QIBA fMRI Reproducibility Subcommittee Update
November 2, 2010
11 am CDT

Call Summary

In attendance:	**RSNA:**
James T. Voyvodic, PhD (Chair)	Joe Koudelik
Andrew Buckler, MS	Julie Lisiecki
Cathy Elsinger, PhD	
Feroze Mohamed, PhD	
Domenico Zaca, PhD	

Update (Dr Elsinger)
- Need a proper measurement for reproducibility
- Concerned about claims development regarding map localization of brain areas and accuracy
- Difficult to make results reproducible based on different patient populations
- How is the data used now? Pre-surgical assessment where clinicians are using entire activation maps – *not* just a particular region. Take the MAP in its entirety to look at reproducibility, not specific regions or brain areas.

Update (Dr Voyvodic)
- Sent *QIBA Quarterly* article to the group for comment; based on multiple ways to test fMRI reproducibility
- Interpreting activation maps quantitatively needs more discussion
- Reproducibility = the same person doing the same task more than one time in the same way
- Reproducibility is based on activation pattern (maps); need to convey reproducibility of maps in quantitative ways

Breath-hold data (Dr Zaca)
- Working on organizing breath-hold results to see if they can be used in a quantitative manner
- Results are used if 90% or more accurate. Otherwise, they are redone or the patient is moved to another task
- Motor tasks are not being accessed, only language
- Determine if breath-hold data exists and whether or not it affects the usefulness of activation maps of BOLD non-responders; does breath-hold data affect map usefulness?
- Determine how to interpret this data; Focus the discussion (with data) on these topics
- Should breath-holding be done routinely? Check with Dr. DeYoe to see if this is one of his behavioral measures

RISK:
- Risk assessment is important in the interpretation of data
- Need information about how to assess bold imaging's capability to produce a map that has validity and is also reproducible

Behavioral data variation:
- How do we know what the person was actually doing? Data may differ if a person does same task in a slightly different manner.
- How much behavioral information is important and how much is not? Variance in behavior may not be proportional to variability of results.
- What behavioral measures should be made; how do these relate to BOLD; more information on behavior needed
- How much activation map information is/not important needs further discussion
- Perhaps add a mini-study requiring minimal funding to add breath-hold details to current clinical scans
- Measurement needed that requires no interaction, but identifies that patient is responding

Dr Mohamed:
- Nothing assessed for behavioral tasks; only language tasks
- Would like measurements to be more quantitative
- Slice position adjusted based on head motion needed
- Willing to do a profusion study – anything to make the process better for the patient
- Consider breath hold results and usefulness as part of a workflow that would be better (effectiveness of breath holds)?

Stimulus Presentation Software:

- Patient complication with language task + decision + motor task; too much cognitive effort for the patient
- Need a measurement where you know the patient is performing the task
- May consider using an eye camera and checking L to R eye movement; distinct pattern of doing task properly

Pilot data (Dr Voyvodic)

- Proposal for ways of measuring behavior and what works well in the area of language expression
- Identification of language tasks can be problematic for non-native speakers of the English language.
- Use a task that is both auditory and visual; can be used separately or together
- Consider: 1) How do we organize the data? 2) Can it be made quantitative? 3) Can we assess the brain's ability to generate a bold response?
- Behavioral measures – what they are and what they should be; how will we collect this data?
- Profusion issues – how to collect and evaluate data; how to interpret the results?
- Profile – Reproducibility study that informs profile claims – what bold fMRI is capable of doing

QIBA:

- Look at studies in the first year that may encourage additional studies and choose these based on the availability of useful data
- Need to organize what to pursue, who to engage in the study, data needed, analysis, how to make data quantifiable

Mr Buckler:

- Focus on tangible work product in efforts to create a study design
- Main Group to focus on the Profile
- Reproducibility group to focus on representing reproducibility
- Spiral Model: Even if we don't know enough to write a Profile, write what we think it should represent – until the data can prove it.
- With the spiral model, the end result is always constant improvement, and a focus on the target.
- Clinicians need new products now. Definition is necessary to drive the product development.
- Use work flow documents to see how much agreement/ understanding exists and compare this to what is done clinically

Dr Elsinger:

- Develop a working hypothesis and see what is good, better, best. What steps are needed?
- What do the workflows tell us if we compare them and build on different aspects?
- Let's come up with an optimal workflow and look at develop a matrix/ checklist agreement.

Next steps:

- Further discussion of how to assess BOLD responsiveness in the face of pathology
- Work on study design and Profile development
- Discuss different workflows and compare different methodologies -- what aspects to build on next
- Matrix of workflow steps proposed
- Next call is scheduled for Tuesday, December 7th 11:00 a.m., CST