QIBA Ultrasound Shear Wave Speed (SWS): System Dependencies Subcommittee

Friday, August 10, 2012; 11 AM CT

Dr. Palmeri's Call Summary

In attendance		RSNA
Mark Palmeri, MD, PhD (Co-Chair)	Andy Milkowski, MS	Fiona Miller
Keith Wear, PhD (Co-Chair)	Kathy Nightingale, PhD	Joe Koudelik
Paul L. Carson, PhD	Nicolas Rognin, MSc, PhD	Julie Lisiecki
Brian Garra, MD	Daniel C. Sullivan, MD	
Stephen McAleavey, PhD	Ron Tosh, PhD	

Agenda / Call Summary for QIBA System Dependencies Telecon (2012-08-10)

Moderators: Mark Palmeri & Keith Wear

*Items in **blue** indicate notes taken during the call. Items in **green** were on the original agenda, but not discussed due to time limitations.*

- Review of last telecon summary
  - Can submitted manufacturer methodology documents be posted for public access to the wiki?
    - ■qEI - ok [Andy M.]
    - ■FibroScan - ?
    - ■SSI - ?
  - Represented systems:
    - ■FibroScan
    - ■SSI
    - ■qEI
    - ■Others?
      - Philips? - Roy Peterson (hx w/ static elastography); Hua X.; Steve Metz
      - GE? - Kai T.?
      - Toshiba - nothing available yet; may be provided in the future
      - Research?
        - Crawling wave (Parker)
        - SDUV (Chen)
- Literature Database Overview
  - 34 members
  - 189 papers
  - ~75% tagged
  - Minimal Data Mining
  - Proposed Parameters to Mine:
    - ■System
    - ■Manufacturer Recommended Procedure
      - Number of repeated measures
      - Mean / median / outlier removal
      - Include software version
    - ■Patient Population
      - Demographics
      - BMI
      - Age
      - Disease(s)
      - Clinical subcommittee input!!

- ■Imaging Target / Locations
- ■Final Metrics
    - Report native measure (SWS, shear modulus, Young's modulus) relative to disease state
    - Also convert to SWS if known material assumptions
- ■Estimated time:
    - Each manuscript: 15 min
    - Total time: 47 hours (HELP!!)
        - Alphabetical parsing by group members
        - No more than 5 papers per member
        - Mark will distribute tasks based on active users on calls and Mendeley, and will extend this to the clinical subcommittee

- ○ Outcomes
    - ■Establish range of values each system is currently experiencing
    - ■Evaluate reported precision relative to this range
        - Current systems may not have rigorous criteria for stated precision [ANDY M.]
        - Differences with how Doppler data are presented [BRIAN G. and KATHY N.]
            - Images of quantitative information versus a stated quantitative metric
            - What about choosing a pixel from a quantitative image?
        - Establish criteria for reporting error bars and how the end-user should interpret these error bars
        - Restrict to "stable" environment versus establishing them in the clinical environment, where, for example, probe pressure on the skin is known to be a significant confounder. [ANDY M.]
            - Clinical subcommittee to come up with recommendation about minimizing these clinical confounders
    - ■Identify confounders that could be reduced / optimized / controlled to reduce this variability

- Identifying most relevant confounding variables
    - ○ Andy Milkowski spreadsheet template
    - ○ Determine first-pass parameters to include
        - ■How do we resolve parameters that are not ubiquitous between systems
        - ■Variables that are necessary to change from the manufacturer perspective
        - ■Populate with "complete" list... then narrow down based on what needs to be modified and then quantify the impact of those restricted parameters
        - ■Mark will solicit these parameters from the manufacturer contacts
        - ■Chat notes from Paul
            - Mechanical shear wave generator variables?
            - Plunger/vibrator diameter(s) / ARF excitation geometry
            - Amplitude
            - Frequency
            - Waveform
                - Shape
                - Duration
            - Placement(s)
            - Depth range of analysis
        - ■Chat notes from Nicolas Rognin (Toshiba)
            - Acoustic pressure at the focus point (e.g., Isppa0.3 / Ispta0.3)
    - ○ System-provided ranges for these parameters
    - ○ Populate data using simulated and experimental phantom data
        - ■Phantom subcommittee addressing the experimental arm of this effort
        - ■Simulation data for ARFI imaging can / will be made available; should be available for other systems?

- Elastic simulations are “easy” to modulate parameters
- VE models are material-model dependent (e.g., Voigt, 3-parameter, etc.)
    - How can this space be constrained?
    - Are all of the elastic parameters also tested in the VE space?
- We ran out of time to discuss this in depth, but got the ball rolling on thinking about how to do this in a timely manner since there will be a lag on phantoms being available for experimental analysis.

■Who performs the analysis for each system in simulation?

- Outcomes
    - ■Prioritized list of confounding system-dependent variables
    - ■Focus efforts of each system to reduce these confounders to standardize a reported value

Next steps:

- Group system representatives to send database entries to Dr. Palmeri mark.palmeri@duke.edu or Dr. Wear Keith.Wear@fda.hhs.gov, and address whether or not wiki posting is permissible.
- Volunteers willing to assist with tagging to contact mark.palmeri@duke.edu

Next calls with moderators:

- QIBA US SWS Technical Committee - **Friday, August 24, 2012 at 11:00 AM CT** (Dr. Hall)
- Phantom Subcommittee - **Monday, August 27, 2012 at 1:00 PM CT** (Drs. Hall and Garra)
- System Dependencies Subcommittee - **Friday, August 31, 2012 at 11:00 AM CT** (Dr. Wear)
- Clinical Applications Subcommittee - **Monday, September 10, 2012 at 1:00 PM CT** (Mr. Cohen-Bacrie, proposed moderator)

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