Participants   **RSNA**

Hendrik Laue, PhD (Co-Chair)   David Clunie, MBBS   Edward Jackson, PhD   Joe Koudelik

Caroline Chung, MD (Co-Chair)   Andrey Fedorov, PhD   Nancy Obuchowski, PhD   Susan Stanfa

Moderator: Dr. Laue

Floating Point DICOM Presentation (Dr. Fedorov)

- During the ISMRM annual meeting in Paris, available DCE BC members gathered to discuss the DICOM conversion freeware initiative from the ISMRM perfusion group.
- Topics included:
  - Welcome and background
  - Introduction: problem statement and aim of this initiative
  - Standardization of data - DICOM for Quantitative Imaging (DCQMI): what DCMQI is, what it does and how it works
  - Demo of DCMQI as a command line tool and implementation example as a library
  - Discussion: what would deter use, what is missing and next steps on a global scale

- For DCE BC members who missed the DICOM meeting during the ISMRM annual meeting, Dr. Fedorov provided his and Dr. Clunie's presentation on "DICOM Parametric Maps: Capabilities of the standard and supporting tools" (slides may be found at: http://bit.ly/dcmdce4ismrm)
  - For background and motivation, see: "Fedorov A, Clunie D, Ulrich E, Bauer C, Wahle A, Brown B, Onken M, Riesmeier J, Pieper S, Kikinis R, Buatti J, Beichel RR. (2016) DICOM for quantitative imaging biomarker development: a standards based approach to sharing clinical data and structured PET/CT analysis results in head and neck cancer research. PeerJ 4:e2057 https://doi.org/10.7717/peerj.2057"
    - Overview of "State of the art" in research practice and in commercial tools
    - DICOM definition of Parametric Map IOD: "a multi-frame image representing pixels with real world values"
    - Voxel values: multi-frame and floating point
    - Meta-data is included in the standard definition of the PM object

  - Relevant capabilities (advantages of DICOM over the alternatives) of the DICOM standard were described
    - Structured communication of critical information otherwise stored using ad hoc solutions: composite context, quantity/units semantics, references to source data
    - Result can live side-by-side with other DICOM data
    - Can be adopted and implemented by commercial/clinical tools
    - Floating point pixel data
    - Can be cross-referenced and is harmonized from DICOM Structured Reporting objects calculating measurements over regions defined on parametric maps

- o [DCMQI](#) (a free, open source library that implements conversion between commonly used imaging research formats and the standard DICOM representation)
  - o Remaining challenges and open issues were discussed

- Suggestions and insights made during this presentation included:
  - o Closer collaboration is needed among DICOM, ISMRM, QIBA
  - o Greater specification relating to encoding would be beneficial to ensure complete and reconstructible data storage; on the other hand, it needs to be ensured that the profile does not get too technical for the intended audience
  - o The critical deidentification process would limit how data can be shared
  - o Standard of care in clinical trials
  - o In addition to producing Profiles, QIBA groups elucidates/documents the issues
  - o More support needed with DCE BC Profile efforts; greater participation encouraged

- Action items:
  - o Drs. Clunie and Fedorov to read the latest version of the DCE Profile on Google docs at: https://docs.google.com/document/d/1in76va1Q96tVX97RWLHHqimOHxCeDsMqh98na8pwOb8/edit?usp=sharing and provide suggestions and content for the appendix
  - o Discussion needed regarding the DICOM standard and how it is implemented in QIBA Profiles; support needed for encouraging implementation of existing standards in the form of recommendations (not requirements)
  - o Feedback by QIBA groups to Dr. Clunie regarding the contents of DICOM was encouraged
  - o Due to low attendance on the July 5 t-con, follow-up discussion with Drs. Clunie and Fedorov on this topic to be scheduled

DCE Profile Update
- Section 3 to be shortened
- Section 4: additional discussion on assessment procedures needed

Next DCE BC Call: Thursday, July 19, 2018 at 11 AM CT