

# *Fleischner Society Guidelines for Solid Nodules*



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The University of Chicago

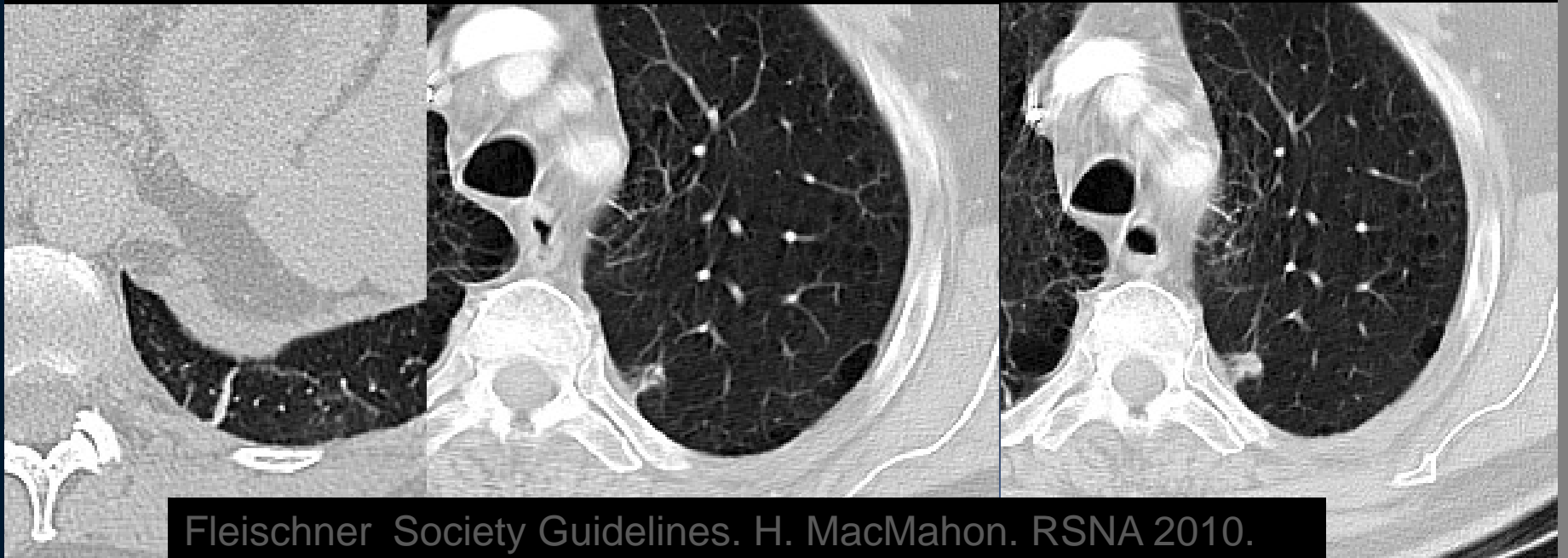


<http://radiology.uchicago.edu/index.php?q=faculty-lectures>

# *What is a Pulmonary Nodule?*

- *Definition: A rounded opacity, well or poorly defined, measuring up to 3 cm in diameter*

