QIBA Volumetric CT Group 1C Update WebEx
Cross-Platform / Inter-Clinical Study

Wednesday, March 4, 2009
11:00 AM CST

Draft Call Summary

In attendance:

Charles Fenimore, PhD (Moderator)
Andrew Buckler, MS
John Lu, PhD
Michael McNitt-Gray, PhD
Daniel C. Sullivan, MD

RSNA staff
Fiona Miller
Susan Anderson
Joe Koudelik

General Discussion

Dr. McNitt-Gray provided an overview of his slides concerning the water phantom scan experiments performed at UCLA

- 2 recon filters used which increased the standard deviation (SD) significantly
- Standard recon filter (at 40 mAs) and bone filter (at 640 mAs) showed same SD results
    - The SD tells much information, but not everything
        - E.g. Spatial frequency content differences not taken into account
- Noise metrics vary with certain settings
- Objects in different noise backgrounds with the same SD may show different noise characterization
    - This noise character may hinder our ability to image the object
- Algorithms affect both noise and spatial resolution
    - This affects the ability to visualize anatomy
- Slice thickness changes affect noise magnitude, not character
- Need to measure changes in patients due to recon algorithms
- ACR Line Pair Phantom overviewed
- 4 lines/cm. 5mm thick, 20mm deep line pairs
- Subjectively assessed; not overly quantitative
- Modulation Transfer Function (MTF) - ability to resolve lost and higher spatial frequencies
    - 10% MTF pushes spatial freq to the right depending on the recon filter
- Quantitation of the MTF is possible
- 10% MTF spatial frequency may be similar at high frequencies, but lower spatial frequencies vary dramatically
- 10% as a single number metric proposed
- Noise metrics
    - Concentration of noise push-out at higher spatial frequencies, i.e. fine grain noise images
    - Resolution and noise concentrated in lower frequencies
    - Spatial frequency content of noise changes, not magnitude of noise
    - This results in more noise at higher spatial frequencies
- RECIST - what is it trying to measure?

    - What is this group's volumetric claim contribution? How do we substantiate this claim?
- Groundwork needed for QIBA VolCT Groups 1A, 1B, 1C
    - Experimental groundwork
    - Analytical groundwork
        - Factors influencing variability
        - All influencing factors must be understood and addressed in the protocol design
- Need to incorporate simple measurements between scanners and sites to measure possible sources of variation
- NLST operating/scanning parameters could be a proxy for physical performance
- Performance metrics like simple spatial resolution and noise metrics are achievable now
- Prescriptive approach
- Scanner sites must be able to perform/abide by specific settings and parameters
- Need buy-in by all stakeholders, including manufacturers, pharmaceutical companies, technologists, academia, etc.

Next Steps

- Drs Fenimore and McNitt-Gray to compile a "candidate specifications" list and ask physicians and medical physicists for input based on clinical trial use
- Design details are the next step
- Dr Fenimore to draft a strawman for group feedback
- Organize QIBA Wiki based on thoughts, i.e. creating and structuring content
    - Format should apply to the clinical research community (a broader audience)
    - IHE model may not meet all our needs
        - Wording choices, details, specifications
- Next call: March 18, 2009, 12 Noon EST