QIBA fMRI Technical Committee Update
Wednesday, January 4, 2012 at 11 AM CST
Call Summary

In attendance

Cathy Elsinger, PhD (Co-Chair)
Jeffrey Petrella, MD (Co-Chair)
Barbara Croft, MD
Ted DeYoe, PhD
Robert Haworth
Feroze Mohamed, PhD

Jay J. Pillai, MD
James L. Reuss, PhD
Laura Rigolo, MS
Daniel Sullivan, MD
James Voyvodic, PhD
Domenico Zaca, PhD

RSNA

Fiona Miller
Julie Lisiecki

QIBA fMRI Technical Committee Call Agenda

General Items:

1. QIBA fMRI/DICOM WG 16 (Dr. Reuss/ Mr. Haworth) – There will be a meeting next week. DICOM WG 16 would like clear "yes" or "no" answers regarding use and implementation of DICOM-related fMRI information from manufacturers
2. ASFNR – abstract submitted – thanks to Dr. Reuss
3. ASFNR – Face to face meeting (Dr. Elsinger to follow up with Dr. Maldjian)
4. Reproducibility meetings – Doodle poll was distributed; call is scheduled for Tuesday, January 10th at 2 pm CST
5. Profile draft has been uploaded to wiki

Intra Reader Assessment Project: next steps – project leader needed- (4-5 cases)
- There was much discussion regarding this topic.
- At the time of the discussion, no clinicians were available for input.
- More discussion is needed to determine how this project will be implemented, how the 4-5 datasets will be isolated, etc.

Profile/ Claims Construction:
- The original purpose in creating a Profile was to gain an understanding of what is passed on by the physicist or neuro-radiologist to the neurosurgeon.
- Claims discussion concerned the concepts listed below:

Claims Construction:
1. What is most relevant clinically for pre-surgical planning?
2. Important to distinguish between defining the methodology for creating the map/measures of interest and understanding how this is used by neurosurgeon/interpretation/practical application
3. Revise the profile claims to reflect an end product with more practical application
4. Suggestions (Dr. Carson – Dr. Reuss)

   - Listing in the profile some semi-ultimate goals and explain why doing simplest first.
   - Ultimate seems to me something like:
     Isoprobability of detectable deficit contours and certainty therein - Or simpler wording: Contour of probable detectable deficit and uncertainty therein.
   - Next step: Let surgeon outline potential resections and get projected fraction of functional performance deficit that would result.
   - Now, provide brain size normalized atlas functional borders centered on the center of activation. Do a goodness-of-fit of that border to actual edges of lesion given uncertainty of edges of lesion.

Current Claims:
Claims characterizing reproducibility of BOLD response
   1. *On a test-retest basis, fMRI can be performed reproducibly to a level such that the center of mass of activation of a focus of interest is within 5mm of itself, with at least 90% overlap of the activation clusters.*

   2. *On a test-retest basis, fMRI can be performed reproducibly to a level such that the relative magnitude of activation in homologous regions across hemispheres should be within 10%.*

Claims characterizing risk assessment (predictive value?) -TBD

Discussion
- "fMRI provides the location of healthy cortex to avoid during surgery." - Main idea that must be re-written as a claim with specifics of benefits of using fMRI

- Committee needs to select claims that have strong support
- Need to define regions of interest and specify methodology that is most reliable/ accurate
- Inter-reader study would help to clarify what methodology and terminology is used at each site
- Dr. Voyvodic emphasized to the group that the Profile claims must demonstrate that fMRI may be used as a quantitative biomarker
    - The closest the group has come to quantitation is with reproducibility of images
    - Dr. Petrella expressed concern about the focus on clinical application of fMRI as a biomarker for presurgical planning and suggested that further discussion is needed in the context of other QIBA models of biomarkers (e.g., FDG-PET group)
        - AMPLE (reproducible measure of edge measurements) also needs to be defined with regard to biological significance
- Possible wording suggested for a claim:
    - "BOLD fMRI is a biomarker of the spatial distribution of neural activity generated by a specific task."
    - Suggested that measurements be based on navigational measurements of direction and distance
- Some discrepancy regarding what is being measured by reproducibility studies:
        - Consensus was that reproducibility refers to both the images themselves *and* the methodology needed to produce the information that ultimately goes to the neurosurgeon.
        - Need to determine the sources of variance in what is delivered to the neurosurgeon

Next Steps
- Dr. Elsinger to add Executive Summary to Profile draft and distribute for review
- Group to discuss Profile claims wording and clearer focus on next call
- Group to further discuss the proposed tech committee intra-reader study
- Dr. Elsinger requested that any ideas generated from the 1/4 discussion be shared with the group via email prior to the next Tech Committee call

Next Calls
- QIBA fMRI Reproducibility WG, **Tuesday, January 10th, at 2 pm CST**
- QIBA fMRI Technical Committee, **Wednesday, January 18th, at 11 am CST**