# *What is a Pulmonary Nodule?*

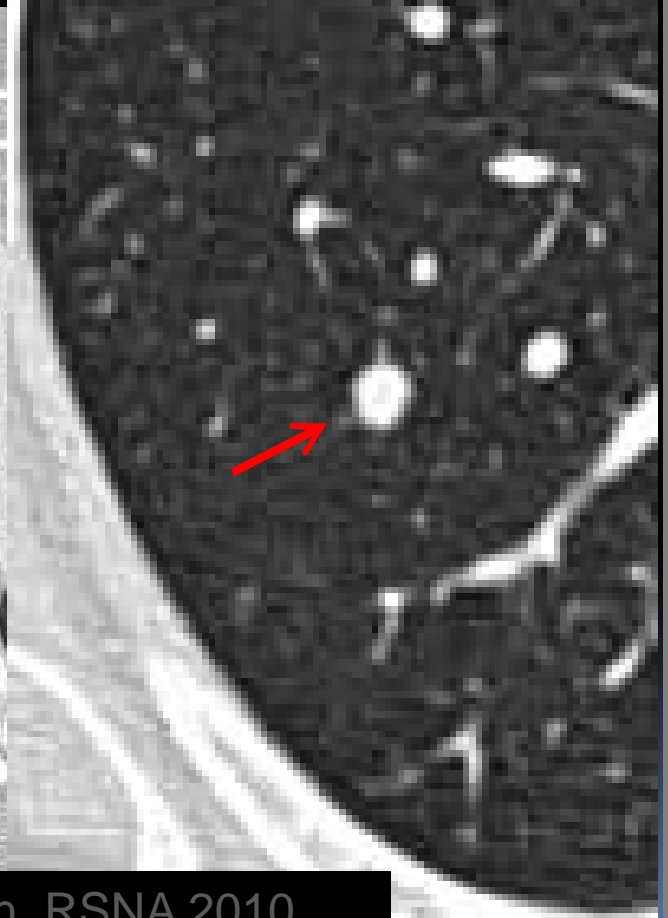


Fleischner Society Guidelines. H. MacMahon. RSNA 2010.

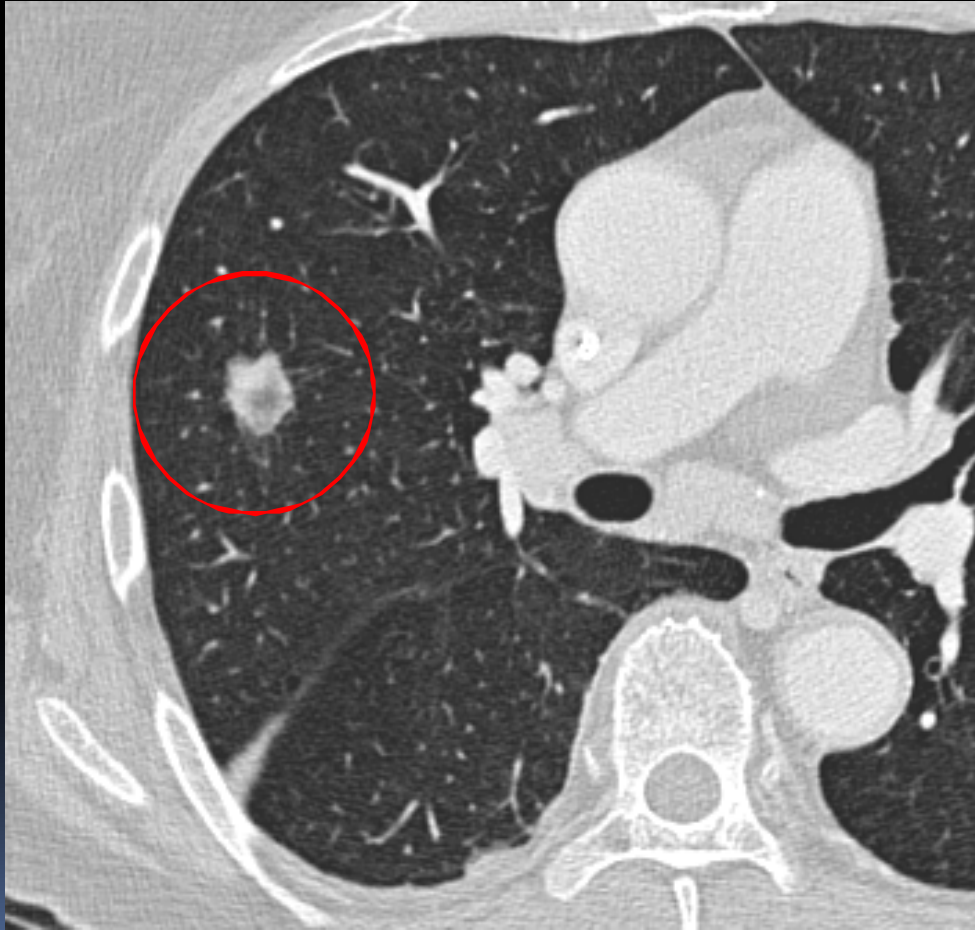
MIP

1mm thin section

Zoom



Fleischner Society Guidelines. H. MacMahon. RSNA 2010.



