Explanatory Notes: Lung Cancer Screening Reporting Template

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Updated by:
Anum Irfan Khan, PhD

Written by:
Micheal McInnis, MD
Priyanka Jain, MPH

Lung Cancer Screening Reporting Template Working Group
Co-Chairs
Heidi Schmidt, MD
Gus Dotsikas, MD

Members
Mini Pakkal, MD       Anastasia Oikonomou, MD       Donna E. Maziak, MD       Kishore Thain, MD
Harman Sekhon, MD     Mark Landis, MD       Waël Hanna, MD           Marc Ossip, MD
Micheal McInnis, MD   D’Arcy Little, MD     Louis Wu, MD              Shona Smith, MD
Kasia Czarnecka, MD   Hugh Langley, MD       Danny Kraftcheck, MD     Tara Becevel, RN
Martin Tammemagi, PhD Beth Miller, MPH
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Overview of Methods Used to Develop the LDCT Lung Cancer Screening Template

Creation of a Low Dose Computed Tomography (LDCT) Lung Cancer Screening Reporting Template was chosen by consensus from the Synoptic Radiology Reporting Clinical Advisory Panel. It was thought to have a significant impact on a large patient population since the National Lung Screening Trial demonstrated a mortality reduction using LDCT screening (1).

A multidisciplinary group was then formed for the purpose of developing the LDCT Lung Cancer Screening Reporting Template. An Expression of Interest was circulated and interested clinicians were asked to submit their CV for consideration. The final working group consisted of members from different specialties including radiology, primary care, radiation oncology, thoracic pathology, thoracic surgery, and nursing. The multidisciplinary group met monthly to review the evidence and formulate items for the reporting template. An internal review was conducted with radiologists to determine the optimal report structure and for review of the clinical content. All comments were brought back to the working group and decisions were reached by consensus.

The end product is an evidence based template, where decisions on the elements of the template were decided on by:

1. American College of Radiology – Lung-RADS Version 1.1™
2. Systematic Reviews on lung cancer screening, radiology terminology, and reporting schemas
3. Expertise & consensus from the LDCT Lung Cancer Screening Reporting Template Working Group

This template should be used during the Cancer Care Ontario’s High Risk Lung Cancer Screening Pilot. Organized cancer screening programs provide important benefits, such as ensuring that appropriate populations are screened with the right test, ensuring appropriate and timely follow-up of abnormal findings, and ongoing quality monitoring and management.

At present, organized programs to screen people at high risk of lung cancer with LDCT are not in place in Ontario or elsewhere in Canada.

Cancer Care Ontario advises against LDCT screening of asymptomatic people on an opportunistic or ad hoc basis due to the considerable risks posed to patients outside of an organized program. Providers are advised to follow the PEBC guidelines for referral of suspected lung cancer and Cancer Care Ontario’s lung cancer diagnosis pathway map for patients exhibiting symptoms of lung cancer (2) (3).
Lung-RADS™

The working group reviewed existing Reporting and Data Systems, and came to a decision to adapt the use of the American College of Radiology Lung Imaging Reporting and Data System (Lung-RADS™) version 1.1 for the High Risk Lung Cancer Screening Pilot (Table 1) (4) Lung-RADS™ version 1.1 standardizes the classification and follow-up of lung nodules found during a screening program.

<table>
<thead>
<tr>
<th>Category Descriptor</th>
<th>Category Descriptor</th>
<th>Primary Category</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete</td>
<td>-</td>
<td>0</td>
<td>Additional lung cancer screening CT images and/or comparison to prior chest CT examinations is needed</td>
</tr>
<tr>
<td>Negative</td>
<td>No nodules and definitely benign nodules</td>
<td>1</td>
<td>Continue annual screening with LDCT in 12 months</td>
</tr>
<tr>
<td>Benign Appearance or Behavior</td>
<td>Nodules with a very low likelihood of becoming a clinically active cancer due to size or lack of growth</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Probably Benign</td>
<td>Probably benign finding(s) – short term follow up suggested; includes nodules with a low likelihood of becoming a clinically active cancer</td>
<td>3</td>
<td>6 month LDCT</td>
</tr>
<tr>
<td>Suspicious</td>
<td>Findings for which additional diagnostic testing is recommended</td>
<td>4A</td>
<td>3 month LDCT</td>
</tr>
<tr>
<td>Very Suspicious</td>
<td>Findings for which additional diagnostic testing and/or tissue sampling is recommended</td>
<td>4B</td>
<td>Referral for further diagnostic assessment For new large nodules that develop on an annual repeat LDCT, a 1 month LDCT may be recommended to address potentially infectious or inflammatory conditions</td>
</tr>
<tr>
<td>Significant – other</td>
<td>Clinically significant or potentially clinically significant findings (non lung cancer)</td>
<td>S</td>
<td>As appropriate to the specific finding</td>
</tr>
</tbody>
</table>

