Notes from RSNA QIBA COPD/Asthma Technical Committee Breakout Meeting at RSNA 2011, November 30, 2011.

Scribe: John D Newell Jr MD – Co-Chair

The presentation by Dan Sullivan and others during the plenary portion of the meeting provided a review of an overall approach to the Profile for our TC. The Profile structure used by the PET/CT SUV TC looked very helpful. In our breakout meeting there was a very lively discussion regarding many key important concepts that are relevant to developing the best COPD/Asthma Profile. As a result of these discussions, the committee members agreed to adapt a Profile structure for our purposes that we think will speed our progress in meeting QIBA's mandate to develop a UPICT and Profile for COPD/Asthma QCT.

Our new COPD/Asthma profile was broken into the following components:

Claim: Coefficient of variation for the -856 LAA metric and the coefficient of variation for percent segmental bronchial wall area (WA%) obtained by doing a meta-analysis of recent papers dealing with normal QCT findings in normal non-smoking subjects will be the current claims for lung density and WA% respectively. We will work to decrease the CV_{-856} and $CV_{WA\%}$ as the committee's work progresses in the future. The CV, or other statistical measures, for other parameters may augment or replace these as the body of knowledge increases due to ongoing research in QCT of COPD/Asthma.

Method for the Profile to obtain CT image data that will support the claim above will be the current version of the SPIROMCS CT lung protocol [UPICT protocol for COPD/Asthma]. There will be ongoing modifications of this UPICT protocol as new information is developed by ongoing research in the area that the TC views as important enough to incorporate into the UPICT protocol that will improve the claim and also lower the radiation dose.

Technical Profile 1: CT Scanner
This Technical Profile will focus on the differences in specific CT models that affect the accuracy, precision, repeatability of the CV_{-856} and $CV_{WA\%}$ measures as well as other important quantitative measures of lung structure. This technical profile will develop a method for CT manufacturers to show that their CT models have the required accuracy, precision, repeatability of the CV_{-856} and $CV_{WA\%}$ so these CT models can be used in multi-center trials that use quantitative CT for the phenotyping of normal and diseased lung tissue. A key part of the work to support this technical profile will come from ongoing work done by Brigham and Women's

Hospital, University of Iowa, Phantom Labs and NIST on test objects that help to calibrate the CT models particularly in the range of normal and diseased lung CT attenuation coefficients. Key partners in this work will be the CT engineers at Toshiba, Phillips, Siemens and GE.

Technical Profile 2:
This technical profile will establish essential biologic lung structure metrics that are to be used from the CT image data that comes from the Claim and UPICT. This profile will be based on the QCT scientific literature in COPD and Asthma. The number of metrics that will be evaluated will include but is not limited to the -950 LAA, -910 LAA, -856 LAA, E/I MLD, 15th Percentile of the lung histogram, outer bronchial area, inner bronchial area, bronchial wall area, bronchial wall area percent, Pi10. This technical profile will clearly indicate which metrics in the literature will best support QCT phenotyping of COPD/Asthma. This will also be an ongoing process where TP #2 will be modified by the TC as more information is acquired from ongoing research.

[Following was not directly discussed but should be considered.]

Technical Profile 3:
This technical profile would identify what the educational needs are of the Radiologist, Medical Physicist, CT technologist, CT manufacturer and how best to meet those needs in an ongoing fashion. This profile will be modified as the TC sees fit as the CT technologies and scientific knowledge in QCT of COPD/Asthma continues to accelerate.

Critical Assignments for the Technical Committee:
1. Meta-analysis to support the claim: David Lynch and Harvey Coxson
2. Recasting the Spiromics Protocol into a final form for the RSNA QIBA COPD/Asthma UPICT: Jered Sieren and John Newell
3. Technical Profile #1: Phil Judy, Josh Levy, NIST
4. Technical Profile #2: Eric Hoffman and Sean Fain
5. Technical Profile #3: ?All members of the committee may contribute to this process and this includes the upcoming QCT meeting at the 2012 STR meeting organized by David Lynch and Jonathan Goldin.