

**QIBA Ultrasound Shear Wave Speed (SWS):
System Dependencies and Phantom-System Measurement Testing Task Force**

Friday, February 6, 2015; 11 AM CT

Call Summary

Notes provided by Dr. Wear

In attendance

Keith Wear, PhD (Co-Chair)

Mark Palmeri, MD, PhD (Co-Chair)

S. Kaiser Alam, PhD

Paul Carson, PhD

Jun Chen, PhD

Shigao Chen, PhD

Brian Garra, MD

Timothy J. Hall, PhD

Christopher Hazard, PhD

Ted Lynch, PhD

Mike MacDonald, PhD

Stephen McAleavey, PhD

Andy Milkowski, MS

Yasuo Miyajima, MS

Kathy Nightingale, PhD

Stephen Rosenzweig, PhD

Daniel Sullivan, MD

Matthew Urban, PhD

Michael Wang, PhD, MASC

Hua Xie, PhD

RSNA

Joe Koudelik

Julie Lisiecki

Moderator: Keith Wear

1. Review and approval of Call Summary of previous meeting.
2. Spreadsheet for Phase II phantom study (Palmeri). Mark Palmeri updated the spreadsheet to include a place to record temperature, in case there is a temperature dependence of SWS (as Kevin Parker's group has observed in bovine liver). He also added ROI height and ROI width/diameter. He acknowledged that some sites have already performed measurements (without necessarily recording temperature) so we might have to live with incomplete information. Data spreadsheets will be uploaded to a common site. Mark will send the latest version of the spreadsheet to Julie so that she can distribute it to all participating labs.
3. Temperature Dependence of SWS in Phase I & II phantoms (Hall). Tim Hall suggested that U. Wisconsin could investigate the temperature dependence of phantom materials in a temperature-controlled bath to see if SWS varies significantly with temperature. Ted Lynch (CIRS) said "For a first pass, I think one Phase I phantom and the most dispersive Phase II phantom would be okay. If we see significant differences in the temperature dependence in those two, we may want to perform additional measurements on the other Phase II phantoms. I am thinking that the most likely source of variation will be in oil concentration, so if those two have similar behavior there is no need to do more measurements. But if the behavior is different you may want to look at more phantoms to get a better understanding of how the temperature dependence changes in each phantom." U. Wisconsin currently has Phase I phantoms and Phase II Set #1 phantoms. Tim proposed measuring over the range from 66 to 76 degrees F. Paul Carson suggested increasing the upper limit from 76 to 80.

Tim suggested the phantoms in Phase II study should be stored in the room where measurements will be made over night. The phantoms should not be stored near a heat or A/C source. Labs should record ambient temperature. It is difficult to control temperature. So labs will just record temperature, not control it.

4. Industry FEM Elastic Simulation Parameters (Palmeri). Mark Palmeri posted a proposed set of parameters (probe and ARFI excitation parameters, acoustic attenuation, elastic parameters, etc.) for FEM elastic simulations on GoogleDocs.
https://docs.google.com/document/d/1JruRIwKpe0U9cRxIHmTmmTR98Y_3oeT3i99ouEPov6w/edit?usp=sharing
. Grid spacing was decided to be 0.1 mm. Lateral Extent was decided to be 15 mm (one sided). Temporal spacing was decided to be 0.1 msec. Imaging plane displacement will be provided (not full 3D dataset). Radius of curvature = 60 mm. Element Height = 14 mm. Center Frequency = 3 MHz. Fractional bandwidth = 100%. F# = 2. #cycles = 500, 1000. Focal depths = 30, 50, 70 mm. Attenuation = 0.45 dB/cmMHz (linear). Poisson ratio = 0.499. Shear modulus = 1, 2, 5, 10 kPa. Future efforts will consider viscoelastic materials. Units will be MKS. Format will be MATLAB.

5. Update on progress of Phase II Phantom measurements. Yasuo Miyajima from reported that Toshiba received the second set of Phase II phantoms on Wednesday, Feb. 4. Visually, they looked fine to him. The weights seemed fine (E2438-1:1,299.82g -> 1.30kg; E2438-2:1,298.83g -> 1.30kg; E2438-3:1,324.00g -> 1.32kg). Yasuo remarked that deepest measurement (7 cm) is difficult and unstable, depending on orientation of transducer. However, 3 and 4.5 cm depths are easy and reproducible. Ted Lynch believes that the attenuation was not significantly higher than 0.5 dB/cmMHz, but the attenuation was nonlinear, so penetration depth could vary with frequency band of ARFI pulse. Paul Carson remarked that a modest angulation of the transducer could minimize artifacts due to reflections from bottom. Yasuo remarked that too much angulation produces interference from side walls.

Toshiba is very busy right now and may not be able to perform measurements soon. Therefore, Toshiba will ship phantoms to Mayo next Wednesday. Phantoms will be sent back to Toshiba later in the study so that Toshiba can complete measurements.

Tim Hall had hoped to perform measurements on Phase II, Set #1 phantoms with MRE, but MRE measurements at U. Wisconsin seem unlikely at this time.

It was recommended that each lab keep the phantoms for no more than **1.5 weeks** (except Mayo which gets 2 week in order to perform MRE in addition to ultrasound).

Phase II Measurement Schedule	Set #1	Set #2
a. Duke	X	X
b. Philips (New York)	X	X
c. Philips (Washington)	X	X
d. Siemens	X	X
e. Toshiba	X	(X)
f. Mayo Clinic	X	
g. Duke (Set #1 only)	X	
h. University of Wisconsin	(X)	
i. Southwoods Imaging Center		
j. Massachusetts General Hospital		
k. FDA/VA		
l. Duke		

6. Paul Carson reminded the group that we are required to produce a draft profile for the QIBA annual meeting in April or May. Paul suggested that the group develop a schedule to make sure measurements are performed in a timely fashion. Paul encouraged manufacturers to attend both quantitative special interest sessions and the Technical Standards Committee meeting at the upcoming AIUM conference in March. Paul reminded people to think about abstracts for RSNA.

Doodle Poll: Availability for informal QIBA US Mtg at AIUM 2015: <http://doodle.com/vs2r44v4akrxcgd4>

Upcoming Schedule for February:

February 13th **US SWS Biomarker Ctte - (Dr. Hall)**

~~**February 20th**~~ ~~System Dependencies & Phantom Task Force~~ *{extra call cancelled by co-chairs}*

February 27th **Clinical Task Force - (Dr. Samir)**