**Compliance with the British Thoracic Society guidelines for follow-up of indeterminate pulmonary nodules on CT**

**Descriptor:**

An audit to assess adequacy of reporting of pulmonary nodules in accordance with British Thoracic Society guidelines and whether appropriate subsequent follow-up is achieved.

**Background:**

The Fleischner Society produced guidelines in 2005 and 2013 for the follow-up of indeterminate solid and nonsolid pulmonary nodules on CT brought into UK context by the British Thoracic Society in 2015 [1-3]. Suggestions from the BTS are for those over 18 years of age with lung nodules identified by CXR or CT. It is essential to identify clinical risk factors (including age, sex, history of smoking/emphysema, family history of cancer). These should be used in context with CT nodule size and characteristics as a composite clinical/radiological predictor for malignancy. Incorporation into a national screening programme requires cost-effectiveness and risk–benefit data. No follow-up is needed for nodules with benign calcification; small intra-pulmonary lymph nodes; solid/sub-solid nodules <5 mm and solid nodules <80 mm3. For 5–6 mm solid nodules, repeat low-dose CT is suggested at 12 months. For solid nodules ≥6 to <8 mm, repeat CT is suggested at three and 12 months. For nodules ≥8 mm (≥300 mm3) and composite risk of cancer <10%, CT surveillance suggested. On follow-up CT, a volume increase ≥25% is considered significant. For sub-solid nodules ≥5 mm, follow-up CT in three months is suggested. Further follow-up of persistent non-solid nodules in years one, two and four is influenced by patient and nodule-specific factors [3, 4].

## The Cycle

**The standard:**

All patients with indeterminate pulmonary nodules should have subsequent follow-up in accordance with the British Thoracic Society and Royal College of Radiologists’ guidelines [3,4].

**Target:**

1. 95% of CT reports (for indeterminate pulmonary nodules) should recommend follow-up by either using the phrase “as per the BTS guidelines” or by suggesting a repeat CT within a timescale that falls within the time period as recommended by the BTS

2. 95% of follow-up CT scans should be performed within the time period as recommended by the BTS

Note: the standards of 95% are given to take into account a small number of patients with additional individual circumstances.

## Assess local practice

**Indicators:**

1. Percentage of reports that recommend appropriate follow-up of indeterminate pulmonary nodules

2. Percentage of pulmonary nodule follow-up CT scans that are performed within the appropriate timescale

**Data items to be collected:**

• Use PACS/RIS to perform a search for the phrase “pulmonary nodule”/“lung nodule” within CT reports for a given time period

• Exclude patients with known malignancy - Identify whether appropriate follow-up has been recommended

- If this is an “index” scan (i.e. first scan on which the nodule was discovered) then review the time period between this scan and any subsequent scans to identify whether time period falls within that recommended. If follow-up CT scans are performed at the incorrect time period, it may be helpful to record whether any other factors (e.g. admission for acute deterioration) have resulted in early or additional scans to those recommended on the report of the index scan.

- If this is a nodule follow-up scan then include the previous scan(s) in this audit and identify whether the time period between scans falls within the recommendation

• Categorising reports according to grade of reporting Radiologist may identify groups recommending inappropriate follow-up

**Suggested number:**

This will vary according to the size of the department - 50-75 examinations (which demonstrate incidental pulmonary nodules) is suggested.

**Suggestions for change if target not met:**

• Awareness of Radiologists regarding the appropriate use of British Thoracic Society guidelines

• Introduction of departmental protocols and templates for reporting incidental pulmonary nodules

• Display RCR iRefer recommendation CC28 summary table as a poster or as a link available for viewing on a reporting workstation

• Recommend that planned follow-up scans should be cancelled if CTs performed during an acute admission result in an “early” follow-up scan for pulmonary nodules

• Education of Radiologists in detecting and characterising intrapulmonary lymph nodes

**Resources:**

- A list of CT scans falling within a particular time period can often be generated within PACS / RIS by a reporting radiologist. If this is not possible, this will require input from PACS administration staff (approximately 1 hour)

- Retrospective review of PACS / RIS approximately (4-8 hours)

- Analysis and interpretation of data (1–2 hours)

- Retrospective review of PACS / RIS approximately (5-10 hours)

- Analysis and interpretation of data (1–2 hours)

**References:**

1. Guidelines for management of small pulmonary nodules detected on CT scans: a statement from the Fleischner Society. MacMahon H, Austin JH, Gamsu G, Herold CJ, Jett JR, Naidich DP, Patz EF Jr, Swensen SJ; Fleischner Society. Radiology. 2005 Nov;237(2):395-400. <http://radiology.rsna.org/content/237/2/395>.
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3. Callister ME, Baldwin DR, Akram AR et al. British Thoracic Society guidelines for the investigation and management of pulmonary nodules. Thorax 2015; 70 Suppl 2: ii1-ii54. [LEVEL V] <https://www.brit-thoracic.org.uk/document-library/clinical-information/pulmonary-nodules/bts-guidelines-for-pulmonary-nodules/>
4. Royal College of Radiologists. iRefer Guidelines: Making the best use of clinical radiology Version 8.0.1  <https://www.irefer.org.uk/guidelines/list?search=nodules&sort_bef_combine=search_api_relevance+DESC&sort_bef_combine=search_api_relevance+DESC>)
5. ACR Appropriateness Criteria: Radiographically detected solitary pulmonary nodule – last review date 2012 <https://acsearch.acr.org/docs/69455/Narrative/>
6. Radiological management of thoracic nodules and masses – last review date 2015 <https://acsearch.acr.org/docs/69343/Narrative/>
7. Horeweg N, van RJ, Heuvelmans MA et al. Lung cancer probability in patients with CT-detected pulmonary nodules: a prespecified analysis of data from the NELSON trial of low-dose CT screening. Lancet Oncol 2014; 15: 1332-1341. [LEVEL I] <https://www.ncbi.nlm.nih.gov/pubmed?cmd=Retrieve&dopt=Citation&list_uids=25282285>

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