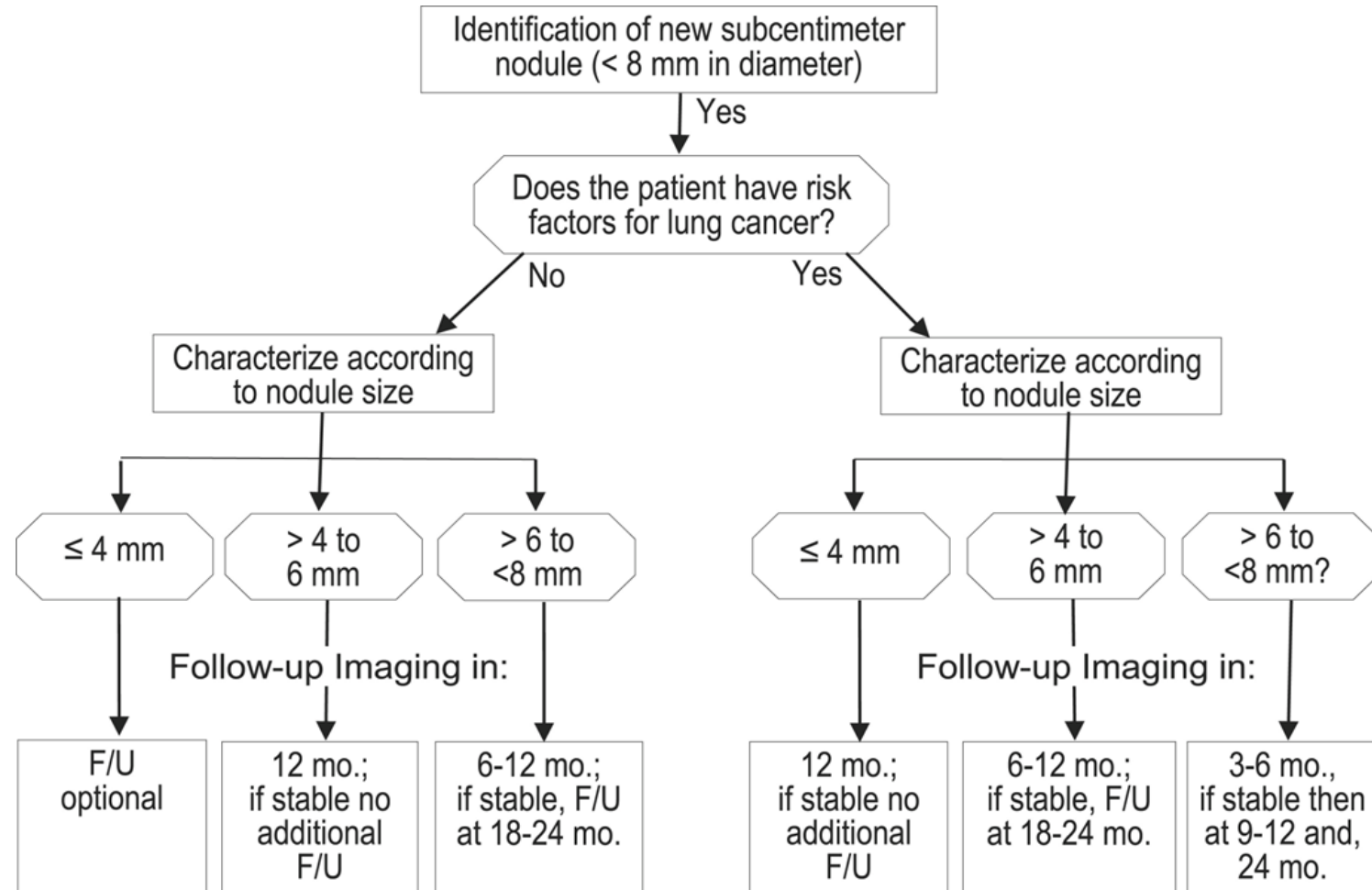




### Evaluation of Individuals With Pulmonary Nodules: When Is It Lung Cancer?

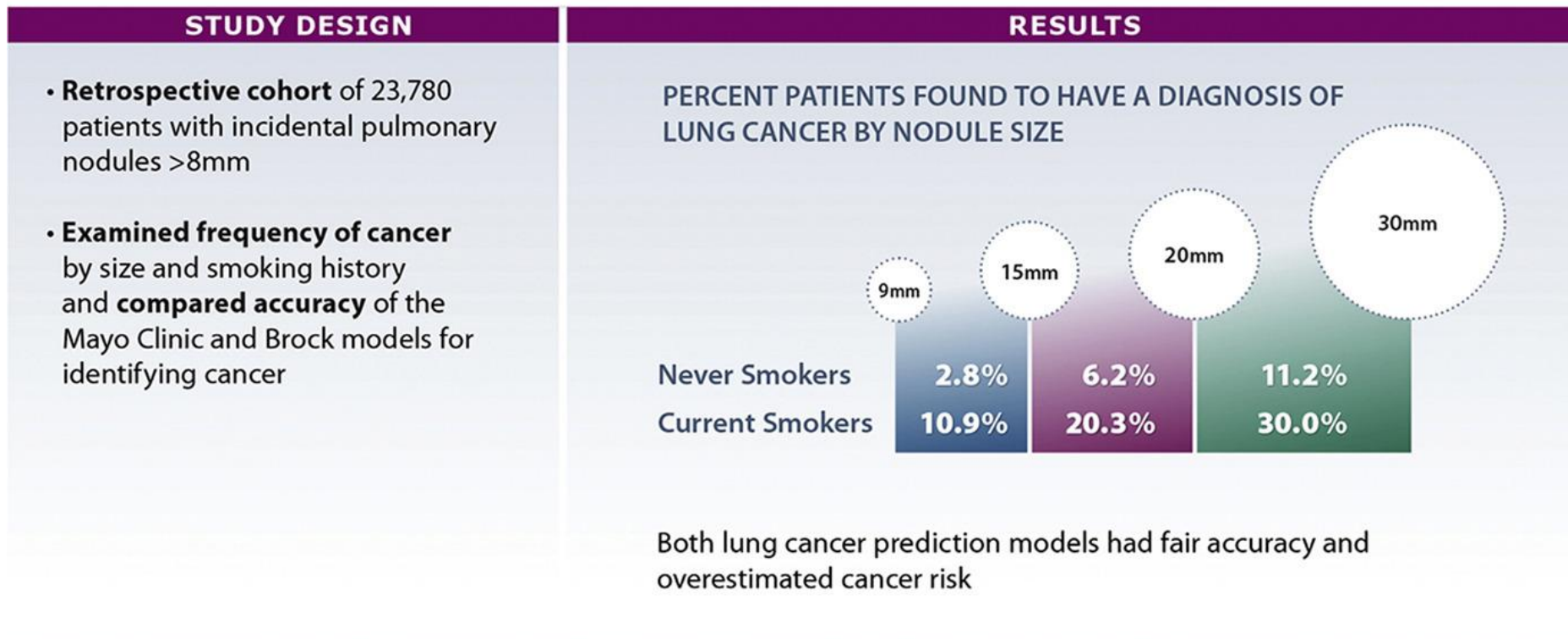
Diagnosis and Management of Lung Cancer,  
3rd ed: American College of Chest Physicians  
Evidence-Based Clinical Practice Guidelines

Michael K. Gould, MD, FCCP; Jessica Donington, MD; William R. Lynch, MD;  
Peter J. Mazzone, MD, MPH, FCCP; David E. Midthun, MD, FCCP;  
David P. Naidich, MD, FCCP; and Renda Soylemez Wiener, MD, MPH





## How Does Frequency of Cancer Vary by Size and Smoking History in Patients With Incidental Pulmonary Nodules >8mm?



Almost 10% of patients with an incidental pulmonary nodule >8mm will be diagnosed with lung cancer within 27 months; the percentage increases for ever-smokers and current smokers.





