**PULSE-ECHO QUANTITATIVE ULTRASOUND
BIOMARKER COMMITTEE**
Agenda for June 5, 2020

Attendees: Ivan, Anthony Samir, Mike Wang, Brian F, Timothy Hall, Tian Lu, Richard Barr, Viksit Kumar, Juvenal Ormachea, Guy Cloutier, Stephen McAleavey, Marie Muller, Kibo Nam, Keith Wear, Stephen Rosenzweig, Paul Siddhu, Giovanna Ferraioli, Tim Stiles, Gary Ng, Arinc Ozturk, Xianhong Wang, Anil Chauhan, Aigu Han, Chris De Korte, Glen Mclaughlin, Michelle Robbin, Ravi Manguli, Jing Gao, Kevin Parker, Roberto Lavarello, Teddy Pierce, Arun Sanyal, Cristel Baiu, Todd Erpelding, Theresa Tuthill, Jon Rubin, Jim Zagzebski, Jeff Bamber, Andy Milkowski, Mark Lockhart, David Becker, Ted Lynch
AIUM staff: Therese Cooper and Kelly Phillips

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

TOPIC	COMMENTS	ACTION ITEMS
Introduction	Introduction of participants (AS) Introduction of BC leadership (AS) Remind this is a joint effort with AIUM (AS)	
BC Communication	Frequency of teleconferences? (IRM) Similar to AIUM LFQTF (to simplify joint work), use of BaseCamp to host BC material, discussions? (IRM) Use of Mendeley (or another reference manager) to host the BC library? (IRM)	Monthly Use Basecamp To be discussed during the next conference calls.

Timeline of activities	Review of proposed activities and timeline BC proposal, comments? (IRM)	Aim 1 - (due Dec 2020) - to produce first draft of profile Aim 2 - (due Dec 2020) - to design and manufacture phantoms for standardization and validation **happens in parallel to aim 1** Aim 3 - (due Dec 2021) - perform phantom-based groundwork and refine claims in the first draft of profile Aim 4 - (due Feb 2022) - review, approve and publish public comment draft
Funding	Definition of funded activities (MW) Identification of participating institutions (MW) Discussion on sources of funding (MW)	Pending (next call) Pending (next call) Pending (next call)
Task groups	Formation of task groups that could start compiling literature on the performance of possible biomarkers (sound speed, attenuation coefficient, backscatter coefficient) (AS) One committee per feature? (AS)	Form in Basecamp Work w/ AIUM Staff to divide up 4 groups: Phantom group Speed of Sound Attenuation Backscatter coefficient

	Focus only on pre-clinical and clinical applications on LFQ or also on other tissues? (AS) Create doodle or google form for participants to sign in? (AS)	
Summary	Summary of discussed points and review of proposed actions (IRM) What to present on QIBA Ultrasound Coordinating Committee Qtr 2 meeting? (IRM) Date: Wednesday, May 27, 2020 Time: 10:00 am, Central Daylight Time (Chicago, GMT-05:00) Next BC call? (IRM)	

Comments from participants

B. Fowlkes gave a brief introduction to what QIBA is and to the QIBA process.

A minute of silence was kept in honor of Ed. Jackson

I. Rosado-Mendez invited participants to review QIBA wiki website and gave an overview of the proposal and timeline.

R. Lavarello brought up the complexity of extending results from phantoms to clinical performance. The abdominal wall poses a great challenge due to aberration. I. Rosado-Mendez responded that the purpose of Specific Aim 2 is to discuss these issues and come up with phantom designs that are more representative of problems found in vivo.

M. Muller mentioned that phantoms characteristics will have to be defined depending on the particular organ or tissue that is going to be characterized. I. Rosado-Mendez mentioned that for the first stage of this QIBA BC we'll be jointly working with the AIUM Liver Fat Quantification Task Force, so emphasis will be put on liver-tissue mimicking phantoms (B/A, aberrators, etc.). A. Samir added that although the first stage will be focused on liver fat quantification, future work of the BC will explore applications in other tissues.

