

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
 - 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