FIGURE 1. [Sections 4.0, 4.3] Management algorithm for individuals with solid nodules measuring 8 to 30 mm in diameter. Branches indicate steps in the algorithm following nonsurgical biopsy. \*Among individuals at high risk for surgical complications, we recommend either CT scan surveillance (when the clinical probability of malignancy is low to moderate) or nonsurgical biopsy (when the clinical probability of malignancy is moderate to high). RFA = radiofrequency ablation; SBRT = stereotactic body radiotherapy.

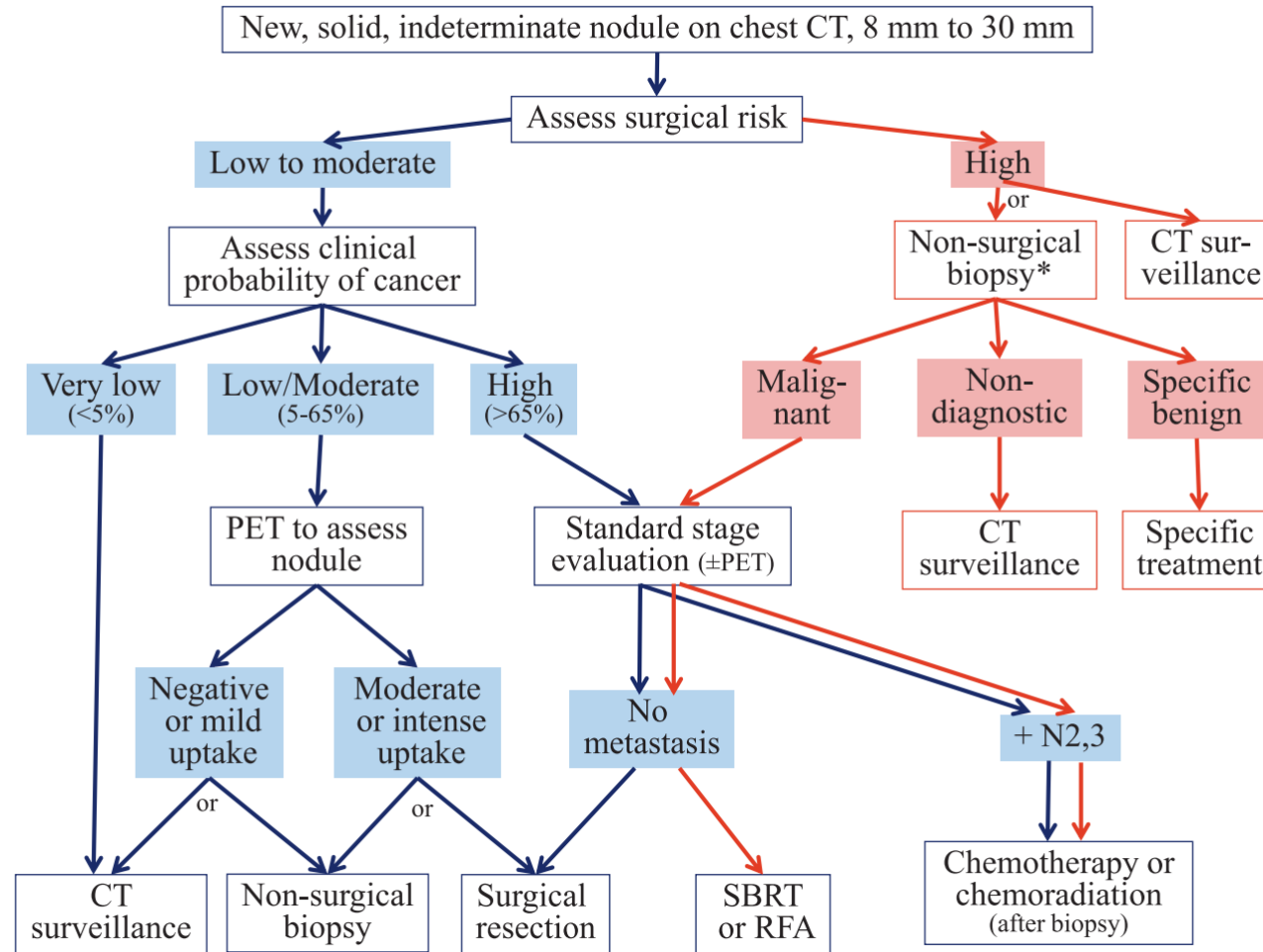






FIGURE 2. [Section 4.0] Factors that influence choice between evaluation and management alternatives for indeterminate, solid nodules  $\geq 8$  to 30 mm in diameter.

Factor	Level	CT Scan Surveillance	PET Imaging	Nonsurgical Biopsy	VATS Wedge Resection
Clinical probability of lung cancer	Very low (< 5%)	++++	-	-	-
	Low-moderate	+	+++	++	+
	High (< 65%)	-	( $\pm$ staging)	++	++++
Surgical risk	Low	++	++	++	+++
	High	++	+++	++	-
Biopsy risk	Low	-	++	+++	+++
	High	++	+++	-	+
High suspicion of active infection or inflammation		-	-	++++	++
Values and preferences	Desires certainty	-	+	+++	++++
	Risk averse to procedure-related complications	++++	+++	++	-
Poor adherence with follow-up		-	-	+++	++++

VATS = video-assisted thoracoscopic surgery.





### Assessment of the probability of malignancy

Assessment Criteria	Probability of Malignancy		
	Low (< 5%)	Intermediate (5%- 65%)	High (> 65%)
Clinical factors alone (determined by clinical judgment and/or use of validated model) <sup>a</sup>	Young, less smoking, no prior cancer, smaller nodule size, regular margins, and/or non-upper-lobe location	Mixture of low and high probability features	Older, heavy smoking, prior cancer, larger size, irregular/spiculated margins, and/or upper-lobe location
FDG-PET scan results	Low-moderate clinical probability and low FDG-PET activity	Weak or moderate FDG-PET scan activity	Intensely hypermetabolic nodule
Nonsurgical biopsy results (bronchoscopy or TTNA)	Specific benign diagnosis	Nondiagnostic	Suspicious for malignancy
CT scan surveillance	Resolution or near-complete resolution, progressive or persistent decrease in size, <sup>b</sup> or no growth over ≥2 y (solid nodule) or ≥ 3-5 y (subsolid nodule)	NA	Clear evidence of growth



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

EBUS = endobronchial ultrasound; ENB = electromagnetic navigation bronchoscopy; VBN = virtual bronchoscopy navigation.