**Table 1.** The Lung-RADS™ tool categorizes nodules based on probability of malignancy which then determines a set management decision. For normal or near certainly benign nodules (Lung-RADS™ category 1 and 2), continued annual screening is recommended. Suspicious nodules (category 4) warrant close follow up or further diagnostic evaluation. The complete table is included in Appendix A.
Clinical Information

The radiologist does not need to narrate the clinical information received from the “High Risk Lung Cancer Screening Pilot Program” into this section.

They should indicate if it is a baseline, annual recall, or follow-up study.

Comparison Study

A comparison of the nodule should be made to the most recent prior (usually the last annual screen or occasionally a more recent 1-, 3- or 6-month follow-up). The most recent prior used for comparison should be recorded here. Readers are reminded that comparison to the baseline examination may be of clinical relevance to evaluate for slow growth.

Imaging procedure description

Overall image quality is determined by radiologist discretion. If a study is non-diagnostic (e.g. due to respiratory motion or inadequate coverage) then the patient should be recalled to complete the examination. When the patient may have had a prior examination that is not immediately available to the reader then the examination may be coded as Lung-RADS™ category 0 until the prior is retrieved for comparison (4).

The LDCT Lung Cancer Screening Protocol should meet the standards as specified by the American Association for Physicists in Medicine (Table 2) (5). The series number on which the nodules are being reported should be recorded.
<table>
<thead>
<tr>
<th>Scan parameter</th>
<th>Parameter specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scanner type</strong></td>
<td>Multidetector helical (spiral) detector rows ≥ 16</td>
</tr>
<tr>
<td><strong>Contrast</strong></td>
<td>No IV contrast should be used</td>
</tr>
<tr>
<td><strong>Patient Positioning</strong></td>
<td>Supine, optimally with arms above head</td>
</tr>
<tr>
<td><strong>Scan Range</strong></td>
<td>From top of lungs through the bottom of lungs</td>
</tr>
<tr>
<td><strong>Respiration</strong></td>
<td>Single breath hold full inspiration</td>
</tr>
<tr>
<td><strong>Reconstructed image width</strong></td>
<td>Thin image thicknesses (≤3mm) are preferred for reading; ≤ 1.5 mm should be made available for assessment of small nodules. Soft tissue and lung reconstruction should be provided</td>
</tr>
<tr>
<td><strong>Reformats</strong></td>
<td>Coronal and sagittal planar MPRs as well as axial or coronal MIPs may be helpful and are encouraged</td>
</tr>
<tr>
<td><strong>CTDvol</strong></td>
<td>≤3 mGy for standard size patient</td>
</tr>
</tbody>
</table>

**Table 2.** Select LDCT scan parameters adapted from the American Association for Physicists in Medicine’s protocol for lung cancer screening CT. CTDvol – volume computed tomography dose index.
Findings

A. Nodules

Variability exists in research trials on how many nodules should be described. The ACRIN trial described 14 nodules, the NLST trial described 6, and the PanCan approach was to describe all nodules. A distribution of number of nodules in the NLST showed that a very small number of individuals had more than 10 nodules and the mean nodule count was only 1.9 (6).

Based on the preference of radiologists, the average number observed in NLST, and on the rarity of cases with more than 10 nodules, the working group decided on describing the 5 most dominant nodules that met the size criteria of ≥ 4mm. The size criteria was based on ACR Lung-RADS™ criteria, as nodules <4 mm do not impact management using Lung-RADS™.

Although most studies will only have around 2 nodules to describe, a rare study may have >10. In this unusual circumstance, it is at the discretion of the radiologist which nodules to describe recognizing that dominant nodules of a Lung-RADS™ 3 or greater category must not be excluded.

Image, Lobe, Location

Reporting of the image number, lobe, and location within the lung is critical for efficient identification and reporting of nodules on follow-up examinations. Furthermore, the lobe and location of the nodule conveys the probability of nodule malignancy. According to the Pulmonary Nodule Malignancy Probability Model upper lobe nodules are more likely to be malignant compared to nodules located in the middle or lower lobes (7).

