

**QIBA Ultrasound Shear Wave Speed (SWS):  
System Dependencies Task Force**

Friday, April 01, 2016; 11 AM CT

*Notes provided by Dr. Wear*

**In attendance**

Keith Wear, PhD (Co-Chair)  
S. Kaisar Alam, PhD  
Paul Carson, PhD  
Jun Chen, PhD  
Shigao Chen, PhD  
Mathieu Couade, PhD

Al Gee  
Gilles Guenette, RDMS, RDCS, RVT  
Tim Hall, PhD  
Andy Milkowski, MS  
Kathy Nightingale, PhD

Nancy Obuchowski, PhD  
Stephen Rosenzweig, PhD  
Theresa Tuthill, PhD  
Matthew Urban, PhD  
Michael Wang, PhD

**RSNA**

Julie Lisiecki

**Moderator:** Dr. Wear

1. Review of Previous SWS System Dependencies Task Force Meeting Minutes – Minutes approved.
2. We are trying to get consistent group velocity measurements from different systems. For example, one confounder is the difference between measurements from displacement fields as opposed to velocity fields. In CIRS phantoms, SWS using velocity data was  $22 \pm 12\%$  higher than SWS using displacement data (Duke data). This could be a reason for bimodal distribution on violin plots for soft phantom.

There is a basic problem in estimating SWS bias. There is current inability to state “ground truth” in the stiffness range corresponding to SWS of 1-4 m/s. We lack a standard by which we can make comparisons with an independently characterized material.

IDEA: We could use MRE at, say, 180 Hz, as a “reference standard for ultrasound.” Dr. Milkowski had the idea that we could compare ultrasound measurements to SWS measurements made with MRE in the appropriate frequency range (e.g. 160 Hz). We aren’t saying it is the “correct” property value, but it is a value to compare to. QIBA doesn’t “care” about how an ultrasound manufacturer obtains that result, only that they agree with that number. It is not an endorsement of clinical MRE. We could perform a comparison among MRE sites on the same phantom to determine if the MRE systems all obtain the same results.

How many MRE sites have the ability to adjust the frequency range? Jun Chen says that a separate standalone amplifier would be required to go from the standard MRE frequency (e.g. 60 Hz) to a new frequency (e.g. 160 Hz). This could be an expensive approach. However, phantoms could be sent to Mayo Clinic for calibration. If Mayo could agree to calibrate phantoms at a reasonable price, this approach could work. Jun Chen will look into this.

Phantoms could be calibrated at 2 points, say approximately 60 Hz (standard Fibroscan/MRE frequency) and approximately 160 Hz (typical ultrasound frequency).

This should be done with a set of phantoms that cover the range of stiffness/viscosity of liver rather than a single phantom. The current CIRS phantoms have SWS values near 2, 2.5, and 3 m/s. There is interest in getting a phantom with lower SWS (~1.5 m/s).

We might need a second MRE site besides Mayo to do reproducibility studies. The site would have to have the capability to do a nonstandard MRE frequency (e.g. 60 Hz). Jun Chen will look into how to achieve this. A special driver and amplifier would be required.

The group was generally in favor of this idea. There were no objections.

3. Round 6 Proposal for Simulation Study: Exploration of Bias in Viscoelastic Media. How do we examine bias in viscoelastic media? Matt Urban proposes to use simulation to explore the following:

Parameter space:

Motion used: displacement vs. velocity

Method of speed estimation (TTP vs. correlation vs. correlation in 2D)

Characteristics of pushes (peak frequency, center frequency, bandwidth)

Approaches to consider to stabilize:

- filter data for consistent frequency content,
- always use speed measurements at set frequency

Translation of results from US SWE to MRE or TE (model fitting, filtering)

Deliverable: Tool to analyze motion

It was suggested that it would be a good idea would be to emphasize the cross-modality (MRE, ultrasound) value of this proposal.

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**Upcoming WebEx Calls & Meetings (Fridays, 11 am CT):**

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- Apr 08: Clinical Task Force
  - Apr 15: QIBA US CEUS Task Force, Leadership Planning Call
  - Apr 22: US SWS BC
  - Apr 29: No call
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