**Evaluation of Individuals With Pulmonary Nodules: When Is It Lung Cancer?****Diagnosis and Management of Lung Cancer,  
3rd ed: American College of Chest Physicians  
Evidence-Based Clinical Practice Guidelines***Michael K. Gould, MD, FCCP; Jessica Donington, MD; William R. Lynch, MD;  
Peter J. Mazzone, MD, MPH, FCCP; David E. Midthun, MD, FCCP;  
David P. Naidich, MD, FCCP; and Benda Soylemez Wiener, MD, MPH**Nonsolid (Pure Ground Glass) Nodules*

**6.5.1. In the individual with a nonsolid (pure ground glass) nodule measuring  $\leq 5$  mm in diameter, we suggest no further evaluation (Grade 2C).**

**6.5.2. In the individual with a nonsolid (pure ground glass) nodule measuring  $> 5$  mm in diameter, we suggest annual surveillance with chest CT for at least 3 years (Grade 2C).**

*Remark:* Early follow-up at 3 months may be indicated for nonsolid nodules measuring  $> 10$  mm (followed by nonsurgical biopsy and/or surgical resection for nodules that persist).

*Part-Solid ( $> 50\%$  Ground Glass) Nodules*

**6.5.3. In the individual with a part-solid nodule measuring  $\leq 8$  mm in diameter, we suggest CT surveillance at approximately 3, 12, and 24 months, followed by annual CT surveillance for an additional 1 to 3 years (Grade 2C).**

**6.5.4. In the individual with a part-solid nodule measuring  $> 8$  mm in diameter, we suggest repeat chest CT at 3 months followed by further evaluation with PET, nonsurgical biopsy, and/or surgical resection for nodules that persist (Grade 2C).**

*Remark:* PET should not be used to characterize part-solid lesions in which the solid component measures  $\leq 8$  mm.

*Remark:* Part-solid nodules measuring  $> 15$  mm in diameter should proceed directly to further evaluation with PET, nonsurgical biopsy, and/or surgical resection.





# British Thoracic Society guidelines for the investigation and management of pulmonary nodules

M E J Callister,<sup>1</sup> D R Baldwin,<sup>2</sup> A R Akram,<sup>3</sup> S Barnard,<sup>4</sup> P Cane,<sup>5</sup> J Draffan,<sup>6</sup> K Franks,<sup>7</sup> F Gleeson,<sup>8</sup> R Graham,<sup>9</sup> P Malhotra,<sup>10</sup> M Prokop,<sup>11</sup> K Rodger,<sup>12</sup> M Subesinghe,<sup>13</sup> D Waller,<sup>14</sup> I Woolhouse,<sup>15</sup> British Thoracic Society Pulmonary Nodule Guideline Development Group, on behalf of the British Thoracic Society Standards of Care Committee

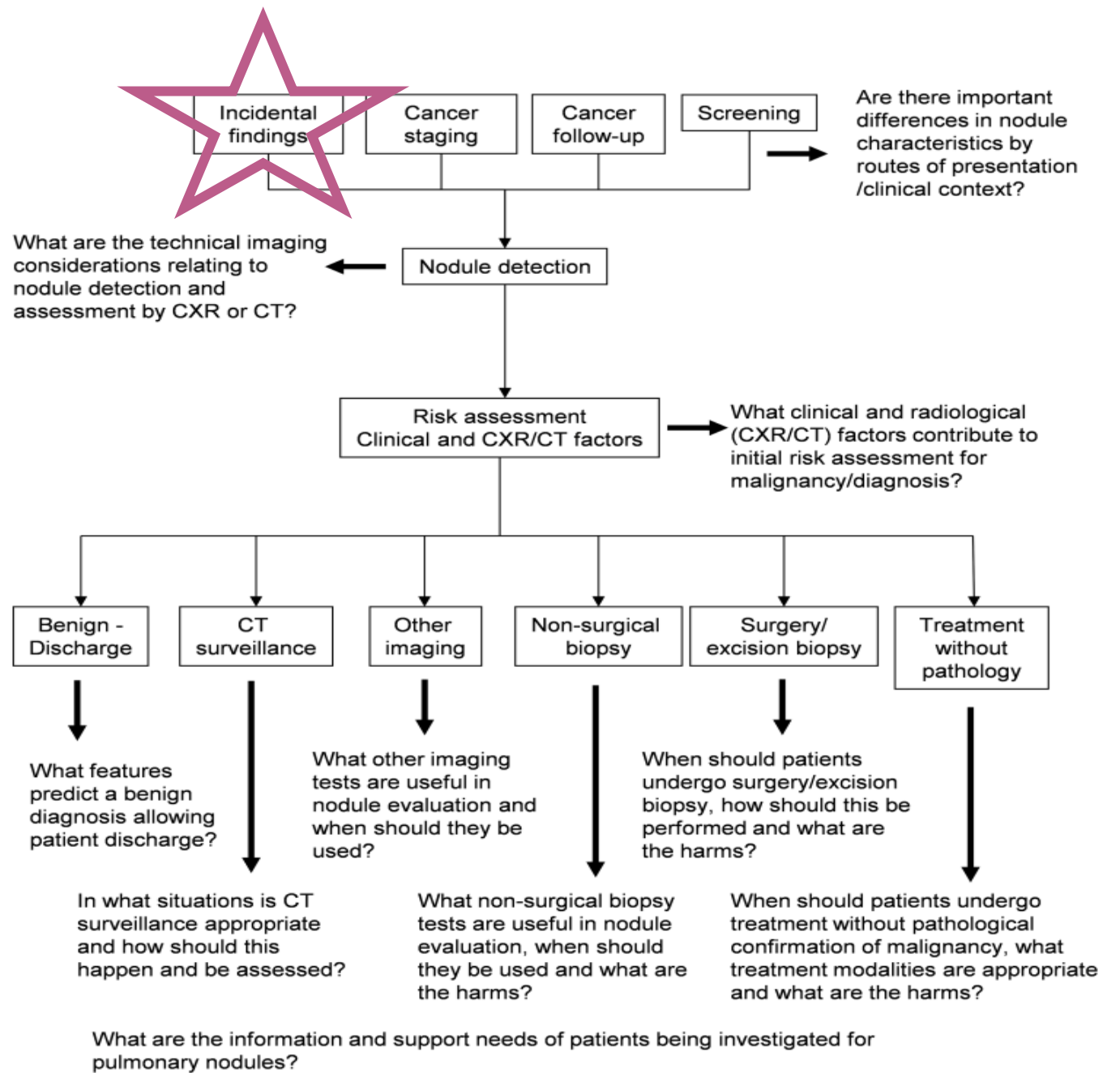


Figure 7 Nodule pathway use to generate key questions, with modified PICO (Patient, Intervention, Control, Outcome) questions after literature review.

