**QIBA Musculoskeletal (MSK) Biomarker Committee (BC)**

Tuesday, April 17, 2018 at 11 AM CT [one-time change in time slot]

*Call Summary*

| **In attendance** | | | **RSNA** |
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| *Xiaojuan Li, PhD (Co-Chair)* | Edward Jackson, PhD | Nancy Obuchowski, PhD | Joe Koudelik |
| *Thomas Link, PhD (Co-Chair)* | Youngkyoo Jung, PhD, DABR | Yuxi Pang, PhD | Susan Stanfa |
| Angie Botto-van Bemden, MD | Kathryn Keenan, PhD | Qi (Chris) Peng, PhD | |
| Robert Boutin, MD | Vladimir Mlynarik, PhD | Carl Winalski, MD | |
| Peter Hardy, PhD | Ed Mojahed, PhD | Cory Wyatt, PhD | |

**Moderator:** Dr. Link

**Arthritis Foundation Calibration Study Activities (Dr. Li)**

- A brief overview of this multi-vendor (GE, Siemens, Philips), multi-site (Cleveland Clinic, UCSF, Univ of Kentucky, Albert Einstein College of Medicine) study was provided
- Since phantom scans at all four participating sites have been completed, preliminary phantom data results were reported to the study committee and the MSK BC
- In the final, standardized protocols the MESE T2 mapping sequence (similar to OAI protocol) was added
- Sequence standardization and measurement across multiple sites and vendors was a challenge
    - The hypothesis was that there would be systematic differences seen across sites and vendors which would require a correction factor if data is highly correlated
    - Variability was assessed and significant differences were found
    - Preliminary data analyses suggest a linear correlation between phantom data from different vendors, thus a correction factor can be developed to address these systematic differences

- The coefficient of variation in the first set of data analysis revealed that there was a 10% difference between platforms/vendors
- While values were collected for different manufacturers, ground truth has not been established (comment from Nancy Obuchowski, PhD)

**MRI Phantom Development (Dr. Li and Dr. Katy Keenan)**

- It was mentioned that the Boulder NIST team now offers a phantom scanning service to make NMR measurements using either 1.5 or 3T scanners across a temperature range of 0 – 40 Centigrade
- Dr. Keenan was asked to provide an overview of her work on a phantom for breast imaging
    - Making measurements across systems was a challenging project taken on by Dr. Keenan as part of her postdoc work at NIST
    - Worked with High Precision Devices (HPD) to do prototyping; NIST performed the research and development regarding fill solutions/materials and HPD developed to physical phantom/shell
    - HPD was granted two small NIST business awards (for a two-phase phantom development process)
    - Current project with MITRE, which is interested in particular phantoms and has granted funding for research and development
        - Students are encouraged to apply for a two year National Research Council (NRC) award to study various materials and to develop a MSK measurement standard/phantom

- February and August 1st are the application deadlines
- https://www.nist.gov/pml/applied-physics-division/magnetic-imaging/nrc-postdoctoral-research-associateships-magnetict
- http://nrc58.nas.edu/RAPLab10/Opportunity/Search.aspx

**Discussion of Technical Aspects Including Subject Handling and Data Analysis (Dr. Link)**

- Discussion needed regarding **QA procedures** for MRI scans, QA procedures used during Osteoarthritis Initiative (OAI) can be used as a template, Dr. Erika Schneider, who was in charge of the OQI QA, will be invited to present at next committee meeting
- The next step is to focus on **Profile development**, specifically sections on subject selection, handling and data analysis
- Rigorous patient **selection criteria** need to be established and incorporated into the subject selection section is as follows
    - Patients at risk for osteoarthritis, as this is a population for which there are substantial data (Patients with KL 2 or lower, obesity, family history, meniscectomy, status post significant injury)
    - Athletes (recreational) to assess cartilage quality, for example as part of run safe clinic
    - Monitoring therapy (intra-articular injections, pharmacotherapy)
    - Assessing cartilage quality in the non-affected compartment before interventions such as osteotomy and unicompartmental prostheses
    - Selection criteria should be based on previously published studies (Dr. Jackson)

- Patient **handling** prior to scans has to be standardized
    - Scan to be performed in the morning
    - Patient should spend a minimum of 30 minutes in a seated position prior to the scan
    - The entire process should not take longer than 1 – 2 hours; longer times deemed to result in site push-back
    - Would need to request information regarding subject's typical activities prior to selection ("moderate" and "strenuous," in terms of exercise intensity, to be defined)
    - Subject should not engage in strenuous exercise within 48 hours prior to the scan (activity control)

- Dr. Link to draft subject selection and subject handling sections and circulate them prior to the June t-con

**Next Call:** Tuesday, June 12 at 10 AM CT [May t-con to be skipped due to QIBA Annual Meeting, ISMRM held during the 3rd week of June]

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