

QIBA fMRI Biomarker Committee (BC) Call

Wednesday, February 6, 2019 at 11 AM CT

Call Summary

In attendance

Feroze Mohamed, PhD (Co-chair)

Jay Pillai, MD (Co-chair)

David Soltysik, PhD (Co-chair)

Shruti Agarwal, PhD

Cathy Elsinger, PhD

Andrew Kalnin, MD

Ho-Ling (Anthony) Liu, PhD

Nancy Obuchowski, PhD

Flavius Raslau, MD

James Voyvodic, PhD

Jerry Wang, PhD

RSNA staff

Joe Koudelik

Susan Stanfa

Review of Previous Call Summary

- The 01.16.2019 call summary was approved as presented

Updates on Profiles v1.0 (motor-mapping)

- The latest copy of Profile v1.0 is located at:
https://docs.google.com/document/d/1QBN8l_wEH620LqShyW649Ejcx9qO3wq52u9iPc5mjg/edit?usp=sharing
(contact Dr. Elsinger if access is needed)
- Dr. Elsinger continues to use a Google Sheet to track how public comments were addressed/resolved and subsequent changes made to the Profile
- Dr. Liu went over the public comments addressed by him
 - Explanation of how comments were addressed is located in the resolution column
 - Comments are flagged for minor revision or when significant discussion is needed
 - Dr. Elsinger confirmed that most changes have been incorporated into the current draft of the Profile
 - A few unaddressed comments need discussion before action can be taken; Drs. Mohamed, Elsinger and Liu to reconvene offline to discuss Profile issues
 - Dr. Pillai requested that comments regarding neurovascular uncoupling (NVU) be forwarded to him
 - Reminder to include in Profile only information needed to achieve the Claim
- Checklist
 - Dr. Soltysik provided a brief recap of the discussions that have occurred over the past few weeks and noted that the checklist needs to match the fMRI Motor-Mapping Profile v1.0
 - Discussion has focused on the computation of Center of Mass Activation (CMA)
 - Whether to remove contrast-to-noise (task-dependent) requirement: “shall calculate center-of-mass activation (CMA)”
 - Computing CMA requirement
 - Concern that checklist instructs to use CMA, but this technique may not be feasible for most Profile users since it requires a stand-alone software package
 - Providing data for both CMA and Signal Peak Activation (SPA) methods of measurement in Profile to be considered to accommodate more real-world users
 - The existing Claim in the fMRI Motor Mapping Profile v1.0 is based on CMA, not SPA, but SPA data would need to be analyzed before forming a separate Claim requiring SPA
 - Until SPA data are acquired, Profile to include only CMA as the optimal requirement
 - Many checklist tasks items remain open for discussion
 - Dr. Soltysik to finish going through them offline, make edits using track changes and circulate to fMRI BC members for feedback
 - Checklist to be reduced to specific activities necessary to achieve Claim
 - Discussion to continue during the February 20 fMRI BC call

Discussion on Language-Mapping Research

- An overview of "[Repeatability of language fMRI lateralization and localization metrics in brain tumor patients](#)," recently published in Human Brain Mapping in late 2018 by Agarwal S et al. was provided by Dr. Pillai, the senior author of the paper
 - This paper was circulated immediately following the January 16 fMRI BC call
 - The purpose was to assess the within-subject intra-scan session repeatability of language functional MRI (fMRI) activation maps in patients with brain tumors who were undergoing presurgical fMRI as part of their preoperative clinical workup at the Johns Hopkins Hospital over a period of several years
 - Two different language paradigms (recommended by the American Society of Functional Neuroradiology) were studied/compared using a large subject group; only individual patients who performed two or more consecutive runs of each task in the same scan session met the inclusion criteria
 - Questions regarding methodology and in particular, region of interest (ROI) selection, were addressed. Broca's area (BA), Wernicke's area (WA), expressive language, receptive language and holohemispheric ROIs were used along with AAL template-based gyral parcellation for definition of each ROI
 - A reasonably high correlation between lateralization index (LI) values in the 1st and 2nd runs across the board was found, for both language paradigms and across different ROIs, regardless of whether an AMPLE threshold-based approach or a statistical threshold-independent approach was used for LI computation
 - A very high degree of repeatability at a single-subject level within single scan sessions of language mapping was demonstrated using both hemispheric lateralization (i.e., regional and holohemispheric LI) and center of mass computation.
 - Variability in LI was fairly low
 - Mean variability in center of mass was low (less than 10mm) across all regions, resulting in valuable data for the Language-Mapping Profile; in particularly language-specific ROIs such as BA and WA, for both language tasks, the variability of center of mass was <5 mm
 - Concern was raised regarding need for assessment of 95% confidence intervals as well for compliance with QIBA profile claims
 - Discussion to continue during the February 20 fMRI BC call

Next calls:

- QIBA fMRI Biomarker Cmte call – **Wednesday, February 20, 2019** at 11am CT - 1st & 3rd weeks of the month
- QIBA fMRI Bias TF call – **Tuesday, February 12, 2019** at 1 PM CT - 2nd & 4th weeks of the month

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