CLINICAL GUIDELINE FOR THE INVESTIGATION AND MANAGEMENT OF PULMONARY NODULES

V1.0

18 March 2016
1. **Aim/Purpose of this Guideline**

1.1. Pulmonary nodules are rounded structures that appear on imaging as focal opacities and by traditional definition are ≤3cm in diameter and surrounded by aerated lung. They may be single or multiple and do not have associated abnormalities of the thorax.


1.3. This guideline has been adapted from the national guideline as, at present, assessment of nodule volume and volume doubling time is not possible.

1.4. This guideline should be used in conjunction with the BTS guidelines.

1.5. The purpose of this guideline is to provide recommendations for the management of patients with pulmonary nodules.

2. **The Guidance**

2.1. **Algorithms**

2.1.1. There are three algorithms attached at Appendix 1-3 to guide management

**Algorithm 1**: Solid pulmonary nodule algorithm for GPs and non-respiratory specialists

**Algorithm 2**: Solid pulmonary nodules algorithm for respiratory physicians and lung MDT

**Algorithm 3**: Sub-Solid pulmonary nodules algorithm

2.1.2. To use these algorithms information on the nodule characteristics and clinical information is required as detailed.

2.2. **General Guidance for Radiologists**

2.2.1. Where nodules are detected on nuclear medicine scans or non-thorax CTs a baseline non-contrast CT thorax is required.

2.2.2. The following radiological characteristics of nodules are required

- Nodule size in mm
- Nodule characteristics (solid, part solid, pure ground glass, calcification)
- Nodule position (lobe)
- Nodule count
- Spiculation
2.2.3. CT Surveillance (see algorithm 1)

- Nodules <5mm (in greatest diameter) can be ignored
- Nodules ≥8mm recommend referral to Respiratory Physician (NOT the lung MDT)
- Nodules ≥5mm THAT ARE NON SOLID recommend referral to Chest Physician
- Nodules that are ≥5 but <6mm, recommend rescan at 1 and again 2 years
- Nodules that are ≥6 but <8mm, recommend rescan at 3, 12 and 24 months
- If the nodule grows during CT surveillance, recommend referral to Respiratory Physician

2.3. General Guidance for Non-respiratory Specialists and General Practitioners

2.3.1. Where nodules are detected on nuclear medicine scans or non-thorax CTs a baseline non-contrast CT thorax is required.

2.3.2. Patients with incidental solid or sub solid nodules <5mm in diameter do not require follow up or referral to a respiratory physician

2.3.3. Patients with solid nodules ≥5mm but <8mm require surveillance CT scanning (Algorithm 1) but do not necessarily require referral to a respiratory physician if an incidental finding or in an asymptomatic patient

2.3.4. Patients with solid nodules ≥8mm require urgent referral to a respiratory physician

2.3.5. Patients with sub-solid nodules ≥5mm require referral to a respiratory physician.

2.4. General Guidance for Respiratory Specialists

2.5.1. To use the Brock Calculator, the following patient characteristics are required:
- Age
- Gender
- Family history of lung cancer
- Presence of Emphysema

2.5.2. When requesting a PET-CT, please include the following clinical information to allow the Herder score to be calculated
- Current or former smoker
- Previous history of extra-thoracic malignancy

2.5.3. The link below can be used to calculate malignancy risk according to the Brock and Herder model
2.5.4. Nodules which do not require follow up
- Nodules with diffuse, central, laminated or popcorn pattern of calcification
- Nodules with macroscopic fat
- Homogenous, smooth, solid nodules with a lentiform or triangular shape either within 1cm of a fissure (perifissural) or the pleural surface (subpleural) and <10mm
- Nodules <5mm in maximum diameter

3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Outcome of pulmonary nodules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Dr M Wijesinghe</td>
</tr>
<tr>
<td></td>
<td>Dr H Belcher</td>
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<tr>
<td>Tool</td>
<td>Audit</td>
</tr>
<tr>
<td>Frequency</td>
<td>Continuous</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Radiology and respiratory departments</td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>Recommendations will be reported to relevant managers and clinicians for implementation</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Outcomes will be shared with the relevant clinicians and lung MDT</td>
</tr>
</tbody>
</table>

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Diversity & Human Rights Policy' or the Equality and Diversity website.

4.2. Equality Impact Assessment
The Initial Equality Impact Assessment Screening Form is at Appendix 5.
Algorithm 1 - Solid pulmonary nodule algorithm for GPs and non-respiratory specialists

Appendix 1.

Solid non-calcified nodule on baseline chest CT

Nodule <8mm

<5mm: Does not require surveillance

≥ 5mm but <6mm

≥6 mm but ≤8mm

CT 1 year after baseline

Stable

CT 2 years after baseline

Stable

YES

NO

Urgent referral to respiratory

CT 3 months after baseline. Stable?

No further surveillance required

YES

NO

NO

YES

Urgent referral to respiratory physician

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Appendix 2.

Algorithm 2 - Solid pulmonary nodules algorithm for respiratory physicians and lung MDT

Solid non-calcified nodule(s) on

Nodule >8mm

Assess using Brock Model

<10% risk of malignancy

≥ 10% of malignancy

CT Surveillance

>5 but <6mm

≥6mm

CT at 3 months

Clear evidence of growth?

