QIBA fMRI Committee WebEx Update
Wednesday, July 14, 2010
11 AM CDT

Call Summary

In attendance
Cathy Elsinger, PhD (co-chair)
Joy Hirsch, PhD (co-chair)
Bradley Buchbinder, MD
Andrew Buckler, MS
Edward DeYoe, PhD
Jay J. Pillai, MD
James L. Reuss, PhD
Douglas M. Tucker, PhD, MBA
James T. Voyvodic, PhD
Domenico Zaca, PhD

RSNA
Fiona Miller
Joe Koudelik

fMRI / DICOM Working Group Update (Dr Tucker)

- Workflow documents established; request feedback from all fMRI members concerning workflows from specific institutions; details need to document data consumption and produced
- Details needed to help understand the various steps/stages, especially post-processing, to assist with identifying possible sources of variability
- Duke sample workflow available on the QIBA fMRI wiki for reference at: http://qibawiki.rsna.org/index.php?title=FMRI_subctte
- DICOM-side goal is to specify/direct available information between acquisition systems for ease of communication and transmission
- Local DICOM tags to contain more fMRI details, fMRI / DICOM Working Group to lend expertise for broader fMRI implementation, e.g. specific fMRI data to be DICOM represented
- fMRI / DICOM could lend momentum and direction to the long-term standardization in capturing the correct information needed for industry

Statistical Thresholding (Fixed vs. Normalized) and Reproducibility

- fMRI does not produce same results when identical tasks performed; reproducibility testing using existing data proposed
- Dr Voyvodic presented *Reproducibility of fMRI* slide deck (for reference on the QIBA Wiki) http://qibawiki.rsna.org/images/6/60/FMRI_Reproducibility071410.pdf
- Statistical thresholding can be subjective; changing fixed to relative value thresholding showed better reproducibility
- Poor quality imagines may not allow full activation capture; need to examine -/+ and +/+ and thresholds
- t-maps (fixed thresholds) vs AMPLE (normalized threshold) discussed
- AMPLE is the only known method to directly look for reproducibility; signal peaks are used as reference instead of baseline; AMPLE can help regularize activation of good signals
- Relative peaks give reproducible boundaries to each area/segment; stable, measurable quantitative peaks very important; spatial extent is very reproducible as well
- Relative AMPLE maps used to mask original activation maps (showing relative activation)
- Dr Voyvodic offered to look over fBIRN patient datasets (based on individuals scanned at 5 different sites)
    - Dr Voyvodic to run AMPLE thresholding process on mixed fBIRN data to determine what extent AMPLE may be used and level of reproducibility
- Need to explore additional methodologies to address fMRI reproducibility
    - Conjunction Analysis is reliable and to be used to broaden beyond AMPLE
    - Identical tasks to be performed with both AMPLE and Conjunction Analysis, i.e. same scan done twice
    - Dr Hirsh to present institutional method of assessing reproducibility on next group call

Histogram Mixture Modeling

- Three classes identified by Oxford group: (1) activated, (2) non-activated and (3) de-activated

fMRI Profile Activity

- Profile description needed; more details on the QIBA Wiki http://qibawiki.rsna.org/index.php?title=What_Are_Profiles%3F
- Are fMRI Claims reasonable?
- Need ways to test sources of variability and noise in data

Next Steps:

- Dr Voyvodic offered to run AMPLE thresholding process on mixed fBIRN data
- Dr Hirsh to present institutional method of assessing reproducibility on next group call
- Next call scheduled for August 25, 2010 at 11 an CDT