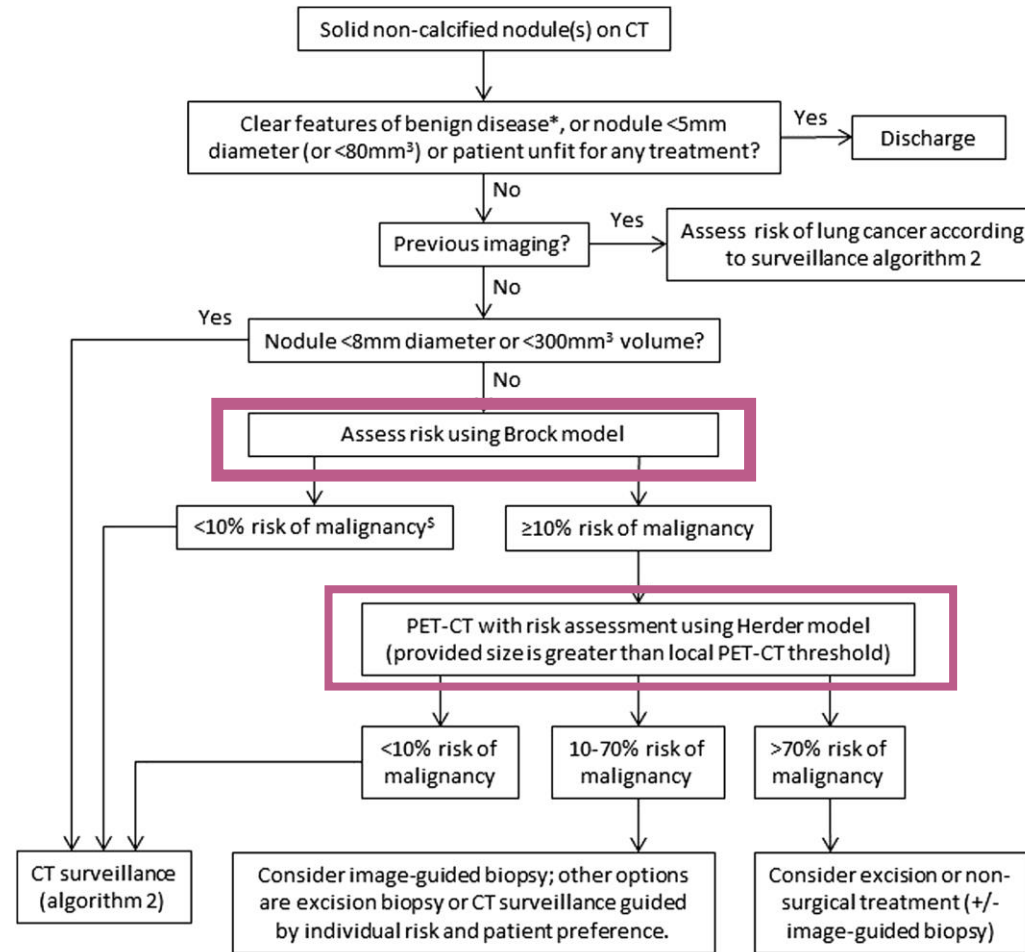


**Table 6** Lung nodule and cancer prevalence in series of incidentally detected nodules and screening trials

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



# Initial approach to solid pulmonary nodules.



\*e.g. hamartoma, typical peri-fissural nodule

⁵ Consider PET-CT for larger nodules in young patients with low risk by Brock score as this score was developed in screening cohort (50-75 years) so performance in younger patients unproven.

M E J Callister et al. Thorax 2015;70:ii1-ii54





**Table 1** The Brock and Herder risk-prediction models

Predictor	Brock OR (95% CI)	Herder OR (95% CI)*
Age	1.03 (0.99 to 1.07)	1.04 (1.01 to 1.07)
Female sex	1.82 (1.12 to 2.97)	N/A
Family history	1.34 (0.83 to 2.17)	N/A
Emphysema	1.34 (0.78 to 2.33)	N/A
Nodule size	Non-linear	1.14 (1.09 to 1.19)
pGGN	0.88 (0.48 to 1.62)	N/A
PSN	1.46 (0.74 to 2.88)	N/A
Upper lobe	1.93 (1.14 to 3.27)	2.19 (1.27 to 3.79)
Nodule count	0.92 (0.85 to 1.00)	N/A
Spiculation	2.17 (1.16 to 4.05)	N/A
Smoker	N/A	2.21 (1.17 to 4.16)
Cancer $\geq$ 5 years ago	N/A	3.8 (1.39 to 10.5)
PET findings	N/A	Increased AUC of Mayo model from 0.79 to 0.92

\*From Mayo model.

AUC, area under the curve; pGGN, pure ground glass nodules; PSN, part-solid nodules.







## Calculator: Solitary pulmonary nodule malignancy risk in adults (Brock University cancer prediction equation)

**Input**

Age  years

Sex  Female (0.6011)  
 Male (0)

Family history of lung cancer  (0.2961)

Emphysema  (0.2953)

Nodule size  mm

Nodule type  Nonsolid or ground-glass (-0.1276)  
 Partially solid (0.377)  
 Solid (0)

Nodule in upper lung  (0.6581)

Nodule count  #

Spiculation  (0.7729)

### Results

**Important:** Inputs must be complete to perform calculation.

Log odds

Cancer probability  %

Decimal precision

## Solitary Pulmonary Nodule (SPN) Malignancy Risk Score (Mayo Clinic Model)



Predicts malignancy risk in solitary lung nodules on chest x-ray.

### INSTRUCTIONS

Do not use in patients with prior lung cancer diagnosis or with history of extrathoracic cancer diagnosed within 5 years of nodule presentation.

When to Use

Age  years

Nodule diameter  mm

Current or former smoker  No 0  Yes +1

Extrathoracic cancer diagnosis  $\geq$ 5 years prior  No 0  Yes +1

Upper lobe location of tumor  No 0  Yes +1

Nodule spiculation  No 0  Yes +1

[FDG-PET](#)