CT 1 year after baseline

Stable

YES

NO

YES

DISCUSS AT MDT

Further work up

NO

PET-CT with risk assessment using Herder Model

DISCUSS AT MDT

<10% risk of malignancy

10-70% risk of malignancy

>70% risk of malignancy

Consider image-guided biopsy, excision biopsy or CT surveillance

Consider excision or non-surgical treatment
Appendix 3.

Algorithm 3 - Sub-Solid pulmonary nodules algorithm

Sub-solid nodule(s) on CT

Nodule <5mm, patient unfit for any treatment or stable over 4 years?

Previous imaging

Assess interval change, if stable over less than 4 years, assess risk of malignancy as below

Repeat thin section CT at 3 months

Resolved

Stable

Growth/altered morphology
DISCUSS AT LUNG MDT

Assess risk of malignancy (Brock Model/altered morphology), patient fitness and patient preference
DISCUSS AT LUNG MDT

Low risk of malignancy <10%

Higher risk of malignancy >10% or concerning morphology-discuss options with patient

Discharge

This section CT at 1,2,4 years from baseline

Image-guided biopsy

Favour resection/non-surgical treatment
Appendix 4. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Clinical Guideline For The Investigation And Management Of Pulmonary Nodules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>18/03/2016</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>18/03/2016</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>18/03/2019</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Dr Meme Wijesinghe Respiratory Physician</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 252779</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>To provide recommendations for the management of patients with pulmonary nodules</td>
</tr>
<tr>
<td>Suggested Keywords:</td>
<td>Pulmonary nodules, CT</td>
</tr>
<tr>
<td>Target Audience</td>
<td>RCHT ✔ PCH CFT KCCG</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>N/A</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>New Document</td>
</tr>
<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>Medicine &amp; ED Division Governance Board</td>
</tr>
<tr>
<td>Divisional Manager confirming approval processes</td>
<td>Divisional Manager, Medicine/ED</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not required</td>
</tr>
<tr>
<td>Name and Signature of Divisional/Directorate Governance Lead confirming approval by specialty and divisional management meetings</td>
<td>Jon Stratton, Divisional Clinical Governance Lead</td>
</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td></td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet ✔ Intranet Only</td>
</tr>
<tr>
<td>Document Library Folder/Sub Folder</td>
<td>Clinical / Respiratory</td>
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</table>
### Links to key external standards

| N/A |

### Related Documents:


### Training Need Identified?

| No |

### Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 16</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>Dr Meme Wijesinghe, Respiratory Physician</td>
</tr>
<tr>
<td></td>
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### All or part of this document can be released under the Freedom of Information Act 2000

**This document is to be retained for 10 years from the date of expiry.**

**This document is only valid on the day of printing**

### Controlled Document

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Appendix 5. Initial Equality Impact Assessment Form

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed (hereafter referred to as policy) (Provide brief description): Clinical Guideline For The Investigation And Management Of Pulmonary Nodules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directorate and service area: Med/ED - Respiratory</td>
</tr>
<tr>
<td>Name of individual completing assessment: Dr Meme Wijesinghe</td>
</tr>
</tbody>
</table>

1. **Policy Aim***
   - Who is the strategy / policy / proposal / service function aimed at?
   - Radiologists
   - Non-respiratory Specialists and General Practitioners
   - Respiratory Specialists

2. **Policy Objectives***
   - To provide recommendations for the management of patients with pulmonary nodules

3. **Policy – intended Outcomes***
   - Safer management of patients with pulmonary nodules

4. **How will you measure the outcome?**
   - Audit

5. **Who is intended to benefit from the policy?**
   - Patients

6a) **Is consultation required with the workforce, equality groups, local interest groups etc. around this policy?**
   - No

   b) **If yes, have these *groups been consulted?**

   C) **Please list any groups who have been consulted about this procedure.**

**7. The Impact**

Please complete the following table.

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Rationale for Assessment / Existing Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
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</tr>
<tr>
<td><strong>Sex</strong> (male, female, trans-gender / gender reassignment)</td>
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<td>√</td>
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<tr>
<td><strong>Race / Ethnic communities /groups</strong></td>
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<tr>
<td><strong>Disability</strong> - Learning disability, physical disability, sensory impairment and mental health problems</td>
<td>✔</td>
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<tr>
<td>Religion / other beliefs</td>
<td>✔</td>
<td></td>
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<tr>
<td>Marriage and civil partnership</td>
<td>✔</td>
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<tr>
<td>Pregnancy and maternity</td>
<td>✔</td>
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<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td>✔</td>
<td></td>
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</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:
- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation - this excludes any policies which have been identified as not requiring consultation. or
- Major service redesign or development

8. Please indicate if a full equality analysis is recommended. | Yes | No |

9. If you are not recommending a Full Impact assessment please explain why.

No potential for differential impact identified

Signature of policy developer / lead manager / director | Date of completion and submission

Names and signatures of members carrying out the Screening Assessment

1. Dr Meme Wijesinghe
2.

Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead, c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

A summary of the results will be published on the Trust’s web site.

Signed __________________

Date ________________