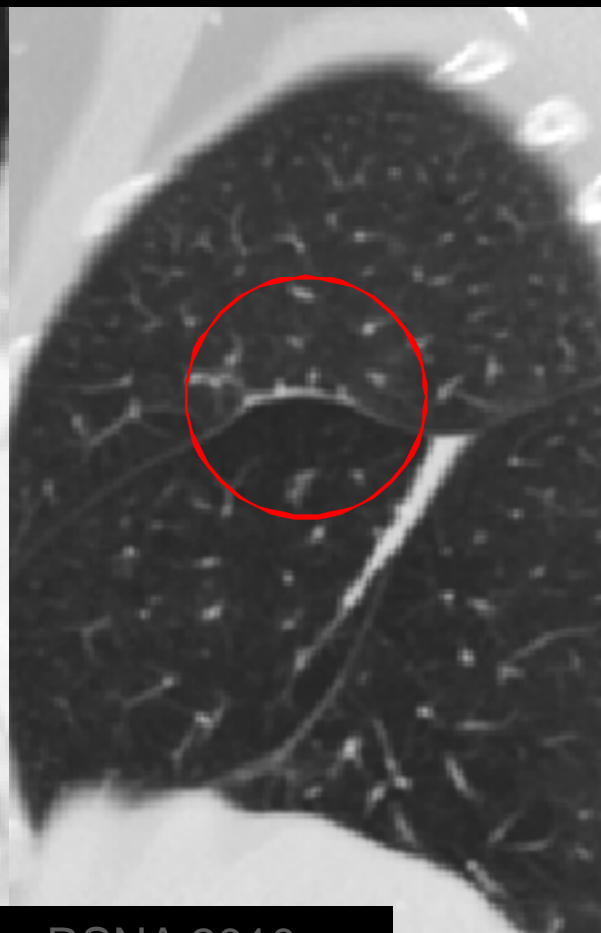
? Nodule

Fleischner Society Guidelines. H. MacMahon. RSNA 2010.

Axial

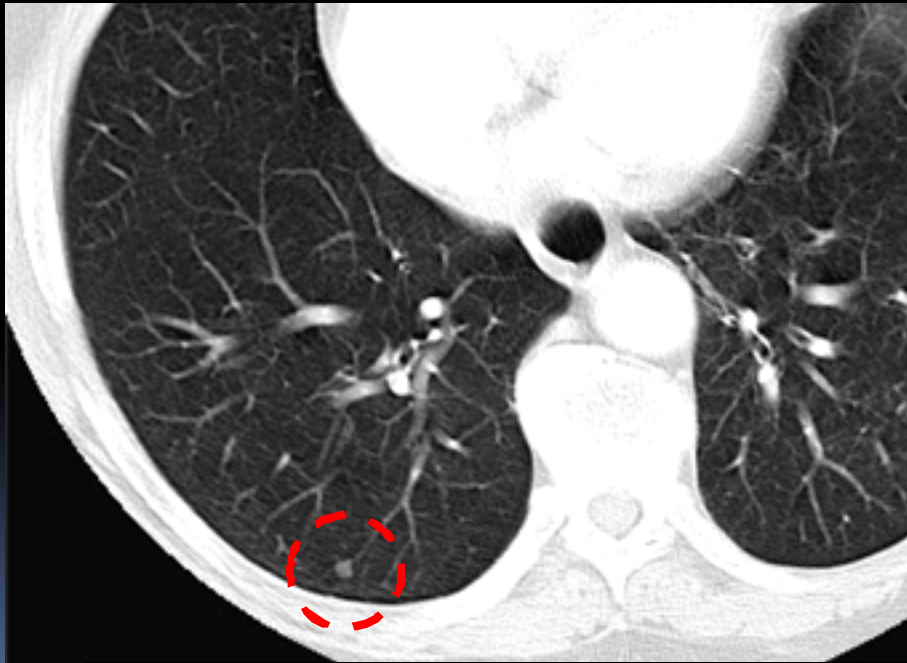
Coronal

Sagittal



Fleischner Society Guidelines. H. MacMahon. RSNA 2010.

# *Recommendations for Management of Patients with Lung Nodules*



? Ignore

? Follow

? Intervene

Fleischner Society Guidelines. H. MacMahon. RSNA 2010.

# *Guidelines for Management of Patients with Lung Nodules*

- *ACCP Guidelines 2003*

*Tan et al. Chest 2003;123(Suppl 1):89S-96S*

*Follow-up CT for ALL indeterminate nodules recommended at 3,6,12 and 24 months*



# *Fleischner Society Guidelines 2005*

- *Data from Lung Cancer Screening programs revealed that majority of smokers over 60 yrs old have lung nodules*
- *Multidisciplinary committee charged with developing new guidelines*

## *Factors Influencing Risk*

### Clinical Data

- Age
- Smoking
- Symptoms
- Known cancer
- Immune status

# *Factors Influencing Risk*

## Imaging Features

- Size
- Growth rate
- Location
- Morphology
- Calcium/fat content

# *Relevant Parameters*

## Imaging Features

- Size
- Growth rate
- Location
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## *Nodule Size and Probability of Malignancy*

<i>Size</i>	<i>ELCAP</i>	<i>Mayo</i>
$\leq 3\text{mm}$		0.1%
2-5mm	1%	
4-7mm		0.7%
6-10mm	24%	
8-20mm		18.7%
21-30mm		33.3%
21-45mm	80%	

Fleischner Society Guidelines. H. MacMahon. RSNA 2010.