Optional, if performed

**PET not performed**

No uptake

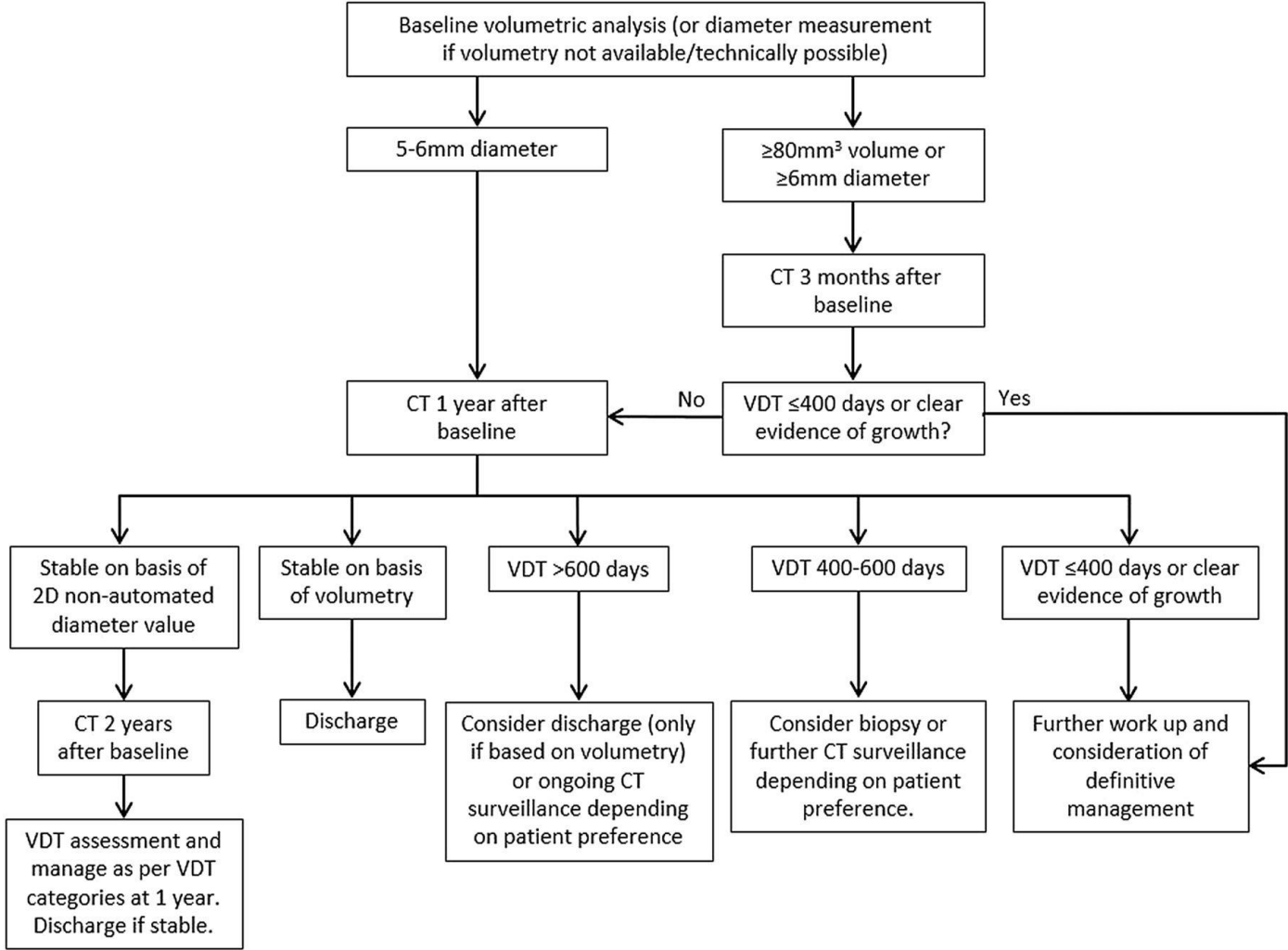
Faint uptake

Moderate uptake

## Result:

Please fill out required fields.

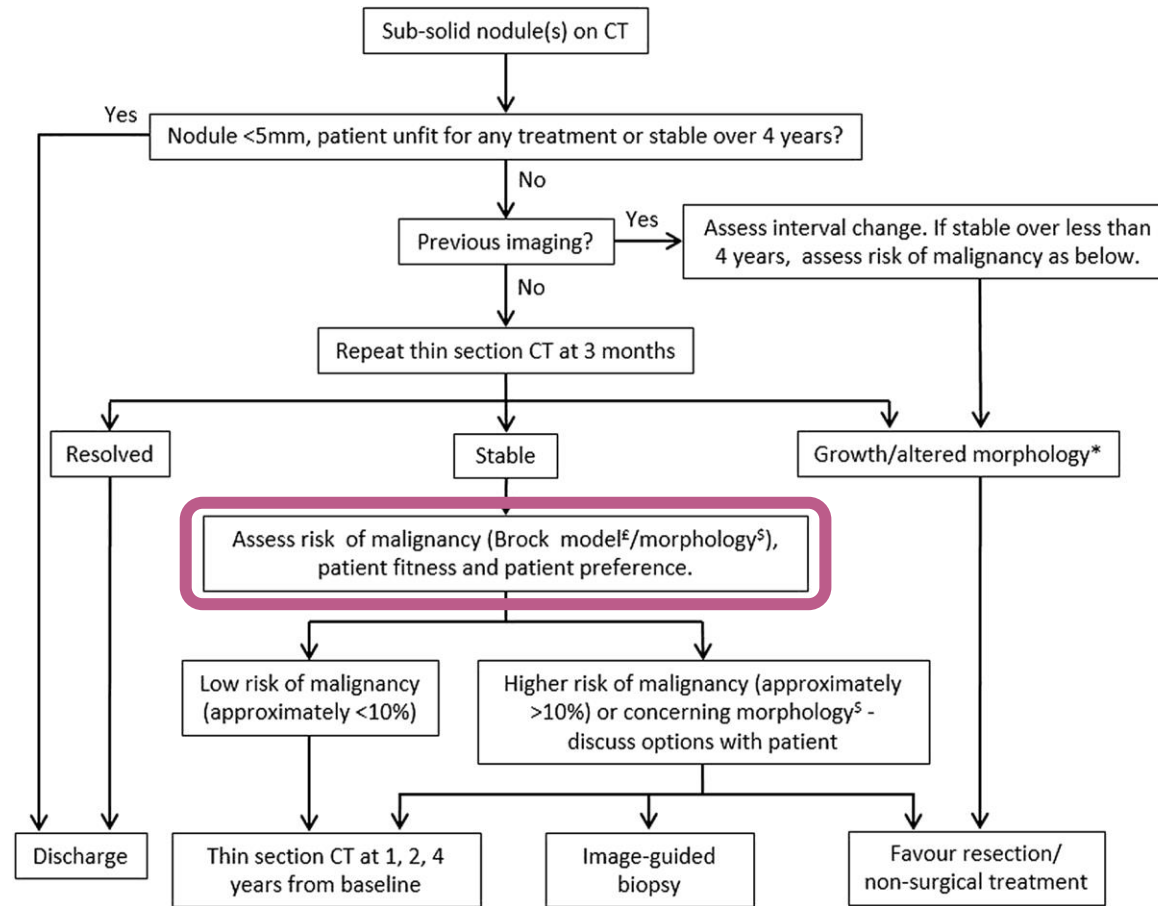
# Solid pulmonary nodule surveillance algorithm.