A perifissural nodule is a fissure-attached, homogeneous, solid nodule that had smooth margins and an oval, lentiform, or triangular shape (Figure 1) (8) (9). Perifissural nodules at CT screening for lung cancer are near certainly a benign finding (10) (9). Growth of a perifissural nodule does not necessarily indicate malignancy. Lung-RADS™ version 1.1 recommends that perifissural solid nodules with smooth margins, an oval, lentiform or triangular shape, and mean diameter of <10mm should be classified as category 2. For nodules 10mm or larger, they will continue to be managed based on the size criteria (9) (10).

In Lung-RADS™ version 1.1:

- Category 2 non solid nodule(s) (GGN):
  - < 30 mm OR
  - ≥ 30 mm and unchanged or slowly growing; for more extensive growth or size, may be upcoded to 4X for a management referral

- Category 3 non solid nodule(s):
  - (GGN) ≥ 30 mm on baseline CT or new
Figure 1. Example of a perifissural nodule. A. This CT image demonstrates a perifissural nodule with a 7 mm mean diameter (9 x 5 mm). This nodule is <10mm and would have received a score of 3 in the previous Lung-RADs™ version 1.0 criteria, but with updated sizing criteria will receive a score of 2 in Lung-RADs™ version 1.1.

Images provided by Dr. Micheal McInnis, University Health Network, Toronto.
Figure 2. Nodule attenuation. A. CT in a 56 year-old woman demonstrates a spiculated solid attenuation adenocarcinoma in the upper lobe. B. CT in a 62 year-old man demonstrates a 2 cm pure ground glass nodule in the lower lobe. Small foci of solid density correspond to vessels coursing through the nodule. C. CT in a 32 year-old man demonstrates a part solid adenocarcinoma in the lower lobe.

*Images provided by Dr. Micheal McInnis, University Health Network, Toronto.*
Attenuation

Nodule attenuation correlates with risk of malignancy and is therefore important. Part-solid and pure ground glass nodules are more likely to be malignant than solid nodules detected at lung cancer screening (11) (12) (13). Part-solid nodules are more likely to be malignant compared to solid nodules (Figure 2) (7).

Although pure ground glass nodules are more likely to be malignant than solid nodules, multiple studies have confirmed that small pure ground glass nodules usually correlate with noninvasive lesions such as atypical adenomatous hyperplasia or adenocarcinoma in situ. Therefore, most pure ground glass nodules can be safely followed in the context of a screening program (14) (15). Careful attention should be paid to pure ground glass nodules to evaluate for the presence of a solid component at baseline or follow up which may warrant re-categorization and, in some cases, warrant intervention. Use of thin sections may be helpful in evaluating for sub-centimeter solid components (14).

Size of Nodule

The main determinant of management in Lung-RADS™ is nodule size which is measured in the axial plane on lung windows as the average of two dimensions (4). Most often the length and width will be equal or near-equal and therefore only the “mean” must be reported. To calculate nodule mean diameter, measure both the long and short axis to one decimal point, and report mean nodule diameter to one decimal point. Occasionally, the length and width will be significantly different and calculation of the mean will have an impact on the Lung-RADS™ categorization. In this scenario, both the length and width measurements are required. The McWilliams Lung Cancer Risk Calculator uses maximum nodule length whereas Lung-RADS™ utilizes mean size. Therefore both length and width must be reported when significantly different. Select examples of how to measure nodules for lung cancer screening are provided below (Figure 3). Nodules are conventionally measured in the axial plane and this is encouraged for consistency. It is at the discretion of the radiologist when to measure in orthogonal planes.

Solid & Pure Ground Glass Nodules

These nodules should be measured in two dimensions (Figure 4).

Part solid

The overall size of part solid nodules is the measure of the nodule including both the solid and ground glass component in two dimensions. The size of the solid component should be measured separately in two dimensions at the level where it is greatest in size. The measure of the solid component and the nodule as a whole will often be on two separate axial slices.
Figure 3. **Measurement of nodules.**

**A.** CT in a 64 year-old woman. Solid nodules are measured in two dimensions in the transverse plane. This 10 x 8 mm nodule is categorized in Lung-RADS™ by its mean diameter of 9 mm. Biopsy revealed adenocarcinoma. **B.** CT in a 73 year-old woman. Pure ground glass nodules are measured in two dimensions in the transverse plane. This 22 x 16 mm nodule is managed by its mean diameter of 19 mm. Pure ground glass nodules < 3 cm on baseline are Category 2 whereas those ≥ 30 mm are Category 3.

