QIBA fMRI Biomarker Committee (BC) Call
Wednesday, September 18, 2019 at 11 AM CT
Call Summary

In attendance

			RSNA staff
Feroze Mohamed, PhD (Co-chair)	Andrew Kalnin, MD	David Scott, PhD	Joe Koudelik
David Soltysik, PhD (Co-chair)	Ho-Ling (Anthony) Liu, PhD	James Voyvodic, PhD	Susan Stanfa
Ping Hou, PhD	Uma Ranjan, MSc, PhD	Yuxiang Zhou, PhD	

Moderator: Dr. Mohamed

Review of Previous Call Summary
- The 08.21.2019 call summary was approved as presented

Profile v2.0 (language-mapping)
- Dr. Liu, v2.0 Profile editor, provided a Profile-writing progress update
- During the Aug. 21 call, an initial draft was presented, and changes were proposed; language-mapping-specific content still needed
  - It was agreed that while most Profile v1.0 content can be applied to Profile v2.0, Claims will vastly differ
  - Profile will not include a "ground truth" Claim, but rather a reproducibility Claim re: BOLD activation using center-of-mass as a measurement
  - Discussion continued re: reprocessing and re-analyzing data to develop Laterality Index (LI) Claim for language-mapping; it is to be determined whether a multi-subject/multi-site effort would be needed
  - Dr. Voyvodic possesses a substantial amount of usable data to be organized and prepared for analysis
    - Included are scans on 562 subjects with multiple language scans for 100+ time points
    - The first step is to re-process the data to generate language maps and QA metrics for motion and consistency of task performance; this will be used to screen-out subjects that do not meet criteria for "good scans/data"
    - Need to define "good data" and the associated criteria
    - There are different permutations of both within-session and across-session data and not all the same tasks were performed
      - More than half of the scans are within-session and more than half are with the same task performed twice
      - Discussion re: difference between within-session and across-session scans; the difference in data across sessions was minimal
    - The greater amount of usable data available, the more statistically sound the Claim will be (i.e., if 500 cases analyzed, could be within 5 mm with 95% confidence)
  - Rather than using clinical goals, the fMRI BC will consider how well tasks used for brain mapping can be used as a reference for a generic activation
    - Plenty of human subject language-mapping data using a sentence completion task and word generation task based on antonyms are available; agreement that Claim should be based on data from specific tasks used during studies
    - Additional discussion re: word tasks fMRI BC members have used with their subjects, the disparities among them, and language areas activated
    - Areas of activation tend to be similar, but they will activate to various degrees among different individuals in response to different tasks
    - Dr. Voyvodic's data was deemed reproducible as a result of using various methods of screening for quality

- o Discussion re: how to develop a Claim based on activation of specific regions of the brain
    - ▪ A template of broad regions of interest (ROIs) based on anatomy was developed and registered to the brain of each subject
    - ▪ Then, within anatomical regions, the largest clusters of activation were identified
    - ▪ To compare two different tasks when conducting a cluster-based analysis, two activation maps were examined to see whether:
        - Cluster locations (activation areas) lined up
        - Cluster sizes were similar
        - Located on the same side of the brain
    - ▪ Discussion re: whether focusing on largest cluster would be most relevant for this study
        - Clusters would be sorted by size, but not only the largest would be examined
        - Language activation maps may include 5 or 6 significant sized clusters in a given region, the "most important" cluster would be difficult to determine because the task would activate all of them to different degrees
        - Any cluster with more than 10 voxels would be evaluated to see whether it was reproducible in two different language scans
        - It was noted that specific areas are almost always activated by any language task, but whether activation is due more to motor or to language would be unknown
        - A better sense of brain region and cluster activation is needed to correlate with a loss of function
    - ▪ Dr. Voyvodic to continue to learn more about the reproducibility of language-mapping and the variability of patterns by continuing to analyze the data

- Reproducibility/repeatability/reliability studies of language fMRI found during a literature review will be referenced to address the issue of identifying clusters
- Challenges remain re: methodology for analyzing the data and deciding which scans could meet the qualifications for the Claim (clear criteria for defining a "good" scan still need to be determined)
- Task activation will be needed to meet the Profile Claim; Dr. Voyvodic defined a reasonable threshold criterion for identifying active voxels
- Dr. Voyvodic welcomed feedback on motion DRO article that will soon be submitted for publication

Reminder:
- Please RSVP for the Dec. 4 QIBA Working Meeting during the 2019 RSNA Annual Meeting
- Please sign up for the RSNA 2019 MTE Sessions at the QIBA Kiosk:
    - o Type in your name next to the presentation time slot that works for you (we encourage that each 30-minute time slot is filled by at least one committee member)
    - o Simply close out of the document (there is no save button and changes will automatically save)

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Next call: Wednesday, September 18, 2019 at 11am CT (1st & 3rd weeks of each month)