M E J Callister et al. Thorax 2015;70:ii1-ii54



## Sub-solid pulmonary nodules algorithm.



\* Change in mass/new solid component

<sup>f</sup> Brock model may underestimate risk of malignancy in SSN that persist at 3 months

<sup>s</sup> Size of the solid component in PSN, pleural indentation and bubble-like appearance

M E J Callister et al. Thorax 2015;70:ii1-ii54

THORAX

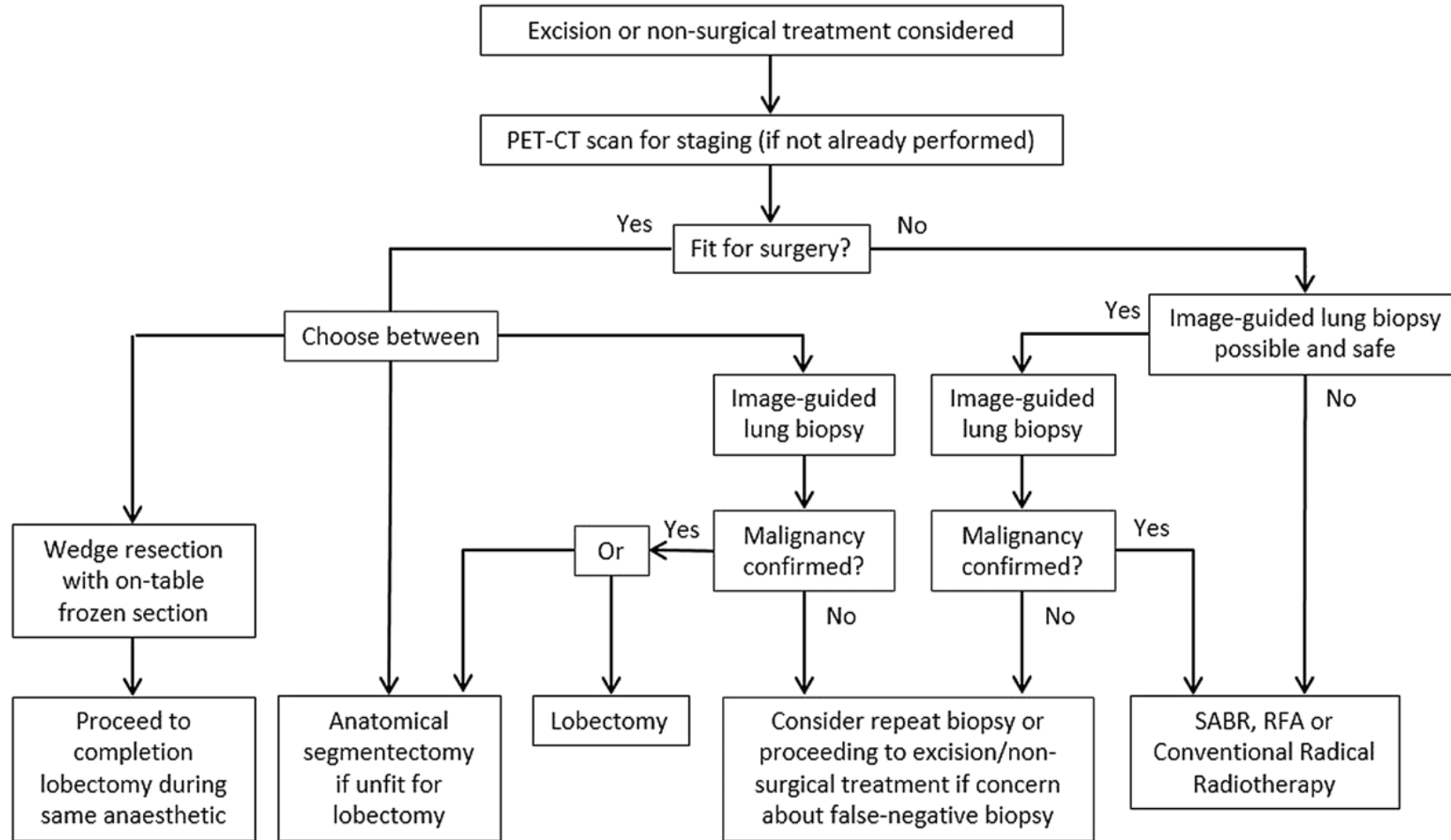


Figure 4 Pulmonary nodule treatment algorithm. RFA, radiofrequency ablation; SABR, stereotactic ablative body radiotherapy.

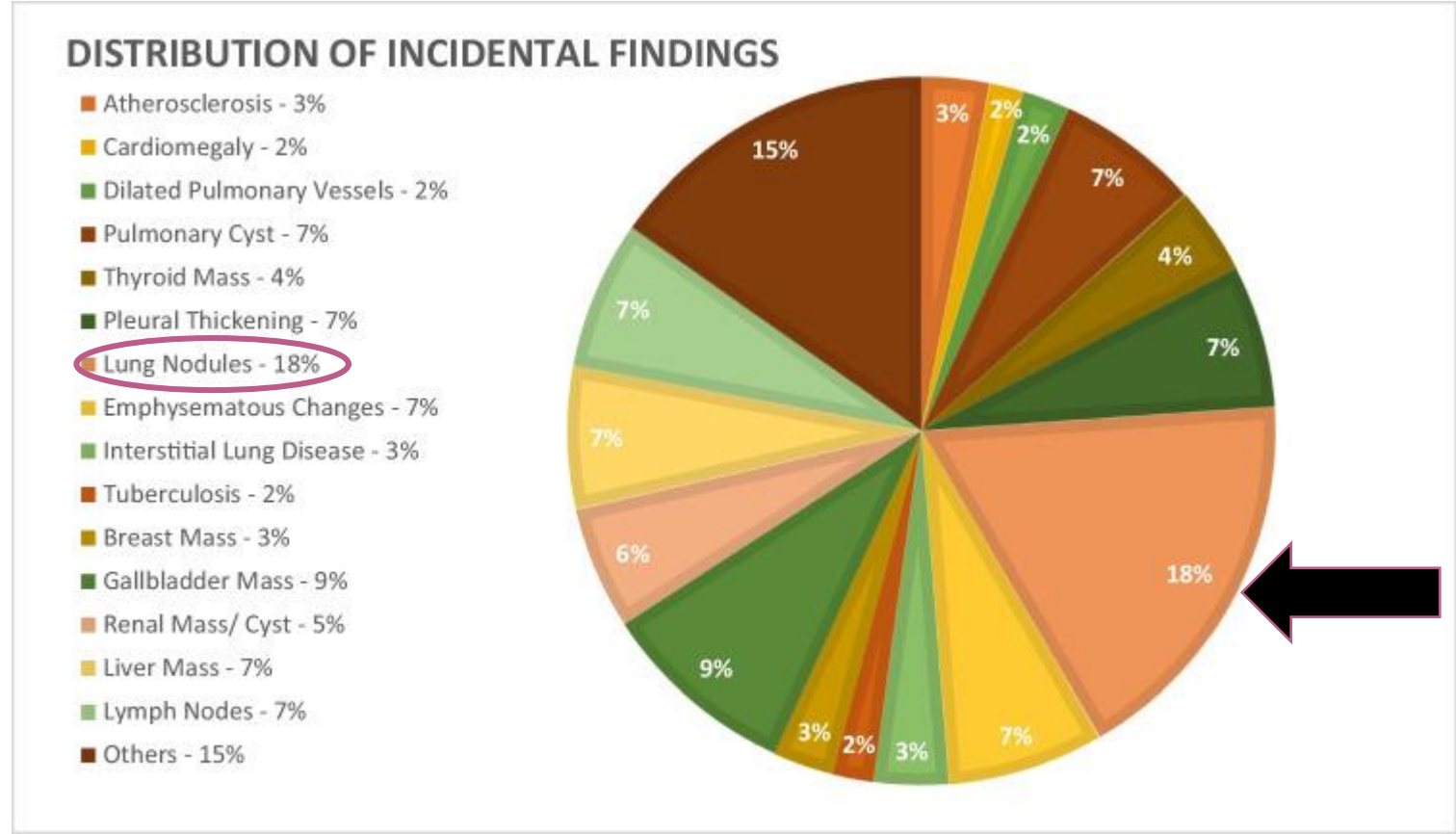




## Incidental Findings in CT Scans on Screening for COVID-19

Shruti Valluri<sup>1</sup> · Harish Neelamraju Lakshmi<sup>2</sup> · Chinnababu Sunkavalli<sup>2</sup>

