

## QIBA COPD/Asthma Phantom Design Subcommittee

January 21, 2010

2 PM CST

### Call Summary

#### In attendance

Philip Judy, PhD (co-chair)

Andrew Buckler, MS

Zachary Levine, PhD

Joshua Levy

Daniel Sullivan, MD

#### RSNA Staff

Susan Anderson, MLS

Joe Koudelik

#### COPDGene CT Number Accuracy Conference Update (Dr Judy)

- Dr Crapo suggested that the Denver meeting be put on hold; suggested that COPDGene group meet f2f prior to the proposed vendor meeting to define agenda and needs
- Dr McNitt-Gray suggested to attend meeting due to his expertise in this subject area and to act as liaison between this and other QIBA activities

#### Status of evaluation of NIST and COPDGene foams (Drs Judy and Levine)

- Two datasets from NIST scans being analyzed: micro-CT (10-12 microns) and mini-CT (125 microns)
- ROI propagated through 50 slices of four scanned foams
  - Micro-CT: 0.34 voxel size
  - Mini-CT: 0.12 voxel size
- Short length correlation is 0.1 mm in foam; difficult to make long scale correlation due to polycarbonate spacer and box artifacts, e.g. shifting CT numbers
- Calibration varied up to 300 units with box-to-box variation seen, e.g. change in x-ray absorption; analysis work continues and Dr Levine expects additional sense of what's possible within the next few weeks
- No slice thickness issues observed; foam material may prove too homogeneous; does not mimic lung sufficiently
- Need an inhomogeneous bubbled foam material on a "CT scale" of approximately 1mm
- Need foam that can demonstrate whether slice thickness affects CT numbers
- Proposed to re-image without polycarbonate spacer leaving air-gap between all four foam samples
- Dr Judy sent COPDGene phantom to Dr Torigian (UPenn) for medical-CT (600 microns) scanning

#### Profile update (Mr Buckler)

- COPD study design needs a framework to build upon
- Better evaluation of CT needed to better evaluate COPD
- Radiologist interpretation may be useful to classify and characterize better than density measurements, but reproducible readouts (QI readouts) still important as subjective radiologist reads
- Quantitative imaging remains critical for longitudinal studies

#### Repeating of the Kemerink Experiments

- Interest in a more anthropomorphic phantom with air (not foam) in trachea and with foam to mimic the lung, possibly big bubbles which are uniform on average but non-uniform on slice
- Dr Stoel to inquire whether he can borrow the Dutch phantom used for the Kemerink experiments

**Status of modification of COPDGene Phantom**

- Mr Levy (Phantom Laboratory) fabricating the COPDGene phantom annulus
- Dr Judy to study air trachea behavior once received

**Next Steps:**

- Rescan foam at the mini-CT level without acrylic box/spacers once returned by Dr Torigian (UPenn)
- Mr Levy (The Phantom Laboratory, Inc) to develop acrylic phantom annulus and send to Dr Judy for inspection/testing
- Drs Judy and Stoel to discuss next steps concerning foam material scanning
- Dr Stoel to inquire whether he can borrow the Dutch phantom used for the Kemerink experiments
- Mr Buckler to forward ancillary study design to group; requests feedback
- Next call scheduled for February 4th, 2010 at 2 pm CST (3 PM EST)