QIBA vCT Technical Committee Weekly Update
Monday, July 6, 2009
11 am CDT

Draft Call Summary

In attendance:

Lawrence Schwartz, MD (Moderator, Co-Chair)
P. David Mozley, MD (Co-Chair)
Denise Aberle, MD
Maria Arthelogou, MD
Kristin Borradaile, MS
Patricia E. Cole, PhD, MD
Gary S. Dorfman, MD
Charles Fenimore, PhD
Wendy Hayes, DO

James Mulshine, MD
Kevin O'Donnell
Anthony P. Reeves, PhD
Matthias Thorn, PhD
Brenda Ye, MD

RSNA staff
Fiona Miller
Susan Anderson
Joe Koudelik

Report on Software Performance Characteristics group (Dr Schwartz)
- First WebEx for the Software Performance Characteristics group was June 29
- Goal is to distribute strawman on performance characteristics for comment by end of week of July 6-10
- The existing claim #4 related to measuring lung tumor volume in the Profile has a placeholder of 18% for repeatability (selected as "twice as sensitive as RECIST")
  - Claim #4: Can measure lung tumor volume with repeatability of 18% for tumors greater than 10mm in Longest Diameter
    Rationale: For uniformly expanding cubes and solid spheres, an increase in the RECIST defined uni-dimensional Longest Diameter of a Measurable Lesion corresponds to an increase in volume of about 72%. To diagnose Progressive Disease at a change of about one half that volume, 36%, the noise needs to be less than about 18%. The claim is thus set to be "twice as sensitive as RECIST". (http://qibawiki.rsna.org/index.php?title=Profile:_CT_Lung_Nodule_Volume_Measurement_for_Primary/Regional_Nodes_and_Metastatic_Sites)
- Want a determination of what constitutes a Pass/Fail, e.g. how software works and performance it would be capable of, e.g. accuracy of x and variation of y
- Focus remains on performance, not method to achieve it
- Two concerns:
  - 1. Software is optimized to meet criteria but doesn't operate well in real world
  - 2. New sources of variance/new sources of failure
- Dr Schwartz invited software vendors to draft ideal/target/acceptable performance metrics and send to him
  - Drs Athelogou, Lapstra and Mr Avila and Nicolson
- Considerations for inclusion in metrics:
  - Speed

- May be context- or vendor-dependent. QIBA can define the metric but customer decides whether software works
    - Ease of use
        - "Number of clicks" or a way to judge navigability
    - Use of DICOM structured reporting with vendor support
    - 'Auditability' must be easy; third party auditor must be able to see and access work done independent of output, e.g. FDA auditor or quality inspector should be able to see work and make assessment; helpful when matching work done between sites
    - Reproducing uni-dimensional line length, longest perpendicular and volume
- Also to be considered:
    - Needs of patients who move between sites
    - User understanding of bull's eye: ideal, target, acceptable
    - Profile may have exceptions, e.g. clinical practice may require a few retrospective time points while clinical trials would require every retrospective time point
        - Features may vary depending on user needs, e.g. pharma vs. clinical use
    - Possible method of review: finalize Profile and send to vendors, incorporate comments and send to other stakeholders, e.g. trialists, incorporate comments and finalize
    - Define terms important to radiologists, e.g. a standard for annotation and certain standard deviation of annotation
    - Consider variance between observers: may be measuring different things or may be caused by observer skill level
    - Input/interaction with clinical trialists needed to determine if performance characteristics meet their needs
    - Inter- and Intra-rater reliability needs better defining
    - Need to draw the line between post-processing and analysis
- Consider generating test data from clinical data in addition to phantom data
    - Volcano data set, in which 10-15 academic and commercial groups made measurements, is being analyzed for presentation in September
    - Includes change in size and volume measurements on varying complexity of lesions with subset of varying slice thicknesses

Relationship with DICOM
- Discussion of dependence on later version of DICOM
- Work on AIM project (annotation and image mark-up) continues at Northwestern
    - Building bigger semantic structure with standard methods for defining volume
    - Has been mapped to DICOM
    - Prototype stage now; may be into DICOM is one year+
- Consensus that there are presently tools to work with and the probability of better tools coming

Profile overlap with UPICT protocol
- Discussion of when post-processing ends and analysis begins; Dr Dorfman requests guidance for UPICT protocol

Next Steps

- Vendor representatives (Drs Athelogou, Lapstra and Mr Avila and Nicolson) to draft software performance metrics and send to Dr Schwartz
- Dr Schwartz and Mr O'Donnell to work metrics into draft Profile