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# Management of Lung Nodules and Lung Cancer Screening During the COVID-19 Pandemic

## CHEST Expert Panel Report

Peter J. Mazzone, MD, MPH, FCCP; Michael K. Gould, MD, FCCP; Douglas A. Arenberg, MD, FCCP; Alexander C. Chen, MD; Humberto K. Choi, MD, FCCP; Frank C. Detterbeck, MD, FCCP; Farhood Farjah, MD, MPH; Kwun M. Fong, MD; Jonathan M. Iaccarino, MD; Samuel M. Janes, PhD; Jeffrey P. Kanne, MD, FCCP; Ella A. Kazerooni, MD; Heber MacMahon, MB, BCh; David P. Naidich, MD, FCCP; Charles A. Powell, MD, FCCP; Suhail Raouf, MD, Master FCCP; M. Patricia Rivera, MD, FCCP, ATSF; Nichole T. Tanner, MD, MSCR, FCCP; Lynn K. Tanoue, MD, FCCP; Alain Tremblay, MDCM; Anil Vachani, MD, FCCP; Charles S. White, MD; Renda Soylemez Wiener, MD, MPH; and Gerard A. Silvestri, MD, FCCP



TABLE 3 ] Voting Results

Scenario	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	% Agree or Strongly Agree
1: Delay initiation of screening	24	...	...	...	...	100
2: Delay annual screening	23	1	...	...	...	100
3: Delay surveillance of solid nodule < 8 mm	18	5	1	...	...	96
4: Delay surveillance of Lung-RADS category 3 nodule	17	5	1	...	...	96
5: Delay surveillance of ground-glass nodule	19	5	...	...	...	100
6: Delay surveillance of part-solid 6-8 mm nodule	15	8	1	...	...	96
7: Delay surveillance of solid nodule ≥ 8 mm, pCA < 10%	8	13	2	1	...	88
8: Monitor solid nodule ≥ 8 mm, pCA 10%-25%, in 3-6 mo	6	12	1	5	...	75
9: Monitor part-solid nodule ≥ 8 mm in 3-6 mo	9	11	2	2	...	83
10: Evaluate solid nodule ≥ 8 mm, pCA 65%-85%	12	7	2	2	1	79
11: Avoid further diagnostic testing of solid nodule ≥ 8 mm, pCA > 85%	11	9	2	1	...	87
12: Consider delay in treatment of stage I NSCLC	15	9	...	...	...	100





[Journal of Clinical Oncology](#) > [List of Issues](#) > [Volume 39, Issue 15 suppl](#) >

Meeting Abstract | 2021 ASCO Annual Meeting I

LUNG CANCER—NON-SMALL CELL LOCAL-REGIONAL/SMALL CELL/OTHER THORACIC CANCERS

## Early detection of lung cancer with an incidental lung nodule program (ILNP).



[Matthew Smeltzer](#), [Wei Liao](#), [Meghan Meadows-Taylor](#), [Nicholas Faris](#), [Carrie Fehnel](#), [Jordan Goss](#), [Sara C. Williams](#), [Olawale Akinbobola](#), [Alicia Pacheco](#), [Amanda Epperson](#), [Joy Luttrell](#), [Denise McCoy](#), [Keith Tokin](#), [Rob Optican](#), [Jeffrey Wright](#), [Edward Todd Robbins](#), [Shailesh R. Satpute](#), [Parker Harris](#), [Meredith Ray](#), [Raymond U. Osarogiagbon](#)

University of Memphis, School of Public Health, Memphis, TN; Baptist Cancer Center, Multidisciplinary Thoracic Oncology Department, Memphis, TN; Midsouth Imaging and Therapeutics, Memphis, TN; Memphis Lung Physician Foundation, Memphis, TN; Baptist Memorial Hospital, Multidisciplinary Thoracic Oncology Department, Memphis, TN

- 13710 pts were evaluated
- Median age 64 years
- 42% male
- 4.9% lung cancer diagnosis
- Adenocarcinoma 39%
- Squamous 20%
- Stage I 39%
- Stage II 8%
- Stage III 17%
- Stage IV 16%

- 832 pts had invasive diagnostic testing
- CT biopsy 50%
- Bronchoscopy 30%
- EBUS 26%

Screening Criteria	%ILNP Lung Cancer Patients Eligible for LDCT Screening
NLST Criteria	33%
CMS Criteria	39%
NELSON Criteria	41%
USPSTF 2013	41%
USPSTF 2020	47%
NCCN Group 1	39%
NCCN Group 2	55%
NCCN Group 3	64%



For Patients and Visitors +

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Lung (Harron Lung Center)

Lung Nodule Program

[Team](#)

## Lung Nodule Program

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### The Lung Nodule Program

[Treatment Programs](#)

[Meet Our Team](#)

[Your Visit](#)

[Research](#)

[Patient Education and Support](#)

[About Us](#)

## Lung Nodules Program

Lung (pulmonary) nodules are small growths on the lung. Some people call them “spots on the lung.” We often find them when we are performing an imaging test for some other medical question. You could have one lung nodule or several. Lung nodules are usually smaller than three centimeters (1.2 inches). While the majority of lung nodules are not cancerous (benign) and do not require treatment, pulmonary nodules can be cancerous (malignant) so it’s always important to check

