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
- 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