

QIBA COPD/Asthma Phantom Design Committee

January 07, 2010

2 PM CST

Call Summary

In attendance

Philip Judy, PhD (co-chair)
Eric Hoffman, PhD
Zachary Levine, PhD
Joshua Levy
John Newell, Jr, MD

RSNA Staff

Susan Anderson, MLS
Joe Koudelik

Phantom Fill Material

- Need consistent material for phantom use
- Foam available in a variety of densities (hole sizes) which produce unwanted CT recon kernel effects; samples being studied by various CT methods
 - Micro-CT (10-12 microns) Dr Levine
 - Mini-CT (125 microns) Dr Judy
 - Medical-CT (600 microns) Dr Torigian
- Dr Levine has implemented a program for the analysis of Micro-CT image data and has preliminary results
- Problem with experimental design may exist because polycarbonate insert placed between four foam samples produced CT streaking/shadow artifacts; will rescan foam material without plastic insert to reassess
 - Need to determine whether CT artifacts coming from foam or polycarbonate storage box as well; consider removing foam from box
- Foam density spatial-correlation data didn't come out as expected; only a slight variation in correlation function with bubble size seen
- Short range uncorrected noise can be averaged over, not too important here
- Standard deviations and means come out small
- Two items to pursue:
 - Need to determine if foams are too uniform, i.e. 'constant', and poor at representing the variation naturally found in lung material
 - Need to position Dr Levine's scanned material in reference to previously done experimental work

COPDGene phantom

- Attempts needed to make the COPDGene phantom more useful
- Need to demo that a phantom air hole design can obtain a HU value equivalent to air trachea
- Need large enough high-density (ring) material around air hole to obtain accurate CT numbers for acrylic estimate
- Need to model effects of material for a computer simulation. Phil Judy is investigating simulation program available in public domain.
- Dr Levine indicated that Dr Rongping Zeng (Dr Nicholas Petrick's FDA lab) has developed a simulation. Dr Judy will contact Petrick for further information.
- Air hole filled with CO₂ v. air and effects due to humidity discussed-no appreciable differences expected
- Dr Judy to send the phantom to Dr Torigian for scanning

- Mr Levy (The Phantom Laboratory, Inc) to develop acrylic phantom annulus and send to Dr Judy for testing

Next Steps:

- Dr Judy to send the phantom to Dr Torigian for scanning
- My Levy (The Phantom Laboratory, Inc) to develop acrylic phantom annulus and send to Dr Judy for inspection/testing
- Next call scheduled for January 21st, 2010 at 2 pm CST (3 PM EST)