Guy Cloutier asked whether clinical studies and animal studies will be considered. I. Rosado-Mendez mentioned that clinical validation will be organized by the AIUM Task Force after the release of the first profile. During the first stage animal studies will not be considered. A. Samir emphasized the great value of human and animal in vivo studies, but that these are not necessary conditions for the QIBA profile. Certainly they are of great importance for clinical validation.

A. Samir mentioned that the selection of individual biomarkers for this stage does not represent endorsement of these biomarkers. The BC is not close to new ideas about possible biomarkers. However, for the first stage, we'll focus on those that have been studied by many groups and for which there exists a large body of literature.

M. Wang mentioned that there will be four work groups (or subcommittees): phantom, attenuation, sound speed and backscatter. M. Wang proposed to use a solicitation process for members to sign up to their work group of interest. A. Samir added that the BC leadership will make the best effort to balance the expertise of the participants in each work group.
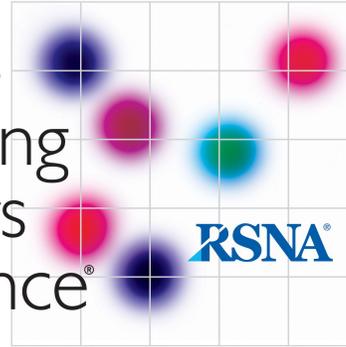
Pulse-Echo Quantitative Ultrasound Biomarker Commettee

BC conference call – June 5, 2020, 11:00 EDT

http://qibawiki.rsna.org

Communication tools

- Frequency of BC conference calls?

- BC document sharing and messaging: Basecamp
  - ✔ Same as AIUM Liver Fat Quantification Task Force

- Literature repository: Mendeley
  - ✔ Libraries for each biomarker work group

PEQUS Biomarker Committee

Mission: Reach consensus on how to report PEQUS features among manufacturers and under equivalent conditions

- Several PEQUS features are included in this committee:
  - ✔ Attenuation
  - ✔ Sound speed
  - ✔ Backscatter coefficient (and related parameters)

Initial goals

✔Reach Stage 1 (public comment) of QIBA's profile creation process within 20 months

✔Producing version 1 of the biomarker profile (PV1) based on phantom-based standardization and validation of PEQUS features that result on initial accuracy and precision claims

Timeline

SPECIFIC AIM 1
First draft of profile based on evidence from literature

SPECIFIC AIM 2
Phantom characteristics for multisite study

SPECIFIC AIM 3
Multisite study to refine claims of bias, variance, inter- and intra-observer variability, and confounders

