

## QIBA Lung Density Biomarker Committee (BC)

Wednesday, April 26, 2023, 2 PM CT

### Call Summary

#### In attendance

Charles Hatt, PhD (Co-Chair)

Miranda Kirby, PhD (Chair)

Gonzalo Vegas Sánchez-Ferrero, PhD, MSc (Co-Chair)

Ehsan Abadi, PhD

Sean B. Fain, PhD

Stephen Humphries, PhD

Mathis Konrad, MSc

Kyle J. Myers, PhD

John D. Newell, Jr., MD

Nancy Obuchowski, PhD

Sam Peterson, MS

#### RSNA

Julie Lisiecki

**Moderator:** Dr. Hatt

#### The following topics were discussed:

- Gas-trapping reproducibility progress on ancillary study
- Automated QA/QC of expiratory scans - tracheal air and shape
- Gas-trapping XCAT simulation

#### Ancillary study / Challenge

- Approval has been received from COPDGene for a gas-trapping reproducibility study (software comparison)
- Data use agreements (DUA) would be required between each participating institution and National Jewish Health before access to COPDGene images would be approved
- It was decided that the invitation would be sent only to previous participants
- A unique ID will be assigned to each participant Person doing the analysis will be blinded to participant identities

#### Image Harmonization (Dr. Vegas Sánchez-Ferrero)

- Image harmonization using the COPDGene phantom, reviewing differences across scanners per manufacturer
- Variability exists across scanners and within the scanner
- Phantom is not reflecting what is happening in the human subject; difference may be due to body composition
- Internal air is more negative than external air in the phantom, whereas it is the complete opposite in the patient
- Drs. Vegas Sanchez-Ferrero and Abadi to collaborate using CATSIM and DUKESIM simulation software
  - Simulations to aid with determining how to approach the study analysis
  - Difference in external vs. internal air needs to be corrected to avoid affecting bias for trachea measurements
  - Beam hardening correction seems to be an important factor
  - May try changing the density of the outer ring instead of changing the size to adjust for issues
- Dr. Abadi is evaluating how to model gas trapping using X-CAT phantoms for a virtual imaging trial platform, simulating a diverse population across various scanners using manual segmentation of air-trapping
- Dr. Newell provided an email for [Dr. Dragos Vasilescu](#) at UBC
  - Dr. Vasilescu is using cutting-edge 3-D imaging technology to target genes that will help to identify and treat a rare genetic condition that affects patients with COPD

#### Action items:

- [Dr. Kirby](#) to draft invitation email to study participants with deadlines to include DUA detail and submission to COPDGene instructions, pending RSNA Board recommendations for QIBA Projects (TBD, June 2023)
- [Julie](#) to send invitation once ready and prepare / edit Google form

#### Previous action items (please strike if complete):

- [Dr. Hatt](#) to follow up with [Dr. Kim](#) from Medical IP (AI solutions)
- [Dr. Vegas Sánchez-Ferrero](#) to follow up with [Dr. Abadi](#) offline re: modeling for gas-trapping
- [Dr. Hatt](#) to share the streamlined checklists for the lung density / emphysema Profile with BC members
- [Dr. Hatt](#) received feedback from Dr. Lynch re: the Radiologist portion of the checklist and will solicit input from Drs. Kazerooni and Newell

- [Dr. Hatt](#) to look into existing studies (e.g., spiromics, etc.) that might be compatible with the Lung Density Profile to aid with reaching Technical Confirmation and validating the algorithms used
    - Plan to replicate software comparison study with gas-trapping Profile
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- [Mr. Avila](#) to follow up with Dr. Noël offline to discuss reproducibility and replication of 3-D printed phantoms
  - [Drs. Hatt, Mulshine](#), and [Mr. Avila](#) to discuss a proposed combined Claim Confirmed (Stage 4) study with lung density and small lung nodule
  - [Dr. Fain](#) to follow up with a colleague, Alejandro C., regarding COPDGene papers, including FRC, Phase II, etc.
  - [Dr. Hatt](#) to ask Dr. Newell re: spiromics data ancillary studies once paper has been published
  - Volunteers needed to assist Dr. Vegas-Sánchez-Ferrero with segmentation work
  - [RSNA staff](#) suggest contacting [Dr. Hoppel](#) re: the multi-site Lung Density “road trip” experiment data
  - Standardized naming of actors across QIBA Profiles (medical physicist or image analysis core, TBD)
  - Exploration of cross-sectional claim instead of longitudinal for gas-trapping Profile

**Next meeting:** May 24, 2023

**References:** [Profile Stages page](#) | [Technical Confirmation Process](#) | streamlined Profile [conformance checklist](#)

- [Notes](#) posted to the [Lung Density BC QIBA wiki page](#) can be referenced for detailed descriptions of biomarkers
- Link to [Air-trapping Profile](#)