

# Solitary Pulmonary Nodule

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# Definition

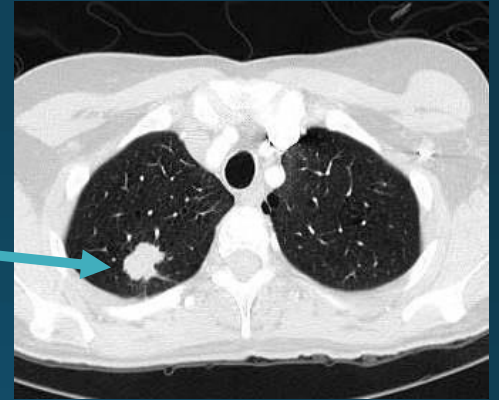
- A lung nodule smaller than 3cm in diameter
- Not associated with pneumonia, atelectasis, or lymphadenopathy
- Usually an incidental finding in up to 0.2% of CXRs and 1% of CT Chest

# Differential

- Benign (80%)
  - Infection (MC)
    - Granuloma, Pulm abscess, Pneumonia, Nocardia
  - Hamartoma
  - Foreign Body
  - Vascular
    - AVM
  - Immune
    - Rheumatoid arthritis, Granulomatosis with polyangitis, Organizing pneumonia
- Malignant cancer (20%)
  - Must exclude primary lung CA, primary pulm lymphoma, carcinoid tumor, or solitary mets (from melanoma, kidney, sarcoma, testicular CA)

# Assessing risk for malignancy

- Based on size, surface characteristics, pt age, smoking hx, and hx of prior malignancy
  - Surface
    - Smooth suggests benign while spiculated suggests malignant
  - Age
    - Lung CA rare in people younger than 45
  - Prior Malignancy
    - Breast, Colon, Kidney, Testicular, Sarcoma, Melanoma, Thyroid



# Management

**Table 40. Recommendations for Pulmonary Nodule Evaluation Based on Risk**

<b>Nodule Size (mm)</b>	<b>Low-Risk<sup>a</sup> Follow-up</b>	<b>High-Risk<sup>b</sup> Follow-up</b>
<4	None	12 months; if unchanged, stop
4-6	12 months; if unchanged, stop	6-12 months; if unchanged, 18-24 months
6-8	6-12 months; if unchanged, 18-24 months	3-6 months; if unchanged, 9-12 and 24 months
>8	Consider contrast CT study, PET scan, or biopsy; if followed, 3, 9, and 24 months	Same as low risk

<sup>a</sup>Low risk: Never-smoker and no other risk factors.

<sup>b</sup>High risk: Current or former smoker or other risk factors.

Modified from MacMahon H, Austin JH, Gamsu G, et al; Fleischner Society. Guidelines for management of small pulmonary nodules detected on CT scans: a statement from the Fleischner Society. *Radiology*. 2005;237(2):395-400. PMID: 16244247 Copyright 2005, Radiological Society of North America.

# Management

- Always check previous CXRs or CT Chest to evaluate change in size
- 2 year Stability Rule:
  - Nodules that remain stable for 2 yrs are benign, no further imaging indicated. (Lung cancers tend to grow fast)
- Calcification in a benign pattern (central, diffuse, lamellar) indicate that the nodule is likely a granuloma; no further imaging needed
- Fat indicates that a nodule is a hamartoma and is benign
- Satellite nodules suggest a fungus or mycobacterium
- If unsure about malignancy, can obtain a PET-CT

# Special Mention: Ground Glass Opacities

- Low density nodules only seen by CT Scan
- Can be low-grade adenocarcinomas and behave different than solid nodules
- DDX: inflammation or fibrosis, atypical adenomatous hyperplasia, adenocarcinoma in situ, and invasive adenocarcinoma
- Usually slow growing, so the 2yr stability rule does not apply
- PET-CT not helpful given low density; Needle bx is usually non-diagnostic