

## QIBA Lung Density Biomarker Committee (BC)

Wednesday, August 26, 2020, 2 PM CT

Call Summary

### In attendance

Sean Fain, PhD (Co-Chair)

Charles Hatt, PhD (Co-Chair)

Miranda Kirby, PhD (Co-Chair)

Samuel Yoffe Ash, MD

Raul San José Estepar, PhD

Philip Judy, PhD

Annelise Malkus, PhD

Joe Mammarrappallil, MD, PhD

Nancy Obuchowski, PhD

Kevin O'Donnell, MASc

Daniel Sullivan, MD

### RSNA

Julie Lisiecki

**Moderator:** Dr. Kirby

### Lung Density Profile's Advancement to Stage 2: Consensus (Dr. Fain):

- Dr. Fain is resolving a few remaining comments from the public comment period
- A Google link for Public Comment Resolution has been created for ease of sharing updates with the group: [https://docs.google.com/document/d/1uOzBaB\\_77vLSv8FKtQ59AxpfcAswtJ4t/edit?dls=true](https://docs.google.com/document/d/1uOzBaB_77vLSv8FKtQ59AxpfcAswtJ4t/edit?dls=true)
  - Once complete, Dr. Fain will make any necessary updates to the Profile and provide the resolution spreadsheet to RSNA staff for posting on the QIBA wiki [Comment Resolutions page](#)
- When ready, the completed resolution document will be submitted with the revised Profile and provided for a [Stage 2: Consensus](#) e-ballot at the BC and CC levels
  - Successful BC and CC votes are needed to publish on the [Profiles Page](#) on the QIBA Wiki

### QIDW Data

- Unfortunately, some protected health information (PHI) was discovered in private tags in the COPDGene dataset, including the phantom data, which may have been co-mingled with other data
- Dr. Humphries is in the process of reviewing this data so that the phantom data can be made available again
- Mr. O'Donnell recommended an open-source DICOM tool, [the PixelMed DICOM cleaner™](#), developed by Dr. Clunie, which could be helpful in removing the private tags from the data
- Deleting all of the private tags may not be possible, as there may be some necessary data contained within tags
- Dr. Hatt to follow up with Dr. Humphries

### Ideas for Groundwork Studies / Funding Proposals

- Dr. Sullivan said that the 8/31 deadline was a soft deadline and that BC discussions may require more time
- Dr. Hatt suggested thinking beyond a small study, possibly considering an NIH grant, as well as synergies between multiple QIBA BCs in a collaborative project, such as a harmonization Profile related to lung cancer screening
- Development of an online tool that could help confirm Profile conformance was also suggested

### Next QIBA Profile: Proposal Ideas Under Consideration (Drs. Kirby and Hatt)

- Dr. Kirby provided an overview of proposal ideas for a future Profile
  - Availability of clinical evidence and potential claims are important considerations, as well as studies on reproducibility and repeatability, which focus on the specifics of quantification for the biomarker
  - A [Google document](#) has been compiled noting the pros and cons associated with these topics; BC members are asked to review and provide feedback, expanding on these topics and providing their expertise, along with any additional pros and cons for each topic
    - This information will be used to create a poll for the BC to vote on future directions for exploration
1. **Airway measurements** are being considered due to the body of knowledge available regarding clinical evidence and studies on reproducibility that address measurement accuracy and precision; pros include:
    - Robust clinical evidence
    - Practical: can leverage pre-existing resources (COPDGene phantom and imaging data)
    - Feasible: can be used as an endpoint in drug development or integration into clinical practice
  2. **Pi10** has been eliminated due to associated vendor proprietary issues

3. **Deep learning-based classification of visual emphysema** is being considered if QIBA Leadership agree that this falls under the QIBA mission
  - QIBA-centric methodology for validation is not yet developed, although that is underway.
  - This could be a potential real-world application of the methods being developed in the Multi-parametric Metrology Group
4. **Fissure completeness percentage**, which is being used to select patients for reduction of lung volume procedures
  - Positive and negative numbers are unknown in terms of how they might affect clinical care, which may make study of this metric very useful
  - This may also prove difficult to study due to restricted proprietary information
  - Dr. Estepar's group has completed some research related to fissure completeness
  - Since the measurand is less obvious, making a case for the biomarker is more challenging
5. **Gas trapping** and **Parametric Response Mapping (PRM)** are complementary to current studies and could expand upon existing work
  - QIBA could request expiration scans from an existing spiromics study and share resulting data
  - Reproducibility could be challenging
6. **Vascular volume** would focus on segmenting vessels in the lung and would be complementary to current work for the small lung nodule efforts

#### **Additional discussion**

- Mr. O'Donnell suggested that the BC consider how much variability exists for each of these measures and what could be done to remove this variability to make them clinically productive
- The BC is considering the possibility of a multi-parametric Profile incorporating several of the previously discussed biomarkers above
  - Traditional metrics may not demonstrate the best reproducibility, which is why PRM was suggested
- Dr. Hatt also mentioned that an ideal goal would be to convince manufacturers to provide an open-source quantitative QIBA kernel, which could help alleviate many quantitation issues by optimizing image accuracy
- It was determined that a combination of many of these ideas would be logical using a multi-parametric approach
- Dr. Obuchowski invited all interested parties to join the calls for the Multi-parametric Metrology Task Force
- Dr. Ash approved supported of the multi-parametric proposal and felt it would be clinically applicable and useful
- Dr. Estepar reminded the group to focus on the most pressing clinical questions
- Another idea related to harmonization techniques would include Dr. Vegas-Sanchez-Ferrero's research on noise stabilization, which involves converting images into the same kernel
- More discussion is needed before consensus can be reached on the new direction

#### **Action items:**

- Complete resolution of public comments and distribute to BC for review, via shared Google doc or attachment
- Provide updated Profile and resolution spreadsheet for posting to the QIBA wiki
- Continue discussion of multiparametric Profile suggestions on next call

**Next meetings:** 9/23, 10/28, 11/25, 12/16 or 12/23