

QIBA fMRI Reproducibility Work Group Update

Tuesday, March 20, 2012 at 11 AM CT

Call Summary

In attendance

James Voyvodic, PhD (Chair)

Paul Carson, PhD

Barbara Croft, MD

Ted DeYoe, PhD

Cathy Elsinger, PhD

Jeffrey Petrella, MD

David Soltysik, PhD

Domenico Zaca, PhD

RSNA

Julie Lisecki

Discussion regarding the study of Metrology as it relates to fMRI and quantitative measurement

- Overview of the upcoming Metrology Workshop at RSNA – April 3-4, 2012, in Oak Brook, IL
- Three main groups will be meeting on topics as follows:
 1. Algorithm
 2. Performance
 3. Terminology
- As a member of the Performance Group, Dr. Voyvodic discussed the group's focus on definitions, particularly *repeatability* and *reproducibility*
 - *Reproducibility* was defined as – the ability to get the same measurement even if under different conditions, i.e., taking a patient's temperature with different thermometers
 - *Repeatability* was defined as – a measurement where you get the same value under the same conditions
- Of particular interest is how measurements are made and evaluated for quantitative validity
- Group would like to use fMRI as an indicator of true change in neuro-activity
 - Blood oxygen level, BOLD signal response, blood flow, and blood volume are closely correlated with this effort, though it's difficult to measure the "absolute physical quantity" of some of these indicators
- It would be good to get the fMRI currently-profiled measures or possible desired ones to Drs. Gatsonis and Raunig along with any manageable amount of data on reproducibility and sources of variability, in order to encourage them to cover fMRI in their examples.

Article recommendation from Dr. DeYoe on Neuro Hemo-dynamic Coupling:

Attwell D, Buchan A, Charkpak S, et al. Glial and Neuronal Control of Brain Blood Flow. *Nature* 2010; 10 November 468:232-243.

- doi:10.1038/nature09613; <http://dx.doi.org/10.1038/nature09613>; published online.

Next Steps

- Continued discussion regarding combining BOLD sensitivity with more quantitative and highly calibrated quantitative measures for more meaningful units or measurement

Next Calls

- QIBA fMRI Technical Committee, **Wednesday, March 28, 2012 at 11 am CT**
- QIBA fMRI Reproducibility Working Group, **Tuesday, May 1, 2012 at 11 am CT**