QIBA fMRI Biomarker Committee (BC) Call

Wednesday, February 3, 2021 at 11 a.m. (CT)

Call Summary

In attendance			RSNA staff
Feroze Mohamed, PhD (Co-chair)	Ichiro Ikuta, MD, MMSc	James Voyvodic, PhD	Joe Koudelik
Jay Pillai, MD (Co-chair)	Andrew Kalnin, MD	Divya Yadav, MD	Susan Stanfa
David Soltysik, PhD (Co-chair)	Ho-Ling (Anthony) Liu, PhD	Francisco Zamorano, PhD	
Shruti Agarwal, PhD	Nancy Obuchowski, PhD	Yuxiang Zhou, PhD, DABR	
Cathy Elsinger, PhD	Kiran Talekar, MD		

Review of Previous Call Summary

- The 01.06.2021 call summary was approved as presented

Discussion on Language Mapping Profile v2.0 Claims

- Laterality and location of activation Claims to be developed:
    - Laterality index (-1.0 - >1.0) – within 0.6 of true LI
    - Laterality – Dominance; match true dominance

- Peak Value was found to be inferior in terms of reproducibility as Center of Mass (COM)
    - It is calculated and related to active regions, but may be altered in a map when thresholds are adjusted; using a weighted COM could help to mitigate this issue and will be looked into further

- Anatomical ROIs were reviewed
    - Started with large MNI lobe ROIs (frontal, temporal, parietal)
    - Generated average language map (mean of all language task maps)
    - Generated new clinical fMRI ROIs (average map >=1.0, dilated ~3 mm and masked by left lobe ROIs)
    - Duplicated left ROIs to right side (focused on 4 major language areas, 2 on each side, left/right symmetric)

- Dr. Voyvodic found that significant signal strength of activation in language areas, e.g., frontal, temporal, parietal, was the only reliable criterion for distinguishing good maps from bad, however, other criteria may also be considered
- There was a difference of only one voxel between cluster center-of-mass and cluster peak; the disparity was greater than 5 mms when comparing two different scans taken years apart
- Discussion re: introducing selection bias when outliers are excluded
    - Limiting the overall time period for validation for reproducibility was suggested as a method to mitigate the effects of tumor growth and other issues associated with brain anatomical changes over a particular period
    - Dr. Voyvodic noted that a shorter time interval between successive scans would not make a difference in results
    - There were no obvious cognitive changes in subjects between scan periods

- It was agreed that a Bland-Altman plot would be a good way to display Dr. Voyvodic's data; after consulting with Dr. Obuchowski re: statistical measures, confidence intervals for reproducibility to be determined

- A standard in QIBA is to set Claims at 95% confidence, however, different confidence rates for different measurements could be considered
  - With comparison maps that agree, confidence interval can be higher
    - Within some regions, e.g., Wernicke's area, he was able to reach 95% confidence on sentence completion task
    - It was noted that there was a positive correlation between ROI size and amount of signal variation
    - Calculation of cluster size to be examined next
  - Dr. Pillai to provide an overview of his findings during the Feb. 17 fMRI BC call

Next call: Wednesday, February 17, 2021 at 11 a.m. CT (1st & 3rd weeks of each month)