QIBA Volumetric CT Group 1C Update WebEx
Cross-Platform Study (Group 1C)

Tuesday, February 3, 2009
1:00 pm CST

Draft Call Summary

In attendance:

Charles Fenimore, PhD (Moderator)	**RSNA staff**
Andrew Buckler, MS	Fiona Miller
Robert Ford, MD	Susan Anderson
Daniel Sullivan, MD	Mary Cerceo

Introduction (Dr. Fenimore)

- Charges to the Subcommittee include:
  - To agree on selection of the platforms and centers and the settings under which imagery is to be collected.
  - To agree on requirements of phantom to be imaged/measured.
  - To identify the measurements and the algorithms for use in image processing.
  - To specify the analysis of the measurements.
- The anticipated main variations will be across scanners, within scanners and across centers.
- Other groups have done similar projects
  - Dr. Fenimore will post article from *Neuroradiology* cross-platform study by Doss and cross-algorithm study on Wiki

Goals

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.

  - Site selection will dictate systems: are there offers of sites?
  - Poll the team: is the sample conducive to our characterization?

- **kVp constant. – follow up w med. phys.**
- **mAs constant. - follow up w med. phys.**
  - kVp may vary between systems despite our specifications; suggest keeping constant
  - mAs setting should be specified as constant although clinical context may alter setting, e.g. screening study
  - Dr. Fenimore will consult with medical physicist on kVp and mAs specifications and the hierarchy for maximum effect
  - possibly specify two values to retrieve maximum data?
- **collimation fixed (+)**
  - Collimation; there has been discussion related to fan beam but will make a decision at a later point
- **field of view (rib-to-rib = closest possible view)**
  - General rule for FOV is “closest possible view for body part”; rib-to-rib is good specification for chest

- **reconstruction filters – follow-up Dr. Hayes & radiologists**
    - Filters are named differently and differ by machine and manufacturer, e.g. detailed filter, lung filter, lung detail, high-resolution filter
    - No specs published for most filters
    - How will filters change accuracy, e.g. 1% or 20%?
    - Is filter variation significant or perceived? ~impact on accuracy needs to be known
    - Find "equivalent" filters
- Goal 1: results won't tell us about Goal 2

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

- **RECIST change vs. volume change**
- **Investigate variance & bias.**
- **Both inter- and intra-system variation**
    - RadPharm will provide mark-up
- Goal 2: if predetermined amount of change is built in, possible to determine ground truth
- Goals 2 and 4 are closely related

3. To identify the measurements and the algorithms for use in image processing. Measure volume: multiple algorithms? (Syngo? Open-source lesion sizing toolkit?)

Measure "image noise" and determine its impact on the measurement of volume. Report the image mask for each segmentation and use it in analyzing the image noise.

- Expert visual assessment of image quality. (work with Dr. Aberle)
- Will have RECIST reading as well as mark-up data
- Mr. Avila suggests that with proper phantom record, it is possible to extract point spread function for use in algorithm
- Greater group participation needed ~ solicit participation on 2/9 Vol-CT conference call

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

- Goal 4 important; volume change measurements may be better than volume measurements

Existing Resources

- RadPharm
- What mark-up is recommended?

Next Steps

- Continue to refine questions and experimental design (similar to 1A and 1B)
- Dr. Fenimore will contact radiologists (Dr. Hayes) and medical physicists (Dr. McNitt-Gray)
- Next call Wednesday Feb. 18, 11:10 am CST