

QIBA CT Small Lung Nodule (SLN) Biomarker Ctte (BC) Call

16 January 2020 at 1 PM CT

Call Summary

In attendance

Samuel Armato, III, PhD (Co-Chair)

David Gierada, MD (Co-chair)

James Mulshine, MD (Co-Chair)

Rick Avila, MS

Artit Jirapatnakul, PhD

RSNA

Joe Koudelik

Julie Lisiecki

Moderator: Dr. Mulshine

Prevent Cancer Foundation Update

- During the week of January 5-12, 2020, an annual live-streamed video game marathon, [Awesome Games Done Quick](#) (AGDQ 2020), raised \$3.1 million for the Prevent Cancer Foundation, uniting players from around the world in a common goal.
- Some of the proceeds from this fundraiser may benefit lung cancer screening innovations in Poland, e.g., to get the SLN Profile implemented across sixteen sites
- Dr. Mulshine and Mr. Avila of the QIBA CT Small Lung Nodule Biomarker Committee were panelists involved in this effort.

Technical Confirmation Work

- It was suggested that the issue regarding edge enhancement be added to the Profile Issues & Resolutions spreadsheet on the wiki
 - Mr. Avila noted that there was no consensus regarding resolution yet
 - The team is waiting for some feedback from Dr. Silva
 - Scanner vendors are providing the reconstruction kernel, so it may be possible to make a small change to the allowable level of edge enhancement, as the previous level was too strict

Software Conformance Work

- The team is following up with Dr. Yankelevitz regarding clinical imaging datasets for software conformance
- Dr. Jirapatnakul mentioned his new project that is being funded by the Prevent Cancer Foundation
 - The project involves characterizing radiomics features of nodules that correlated with their measurement uncertainty
 - He has access to Dr. Yankelevitz's database and many scans of the same patient on the same day, which will help to characterize nodules from the image collection
 - These images might be useful for the software conformance testing process
 - The only drawback is that the data are from a single scanner at Mt. Sinai; Dr. Obuchowski previously cautioned that images were needed from multiple institutions to be statistically rigorous
 - Although deemed acceptable for "start-up research", Dr. Yankelevitz thinks that he may be able to obtain more data from other institutions
 - Dr. Gierada offered to provide additional data from Wash U
 - Dr. Mulshine noted the importance of drawing attention to scanner software issues re: bias and repeatability, observed across sites using the CTLX1 and CTLS phantoms
 - Eventually, it would be beneficial if vendors could choose pre-approved software from a list of options
- Mr. Avila is working on solutions to some other issues that were identified:
 - Bias is under 5%, which has a nonlinear effect
 - The nodule phantom (CTLS) is being used to collect data for bias and repeatability

- He is documenting the biases of different software and evaluating it based on repeatability
- A scientific abstract based on this work is being considered for RSNA 2020
 - Mr. Avila to confer with Drs. Jirapatnakul and Silva regarding drafting an abstract
 - RSNA 2020 abstract submission opens in late January and closes ~mid-April
- Mr. Avila to follow up with Drs. Silva and Gierada regarding the ellipsoid phantom to obtain cutoffs for optimal slice thickness (e.g., 1.25mm vs. 1.0mm vs. 0.625mm)
 - With direction from Dr. Obuchowski, the team wants to design a study using multiple scanner models with multiple software packages and the CTLS (ellipsoid) phantom
 - Dr. Silva has completed scanning on the CTX1 phantom, and he has seen variability related to performance with key parameters
 - There may be enough data available for a manuscript

Medical Imaging and Technology Alliance (MITA)

- QIBA Leadership is awaiting a response and proposed next steps from MITA representatives, following the October 2019 meeting with MITA to discuss Profile conformance, and concerns re: metrics used in the SLN Profile
- It is believed that MITA's response concerning the SLN conformance process will be relevant across all QIBA efforts
- Better alignment between QIBA and AAPM was encouraged to reach consensus re: the conformance process, and it was suggested that team members identify AAPM subcommittees that might be interested in joining calls or reviewing project work, e.g., Dr. Supanich (RUSH) is on a CT Subcommittee at AAPM and has in the past offered feedback re: the CT Volumetry Profile
- QIBA maintains an inventory of societies that support or overlap with QIBA goals and projects
 - Dr. Mulshine indicated that it is important to ensure QIBA and related societies are speaking the same language and have common goals

Manuscripts

- Dr. Sullivan previously stressed the importance of peer-reviewed publications in demonstrating the acceptance of the SLN Profile and conformance process by the scientific community
- Mr. Avila noted that two manuscripts are being drafted for publication in 2020
- These will address prediction of coefficient of variation, both clinical and technical, and will support the experimental basis for the team's conformance approach
 - It is hoped that the publications will alleviate concerns that the SLN conformance process is not supported by the medical physics community
 - As Profile conformance is evolving, it is important to publish to demonstrate the scientific rigor behind the QIBA process

Accumetra CTLX2 (Water Jacket) Phantom Update

- Mr. Avila mentioned that NIH colleagues have been testing the water phantom and will provide data to QIBA
- Poland is also moving forward with lung cancer screening utilizing the CTLX2 phantom
- There is interest from Canada in the SLN Profile; performance parameters may be incorporated within their national screening recommendation guidelines if approved
- Interoperability of various systems is critical to long-term lung screening since patients must be followed for 20+ years
- It is important that image quality be improved based on QIBA performance thresholds

QIBA CT Schedule:

- **01/23/2020** CT Volumetry BC call, 11 am CT
 - **02/19/2020** CT Coordinating Committee, Quarter 1 call, 1 pm CT
 - **02/20/2020** CT Small Lung Nodule BC call, 1 pm CT
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