QIBA fMRI Biomarker Committee (BC) Call
Wednesday, August 7, 2019 at 11 AM CT
Call Summary

In attendance
Feroze Mohamed, PhD (Co-chair)  Andrew Kalnin, MD  David Scott, PhD
Jay Pillai, MD (Co-chair)  Ho-Ling (Anthony) Liu, PhD  James Voyvodic, PhD
David Soltysik, PhD (Co-chair)  Nancy Obuchowski, PhD  Zhiyue (Jerry) Wang, PhD
Cathy Elsinger, PhD

RSNA staff
Joe Koudelik  Susan Stanfa

Moderator: Dr. Soltysik

Review of Previous Call Summary
- The 07.17.2019 call summary was approved as presented

Profile v2.0 (language-mapping)
- Due to greater clinical interest for language-mapping, efforts were redirected from Profile v1.0 (motor) to v2.0 (language)
- Dr. Liu, v2.0 Profile editor, provided a progress update, and indicated he planned to dedicate more time to the Profile in September
- While most Profile v1.0 content can be applied to Profile v2.0, Claims will substantially differ
- A literature search for Profile v2.0 has begun and a review of repeatability studies is underway with the goal of identifying a suitable quantitative index
- Overviews on two reproducibility/repeatability/reliability studies of language fMRI were provided:
    - 12 healthy volunteer subjects
    - Performed well on language-mapping task (sentence completion) with little motion
    - 1 – 6-hour test-retest period
    - Tasks included sentence generation (37 patients) and silent word generation (78 patients)
    - Test-retest period was composed of consecutive runs within the same scan session
    - Good data for based on patients repeating a task were obtained
  - It was noted that disparity in Laterality Index (LI) calculations between the two studies is likely
- Guidance developing Claims based upon reviewed literature was requested
- Statistical methods used to calculate the true confidence intervals to achieve the Claim in v1.0 were explained
- Values in motor-mapping Profile v1.0 were conservative; language-mapping v2.0 Claims to be more accurate
- Profile v2.0 will not include a “ground truth” Claim, but rather a reproducibility Claim re: BOLD activation
- It was mentioned that we need across-session studies to make claims about language fMRI reproducibility
- It was determined that additional data need to be reviewed and analyzed before Claim values can be established; 300 available datasets deemed more than enough
  - Discussion regarding what is needed for a Profile Claim to help steer data analysis
  - Within-subject variability to be the focus, since bias is not understood (no phantom studies to compare in terms of truth)
o Caution voiced re: questionable assumptions between DRO and human task comparisons; this was deemed a risky direction to pursue
o DROs can be generated if necessary; Dr. Voyvodic has motion DROs with language data with variability in the way that tasks were performed (variability based on head motion and test performance could be added)
o Suggestion to incorporate center-of-mass data based on published results

• Benefits of motion from empirical data vs. other modeled DROs data were discussed
• Challenges remain re: how to analyze the data and deciding which scans would meet the qualifications for the Claim
  o Decide how to calculate motion, task performance, etc. and what is acceptable
  o Alternative ways to assess performance in fMRI when evaluated in terms of patterns of activation in the task, as opposed to measuring task performance
  o Parameters/qualifications for a good language scan to be defined
  o How to make a scan reproducible and what degree of reproducibility is needed to be determined
  o Need to define laterality
  o These issues will need to be discussed at great length

• In Profile v1.0, the measurand (BOLD signal) was defined early in the Profile
  o In a good fMRI scan, i.e., subject successfully performs test with low imaging noise, a good BOLD signal map will result
  o Recommendation to also use BOLD signal as the measurand in v2.0, and focus on defining a good scan; if the scan is not good, the Claim would be irrelevant
  o Amount of variability that would allow a good BOLD signal to be defined; most data to come from DROs
  o DRO data to be sorted for those that meet criteria for a good scan (has good BOLD signal)
  o Within-subject imprecision due to biology of patient, scanners, software, etc. needs to be determined

Next Steps
• Potential issues for v2.0 to be identified over the coming weeks
• Text will be copied from v1.0 and pasted into v2.0 where applicable

Next call: QIBA fMRI Biomarker Cmte call – Wednesday, August 21, 2019 at 11am CT - 1st & 3rd weeks of each month

RSNA Staff attempt to identify and capture all committee members participating on WebEx calls. However, if multiple callers join simultaneously or call in without logging on to the WebEx, identification is not possible. Call participants are welcome to contact RSNA staff at QIBA@RSNA.org if their attendance is not reflected on the call summaries.