

QIBA fMRI Biomarker Committee (BC) Call

Wednesday, February 5, 2020 at 11 a.m. CT

Call Summary

In attendance

Feroze Mohamed, PhD (Co-chair)

Jay Pillai, MD (Co-chair)

David Soltysik, PhD (Co-chair)

Michael Boss, PhD

Cathy Elsinger, PhD

Ping Hou, PhD

Ichiro Ikuta, MD, MMSc

Andrew Kalnin, MD

Yunhong, Shu, PhD

Judd Storrs, PhD

Jim Voyvodic, PhD

Yuxiang Zhou, PhD

RSNA staff

Susan Stanfa

Review of Previous Call Summary

- The 01.15.2020 call summary was approved as presented

Profile

- Staff circulated the latest Profile draft from Dr. Liu on December 18, 2019
- It was concluded that word generation and sentence completion tasks will be used in this Profile, as they yield very similar and meaningful results for center-of-mass and laterality indices (LI); the next focus will be on Claim development based on said tasks
- Methodology and supporting literature to be defined; data to support a LI Claim are also needed
- LI and how to compute them need to be decided
- There was discussion during previous fMRI calls re: whether to include both whole hemispheric and regional ROIs; whole hemisphere deemed nonreproducible, therefore, a corresponding Claim cannot be developed
 - Whether there is activation in reasonable areas (e.g., Broca's and Wernicke's areas) to be determined
 - Discussion needed regarding separate Claims for anterior and posterior language areas
 - Before the ROI issue can be addressed, analysis and statistical methods for generating activation maps to be determined
- Claims to be developed based on activation of specific regions of the brain
- It was noted that the primary difference between fMRI Profiles v1.0 and 2.0 is the lateralization issue
- Challenges remain re: methodology for analyzing the data and deciding which scans could meet the qualifications for the Claim - clear quality control criteria for defining a "good" scan still need to be determined
- Discussion re: method of performing quantitative measurements for language-mapping
 - Significant unpredictability and complication due to the location of language areas and weaker signal will present challenges for Profile v2.0; procedures used in v1.0 will be insufficient
 - Because activations are not as strong with language-mapping as with motor-mapping, variables such as head motion become more challenging
 - For example, intersubject variability is low with motor-mapping, but higher with language-mapping – therefore, an identical approach cannot be used
 - Identifying anatomy and normalizing an atlas to a subject may be essential steps for language-mapping
- The Profile should not merely describe what is currently being done; it needs to advance the field
 - Unless reproducibility is improved (rather than merely demonstrated/measured), the Profile will not be valuable
 - Users may be convinced to perform their imaging methods quantitatively as a result of the Profile
 - The goal for the fMRI Profile is to improve patient care and reproducibility by changing the way fMRI is used diagnostically in clinical practice or during clinical trials

- Dr. Voyvodic discussed the methodology of his ongoing language reproducibility study
 - Start with language-related areas identified in MNI space reference atlas (from the Montreal Neurological Institute)
 - Perform a linear transformation registration to align the atlas to the individual patient
 - Apply large ROIs as the first step toward lateralization measures
 - Discussion to be continued re: possible refinements to this process

Next Steps

- Discussion re: normalization approaches and methodology to be continued on February 19

Next call: Wednesday, February 19th, 2020 at 11 a.m. CT (1st & 3rd weeks of each month)

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