QIBA VOL-CT Weekly Update WebEx
Monday, January 26, 2009, 11am CST

Call Summary

In attendance:
Andrew Buckler, MS (Co-Chair)        Kevin O’Donnell
P. David Mozley, MD (Co-Chair)       Nicholas Petrick, PhD
Lawrence Schwartz, MD (Co-Chair)     Daniel Sullivan, MD
Harris Ahmad, MD                     Hiro Yoshida, PhD
Alaaddin Akkaya, MD                  RSNA staff
Rick Avila, MS                       Fiona Miller
Robert Ford, MD                      Joe Koudelik
David Gustafson, PhD                 Susan Anderson
Michael McNitt-Gray, PhD             RSNA staff
James Mulshine, MD                   Fiona Miller

Agenda (Mr. Buckler)
• Discussion of Kitware Lesion Sizing Toolkit (Mr. Avila)
• Claims language and details (Drs. Mozley and Mulshine)
• Wiki updates
• Group reports

QIBA structure (Dr. Sullivan, Mr. Buckler)
• Mr. Buckler has left Philips but will stay involved with QIBA efforts
• QIBA membership and representation is in flux; when QIBA was started, representation from three companies was aligned with the three biomarkers
• QIBA structure is also in flux; may consider other biomarkers either within existing committees or in new structure of umbrella modality committees
• QIBA Steering Committee will address future structure and membership

Lesion Sizing Toolkit (Mr. Avila)
http://public.kitware.com/LesionSizingKit/index.php/Main_Page
• The goals are:
  o (1) To develop an open source and general framework for implementing lesion segmentation algorithms
  o (2) To provide reference methods and an application for CT lung lesion segmentation
• Emphasis is on volumetric segmentation methods using a model-based approach adaptable to different scanners/scanners/protocols
• Will be added to the Insight Segmentation and Registration Toolkit (http://www.itk.org)
• Has a BSD License
• The open source architecture provides a highly extensible framework designed to support rapid algorithm development and evaluation
• The extensible framework allows components to be replaced or replugged
• ITK has additional info on the Feature Generator or Segmentation Module
• Initial performance on FDA solid spherical lesion was good with a % Volume Error of -4%; results will improve when sub-voxel edge detection is added
• Edge detector is being modified for part solid lesions
• Working towards data sets for multiple density lesions; Dr. Petrick has a case with a large air pocket in center
  • The NIST pocket phantom, with a range of spherical pieces inside allows measurement of a large number of objects with one data set
    o Results with NIST pocket phantom will improve when sub-voxel edge detection is added
  • Next steps for development of the Lesion Sizing Toolkit include:
    o Adding sub-voxel edge detection to decrease percentage error
    o Running against a large number of phantom and clinical datasets
    o Refining methods
    o Improved acquisition/protocol modeling
    o Better differential operators
    o Community comments/feedback
      ▪ Feature aggregator may need additional description
  • The components are well-described in the documentation; Mr. Avila encourages questions and comments from the committee.
  • QIBA relevance: Toolkit can be used to better understand the performance of a range of algorithms, including tradeoffs such as resolution and other scanner parameters
    o Can be used to run QIBA analyses
      ▪ Using current set of reference methods
      ▪ Using contributed methods

Comments on Lesion Sizing Toolkit
• 1A (Dr. Petrick): may not be applicable in this first stage of readers because of timing but excellent option for readers in addition to Siemens options
• 1B (Dr. McNitt-Gray): could possibly use this as a reference method or benchmark
• 1C: could collect as characterization of algorithm
  | Dr. Mozley: We could provide this software to CRO for head-to-head comparison with the software Merck generally provides and create a mechanism to verify individual reports on variance, etc.
• Efforts are similar to standardizing radioimmunoassays in England 20 years ago; this provides a way to communicate performance compared to benchmark
• Use QIBA as an archivist of metrics and repository of test cases?
• The Optical Society of America (OSA) is partnering with the National Library of Medicine on the Interactive Science Publishing initiative (ISP).
  o ISP software program provides publishing software and viewing and analysis tools for integrating very large data sets published in conjunction with a traditional text-based journal article.
• OSA collaborated with Kitware Inc, a supplier of open source imaging software, to develop ISP software.
Review of Wiki activity

- Graphic demonstrating a flow which represents the structure of the QIBA effort as well as the resulting output of flow inserted at top of page
- Dr. Mozley's claims are posted with numbers inserted to garner refinements from group
  - Need a description of a more rigorous and scientific way to arrive at numbers
- Dr. Mulshine's clinical description will be useful for evaluating claims within a clinical scenario

Next Steps

- Committee to review Wiki materials, comment or refine
- Group 2 will update the profile strategy section of the Wiki with the content of the paper that Dr. Mulshine has distributed
- Next call: February 2, 2009, 11am CST