QIBA FDG-PET/CT Digital Reference Object (DRO) - Subcommittee Update WebEx
March 13, 2009
2-3 PM CDT
Call Summary

In attendance:
Paul E. Kinahan, PhD (Chair)
Ronald Boellaard, PhD
Michael E. Casey, PhD
Patricia E. Cole, PhD, MD
Dennis Nelson, PhD
Ling X. Shao, PhD

RSNA
Susan Anderson
Joe Koudelik

General Discussion

Definition: A Digital Reference Object (DRO) is a DICOM image object used for testing data validity and/or quality in a manner relevant for clinical trials and other quantitative imaging procedures. A DRO can be generated in one of four manners:
1. As a *de novo* DICOM image stack
2. By the reconstruction of a stored synthetic raw data object (i.e. sinogram)
3. By the reconstruction of a stored measured object (i.e. calibration phantom)
4. Some approximation between version 1 and 3.

What is the role of a Digital Reference Object (DRO)?
- Basic Quality Control for
    1. Reporting critical scanner information (global scale factors, s/w version no., basic sanity check with test image generated from stored raw data (either real or synthetic))
    2. Testing connection with display workstations
    3. Providing evaluation base for further processing (e.g. ROI tool evaluation)
- Show or if something in scanner has changed, i.e. scatter correction algorithm

Issues
- Need to know what the DROs can and cannot be used for
    1. Covariates testing/validation
    2. Daily or routine QA/QC tracking
    3. Prevention of data entry errors (injected dose, uptake time etc.)
- Raw data is stored in various states for each vendor - this may cause issues
- Simulated data is considered the only "perfect" data

Discussion
- System acquisition generated DRO's discussed
    - DROs could be created on scanner computers and sent to work stations for reference
    - Mathematical datasets (new data) and reconstruction data sent to work stations now
    - e.g. CT systems hard-coded, stored sinogram (normalized) data used today - data comes directly from scanners - this could be used to specify software version and be written into the imaged object

- Two phantom types (physical or digital) worth pursuing for different reasons
- To be used to evaluate the integrity of the system process, not meant as a validation phantom

    - Physical phantom - can be scanned at factory prior/post shipment for QC
    - Digital phantom - can be used at site for routine QC and monitoring image quality changes following SW updates/changes and system maintenance
- Two roles of phantom
    - Image quality
    - Image data consistency

- What is the endpoint?
    - Consistency
    - Track changes in data processing steps
    - Track display station interoperability

DICOM Discussion

- What is the DICOM information we need? – important question for all subcommittees
- 1-2 contacts from each scanner and workstation manufacturer needed with knowledge of:
    - How to create/write the DICOM objects
    - How to read the DICOM objects
- Each QIBA FDG-PET/CT Subcommittee should collect DICOM questions and requests to be forwarded to the main FDG-PET TC and Dr Frank for coordinated discussion, prioritization and subsequent inquiry with vendor contacts
- ROI subcommittee developing guidelines and attempting to define scanner parameters in more detail (e.g. ACRIN 6678)

Action Items:

- Staff will explore creation of a master calendar of FDG-PET subcommittee calls - e.g. post on QIBA Wiki?
- DRO and ROI Subcommittees to interface on common DICOM themes
- Next call scheduled for Friday, March 27, 2009 at 2 PM CDT