

## QIBA COPD/Asthma Committee

December 15, 2009

11 AM CST

### Call Summary

#### In attendance

Philip Judy, PhD (Co-chair)  
David Lynch, MD (Co-chair)  
Andrew Buckler, MS  
Harvey Coxson, PhD  
James Crapo, MD  
Sean Fain, PhD  
David Gierada, MD

Zachary Levine, PhD  
Michael McNitt-Gray, PhD  
Daniel Sullivan, MD

#### RSNA

Fiona Miller  
Susan Anderson, MLS  
Joe Koudelik

#### General Discussion

- Bi-weekly COPD/Asthma Ctte call schedule to resume in January 2010
- Highly technical Phantom Design Group calls deemed secondary to COPD/Asthma with ad hoc calls; urgent design issues can be discussed on the COPD/Asthma calls

#### Proposed COPDGene-RSNA Imaging Industry Advisory Meeting

- One-day COPDGene-RSNA Industry Advisory Meeting proposed for March-April in Denver area to discuss equipment standards needed to help area of lung disease, including phantom design and algorithms needed for image reproducibility over time
- Dr Crapo looking for times, locations, and travel funding support for proposed dates in March-April 2010
- RSNA staff will poll core participants for their availability when tentative dates are identified
- Dr Crapo meeting with Pharma representatives this week; will inquire about financial support

#### Profile Development

- Review of experimental work and optimization efforts to help attain group's goal ongoing
- Will need to identify appropriate criteria leading up to the 2010 meeting
- Specific lines of activity needed such as short term standards that manufacturers can adhere to needed
- The COPDGene phantom deemed usable for the initial pass to define these standards
- Drs Boone and McNitt-Gray met with reps from GE, Siemens, and Toshiba manufacturers at RSNA 2009 meeting to discuss importance of harmonization across vendor systems, specifically spatial resolution and airway wall thickness using standard recon kernels and slice thickness (1mm-1.5mm advocated by vendors). Option to turn off non-linear filtering to keep quantitation also discussed.
- Calibration of HU needed for lung and trachea; manufacturers to consider using the COPDGene phantom to help calibrate
- Further discussion planned for Jan/Feb 2010
- Profile to act as vehicle to represent need for standards among manufacturers
  - Need input from manufacturers for longitudinal analysis of COPD Profile
- Dr Crapo to follow-up with manufacturer reps discussed above

#### Profile update

- Ancillary study (draft study design) to establish accuracy proposed; material/data exists already
- Need to separate the *what* and *how* tasks in this document
- How can this be implemented without funding?

- Phantom to be designed
- Infrastructure exists to pursue testing
- Cost to develop hypothesis within COPDGene infrastructure based on modified COPDGene phantom is low
- Need to modify and test the COPDGene phantom to meet our criteria and identify test sites
- Central funding for COPDGene phantom modifications needed
- Research groups may raise needed funding directly to pursue testing at their locations
  - e.g. Standardization work at Univ of Iowa being done
  - Much interest in this area; funding may be possible
- 18 month deadline before the NIH study (5 year re-scan) will be performed
- Need criteria to demonstrate change in patient images, not based on scanner
- Documents needed to proceed
  - Profile – to establish material for a paper (front end); UPICT template (back end); need to further develop the Profile document with manufacturer engagement from the beginning
  - Ancillary study plan – draws from the Profile (baseline); sources of variability (i.e. matrices – problems); sets of how to proceed with experiments and phantom modifications
  - Documents to be circulated for feedback

### **Phantom Design**

- Phantom is critical element for future studies involving spatial resolution and CT attenuation value work; manufacturers are supportive
- One phantom design not deemed sufficient
- Manufacturers' system calibration may require two phantoms (two separate calibrations)
- COPDGene phantom not deemed primary for studying the airway and trachea
  - Siemens phantom very useful for trachea work
- Ideal phantom to mimic magnitude affects of airway cavity to -1000 HU
- Performance requirement needs two different sized phantoms
- Need requirements for longitudinal progression assessments and literature to support this
- Dr Judy will examine the COPDGene phantom to support Profile Claims (statements)
- Dr Judy inquired with Mr Levy about COPDGene phantom modifications; will send internal rings to PhantomLabs to explore modifications
- Phantom designed elements to come from elite institutions (high powered imaging locations) to help assist with validating the reference phantom

### **Radiation Dose Concerns**

- Radiation dose is ongoing hot-topic
- Need to correct measurements for lower dose CTs

### **Current Modulation**

- Current modulation not used to get constant noise
- Current modulation techniques and dose variation to be applied at "motivated" sites with financial support

### **Output**

- Need advice from manufacturers on how to achieve consistent scanner output across platforms
- Need to know how scans were performed in 2007/2008 for comparison, i.e. how scanners view and retain cohort scan data similar to 5-year-old images
- Need to determine whether adaptive filters will cause new problems
- Need confidence to compare next series of rescan data in 2011 to 5 year old cohort data to make study comparisons effective

**Next Steps:**

- Dr McNitt-Gray to supply recommendations to improving the qi accuracy
- Dr Lynch to forward the COPDGene protocol to Mr Buckler who will translate into the UPICT format (1<sup>st</sup> step) with extensions, changes, improvements made by physicists later (2nd step)
- RSNA staff will poll core participants for their availability for spring mtg with industry when tentative dates are identified
- Draft agenda for 2010 industry mtg, Profile work and phantom modification to be discussed on next call
- Next call scheduled for January 5, 2010, then bi-weekly call schedule