

## QIBA Diffusion-Weighted Imaging MR Biomarker Committee (BC) Call

Thursday, July 16, 2020 at 2 p.m. (CT)

### Call Summary

#### Participants

Michael Boss, PhD (Co-chair)

Dariya Malyarenko, PhD (Co-chair)

Edson Amaro, MD

Rajpaul Attariwala, MD, PhD

Thomas Chenevert, PhD

Amita Shukla Dave, PhD

Daniel Margolis, MD

Felipe Nascimento, MD

Nancy Obuchowski, PhD

Savannah Partridge, PhD

Mark Shiroishi, MD

#### RSNA

Joe Koudelik

Susan Stanfa

**Moderator:** Dr. Boss

#### Review of Previous Call Summary

- The notes from the June 18, 2020 DWI BC t-con were approved as presented

#### DWI BC Leadership Changes are Official (Drs. Boss and Malyarenko)

- Dr. Boss reported that Dr. Chenevert had stepped down from his DWI BC Co-chair role, in which he has served since the inception of this group
  - He has made many significant contributions to QIBA efforts, including the management of a DWI groundwork project that informed the Profile, and as the MR Scientific Liaison on the Steering Committee
  - He plans to continue his involvement as a member of the DWI BC
  - Dr. Malyarenko was welcomed as a new DWI BC Co-chair; it was noted she has a strong understanding of DWI work to be done and has been the point-of-contact with the VERDICT team
- Dr. Boss thanked Drs. Chenevert and Malyarenko for their valuable contributions

#### Update on Brazil DWI efforts, technical confirmation conversation redux (Drs. Boss, Amaro and Obuchowski)

- Drs. Nascimento and Amaro recently contacted Dr. Boss regarding their RSNA R&E grant exploring implementation of the DWI Profile in São Paulo, Brazil
- The phantom and clinical data they have collected may be enough to help advance the DWI Profile to Stage 3: technical confirmation, at least for the brain disease site
- There were substantive differences in imaging protocols across disease sites, as well as differences in b value and echo time and repetition time
- Brief background on the project was provided, and it will be presented in greater depth during the Aug. call
  - 478 human subjects and the QIBA ADC phantom were scanned at 17 different sites with 1.5T and 3T MR platforms; a comparison was done to assess variability
  - The same subjects were scanned on multiple vendor platforms for a subset of cases
  - Challenges included temperature issues in phantoms and position ROIs
  - Working at a large hospital with government connections facilitated involving so many sites in this study
- In reference to their draft final reports, Drs. Amaro and Nascimento may have demonstrated the feasibility of the DWI Profile's brain protocol
- Advancement to stage 3 requires drafting a checklist and sending it to 2-3 sites to determine whether the requirements are feasible; it is also necessary to demonstrate that conformance activities in Section 4: Assessment Procedures, of the Profile can be performed
- This could be a possible model for other Profiles to achieve technical confirmation, and with modification, possibly claim confirmation

- Additional discussion needed re: a path forward for Profiles with disease site-specific Claims
  - Patient data are critical to demonstrate the feasibility of the Profile
  - Obtaining funding for test-retest studies is a challenge
  - Dr. Boss noted how useful the R&E grant mechanism has been to advance the DWI Profile effort to this advanced stage; grant funding was used to collect test/retest data
  - The DWI BC is hopeful that data can be obtained from additional institutions re: disease sites other than brain; there may be a prospect for an additional study in Brazil
  - Collaboration with the VERDICT team and experience with ACRIN 6701 provides encouragement that the prostate protocol is achievable
  - ISPY-2 data from ACRIN 6698 may provide breast data

### White Paper (Dr. Boss)

- Dr. Boss is leading the effort to draft a white paper to inform the public about the DWI Profile, promote QIBA DWI BC efforts, and better engage the radiology community
- The outline was circulated for feedback prior to this call
- The plan is to model the paper after Kinahan PE, et al. [QIBA Profile for FDG-PET/CT as an Imaging Biomarker Measuring Response to Cancer Therapy](#)
  - The manuscript was a digestible summary of the various FDG-PET Profile sections
  - It was noted in the paper that the Technically Confirmed Claims were informed by a review of the literature, but were not independently verified by a prospective study that conformed to the Profile
- Although there was concern voiced regarding the number of similar QIBA member-driven papers that *Radiology* would be willing to publish, the DWI BC intends to submit this paper to *Radiology*, with *JMRI* as back-up
- The content will include the history of the DWI Profile and its development
  - First, a literature search was conducted on all disease sites; responsibilities were divided among volunteers to review the publications for test-retest data
  - There were not enough test-retest data on breast to include this disease site when the Profile was published as Stage 2: Public Comment; once the required data were made available, content was added, a second round of public comment ensued, the Profile was edited in response and the updated version was published
  - The challenge posed by the lack of test-retest literature and metrics will be highlighted and the white paper effort led by Dr. Dave: [Quantitative imaging biomarkers alliance \(QIBA\) recommendations for improved precision of DWI and DCE-MRI derived biomarkers in multicenter oncology trials](#), will be referenced
  - New repeatability studies currently exist and should be noted in the paper, since these were not referenced in Dr. Dave's original white paper
- As a next step, suggestion to insert sections of the DWI Profile, circulate the draft, and ask DWI members for feedback

### Discussion on VERDICT team data/collaboration, next steps (Dr. Malyarenko)

- The DWI BC has been in contact with a research team in the UK, led by Dr. Shonit Punwani, that developed a promising quantitative technique for prostate diffusion MRI called VERDICT
  - This approach yields a QIB called the intracellular volume fraction (FIC), which they compared to ADC in a test-retest study published in *Radiology*
  - Dr. Malyarenko has spearheaded the collaboration with their team to encourage a companion publication that reports on this work using wCV rather than the ICC repeatability metric employed in their original publication

- The DWI BC and VERDICT team have discussed prospective DWI data acquisition, which could provide ADC test-retest data to confirm the DWI claim
  - The MR CC and RSNA staff who had previously inquired about the collaboration were informed of this effort
  - In combination with the ACRIN 6701 study, there may now be sufficient data to refine the prostate claim, and better support the existing claim with additional literature
- Dr. Malyarenko reported that next steps with VERDICT have been defined; she will provide offline updates as more information becomes available
- Discussion with MR CC Co-chairs, and perhaps EC/SC needed re: this pathway/opportunity for acquiring claim confirmation data; it was noted that no other QIBA group has achieved stage 4

### **Extended BC Call Schedule for August and September (RSNA Staff, all)**

- In lieu of F2F breakout sessions that typically occur during QIBA Annual Meetings, BCs were offered the opportunity to extend their calls from 1 to 2-hours starting in July, until the Sept 29 virtual QIBA Annual Meeting
- The DWI BC will have extended calls in Aug and Sept to focus on strategy for Stage 3: Technical Confirmation

### **Next Steps**

- Drs. [Amaro](#) and [Nascimento](#) will discuss results with Dr. Obuchowski prior to the Aug call
  - Feedback from DWI BC members was encouraged; this will help Drs. Amaro and Nascimento to develop their presentation for the next call, which will focus more in-depth on their work
- Staff will Doodle for some 2-hour blocks in mid-Aug and mid-Sept in case the more time than usual is needed
- Dr. Boss to insert sections of the DWI Profile into the white paper, circulate the draft, and ask DWI members for feedback/additions to the document
  - Staff to circulate Kinahan paper for reference
  - The Dave paper will also be distributed to help DWI BC members to avoid duplicating information and address gaps in that already-published work

**Next DWI-MR BC Call:** TBD, based on DWI BC member availability for a 2-hour long call

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