

## QIBA Lung Density Biomarker Committee (BC)

Wednesday, February 22, 2023, 2 PM CT

### Call Summary

#### In attendance

Charles Hatt, PhD (Co-Chair)

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

Rachel Eddy, PhD

Raúl San José Estépar, PhD

Jong-Min Kim, PhD

Mathis Konrad, MSc

David A. Lynch, MB

Hatem Mehrez, PhD

Martha Menchaca, MD

#### RSNA

Julie Lisiecki

**Moderator:** Dr. Hatt

#### The following topics were discussed:

- Scanner bias in COPDGene
- Modeling gas-trapping for virtual trials
- Open-source kernel

#### Projects in progress (PIs not on call)

- Dr. Abadi is evaluating how to model gas trapping using X-CAT phantoms for a virtual imaging trial platform
- Drs. Kirby and Humphries working on a COPDGene Ancillary Study (software comparison study based on the new airway trapping Profile, similar to the previous lung density study)

#### 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
- Evaluating the density of air; corrections may be possible
- Hypothesized that there is systematic bias caused by scattering, which is less concerning than the variability
- Want to propose corrective action to improve reproducibility, e.g., regular interval phantom scanning
- Reviewed software compliance headers to identify confounders, looking for differences or slight differences between the fields and the headers
- Possible technical upgrade may have caused some issues with recalibration
  - May be an error with the update of the protocol itself for the system
- Profile updates may be needed: review bias issues related to the physics and changes in scanning
- Bias measured with phantoms will not be the same type of spatially varying bias that occurs with patients; however, the aim is to do the best harmonization possible with available data
- Possible suggestion to do a longitudinal QA step for reproducibility threshold

#### Action items:

- [Dr. Hatt](#) to follow up with Dr. Humphries re: status update on COPDGene study proposal (reproducibility in gas-trapping)
- Plan to discuss gas-trapping virtual phantom experiments next time
- [Dr. Hatt](#) to follow up with [Dr. Kim](#) from Medical IP (AI solutions)

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

- [Drs. Hatt](#) and [Kirby](#) to meet offline to update the COPDGene study proposal to reflect the current plan
- [Dr. Kirby](#) to send updated proposal to Dr. Humphries to include DUA detail and submission to COPDGene
- [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](#) has received feedback from Dr. Lynch re: the Radiologist portion of the checklist and will solicit input from Drs. Kazerooni and Newell
- [Drs. Kirby, Hatt, and Vegas Sánchez-Ferrero](#) to provide detailed plan of what specific additional resources will be needed for the proposed ~10 COPDGene subject software comparison study

- [Proposal needs approval by](#) QIBA CT CC and the QIBA Steering Committee
- [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
- [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

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- [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
  - [Dr. Hatt](#) to connect with Dr. Abadi re: virtual imaging
  - 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:** March 22, 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](#)