**C and D.** Follow up in the same patient in image B, 6 years later. The pure ground glass nodule developed a solid component consistent with invasive adenocarcinoma. Both the solid (C) and total nodule diameter (D) are reported. *Images provided by Dr. Micheal McInnis, University Health Network, Toronto.*
Figure 4. Example of a scoring change between the previous Lung-RADS™ version 1.0 and Lung-RADS™ version 1.1 for ground glass nodules. A. This CT image demonstrates a pure ground glass located in the upper right lobe with a mean diameter of 21mm (25 x 18mm). This nodule would have received a score of 3 in the Lung-RADS™ version 1.0 criteria, but with updated sizing criteria will receive a score of 2 in Lung-RADS™ version 1.1

Images provided by Dr. Micheal McInnis, University Health Network, Toronto.
Comparison

During follow-up studies (1 month, 3 months, 6 months, and 1 year recall exams), a comparison of the nodule should be made to previous exams to examine changes in size.

Interval increases in the solid component drives changes to the Lung-RADS™ score. The interval increase in the solid component applies to both solid and part-solid nodules.

Interval increase in ground glass component applies to both part-solid nodules and pure ground glass nodules.

As specified by Lung-RADS™, only increases in size of >1.5 mm should be regarded as significant as differences <1.5 mm are frequent and unreliable given variability between radiologists and technical error (4).

Margins

A number of studies have linked margin types to survival (16) and the probability of malignancy (13). Spiculated margins have been associated with a shorter survival and greater chance of malignancy compared to smooth margins (Figure 5) (16). Spiculation in nodules categorized as a Lung-RADS™ 3 or 4 may be regarded as suspicious and can be re-classified as Lung-RADS™ 4X when applicable.
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Figure 5. Nodule Margins. A. CT in a 50 year-old man demonstrates a spiculated upper lobe nodule. B. Coronal reformat CT in a 40 year-old woman demonstrates a lobulated lower lobe nodule adjacent the major fissure. Biopsy yielded adenocarcinoma. C. CT in a 63 year-old man demonstrates a growing nodule in the upper lobe (arrow). Smooth margins and central location render this nodule easy to miss.

Images provided by Dr. Micheal McInnis, University Health Network, Toronto.

Calcification

Calcification is most frequently seen as the benign sequela of granulomatous disease (e.g. tuberculosis) and commonly coexists with calcified mediastinal or hilar lymphadenopathy. Importantly, calcification can be seen in some tumors, both benign and malignant, most commonly carcinoid tumors (17). Occasionally, a primary lung malignancy may engulf adjacent calcified granulomas. The presence of calcification is not necessarily regarded as benign. A small portion of primary malignant lung tumors show indeterminate calcification at baseline (18). Benign calcification patterns include central, diffuse solid, laminated, and popcorn.
B. Incidental Findings

In this section of the report, radiologists are asked to comment on an incidental findings by anatomical region.

Lung or Pleura

Interstitial lung abnormalities (ILA) are common in the lung cancer screening population seen in near 10% in one study of NLST subjects. Interstitial lung abnormalities will progress in a small but significant number of patients and therefore the presence of fibrotic or non-fibrotic ILA may be clinically important (19).

Emphysema should be visually quantified. The Fleischner Society provides guidance on the classification and quantification of emphysema that may be helpful to the reader (20). Emphysema is an independent risk factor for lung cancer, and increases the odds of lung cancer (7). Severity of emphysema as visually assessed on CT is also associated with increased mortality risk (21).

The presence of pleural abnormalities such as evidence of prior asbestos exposure should be commented on when present. Occasionally, a new pleural abnormality such as a new pleural effusion would be a clinically significant finding that warrants use of the Lung-RADS™ S modifier.

Mediastinum or Hilum

Cardiovascular illness remained the most common cause of death in the NLST cohort despite their high risk for lung cancer (1). Furthermore, coronary artery calcification (CAC) was found to correlate with coronary heart disease death and all-cause mortality in lung cancer screening patients. A simple visual assessment on LDCT as described by Chiles et al is comparable to the Agatson score and therefore use is encouraged (Figure 6). In this scheme, CAC may be classified globally as none, mild, moderate, or heavy. The burden of CAC in each vascular territory need not be provided (22).