SPECIFIC AIM 4
Discussion of PV1

June – December 2020

January – December 2021

January – February 2022
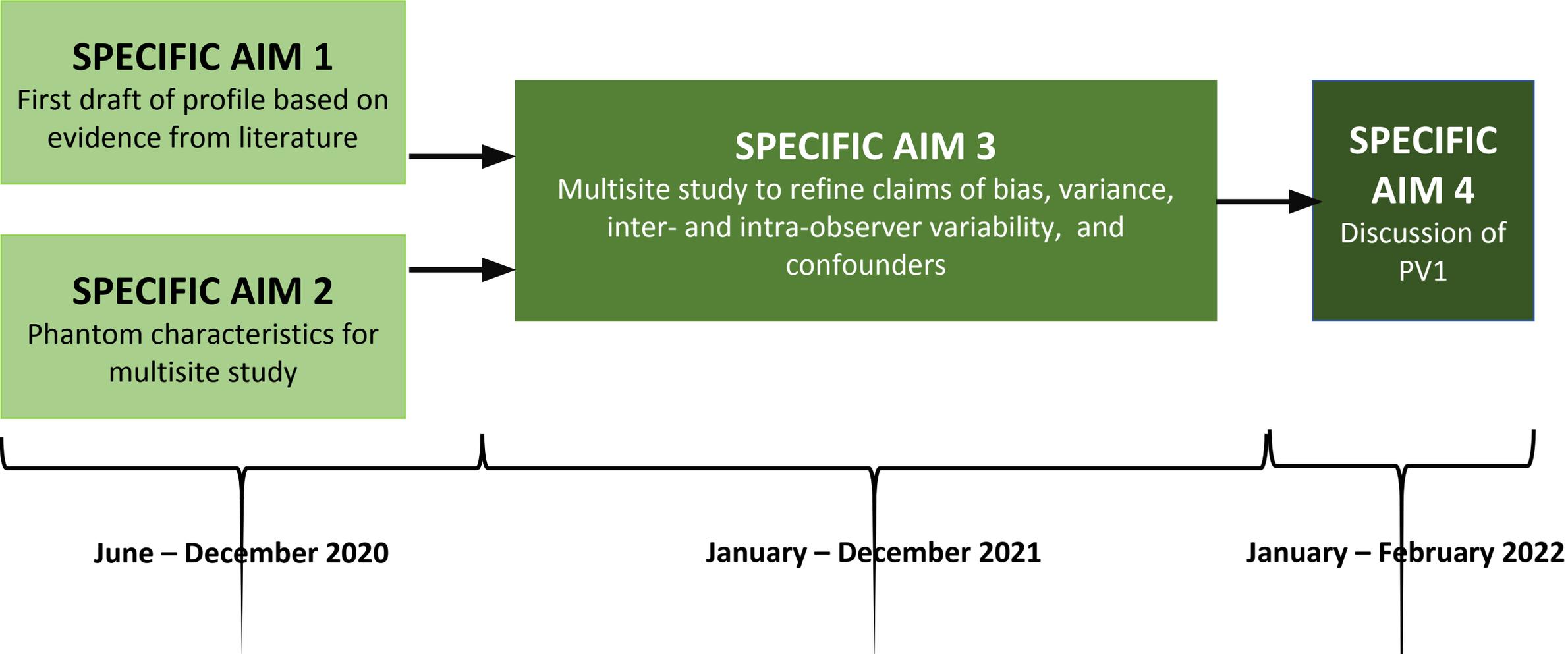
Goals and aims

- **Specific aim 1 (Due December 2020): Produce the first draft of PV1**

1. Approval of BC proposal
2. Formation of biomarker work groups
3. Compilation of literature on sources of bias and variability, covariates, and confounders (physical, technical, biological)
4. Initial consensus on how to report biomarkers
5. Drafting of PV1, including protocols for data acquisition, quality control, and biomarker reporting

Goals and aims

- **Specific aim 2 (Due December 2020): Design and manufacture phantoms for standardization and validation**

   1. Definition of criteria for the structure and composition of tissue-mimicking phantoms to be used in Specific Aim 3
   2. Definition of a phantom work group to coordinate design and fabrication of the required phantoms

Goals and aims

- **Specific aim 3 (Due December 2021) – Perform phantom-based groundwork**

  1. Multi-site prospective study to evaluate intrinsic scanner variability and intra- and inter-operator bias and variance
  2. Definition of claims of accuracy and precision and the conditions under which they were achieved
  3. Refinement of draft of PV1

Goals and aims

- **Specific aim 4 (Due February 2022) – Review, approve and publish public comment draft**

  1. Revision, discussion, and refinement of PV1 within committee members
  2. By the end of this period, PV1 will be published for public comment

What comes next?

- Public comment and technical claim confirmation
- Clinical confirmation organized by the Liver Fat Quantification task force of the American Institute of Ultrasound in Medicine focused on liver fat fraction quantification
- Improvement of the profile considering new quantification algorithms:
    ✔ Regularization methods for attenuation compensation
    ✔ Use of single-channel data for sound speed estimation
    ✔ Data compounding strategies