### Mount Sinai Multispecialty Lung Nodule Diagnostic and Treatment Program

**Address:**

10 East 102nd Street, Fifth Floor  
New York, NY 10029

**Phone:** 646-581-0470







# PLOS ONE

OPEN ACCESS PEER-REVIEWED

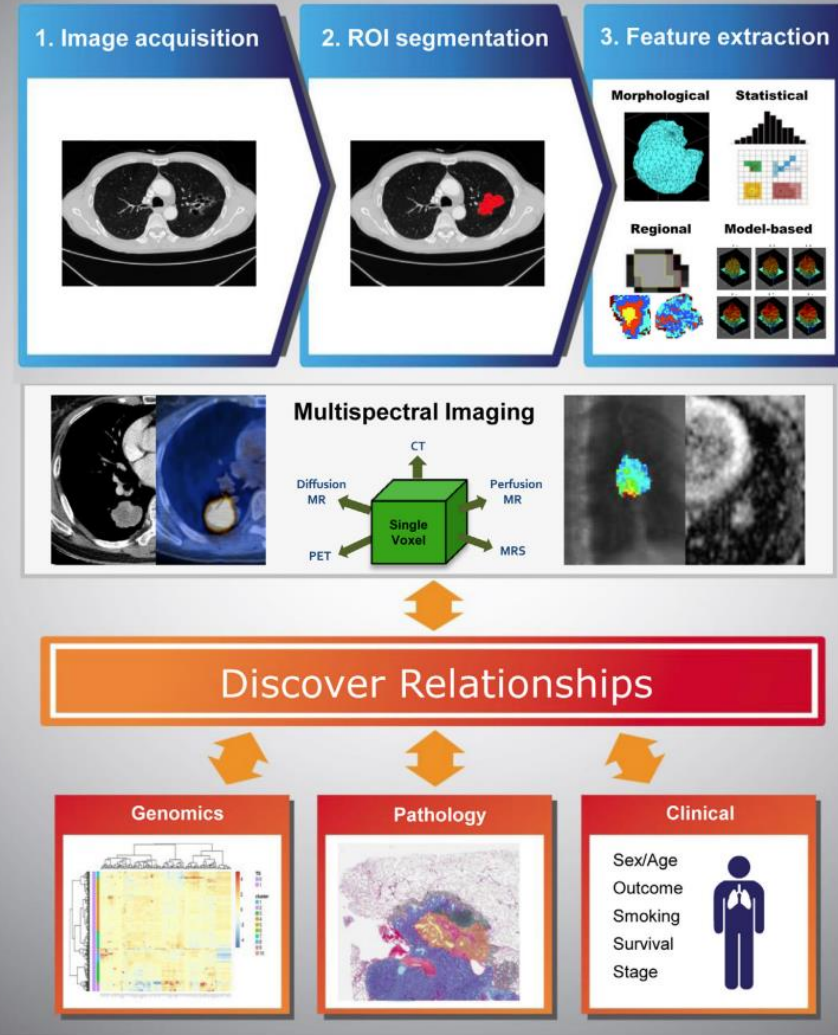
RESEARCH ARTICLE

## Computer-aided diagnosis of lung nodule classification between benign nodule, primary lung cancer, and metastatic lung cancer at different image size using deep convolutional neural network with transfer learning

Mizuho Nishio, Osamu Sugiyama, Masahiro Yakami, Syoko Ueno, Takeshi Kubo, Tomohiro Kuroda, Kaori Togashi

Published: July 27, 2018 • <https://doi.org/10.1371/journal.pone.0200721>

### Radiomics : Processing of Radiological Imaging Data

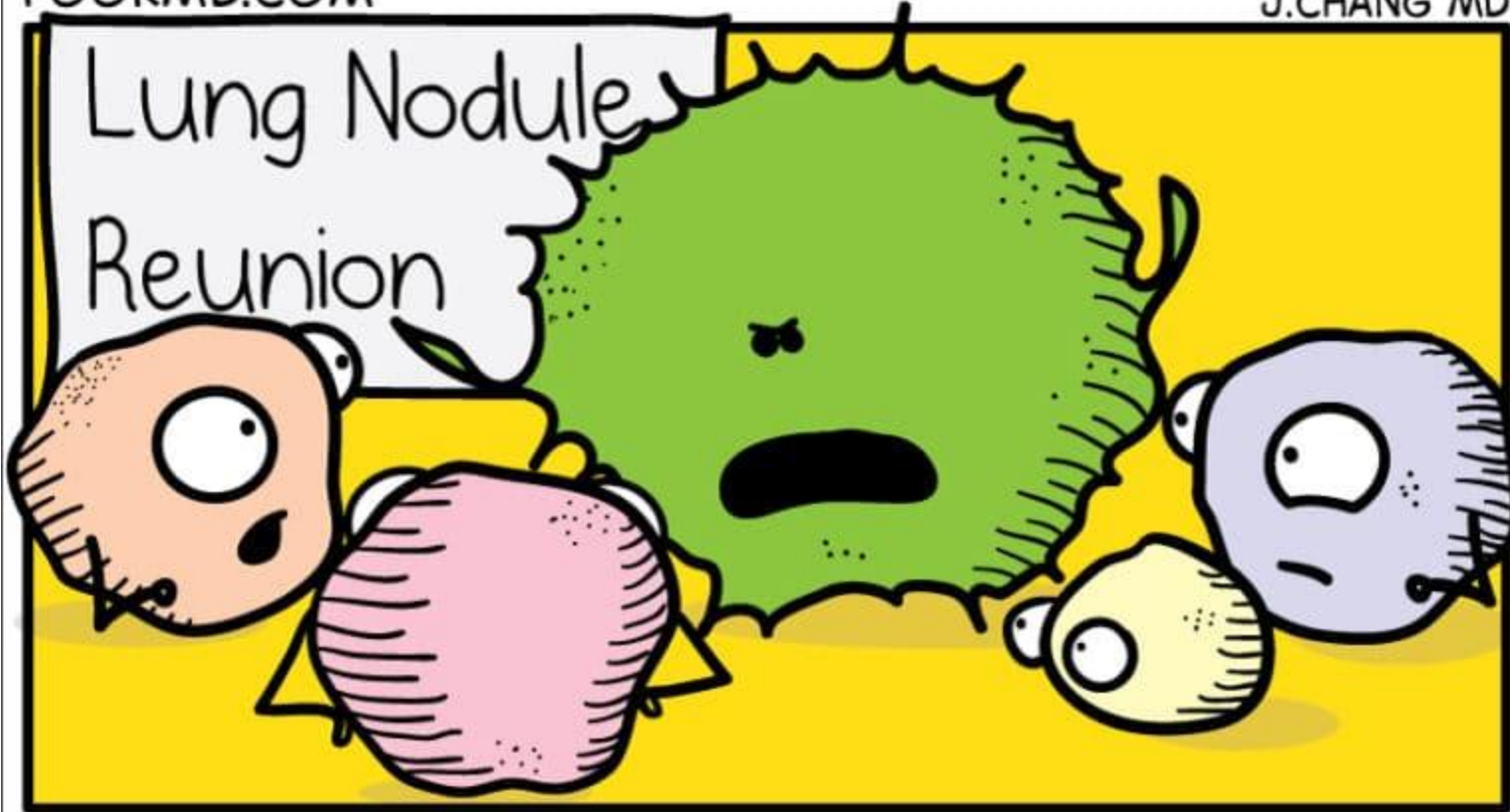


**Fig 1.** Overview of radiomics, the processing of radiological imaging data. Regions of interest are segmented for the whole tumor, and multiple quantitative features are extracted. Combining information from multiple imaging modalities provides a multispectral view of the tumor and allows improved tumor characterization. Discovering relationships among the radiomic features and genomic, pathology, and clinical data is a challenging but important step.

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J.CHANG MD

# Lung Nodule Reunion



Hey guys! Just because I've grown and I'm a little more spiculated, you have no right to call me cancer!