The International Association for the Study of Lung Cancer (IASLC) regional lymph node map should be used in the classification of lymphadenopathy at lung cancer screening (23). Generally, lymph nodes should be reported in short axis diameter with those ≥10 mm being regarded as suspicious.

However, LDCT lung cancer screening does not constitute a staging CT even when there is a suspicious mass (e.g. Lung-RADS™ 4B). The reader will find that some lymph node stations may be difficult to assess by LDCT,
particularly in those with little mediastinal fat or a large body habitus. Therefore, a regular dose contrast enhanced CT may be performed for staging in suspected lung cancers at which time the lymph node stations may be more accurately staged (1).

The presence of lymphadenopathy may warrant categorization of a lung nodule as Lung-RADS™ 4X or may warrant use of the S modifier in the absence of a concerning nodule.

![A](image1.jpg)  ![B](image2.jpg)  ![C](image3.jpg)

**Figure 6. Coronary Artery Calcification.**
Select examples of **A.** Mild, **B.** Moderate, and **C.** Severe coronary artery calcification as described by Chiles et al. (22)

*Images provided by Dr. Micheal McInnis, University Health Network, Toronto.*
Chest Wall and Axillae, Bones, Upper Abdomen, and Other

Incidental findings outside of those described above are common at lung cancer screening and the majority are likely to be benign. The American College of Radiology provides guidance on the management of incidental thyroid nodules and abdominal findings (24) (25).

Impression

The most suspicious nodule drives the Lung-RADS™ category. It should be described again in the impression section, along with the image number where it can be seen.

The most suspicious nodule is assigned a Lung-RADS™ category (0, 1, 2, 3, 4A, 4B, 4X).

For new nodules classified as 4B on an annual recall scan, radiologists are asked to determine if any inflammatory or infectious characteristics are present and to describe them (Figure 7).

An S modifier is added if there are any clinically significant, or potentially clinically significant actionable incidental findings discovered on the LDCT images. Actionable incidental findings should be restated, and a follow-up recommendation should be provided.
Figure 7. Example of a 4B with inflammatory features. A. A new part solid nodule identified on a CT fitting the characteristics of a 23 x 10mm 4B nodule with an overall mean diameter of 16mm and spiculated margins. It does however features which would we consistent with an inflammatory lesion (asymmetrical, non-nodular morphology, air bronchogram) as well. B. Short term follow-up later demonstrates a reduction in inflammation

*Images provided by Dr. Micheal McInnis, University Health Network, Toronto*
References


## Appendix A – Lung-RADS™ version 1.1

<table>
<thead>
<tr>
<th>Category</th>
<th>Category Descriptor</th>
<th>Finding</th>
<th>Management</th>
<th>Probability of Malignancy</th>
<th>Estimated Population Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete</td>
<td>-</td>
<td>prior chest CT examination(s) being located for comparison</td>
<td>Additional lung cancer screening CT images and/or comparison to prior chest CT examinations is needed</td>
<td>n/a</td>
<td>1%</td>
</tr>
<tr>
<td>Negative</td>
<td>No nodules and definitely benign nodules</td>
<td>no lung nodules</td>
<td>n/a</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Benign Appearance or Behavior</td>
<td>Nodules with a very low likelihood of becoming a clinically active cancer due to size or lack of growth</td>
<td>solid nodule(s):</td>
<td>12 month LDCT</td>
<td>&lt; 1%</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 6 mm (&lt;112 mm³)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>new &lt; 4 mm (&lt;34 mm³)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>part solid nodule(s):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 6 mm total diameter (&lt;113 mm³) on baseline screening</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>non solid nodule(s) (GGN):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 30 mm (&lt;14137 mm³) OR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 30 mm (&lt;14137 mm³) and unchanged or slowly growing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>category 3 or 4 nodules unchanged for ≥ 3 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probably Benign</td>
<td>Probably benign finding(s) - short term follow up suggested; includes nodules with a low likelihood of becoming a clinically active cancer</td>
<td>solid nodule(s):</td>
<td>6 month LDCT</td>
<td>1-2%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 6 to &lt; 8 mm (≥ 113 to &lt;268 mm³) at baseline OR new 4 mm to &lt; 6 mm (34 to &lt;113 mm³)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>part solid nodule(s):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 6 mm total diameter (≥ 113 to &lt;268 mm³) with solid component &lt; 6 mm (&lt;113 mm³) OR new &lt; 6 mm (&lt;113 mm³) total diameter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>non solid nodule(s) (GGN) ≥ 30 mm (14137 mm³) on baseline CT or new</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspicious</td>
<td>Findings for which additional diagnostic testing is recommended</td>
<td>solid nodule(s):</td>
<td>3 month LDCT</td>
<td>5-15%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 8 to &lt; 15 mm (≥268 to &lt;1767 mm³) at baseline OR growing ≥ 8 mm (≥268 mm³) OR new 6 to &lt; 8 mm (113 to &lt;268 mm³)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>part solid nodule(s):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 6 mm (≥113 mm³) with solid component ≥ 6 mm to &lt; 8 mm (113 to &lt;268 mm³) OR with a new or growing &lt; 4 mm (&lt;34 mm³) solid component</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>endobronchial nodule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Suspicious</td>
<td>Findings for which additional diagnostic testing and/or tissue sampling is recommended</td>
<td>solid nodule(s):</td>
<td>Referral for lung diagnostic assessment</td>
<td>&gt; 15%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 15 mm (≥1767 mm³) OR new or growing, ≥ 8 mm (≥268 mm³)</td>
<td>For new large nodules that develop on an annual repeat screening CT, a 1 month LDCT may be recommended to address potentially infectious or inflammatory conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>part solid nodule(s) with:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>a solid component ≥ 8 mm (≥269 mm³) OR a new or growing ≥ 4 mm (≥34 mm³) solid component</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Clinically Significant or Potentially Clinically Significant Findings (non-lung cancer)</td>
<td>modifier - may add on to category 0-4 coding</td>
<td>As appropriate to the specific finding</td>
<td>n/a</td>
<td>10%</td>
</tr>
</tbody>
</table>