## *Growth rate of Nodules*

- *Volume doubling time (VDT):*  
*26% diameter increase = One volume doubling*
- *Typical lung Ca VDT = 100 – 200 days*  
*Range = 30 – 1000+ days*

## *Mean Doubling Times According to CT Features*

*(M.Hasegawa et al. B.J.R. 12/2000)*

<i>HRCT Type</i>	<i>n</i>	<i>Mean VDT <math>\pm</math> SD</i>
<i>Type G</i>	<i>19</i>	<i>813 <math>\pm</math> 375</i>
<i>Type GS</i>	<i>19</i>	<i>457 <math>\pm</math> 260</i>
<i>Type S</i>	<i>23</i>	<i>149 <math>\pm</math> 125</i>

Fleischner Society Guidelines. H. MacMahon. RSNA 2010.

## *Mean Doubling Times According to CT Features*

*(M.Hasegawa et al. B.J.R. 12/2000)*

Size (mm)	n	Mean VDT $\pm$ SD
<10	22	536 $\pm$ 283
10-15	23	466 $\pm$ 481
16-20	9	325 $\pm$ 353
>20	7	299 $\pm$ 273

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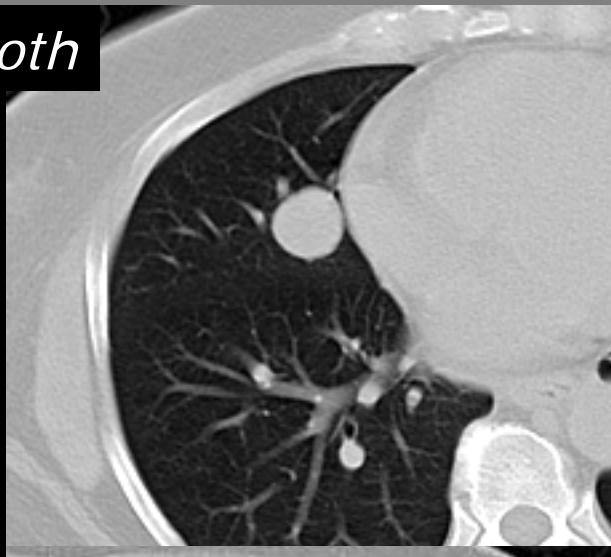
# *Factors Influencing Risk*

