QIBA Lung Density Biomarker Committee (BC) Call
February 1, 2017 at 2 PM CT
Draft Call Summary

In attendance			**RSNA**
Sean Fain, PhD (Co-Chair)	Heather Chen-Mayer, PhD	Philip Judy, PhD	Julie Lisiecki
David Lynch, MD (Co-Chair)	Charles Hatt, PhD	Miranda Kirby, PhD	
Matthew Fuld, PhD (Co-Chair)	Stephen Humphries, PhD	Daniel Sullivan, MD	

Discussion Regarding the Round-6 Groundwork Project (Dr. Humphries)

- No application has been submitted yet for the COPDGene datasets
- Dr. Lynch to choose cases from dbGaP once a studies request is submitted
- COPDGene ancillary study proposals will be the focus for this project
- Corrections will be applied based on new phantom data for lung density measures acquired
- University of Iowa software will be utilized for analysis; Dr. Hoffman to provide additional repeatability data to aid with resolving the claim
- Dr. Chen-Mayer is helping with Round-2 analysis and consultation regarding scanning protocols
    - Dr. Hatt to follow up with Dr. Hoffman regarding spiromics data, as some questions remain regarding the following:
        - whether or not subjects could achieve the same lung volume
        - whether or not the field of view was correct
    - Dr. Fain plans to hold an ad hoc meeting to resolve these questions with Drs. Chen-Mayer and Hatt; interested BC members can contact Dr. Fain: sfain@wisc.edu.
    - These details need to be clarified for a pending publication of the group's work

AEC Harmonization Update (Dr. Fain)

- The AEC harmonization project was an effort to harmonize different vendor platforms to reduce dose and noise, as phantoms were not truly comparing similar measurements
- Additional data point helped to make the process more accurate
- The AEC harmonization process consisted of the following steps:
    - Establishing a functional dependence of noise performance on AEC parameter settings for a reference body size, adjusted for varying patient size. This was achieved using the equivalent water diameter, denoted as D_w, empirically measured through scanning phantoms of increasing size
    - Defining a target noise performance empirically with lung equivalent foam for the desired CT dose protocol in an anthropomorphic phantom
    - Determining AEC parameter conversion factors between systems for equivalent noise performance
- Calibrations for AEC enabled direct calculation of slopes for conversions across platforms
    - Hounsfield Unit (HU) harmonization may eliminate differences between platforms

Update on NIST foams (Dr. Chen-Mayer)

- Collected data was broken out by the scanner; some limitations may exist between models
- Results from the lung foam measurements were not as good as expected, as there were slight variations in the densities of the foams; overall High density foams perform better than the low density foams
- The next step will be to formulate a plan for clinical translation though the group is not at this point yet

Profile update (Dr. Fain)

- Dr. Fain has updated the Profile by incorporating individually-written sections
- First review will be completed by the three co-chairs, followed by an internal review of the Profile by Biomarker Committee members

- A review of the near-final version of the Profile prior to Public Comment release will be completed during the Lung Density Breakout Session at the QIBA Annual Meeting, May 17 – 18; using WebEx for those not in attendance

Preparation for a Vendor Challenge and Discussion of Variance (Dr. Hatt)

- Dr. Hatt anonymized 2-year-old datasets with low attenuation data from 4 vendors to look at variation
- The mean value between them is the baseline, demonstrating that variation is a function of the baseline value
- The highest density of the measurements is close to zero line with the same outliers
- Standard deviation is roughly 2 to 2.5% of volume, though a 2% difference may not be seen in the left atrial appendage (LAA) measurements
- Review of this data has underscored the need to review a comparison between vendors
- It was noted that it is the change of volume that matters most, as volume is the primary determinant of low attenuation area
- High agreement is expected to be seen in the low attenuation area
- Average values regarding heterogeneity of Perc 15 will be calculated and compared for every vendor
    - Plan to select cases with both regular (high) dose and low dose using filtered back projection scans with iterative reconstruction (IR)
- Once ready, the software challenge will be uploaded to the QIDW
- Dr. Lynch needs to complete a request to COPDGene and to select datasets – 50 full dose and 50 low dose
- The challenge would focus on limits of agreement, though the Profile is focused on longitudinal assessment
- The group believes that it would be useful to the field to have an established reference dataset
- Anonymized results from the challenge will be added to the Profile as an appendix

Action Items

- Drs. Chen-Mayer, Fain, and Hatt to have an ad hoc meeting to discuss claims in light of Spiromics repeatability data
- Continue collection of reference data set (Drs. Lynch and Hatt) for software challenge
- Drs. Lynch, Fain, and Fuld to edit the Profile and plan a meeting to discuss end of February time frame
- Dr. Humphries to contact individual sites for field testing of harmonization with Dr. Chen-Mayer
- Dr. Fain to follow up with Dr. Chen-Mayer regarding publication forms

Next call: Wednesday, February 15, 2017 at 2 pm CT