PULSE-ECHO QUANTITATIVE ULTRASOUND BIOMARKER COMMITTEE

Agenda for Aug 7, 2020 – 11am EST

Attendees: Aiguo Han, Amy Lex, Anil Chauhan, Brian Fowlkes, Cristel Baiu, Giovanna Ferraioli, Guy Cloutier, Hersh Sagreiya, Jim Zagzebski, Jing Gao, Juvenal Ormachea, Kai Thomenius, Kibo Nam, Marie Muller, Michelle Robin, Arinc Ozturk, Ravi Manguli, Roberto Lavarello, Jonathan Rubin, Stephen McAleavey, Stephen Rosenzweig, Tian Liu, Tim Hall, Timothy Stiles, Todd Erpelding, Viksit Kumar, Xiaohong Wang, Keith Wear, David Fetzer, Theresa Tuthill, Theodore Pierce, Shigeto Ono

AIUM Staff: Kelly Phillips, Therese Cooper

AS: Anthony Samir
IRM: Ivan Rosado-Mendez
MW: Michael Wang

TOPIC	COMMENTS	ACTION ITEMS
Introduction	Welcome (MW)	Discuss methods for sharing documents, inclusion criteria, selection of reference method
Backscatter WG call summary	Introduction of WG co-chairs (Theresa Tuthill, Aiguo Han, Roberto Lavarello) First call summary (one of the co-chairs)	
Sound Speed WG call summary	Introduction of WG co-chairs (Theodore Pierce, Stephen Rosenzweig) First call summary (one of the co-chairs)	
Attenuation WG call summary	Introduction of WG co-chairs (Viksit Kumar, Arinc Ozturk) First call summary (one of the co-chairs)	

Phantom WG call summary	Introduction of WG co-chairs (Tim Stiles and 1 more TBD) First call summary (one of the co-chairs)	
Discussion of issues raised during first WG calls	Methods for sharing documents in literature search (MW) Inclusion criteria for methods and systems to be tested in multi-site study (MW) – Special focus on Fibroscan Selection of reference method for verifying phantom properties (MW)	-Decide which tool to use for literature search -Test endnote/Mendeley capablities -Contact a Fibroscan rep to see if interested in joining the group
Close call	Reminder to WG co-chairs to setup Aug WG calls and to set agenda (MW) Next BC meeting (MW) Date: Sep 4, 2020 Time: 11:00 am, EST	

Work Group Summaries –

Backscatter: TT – What is the best way to report the measurements? Relationship between backscatter and attenuation;
Separate phantoms to address the different working groups
AH – How to divide literature search among group members, writing summaries

Sound Speed: SR - Focused on how to measure speed of sound with a specified variance and accuracy; can we have a single set of phantoms or separate for each biomarker; techniques for sound speed estimation from coherence analysis and tomographic techniques to resolution degradation; industry involvement in specific aim 3; objective is to narrow selection of potential techniques for sound speed estimation and subdivide into groups focused on each technique

Attenuation: Addition of Richard Barr as co-chair
VK – There is a need to define the inclusion criteria and standards for the methods to be utilized at each site

Phantom: Addition of David Fetzer as co-chair

TS – Discussion of the issues related to the range of equipment – how it affects frequency range and the size of the phantoms; separate phantoms with properties; look at steatosis stage or correlate with PDFF percentage; If possible: phantom have availability to use PDFF and if morphology components could be consistent with liver droplets

Discussion of Issues –

(MW) Suggestions for sharing documents in literature search:

-To use excel file in a shared common location amongst the group members

-Mendeley group

-propose to set up a group for QIBA PEQUS and have separate folders for each working group

-does not allow sharing of pdf documents, just references

-library of references to papers: can set up your own library with a database of literature; set up groups which allow references to be shared with many different people; can be used to export (possibly to be used with endnote)

-If we decide to use this tool - MW can make the groups and invite members to join

-can be more dynamic and capture what we are working on; QIBA wiki could be more centralized space for the data

-Endnote

IRM: Suggest each work group should have their own library

Division of work – Suggestion

-subdivide papers into different techniques

-group members can separate based on their areas of expertise

-discussion of subtopics for individual work groups

-summary for each paper

Inclusion Criteria

1. PEQUS techniques supported by continuous development in the literature
2. Conformance to a consensus as to how to perform the measurement **task assigned to each biomarker WG
3. Documented hardware and software configuration of any method included

-multiple systems not a requirement

-Should Fibroscan CAP be included?

