QIBA CT Volumetry Biomarker Committee (BC)

01 November 2022 at 1 PM (CT)

Call Summary

In attendance			**RSNA**
Ritu Gill, MD, MPH (Co-Chair)	Jayant Narang, MD	Kevin O'Donnell, MASc	Julie Lisiecki
Rudresh Jarecha, MBBS, DNB, DMRE (Co-Chair)	Nancy Obuchowski, PhD	Ying Tang, PhD	
Heang-Ping Chan, PhD	Jim O'Doherty, PhD, MSc	Hiro Yoshida, PhD	
Mathis Konrad, MSc			

Moderator: Dr. Jarecha

Discussion Topics:

- Plans for Stage 4 Study
- Potential challenge similar to former QIBA Group 3A challenge
- Expansion of the current Profile to include lymph or liver
- Ways to demonstrate better measurements due to use of the QIBA Profile (Proof of Value)

Proposed challenge

- A challenge similar to 3A using the RIDER data on a smaller scale is under consideration
- This would be a comparative study with sites using the QIBA Profile vs. sites not using the Profile to see if there is a significant difference in measurements
- It is too difficult to complete all 3 plans simultaneously – will need to choose one to start

Questions to consider and use of AI tools

- Groundwork may be needed regarding contrast variability for the liver
- Criteria needed for evaluating scans
- AI tool may be helpful but need to be cautious of potential "drift"
- QIBA can help to quantify and constrain variability, and check parameters while testing the functionality of AI tools, which would be beneficial to AI tool developers
- The Stage 4 procedure would require sites to be QIBA-conformant and would need to confirm performance of the AI tools using QIBA Profile requirements
- Dr. Chan noted that there are several sources of variability to consider, e.g., *tool, user, protocol, machine*
- The AI tool itself requires a QC procedure to determine consistent performance over time

RIDER data

- Some of the RIDER data is not suitable for lymph nodes
- Dr. Samei to see if he has a suitable dataset that will meet the QIBA Profile requirements
- Dr. Samei has clinical patient data (patients scanned 2x) as well as a simulated dataset for the liver
    - The simulated lesions included contrast and ground truth
- Clinical dataset may be preferable though it is unknown if these data have been evaluated or published
- Lymph node data are needed

Proposed plans

1) *Plan A – Lung Stage 4*
    a. Try to advance the Stage 3 Lung Profile to Stage 4
    b. Clinical setting needed
    c. Challenge is CT scan and re-scan of patients to measure performance
    d. May be able to apply one of Dr. Samei's simulated datasets (see how many cases can be used for lung or liver)
    e. A public cloud-based platform is needed

2) *Plan B – Liver Stage 2*
    a. Expand the Profile to include lymph and liver
    b. May need to go back to Stage 2 (Consensus) to get additional details and create new Profile language
    c. Funding may be needed for this project

3) *Plan C – Lung Volume – Proof of Value*
    a. Demonstrate the value of existing Profile by showing use of groundwork studies
    b. Design a study to demonstrate how measurements are improved by using the QIBA Profile

New action items:

- Julie to invite Dr. Samei to next meeting (mid to late January)
- Drs. Jarecha and Gill to email Dr. Samei to discuss some of the questions raised on 11/1 re: his data
- Dr. Samei to follow up via email re: access to shared dataset for proposed challenges
- All to reach out to research community re: similar coffee break studies but for liver or lymph nodes

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Ongoing action items: (please strike if complete)

- BC leaders to contact Mr. Buckler, as his company hosted the 3A Challenge data and completed the analysis
- Permission would be requested from participants to use segmentation and volume details of the lesions for publication
- Training and clear instructions needed to provide reproducible results
- Update *re: Dr. Jarecha to look for candidates to provide cross measurements to aid with determining ground truth*: Dr. Narang agreed to support the cross measurements once Dr. Gill has identified the cases and lesion locations.
- Dr. Jarecha to begin drafting some study guidelines for the Stage 4 study
- Dr. Obuchowski to consider an appropriate assessment of the number of radiologists needed for approximately 31 lesions and 14 modules
- Dr. Obuchowski to email the Process Committee working document on study guidelines to Dr. Jarecha (note – this is still in process)
- Dr. Obuchowski to determine if a revised coefficient of variation is needed and share revised sample size plan
- Mr. O'Donnell will double check with Dr. Obuchowski and Mr. Buckler to determine the ideal number of cases needed from RIDER data
- Dr. Obuchowski to adjust section 4.4 to account for precision and bias
- Dr. Obuchowski's revised sample size plan to be shared with Dr. Beaumont (for possible Stage 4 study)
- Suggestion to build use cases for the payers (future Profile version)
- Consider guidance or training data going forward for radiologists to become better "quantitators"
- Other questions to consider:
    - Should the Profile retain repeatability requirements for the radiologist?
    - Should a test of bias and linearity be added?

- Hurdle remains obtaining the test-retest data due to subject exposure to ionizing radiation

Next Call: TBD via doodle poll (possibly mid-to-late January due to RSNA meeting and holidays – need Dr. Samei for next meeting)

Shared Google document / stage 4 planning:
https://docs.google.com/document/d/1Wcmkzp8N_2lLL-FCykNPwgsn1BJOs7Z9A1ZyTIkuGCo/edit

- Group editing is welcome. All are invited to share ideas.

Reference: Data are available on the QIDW – https://qidw.rsna.org/ under CT modality datasets