## **Imaging Features**

- Size
- Growth rate
- Location
- Morphology
- Calcium/fat content

*Overall Shape  
Solid/Non-solid  
Edge features*

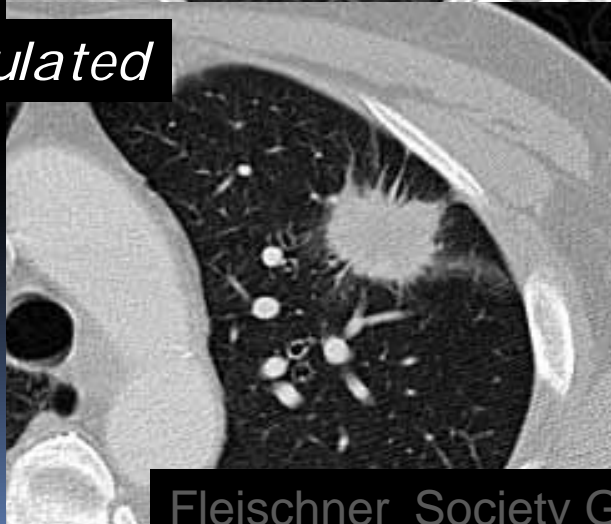
*Smooth*



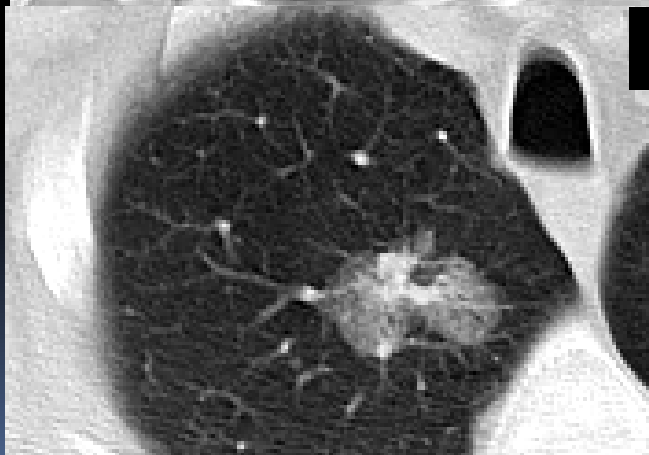
*Lobulated*



*Spiculated*



*Part-Solid*



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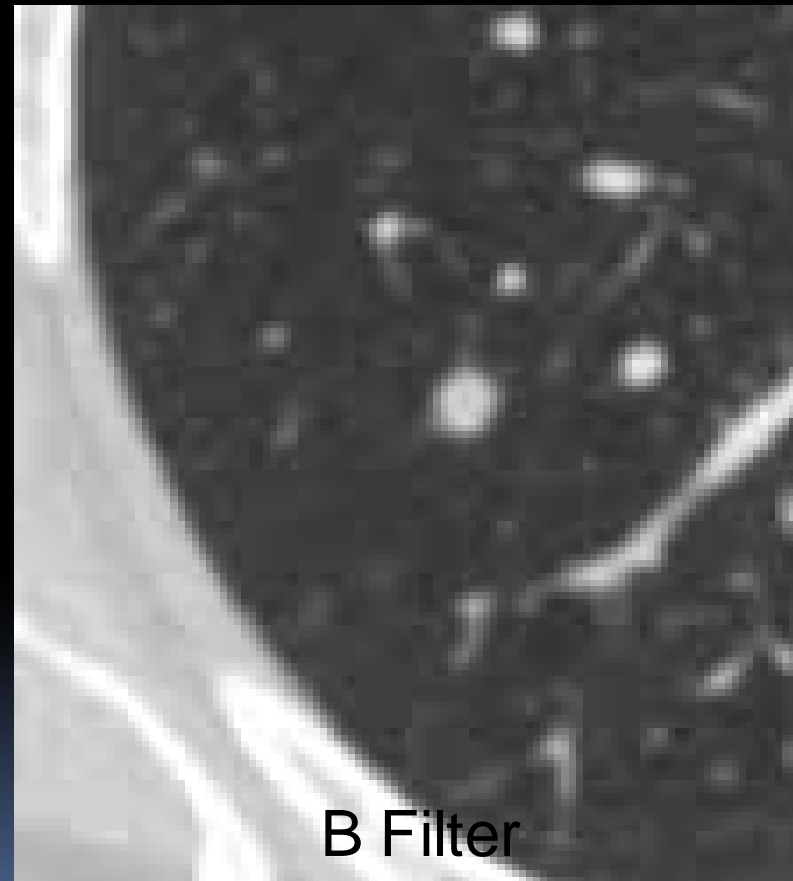
# *Factors Influencing Risk*

## Imaging Features

- Size
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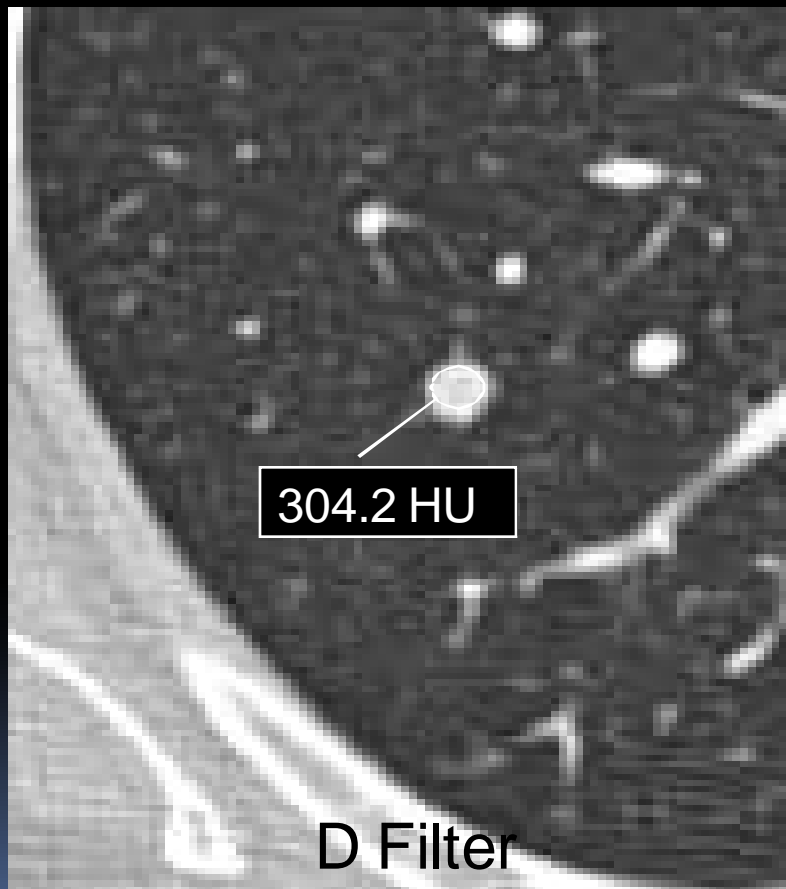


