

QIBA Lung Density Biomarker Committee (BC)

September 23, 2015 at 2 PM CT

Call Summary

In attendance

Sean Fain, PhD (Co-Chair)

Matthew Fuld, PhD (Co-Chair)

Andrew Buckler, MS

Heather Chen-Mayer, PhD

Dominic Crotty, PhD

Bernice Hoppel, PhD

Edward Jackson, PhD

Nancy Obuchowski, PhD

Karen Procknow, RT (R)

RSNA

Joe Koudelik

Julie Lisiecki

Phantom Scanning, Round II:

- Work continues toward goal of harmonizing Automatic Exposure Control (AEC) and establishing baseline performance of different Iterative Reconstruction (IR) algorithms across different platforms and models
- Results from the vendor phantom scans will inform the specifics of the Profile
- Protocols for AEC and IR will support lower dose protocols for quantitative lung CT
- Plans are in the works to scan additional phantoms (2 scanners/ vendor) at sites in the Chicago / Milwaukee area this fall to harmonize scanning protocols using the Alderson phantom (ART) for AEC
- Sites are also being identified for scanning with NIST calibrated foams
- Dr. Fuld to provide a U-Iowa software developer's contact info to Dr. Chen-Mayer for access to the automated software that the vendors have been using with their scanning data

Other issues related to the scanning effort:

- There are separate issues for AEC and IR scanning protocols:
 - For AEC: how data is acquired
 - For IR: how data is reconstructed
- Many variables remain unresolved at this time.
- When running the scans, there were some problems with the current modulation
 - Current was high and would drop precipitously
 - Drs. Fain and Fuld to confer regarding this issue

3D-printed anthropomorphic phantom:

- Due to the delicate construction, natural cork was used for filler
- Drs. Chen-Mayer and Hoppel collaborated on this phantom scanning effort to produce volume histograms of lung density for reference using the NIST PET / CT scanner
- Data analysis to continue, though questions remain regarding how to move forward with IR inclusion

Action items:

Request from Dr. Fain (Please respond before next call, October 7th):

In advance of the proposed AEC testing on the Alderson 2 phantom with the NIST foams, we need your advice on which models are most relevant to canvas the expected AEC performance represented by each manufacturer.

The goal is to test on a "legacy" model that reflects the installed base and an advanced model that reflects the next generation. Please indicate where we might find systems to test on in the greater Chicagoland, Madison/Milwaukee area also if possible. Please add or subtract to this list based on your expert opinions and knowledge of the AEC systems on your scanners.

From my notes of our discussion I have the general breakdown thus far:

- For GE: VCT and 750HD (Need revolution?)
- For Siemens: Definition AS and Force
- For Toshiba: Aquilion 640 (Vision) and ? (Prime)
- For Philips: Brilliance iCT or Ingenuity CTx
- A translation matrix is needed for the various platforms; Dr. Fuld is working on creating one
- Dr. Fain to provide a table of AEC and IR settings to be used by vendors during phantom scanning
- Co-chairs to invite Mr. Buckler to a future call to discuss development of conformance procedures, across QIBA groups (Suggested that this be after the 2nd round of vendor scans – possibly Oct. 7th).

- Vendors to take notes on harmonization while scanning to inform performance metrics in the Profile
- Additional discussion regarding adaptation to patient sizes for harmonization across vendor platforms

Reference provided:

Hague CJ, Krowchuk N, Alhassan D, et al. **Qualitative and Quantitative Assessment of Smoking-related Lung Disease: Effect of Iterative Reconstruction on Low-dose Computed Tomographic Examinations.** *J Thorac Imaging* ☞ Volume 29, Number 6, November 2014.

Next call: Wednesday, October 7, 2015 at 2 pm CT