-pros and cons

-proposed strategy

-consider imaging-based ultrasound methods as “core technology” and consider CAP as “non-core technology”

- Action Item: contact a Fibroscan rep to see if interested in joining the group

-Selection of reference method for verifying phantom properties

-Is phantom group comfortable with having enough resources and expertise to select the reference method for each of the biomarkers? – Group can discuss

-TJH: Methods for characterizing acoustic properties of phantoms are well understood. There should not be any technical barriers to

-AS: What is the correct pathway to get the measurements to be less variable? PDFF as a reference standard – imperfect; understanding what the sources of variation might be; core component of the activities of each group – identifying when confounding factors are likely to occur and over what range of steatosis and how you propose to deal with it

Open discussion –

-IRM: In reference to clinical studies done in higher frequencies – keep in mind results reported may not directly translate to clinical situations

Discussion on differences in scatterer size between phantoms and liver:

- How does scatterer size change with pathology? Answer is unknown.
- Size and distribution of lipid droplets depends on disease processes, so it would be great to mimic this with phantoms if possible.

-AS: Initially unclear as to how to make progress – useful to define the technologies that are available and prioritize the technologies

-Methods can be added to the QIBA profile when the profile is revised. Wouldn't want to take early technology and training sites etc; Focus on those in late stage, figure out how to perform measurements in those prioritized technologies together with the phantom group

-Chairs of each group confirm they have clarity on the next steps and how to get started.

-IRM: encourage at least one co-chair participate in the WG discussions of the phantom work group