D Filter



B Filter

Fleischner Society Guidelines. H. MacMahon. RSNA 2010.



Fleischner Society Guidelines. H. MacMahon. RSNA 2010.

# *Guidelines for Management of Small Pulmonary Nodules detected on CT Scans:*

*MacMahon et al. Radiology 2005; 237:395-400*

- ***Incidental Nodules***

*In persons of 35 years of age or older with chest CT scans performed for reasons unrelated to cancer or opportunistic infection, such as to evaluate for pulmonary embolism.*

# *Fleischner Society Recommendations for Follow-up and Management of Small Nodules*

<i>Nodule Size</i>	<i>Low risk patient</i>	<i>High risk patient</i>
<i><math>\leq</math> 4 mm</i>	<i>No follow-up needed</i>	<i>CT follow-up CT at 12 months; if unchanged, no further follow-up</i>
<i>&gt; 4-6 mm</i>	<i>CT follow-up at 12 months; if unchanged, no further follow-up</i>	<i>Initial CT follow-up at 6 to 12 months, then at 18-24 months if no change</i>
<i>&gt; 6-8 mm</i>	<i>Initial CT follow-up at 6 to 12 months, then at 18 to 24 months if no change</i>	<i>Initial CT follow-up at 3 to 6 months, then at 12 and 24 months if no change.</i>
<i>&gt; 8 mm</i>	<i>One or more of the following: CT follow-up at 3, 9, 24 months/ Dynamic CT / PET scan / Biopsy</i>	

## Compliance with Fleischner Society Guidelines for Management of Small Lung Nodules:

*A Survey of 834 Radiologists*

*Ronald L. Eisenberg, et al. Radiology June 2010 (255) 3*

- Of 834 respondents 649 (77.8%) were aware of the Fleischner Society guidelines and 490 (58.8%) worked in practices that employed them or similar guidelines.
- Management selections were consistent with the Fleischner guidelines in 34.7%–60.8% of responses for the three scenarios.

Fleischner Society Guidelines. H. MacMahon. RSNA 2010.



## Provider Reference Guide

CareCore National Radiology Management Program  
for Excellus BlueCross BlueShield Members

*(Please refer to this updated document and discard the prior version.)*

**Extended authorizations are available via the CareCore National Web site.** Requests for extended authorizations are *initially* available for:

- Solitary pulmonary nodule based on the **Fleischner Society guidelines**
- Follow-up of endovascular abdominal aorta grafts and/or stents
- Multiple sclerosis in active treatment (e.g., natalizumab)
- Surveillance testing in patients with underlying malignant conditions for which the ASCO or NCCN guidelines support follow-up testing for that stage of disease

Fleischner Society Guidelines. H. MacMahon. RSNA 2010.

## **IMPACT OF IMPLEMENTATION OF FLEISCHNER SOCIETY PULMONARY NODULE SURVEILLANCE CRITERIA WITHIN THE MADIGAN ARMY MEDICAL CENTER**

William T. Lewis, DO\* and Mohammed Naeem, MD

Prior to use of Guidelines, 1091/2377(48)% of all chest CTs were for nodule surveillance

After Guidelines chest CTs for nodule surveillance reduced 31% (15% of total workload)

Saved 90 staff man-hours & 113 technologist man-hours

Cost reduction of \$135,300

Patient dose reduction of 1579 mGy

Fleischner Society Guidelines. H. MacMahon. RSNA 2010.

# *Updates*

- New information from NLST trial results
- Guidelines for non-solid/part-solid nodules

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