QIBA VOL-CT Weekly Update WebEx
Monday, February 9, 2009, 11am CST

Call Summary

In attendance:

Andrew Buckler, MS (Co-Chair)
P. David Mozley, MD (Co-Chair)
Lawrence Schwartz, MD (Co-Chair)
Charles Fenimore, PhD
David Gustafson, PhD
Frank Klein
Michael McNitt-Gray, PhD
James Mulshine, MD
Daniel R. Nicholson
Kevin O'Donnell
Nicholas Petrick, PhD
Ekta Shah, MS

RSNA staff
Fiona Miller
Susan Anderson
Joe Koudelik

Agenda (Mr. Buckler)

- Group reports
- Workflow
    - Groups 1A and 1B to influence Profile Details
    - Group 1C to set Profile Claims - based on profile details

Group 1A (Dr. Petrick)

- Wiki is updated with examples of filters and output data formats
    - Request consensus from the group on filter and format to use in pilot and study
    - Suggestion:
        - For Reader study: use tools generally available in house (short term - eventually utilizing DICOM format)
        - For Profile: use one of three DICOM formats
            - 1. Used by chest CAD systems
            - 2. Voxel-based
            - 3. Surface measurement
        - Benefit is availability of management tools and that PACS can be used to manage data
        - Can adjust to other formats once system is in place
    - Important to use formats compatible with real-use model (DICOM format)
    - RadPharm will use Siemens format for Group 1A pilot study
    - Material will be uploaded to Wiki to facilitate short discussion on DICOM format advantages (Mr. O'Donnell)
- By end of week, Wiki will be updated with the steps of the reader study
    - Request consensus from the group; when steps are finalized, pilot can begin
- The 10 initial cases for the pilot have been shipped to RadPharm
- Issue of data storage format
    - More general PLY format vs. *3-D Doctor*

Group 1B (Dr. McNitt-Gray)

- Working on Questions 1&3 of 5 initially identified
    - 1: What level of accuracy and precision can be achieved in measuring tumor volumes in patient datasets?
    - 3. What is the minimum detectable level of change that can be achieved when measuring tumors in patient data sets under a "No Change" condition? (extension of the MSKCC Coffee Break experiments)
- Dr. Ford will identify RadPharm readers
- Agreement on data analysis needed
- Dr. Fenimore will offer comments based on his experience
- Drs. Schwartz and Zhao will assist with Question 3 (Coffee Break experiment extension)
- Timeline needed
    - Dependent on Dr Ford's reader availability
    - Prepared to begin after 1A
- MASK (i.e. segmentation) data to capture coordinates as Group 1A is planning
    - More discussion required
- Which parameters should be used to improve volume measurements: one set of parameters, mimicked on other scanners?

Group 1C

- Agreement will be reached on the platforms and centers to be selected and settings under which imagery is to be collected.

Goal 1

Measure nodule volume on CT imagery collected from several CT scanners/sites (including single scanners with varying settings). Determine the systems to be used and the system settings to be varied.

(a) kVp constant. – follow up w med. phys.
(b) mAs constant. - follow up w med. phys.
(c) collimation fixed (+)
(d) field of view (rib-to-rib == closest possible view)
(e) reconstruction filters – follow-up with radiologists (Dr. Hayes) to find "equivalent" filters

Site selection – poll the team. Scanners follow sites.

- Field of View (FOV)
    - Not a core part of study but a side line - not known whether FOV is a contributor to variance
    - Scale for translation into clinical practice; workflow may be too difficult
    - Is FOV always bilateral?
        - May want larger FOV than "rib-to-rib" for metastases to scapula, etc.
        - Technologists' terminology may provide better wording, e.g. "skin-to-skin"
    - Working with phantoms, is it possible to do both larger and smaller FOV?
    - Reserve this issue for smallest detectable change, e.g. if using narrow FOV, use two different lesions in two different locations
    - Trial sites for Merck routinely use a 55cm FOV
    - Within a range, variance will be very low

- Could move targeted reconstruction; Dr. Petrick has data from three different scanners
- FDA data will not be useful; all acquisition is new
- Shuttling the phantom between sites will show operating conditions across sites
- NLST experiments tried to make scanners look similar but experiment was hurried
    - Can this experiment be used to explore more?
- Recommended article: need citation: Doss, *Neuroradiology* 2007

Goal 2
Compare the accuracy and precision of measurements for these phantom datasets.

(a) RECIST vs. volume change
(b) Investigate variance & bias
(c) inter-system variation
(d) intra-system variation

Goal 3
Skipped for this discussion

Goal 4
Determine the minimum detectable level of change that can be achieved when measuring nodules in phantom datasets?

- If we want to directly measure level of change: bias errors associated with volume measurements may be larger than change data (lower level of variations)
- Try simple solution? Populate the FDA lung phantom with nodules of graded size so there is small change present for reading of nodules of similar but not identical size
    - Focus on nodules $\leq$ 3mm
    - Possible to tie nodules into phantom with surgical suture line - difficult process
    - A variety of nodule sizes would be useful in estimating a high confidence of volume change

Next Steps

- Material will be uploaded to Wiki to facilitate short discussion on DICOM format (Mr. O'Donnell)
- Agenda for Feb. 23 call: updates to Profile on Wiki
    - 1. Claims: pulling information from imaging manuals
    - 2. Details: request that hardware and software vendors weigh in
- Ad hoc group of Dr. Mozley, Dr. Hayes, Mr. Avila, Dr. Mulshine, Ms. Shah, Mr. Licato, Dr. Gustafson, Dr. Hilaire, Mr. O'Donnell will spearhead preparation for the discussion
- Next call: February 23, 2009, 11am CST (No call on Monday, Feb. 16, Presidents' Day)