**Appendix A : Derivation of LNS and WLNS**

The lymph node score (LNS) is formally demonstrated in Equation 1 where is the number of features and is the category for nodule and feature . A weighted lymph node score (WLNS) was also derived based on a category’s ability to differentiate presence or absence of malignancy. The derivation of this score is formally demonstrated in Equations 2 – 4. is the frequency of nodules having a given feature being placed in the possible malignant category for both readers, where is the total number of potentially malignant nodules having a given feature for each reader and is the total number of nodules (malignant and benign) having feature for both readers. Derived values for each feature are listed in the table below the equations. is the benign index score for nodule . is the maximum benign index score (derived as 8.23), and is the minimum benign index score (derived as 4.36).

 **( 1 )**

 **( 2 )**

 **( 3 )**

 **( 4 )**

|  |  |
| --- | --- |
| **Feature** | **Fr(malignancy, feature)** |
| Sharp Border | 0.05 |
| Poorly Defined Border | 0.14 |
| Spiculated Border | 0.5 |
| Round Shape | 0.19 |
| Oval Shape | 0.04 |
| Irregular Shape | 0.25 |
| Flat Shape | 0.02 |
| Intralobular Extension | 0.04 |
| No Intralobular Extension | 0.18 |
| Angular Margin | 0.03 |
| No Angular Margin | 0.11 |
| Pleural Distance = 0 | 0.07 |
| Pleural Distance > 0 | 0.08 |
| Solid Density | 0.07 |
| Subsolid | 0.22 |
| Groundglass | 0.11 |

**Worked Examples of LNS and WLNS:**

Assuming we have a solid pulmonary nodule with a sharp boarder, round shape, no intralobular extension, no angular margin, and a pleural distance greater than zero:

**LNS** = (solid = = 1) + (sharp boarder = = 1) +(round shape = 0) +(no intralobular extension = 0) +(no angular margin = 0) +(pleural distance greater than 0 = 1) = **2**

 **= 5.977**

 **= 3**

**Appendix B: Derivation of # of CTs for Fleischner Criteria and Lung-RADS**

Derivation of the number of CTs for both unmodified and modified Fleischner criteria are summarized in Equation 5 where are the number of nodules less than 6 mm in maximum diameter, are the number of nodules equal to 6 mm but less than 8 mm in maximum diameter, and are the number of nodules greater than or equal to 8 mm in maximum diameter. This derivation assumes no change in size of characterized nodules during the 2 year interval and that half of patients with optional 12 month follow up receive follow up.

Derivation of the number of CTs for unmodified Lung-RADS is summarized in Equations 6 where are the number of nodules in category 2, are the number of nodules in category 3, and are the number of nodules in category 4A. All nodules are assumed to be unchanged in size during the 2 year interval.

 **( 5 )**

 **( 6 )**