

Appendix 1 LDCT findings and recommendations

1. Ordinal coronary artery calcification scoring

Each coronary artery is identified (left main, left anterior descending, circumflex, and right coronary artery). Evidence of calcification in each artery is documented as none, minimal, moderate, or severe, scored as 0, 1, 2, and 3, respectively. Minimal calcification was defined if less than 1/3 of the length of the entire artery, moderate as 1/3-2/3, and severe as more than 2/3 shows calcification. With 4 arteries thus scored, each person receives an Ordinal coronary artery calcium (CAC) Score in the range from 0 to 12. With additional effort, the Agatston, volume or mass calcium scores on LDCTs can also be obtained. New rapid scanning techniques minimize cardiac motion and allow for improved Agatston scoring on non-gated examinations.

Ordinal CAC score	Agatston score	Recommendation
0	0	Probability of cardiovascular heart disease (CHD) is low. Reassure and keep healthy lifestyle
1–3	1–100	Probability of CHD is mild to moderately increased; Recommend healthy lifestyle, moderate statin, ASA
4–12	>100	Probability of CHD is moderate to high. Healthy lifestyle; very intensive statin + second drug as needed; ASA; Consider function testing to r/o obstruction; Aggressive BP lowering; Referral to internist or preventive cardiologist

2. Aortic valve calcifications

Using standard mediastinal window setting (width and level of 350 and 50 HU with 2.5 mm or 3.0 mm slice thickness) and if needed, multiplanar reconstruction to determine the location of calcifications. The extent of AVC was classified as:

- ❖ Mild: single or multiple isolated aortic valve calcifications;
- ❖ Moderate: multiple larger aortic valve calcifications, but not involving all three aortic leaflets;
- ❖ Severe: multiple larger aortic valve calcifications of all three aortic leaflets.

For moderate and severe AVC, recommend referral to a cardiologist is recommended and possible echocardiography, as there is a high probability of AS.

3. Pulmonary artery hypertension

The diameters of the main pulmonary artery (MPA) and aorta (AA) are measured on an axial CT image at the level of the MPA bifurcation at the widest diameter vertical to its long axis and of the adjacent AA diameter.

If $MPA \geq 34$ mm or $MPA:AA \geq 1.0$, recommend a pulmonary consult to determine its etiology and possible echo sonography.

4. Emphysema

The extent of emphysema is identified and classified as none, mild, moderate, or severe. Each subject receives an emphysema score in the range from 0 to 3 (7).

- ❖ Mild emphysema (Score 1): no discrete areas of decreased CT attenuation but splaying of blood vessels suggesting parenchymal expansion or having occasional discrete areas of decreased attenuation;
- ❖ Moderate emphysema (Score 2): discrete areas of decreased attenuation can be identified involving less than half of the lung parenchyma; and,
- ❖ Severe emphysema (Score 3): discrete areas of decreased attenuation can be identified involving more than half of the lung parenchyma.

If emphysema is present and previously unrecognized, recommend consultation with a pulmonologist.

5. Interstitial findings

Early findings of usual interstitial pneumonitis (UIP) include pre-honeycomb and honeycomb (HC) findings. Other interstitial diseases can also be identified and may differ in location and findings. Pre-honeycomb findings may start with traction bronchiectasis alone and then progress to ground-glass opacification and reticulations, typically at the periphery of

the lungs and at the lung bases. The likelihood of disease progression is associated with honeycombing. Early identification is important and consultation with a pulmonologist is recommended.

If any of these findings are identified, recommend consultation with a pulmonologist.

6. Mediastinal abnormalities

Mediastinal masses can occur anywhere in the mediastinum, including in the thymus, heart, and esophagus; and masses in the neck, such as the thyroid, may extend into the mediastinum. Such mediastinal and soft tissues masses are documented as to location and size.

Thymic mass:

- (I) ≤ 30 mm in diameter on baseline CT without invasive features (e.g., irregular borders or loss of fat planes), recommend follow-up CT in 1 year;
- (II) >30 mm, recommend further workup according to standard practice is recommended.

Thyroid nodule:

- (I) <15 mm on baseline or annual repeat LDCT with low HU attenuation, recommend annual follow-up;
- (II) <15 mm with heterogeneous enlarged appearance, recommend dedicated thyroid ultrasound examination;
- (III) ≥ 15 mm, recommend dedicated thyroid ultrasound examination.

7. Breast density

Using mediastinal settings, the CT images of the breast are reviewed and classified according to the Breast Imaging Reporting and Data System (BI-RADS) developed by the American College of Radiology (70). The BI-RADS classification identifies 4 grades according to the breast density. Calcifications seen in the breast also provide information about coronary artery disease and should be reported (76,78).

The key differentiation is between Grades A-B and C-D (68,71).

Grade A: almost entirely fatty

Grade B: there are scattered fibroglandular densities

Grade C: breasts are heterogeneously dense, which may obscure small masses

Grade D: breasts are extremely dense, which lowers the sensitivity of mammography

For Grade C or D, recommend including this information in the report as it suggests an increased risk for breast cancer and if clinically indicated ultrasound (72) or MRI (73) of the breast is suggested instead of a mammogram as it might obscure an early cancer or precursor lesion.

8. Adrenal glands

Adrenal glands are measured on axial CT images. If the largest transverse diameter is:

≥ 40 mm, recommend further evaluation according to standard of care;

<40 mm and low attenuation (less than 10 HU), recommend annual low-dose CT scans to assess growth, but if the borders are irregular, heterogeneous, hemorrhagic, central necrosis or calcifications, recommend further evaluation.

9. Liver steatosis

The hepatic portal level is selected to measure liver attenuation (HU) and the liver is divided into four sectors (left lateral, left medial, right anterior, right posterior). In each sector, a standard 1.0 cm² region of interest (ROI) is selected, avoiding other lesions and large blood vessel. HU measurements are made using standard mediastinal window settings (width 350 HU; level 25 HU) and the average attenuation and its standard deviation (SD) are calculated. Splenic average CT attenuation measurement are obtained in the same fashion in the upper, middle, and lower thirds of the spleen.

If the liver attenuation measurement < 40 HU or liver-spleen ratio < 0.8 , recommend follow-up with a primary care physician or liver specialist for further evaluation.