Pulse-Echo Quantitative Ultrasound Biomarker Committee

BC conference call – Aug 7, 2020, 11:00 EDT

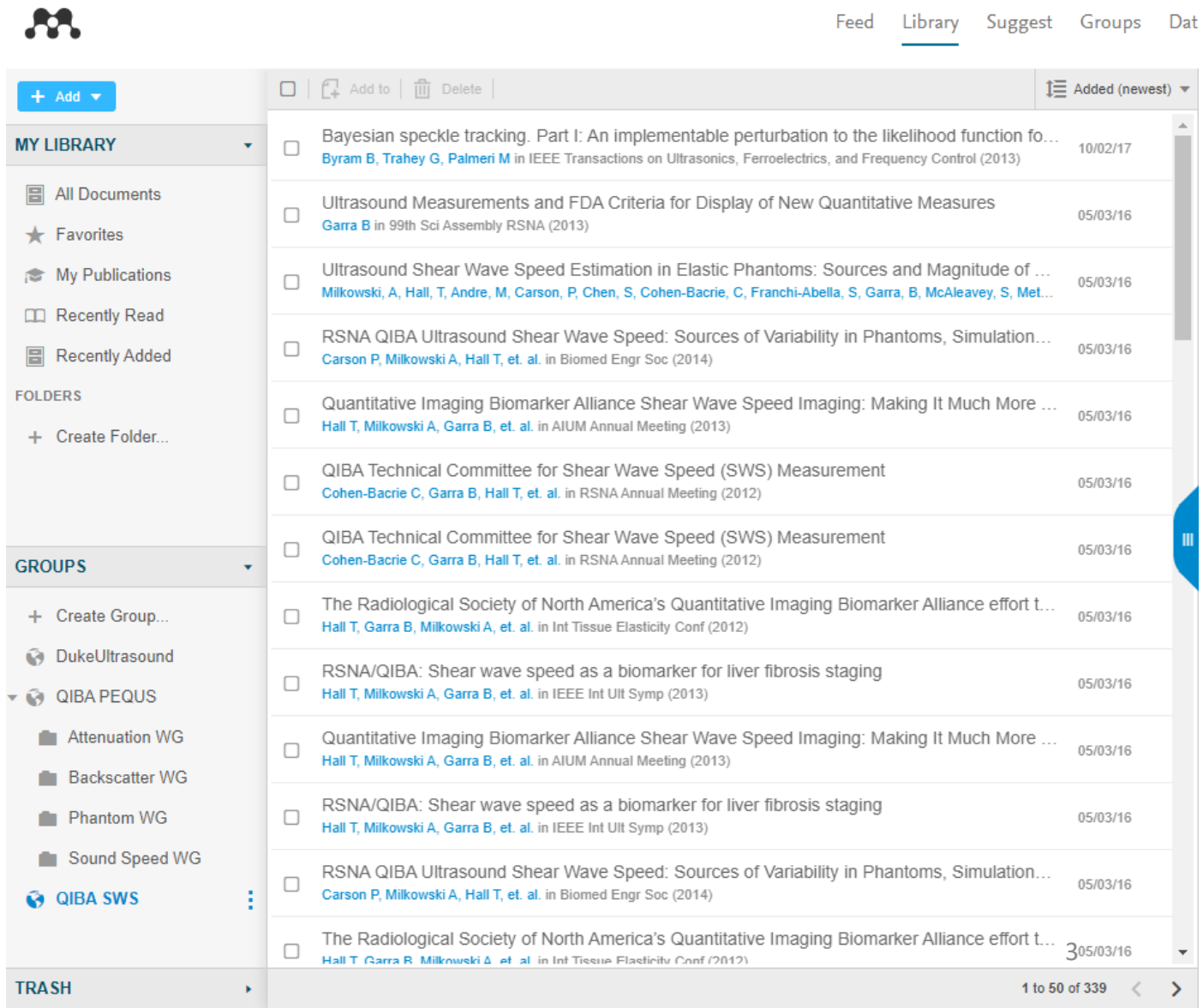
Agenda

- Introduction of WG co-chairs and last week's call summary
  - Backscatter (co-chairs Theresa Tuthill, Aiguo Han, Roberto Lavarello)
  - Sound Speed (co-chairs Theodore Pierce, Stephen Rosenzweig)
  - Attenuation (co-chairs Viksit Kumar, Arinc Ozturk, Richard Barr)
  - Phantom (co-chairs Tim Stiles and David Fetzer)

- Discussion of issues raised in last week's calls
  - Methods for sharing documents in literature search
  - Inclusion criteria for methods and systems to be tested in multi-site study – Special focus on Fibroscan
  - Selection of reference method for verifying phantom properties

Methods for sharing documents in literature search

- Excel file
- Mendeley Group
  - Separate folders for each WG



Inclusion criteria for methods and systems to be tested in multi-site study

1. PEQUS techniques supported by evidence of continuous development in the literature (simulations, phantom-based studies, pre-clinical and clinical implementations)

2. Conformance to initial consensus on
   - How to measure (e.g., frequency range, depth)
   - How to report (type of metric)

3. Documented hardware and software configuration. Examples:
   - Data acquired and processed on commercially released systems
   - Data acquired on commercially released systems (e.g., GE RF data capture), processed offline
   - Data acquired on modified commercially released systems (e.g., Siemens URI), processed offline
   - Data acquired on research systems (e.g., Verasonics), processed offline

Should Fibroscan CAP be included?

Pros:

- Substantial clinical evidence (10 years)
- Inclusion may lead to better understanding of relationship between CAP and image-based attenuation

Cons:

- Proprietary technique, unclear if CAP (dB/m) = attenuation reported by imaging systems (dB/cm-MHz)
- Conformance to measurement and reporting standards may not be possible
- Unclear if additional requirements are needed for phantoms

Proposed Strategy for Fibroscan

Consider imaging-based US methods as “core technology”

Consider CAP as “non-core technology”

- First priority is to design the phantom, define measurement protocol and reporting methods for the “core technologies”.
- Endeavor to have the phantom work for CAP as long as the first priority is achieved.
- Our goal is to reduce measurement bias and variability across the “core technologies”.
- Reducing measurement bias and variance between CAP and “core technologies” is out of scope, but would encourage Fibroscan to consider doing so.

Selection of reference method for verifying phantom properties

- Reference method for calibrating phantom should be independent of PEQUS techniques in consideration for multi-site study
  - For example: Narrow-band substitution, through-transmission for attenuation and sound speed
  - Backscatter? (by definition, pulse echo)

- Selection of reference method to be done by Phantom WG, with agreement from each Biomarker WG.

Other issues from last week’s calls?

Next BC Call

Date: Sep 4, 2020

Time: 11:00 am, EST

Reminder to WG co-chairs to set Aug call agenda