

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

Friday, May 17, 2013; 11 AM CT

Call Summary

Notes provided by Drs. Palmeri and Wear

In attendance

Mark Palmeri, MD, PhD (Co-Chair)

Keith Wear, PhD (Co-Chair)

Paul L. Carson, PhD

Shigao Chen, PhD

Claude Cohen-Bacrie, MS

Liexiang Fan, PhD

Brian Garra, MD

Ted Lynch, PhD

Stephen McAleavey, PhD

Michael MacDonald, PhD

Andy Milkowski, MS

Thomas Nelson, PhD

Kathy Nightingale, PhD

Daniel C. Sullivan, MD

Hua Xie, PhD

RSNA

Joe Koudelik

Julie Lisiecki

Moderator: Mark Palmeri, MD, PhD

- Approved pre-circulated call summary from previous subcommittee meeting
- Kathy, Brian and Andy provided a brief overview of the QIBA meeting in Washington DC earlier this week. Some notes...
 - We collectively need help with all of the phantom analysis. There may be interns available for help at the FDA this summer. Any subcommittee volunteers would be welcome!
 - Development of dispersive phantoms being actively discussed. These are more difficult to fabricate, so it may necessitate only ~4 phantoms being fabricated and then being circulated to different sites.
 - QIBA has an objective of recommending a "standardized phantom"; that is still a work-in-progress.
- Duke measurements of all QIBA phantoms (Kathy)
 - Presented methodology used for all phantom measurements (separate slides)
 - Presented absolute shear wave speed (SWS) values across all of the phantoms
 - Presented absolute SWS values as a function of depth
 - At depth = 6 cm, SWS were ~0.9 and 2 m/s for the soft and stiff phantoms, respectively.
 - Phantom-to-phantom variability was +/- 5%
 - Shallower locations were stiffer (electronically focused)
 - Repeated measurements with translation of the transducer away from the phantom with a water path to maintain the same elevation focus at each position, and the same depth dependence was seen in the data.
- Shigao presented on phantom study comparing curvilinear and linear array SWS measurements in phantoms
 - Trends with depth when using curvilinear arrays
 - No trends with linear arrays
- **What is "good enough" consistency between measurements systems? When are these system differences small enough that other things like biological variability, etc. will "clearly" dominate?**
- Mark commented that simulation data of curvilinear arrays have not shown such depth dependencies.
- Andy presented on multi-site phantom study; too much data to do justice to with text!
 - Appraiser not a factor in analysis; relatively insensitive to that
- Data from Philips not included in current analysis since data were reported as Young's moduli, not SWS
- Depth dependency consistently present in data from different sites and systems
 - SSI data precision limited to 0.1 m/s, so tough to see some of the trends present in the Siemens and research site data
 - SSI values were higher than the other systems on the soft phantom; reversed trend for the stiffer phantom
- All data will be shared with participating labs, along with mechanical testing data from UWM and Rheolution
- New experiments moving forward to tease apart depth dependencies:
 - Image phantom from the side?

- Couple with an alcohol & water solution to get closer in sound speed.
- **Please chime in on other potential experiments to do in the near future!!**
- **Drs. Palmeri and Wear will be following up with more emails before the next schedule telecon to solicit more data / analysis.**

Next QIBA US SWS calls:

- QIBA US SWS Technical Committee, **6/07/2013**, Friday, 11 am CT (Mr. Milkowski)
- QIBA US SWS Phantom Subcommittee, **6/10/2013**, Monday, 1 pm CT (Dr. Hall)
- QIBA US SWS System Dependencies Subcommittee, **6/14/2013**, Friday, 11 am CT (Dr. Wear)
- QIBA US SWS Clinical Applications & Biological Targets Subcommittee, **6/17/2013**, Monday, 1 pm CT (Dr. Samir)

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Slide Presentations are posted to the wiki:

- 1) [QIBA phantom1 study results v2 \(slides 1-12\)](#)
- 2) [More on all QIBA phantoms \(slides 1 -3 \)](#)
- 3) [Depth Dependent Measurements Observed in Phantoms, S. Chen \(slides 1 -6\)](#)