QIBA Ultrasound Shear Wave Speed (SWS) Combined Call:
System Dependencies *and* Phantom-System Measurement Testing Subcommittees
Friday, July 11, 2014; 11 AM CT
Call Summary
Notes provided by Dr. Wear

In attendance

Mark Palmeri, MD, PhD (Co-Chair)
Keith Wear, PhD (Co-Chair)
S. Kaisar Alam, PhD
Michael André, PhD
Jun Chen, PhD
Steven Fick, PhD
Christopher Hazard, PhD
Ted Lynch, PhD
Stephen McAleavey, PhD
Yasuo Miyajima, MS
Kathy Nightingale, PhD
Nancy Obuchowski, PhD
Nicolas Rognin, MSc, PhD
Ned Rouze, PhD
Vijay Shamdasani, PhD
Daniel Sullivan, MD
Matthew Urban, PhD

RSNA
Julie Lisiecki
Madeleine McCoy

Moderator: Keith Wear, PhD

1. **Recent results from Duke on Phase II phantom measurements**

The Duke group presented values of shear wave velocity at 200 Hz, c(200 Hz) in m/s, and dispersion, dc/df in m/skHz, for 6 phantoms that have been developed in search of good recipe for the Phase II phantom inter-laboratory comparison study. The phantoms are made by Ted Lynch of CIRS and are labeled E2250-X where X = 1, 2, 3, 4, 5, or 6. The Duke group plotted dc/df vs c(200 Hz) for all 6 phantoms. The six data points were superimposed on measurements of dc/df and c(200 Hz) in 107 patients.

	c(200 Hz) (m/s)	dc/df (m/skHz)	Attenuation Slope (dB/cmMHz)
Phantom E2250-1	**2.1**	**7.5**	
Phantom E2250-2	**1.8**	**5.8**	
Phantom E2250-3	**3.4**	**6.0**	**0.59**
Phantom E2250-4	**2.9**	**4.2**	
Phantom E2250-5	**2.8**	**4.0**	**0.34**
Phantom E2250-6	**2.6**	**4.2**	
Mean values in 107 livers	**2.5**	**6**	**0.5?**

All values are approximate.

Samples 1 and 2 are too soft and are probably not appropriate for this study. Sample 3 is the stiffest. Samples 3-6 seem potentially appropriate for the study. Ted Lynch remarked that viscosity is not independent of attenuation. Samples 4-6 had a reasonable attenuation and were near the border line between Metavir F2 and F3.

Ted Lynch remarked that the attenuation was nonlinear and that the quoted slope values were linearizations (with frequency) across a frequency band. Measurements were made from 2 to 5.5 MHz, which is reasonable for clinical scans of liver.

Higher attenuation leads to lower SNR.

It was decided that phantoms 3 and 5 might be a good pair to distribute. It would be nice to generate another phantom near c(200 Hz) = 2 m/s and dc/df = 2 m/skHz. Ted Lynch said that such a phantom would be feasible

Plan: Make 3 phantoms:

1. One phantom similar to 1 and 2 in c(200 Hz) but with lower dc/df (normal liver)
2. One phantom like 4-6 (borderline F2/F3)
3. One phantom like 3 (more advanced fibrosis)

Ted will make 3 sets of 3 phantoms to distribute to 2-3 initial test sites (Duke, Mayo, plus one more – e.g., Rochester or SSI). The sub sites might exchange phantoms and repeat measurements to look for sample differences. These

phantoms will be too small for clinical ultrasound and MRE systems. They will just be for the purpose of validating and refining the recipes.

Mark will follow up with SSI to gauge their interest in participating in this phantom test.

Remaining July Call:

- Friday, **July 18, 2014**: US SWS Technical Committee Call – Dr. Hall
- Friday, **July 25, 2014**: Clinical SC – Dr. Samir – ***call cancelled*** – next call will be **August 8th**

Conferences for Ultrasound on QIBA Wiki