QIBA Q-CT Committee Weekly Update
Monday, August 30, 2010
11 AM CDT

Call Summary

In Attendance
Andrew Buckler, MS (co-chair)
P. David Mozley, MD (co-chair)
Lawrence Schwartz, MD (co-chair)
Maria Athelogou, MD
Patricia E. Cole, PhD, MD
Charles Fenimore, PhD
Kavita Garg, MD
Philip Judy, PhD
Hyun Grace Kim, PhD
James Mulshine, MD
Daniel R. Nicolson
Kevin O'Donnell
Nicholas Petrick, PhD
Daniel Sullivan, MD
Ying Tang, PhD
Hiro Yoshida, PhD
Binsheng Zhao, DSc

RSNA
Fiona Miller
Joe Koudelik

QIBA Q-CT Group 3A Study Overview (Dr Athelogou)

- Study to tie meta-analysis of multiple phantom studies together while also expanding to multiple algorithms
- Characterize algorithms for accuracy based on known ground truth (ie, phantom data) for hardware and software; similar to 1A goals but based on clinical data
- Literature search of volumetric studies based on lung CT phantoms provides some groundwork
- FDA phantom CT database is a central resource; very useful paper published by Mario Gavrielides http://spie.org/app/sitesearch/index.cfm?searchtext=phantom%20lung%20CT&section=publications
- Much data exists, but a systematic approach to evaluation of lesion volumes is needed
- Need standards workflow or procedure for algorithm analysis based on metrics in-hand

Absolute volumes vs. change classification

- Same phantoms may not be useful for both characterizations
- Differences of measurements methods possible with phantom image data as a start to achieve "Gold Standard" first
- Need to define methods/procedures for "knowledge extractions" from such studies; use data to support some simple standardization first steps
- Literature extractions are the first step; need to determine what data/knowledge is already available
- Additional discussion needed concerning volume change metrics in phantom data
- Comparing phantom data to clinical data will prove challenging

Accuracy and Repeatability

- Phantom work needed to characterize vCT as accurate in respect to target volume
- Change analysis may not be suited for phantom studies, more clinical data needed
- Accuracy and repeatability are goals
- Characterization of accuracy of phantom is valuable (single center and algorithm), but 1C will broaden scope to include multiple-site conditions
- Systemic evaluation of error measurements needed by using image analysis algorithms
- Expert readers annotating same images may be able to quantify change in humans, algorithms, criteria for volume change
- 1st step proposed is to calculate image analysis algorithm error
- FDA currently possesses valuable phantom data with known truths; no new imagine acquisitions needed; use existing FDA datasets proposed
- Run algorithms "in-batch" across three different subsets of data based on performance characterizations, i.e. Acceptable, Target, Ideal

How Data is to be Used

- "Baskets" of data to be run with multiple algorithms; as many baskets as team deems necessary
- 3A + 3B comprise full data package to qualify vCT as biomarker presenting itself as an authoritative dataset for implementation of hardware and software compliance
- Qualification and workflow process need to line-up

Q-CT Group 3A Calls to Proceed

- 3A subcommittee calls to proceed; Dr Athelogou to lead this effort
- Develop process for "Next Steps" and establish membership
- Drs Athelogou, Colditz, Kim, Petrick, Fenimore, Zhao, John Boone, Buckler, Gustafson, Robert Schwanke, Matthias Thorn, Rick Avila and Ying Tang

Formation of 3B Group

- As part of tractable plan, use existing data tied to clinical outcomes to tie changes in volume to changes in health status
- Drs. Mozley and Schwartz to solicit people to proceed

Q-CT Profile Writing Group

- Profile construction requires subspecialty of experts with technical input from modality experts
- Feedback needed to identify modality experts

Next Steps:

- Briefing Document segments need to converge
- Tractable Plan needed to move forward
- Statistical approach needed for phantom studies 1A, 1C and 3A
- Next call scheduled for Sept 13, 2010 at 11 am CDT