**Legend:**
- **0:** No lung nodules
- **1:** no lung nodules
- **2:** Perifissural nodule(s) (See Footnote 11)
- **3:** solid nodule(s): ≥ 6 mm (<112 mm³)
- **4:** new < 4 mm (<34 mm³)
- **5:** part solid nodule(s): < 6 mm total diameter (<113 mm³) on baseline screening
- **6:** solid nodule(s) with specific calcifications: complete, central, popcorn, concentric rings and fat containing nodules
- **7:** new ≥ 8 mm (≥1767 mm³)
- **8:** growing ≥ 8 mm (≥268 mm³)
- **9:** new 4 mm to < 6 mm (34 to <113 mm³)
- **10:** part solid nodule(s): ≥ 6 mm total diameter (≥ 113 to <268 mm³) with solid component < 6 mm (<113 mm³) OR new < 6 mm (<113 mm³) total diameter
- **11:** non solid nodule(s) (GGN) ≥ 30 mm (14137 mm³) on baseline CT or new
- **12:** solid nodule(s) ≥ 8 mm to < 15 mm (≥268 to <1767 mm³) at baseline OR growing ≥ 8 mm (≥268 mm³) OR new 6 to < 8 mm (113 to <268 mm³)
IMPORTANT NOTES FOR USE:

1) Negative screen: does not mean that an individual does not have lung cancer
2) Size: To calculate nodule mean diameter, measure both the long and short axis to one decimal point, and report mean nodule diameter to one decimal point
3) Size Thresholds: apply to nodules at first detection, and that grow and reach a higher size category
4) Growth: an increase in size of > 1.5 mm (≥ 2 mm³)
5) Exam Category: each exam should be coded 0-4 based on the nodule(s) with the highest degree of suspicion
6) Exam Modifiers: S modifiers may be added to the 0-4 category
7) Lung Cancer Diagnosis: Once a patient is diagnosed with lung cancer, further management (including additional imaging such as PET/CT) may be performed for purposes of lung cancer staging; this is no longer screening
8) Practice audit definitions: a negative screen is defined as categories 1 and 2; a positive screen is defined as categories 3 and 4
9) Category 4B Management: this is predicated on the probability of malignancy based on patient evaluation, patient preference and risk of malignancy; radiologists are encouraged to use the McWilliams et al assessment tool when making recommendations
10) Category 4X: nodules with additional imaging findings that increase the suspicion of lung cancer, such as spiculation, GGN that doubles in size in 1 year, enlarged lymph nodes etc.
11) Solid nodules with smooth margins, an oval, lentiform or triangular shape, and maximum diameter less than 10 mm or 524 mm³ (perifissural nodules) should be classified as category 2
12) Category 3 and 4A nodules that are unchanged on interval CT should be coded as category 2, and individuals returned to screening in 12 months
13) LDCT: low dose chest CT

*Additional resources available at - https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/Lung-Rads