

## QIBA COPD/Asthma Technical Committee

July 11, 2012 at 2 PM CT

Call Summary

### In attendance

**Philip F. Judy, PhD (Chair)**

Sean Fain, PhD (presenter)

Paul Carson, PhD

Heather Chen-Mayer, PhD

Martin Connell, BSc

Barbara Croft, MD

Bernice Hoppel, PhD

Zachary Levine, PhD

David A. Lynch, MB

Frank Ranallo, PhD

Alfonso Rodriguez, MSc

Daniel C. Sullivan, MD

### RSNA

Joe Koudelik

Julie Lisiecki

### Agenda-University of Wisconsin Presentation:

1. Density measures under different "Scatter Equilibrium" conditions (i.e. different extended axial phantom thickness)
  - a. Density measures in air, water and NIST Foam III.
  - b. Interaction with scan FOV, collimation.
2. Lumen diameter, wall thickness, and wall area percent measures
  - a. Revisit of measures with averaging over central 5 slices
  - b. Resolution quality with reduced DFOV and kernel selection (standard vs. edge)

### Density Measures Summary

1. Density measures are affected by scatter due to absence of equivalent material along the axial extent of the phantom
2. Density measures are affected by choice of scan FOV, likely due to the interaction of beam hardening with scatter correction from the different bow-tie filters used
  - Suggests beam hardening will be a general problem for density measures
  - Consistent with prior reports by Mr. Connell and Dr. Judy

### Airway Measures Summary

1. Measures are largely independent of dose, with some increase in variance at lowest 25 mA tube current
2. Wall Thickness measures are off by as much as 200% for the smallest airways (Airway 4: 0.4 mm thick vs. ~1.2 mm measured)
3. Lumen Diameter measures (error 2-32%), and by extension, Wall Area Percentage (error 4-86%) are more accurate but still unacceptably high for smallest airways.
4. ASIR reconstruction degraded Wall Thickness measure but slightly improved Lumen Diameter and Wall Area % measures

### Overall Summary

1. Need axial extent of phantom of at least 20 cm for 40 mm collimation to achieve stable scatter correction.
2. Scan FOV impacts beam (hardening) and therefore affects density measures
3. Airway wall thickness measures for tubes of 2.5 - 3 mm diameter suffered from large errors (>100% over estimation).
4. Lumen diameter and wall area percentage less so, but still unacceptably high (~30-80%).
5. May be possible to improve spatial resolution (and accuracy) by combining limited display FOV reconstruction with edge reconstruction kernel
  - Improvement for reduced DFOV and Edge kernel
  - Variable results with Edge and ASIR, may be compatibility issues

### Next Steps

- Seek alternate sources of funding of RFP for computer program to analyze COPDGene
- Review and evaluate low-dose reconstruction protocols
- Plan a comparison of airway-size algorithms
- **Please Note:** [Plan for summer activities listed on the reverse side of this summary](#)

**Next call:** QIBA COPD/Asthma Update Call, **Wednesday, July 25, 2012, 2 pm CT - (Presenter will be Dr. Chen-Mayer)**

## **QIBA COPD/Asthma Technical Committee Summer Events**

### **1. AAPM - 7/28/2012 – 8/2/2012**

Face to face meeting?

Status of round robin; round robin protocol

### **2. SPIE Abstract Deadline 7/30/2012 Meeting: 9-14 February 2013 Disney Coronado Springs, Orlando Florida**

Evaluation of dose reduction protocols

NLST results – Use of low dose exams

Plan - face to face

### **3. COPD Genetics Conference 9/27/2012- 9/28/2012 AMSTERDAM**

## **Proposed Summer Schedule (*times shown in Eastern*)**

### **7/25/2012 - Wednesday 3 PM Regular Conference Call**

1. Review NIST AAPM Presentation

2. Results of NIST scans of COPDGene Phantom

### **8/8/2012 - Wednesday 3 PM Regular Conference Call**

1. Qualification of scanner models using COPDGene Phantom

2. Experience with Aquilion

### **8/22/2012 - Wednesday 3 PM Regular Conference Call**

1. Review of CT lung density clinical applications

2. Normative CT lung density data

### **9/12/2012 - Wednesday 3 PM Regular Conference Call - TBD**

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