QIBA Newsletter

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QIBA MISSION
Improve the value and practicality of quantitative imaging biomarkers by reducing variability across devices, sites, patients, and time.

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Timothy J. Hall, PhD
QIBA Chair

In My Opinion

Quantitative Imaging in the Era of Artificial Intelligence

By CAROLINE CHUNG, MD, MSc, FRCPC

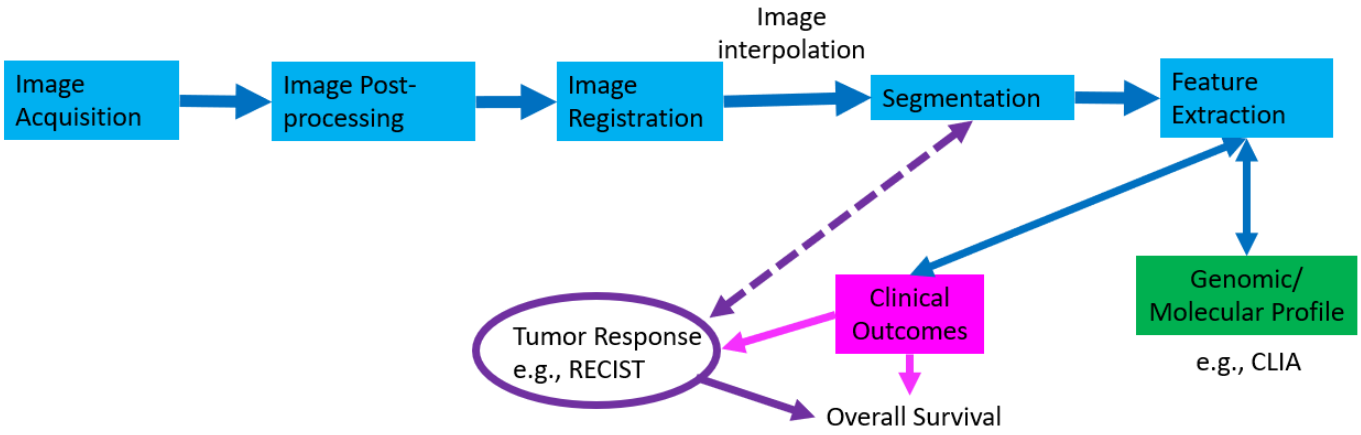
Despite the shared aspirations to enable personalized health care delivery and precision medicine, the progress toward this goal has been slow and challenging. Precision medicine, an approach that aims to customize health care decisions, including prevention, treatments, and procedures to subgroups of patients or even individual patients, is built on the assumption of precision measurement.

With imaging becoming a central tool for evaluating the baseline state and response assessment of medical treatments, quantitative imaging is a critical component in enabling precision measurement in medicine. As stated on the QIBA website, "*Quantitative imaging is the extraction of quantifiable features from medical images for the assessment of normal or the severity, degree of change, or status of a disease, injury, or chronic condition relative to normal*."

However, amidst the exponential rise in the generation of medical data each year, with medical imaging data making up approximately 30% of this volume, the small fraction of information extracted for clinical impact from this growing collection of health care data remains largely inconsistent and unstructured. The human-centered workflows for data use have largely remained unchanged during periods of major digital transformation. As a result, there are growing demands to maximize insights and challenges to scale-up our approach to address the tsunami of data.

AI is a promising technology that can be utilized to support the immediate demands of clinical workflow, enhancing human performance while also raising the potential to support additional discoveries and insights from the advanced data we are gathering at each imaging session. Radiology has been at the forefront of computer assisted diagnosis and early demonstration of the potential utilization of AI in health care has utilized radiological imaging data.

Quantitative Imaging Workflow: Relating to Outcomes & Opportunities for AI



- Variability at each step introduces challenges in clinical interpretation
- Upstream variations can hinder progress of the clinical/research questions at hand

As the world gains experience and the hype of AI and big data starts to settle, there is growing awareness of the need for high quality and consistent data both for training and successful deployment. Beyond the models developed from the imaging data itself, it has been recognized that the uncertainty of the imaging-derived measurements integrated into predictive AI models can impact the uncertainty in the predictions themselves. To this end, QIBA can play a key role in accelerating and enhancing AI development because the steps taken to ensuring quantitative imaging also generate consistent, high quality imaging data along with the estimated uncertainty.

Imaging acquisition and processing is also being impacted by AI technologies, and it is unclear how these innovations to accelerate image acquisition will impact the QIBA Profiles and claims. As emerging AI-driven image processing algorithms may help facilitate normalization, harmonization or calibration of images to facilitate aggregation of imaging data, the coordinated efforts across QIBA, industry partners, and clinical sites will be critical to aligning and updating QIBA Profiles to realize benefits to clinical impact.

With mutually beneficial and common motivations to improve the consistency and quality of image acquisition in support of quantitative

imaging and AI, the QIBA community is well-positioned to collaboratively connect with the clinical, research, and data science communities to realize the full power of AI and support advances toward precision medicine and personalized health care.

Caroline Chung, MSc, MD, FRCPC

Dr. Chung is vice president, chief data officer, and an associate professor in radiation oncology and diagnostic imaging at the University of Texas MD Anderson Cancer Center (MCACC). Her clinical practice is focused on CNS malignancies, and her computational imaging lab has a research focus on quantitative imaging and modeling to detect and characterize tumors and toxicities of treatment to ultimately enable personalized cancer treatment. She serves as co-chair of the Tumor Measurement Initiative (TMI) at MDACC, which aims to build an institutional platform for standardized, automated quantitative imaging-based tumor measurement across each patient's journey to advance multidisciplinary, data-driven, high precision cancer treatment. Dr. Chung is actively involved in international multidisciplinary efforts to improve the generation and utilization of high quality, standardized imaging to facilitate quantitative imaging integration for clinical impact across multiple institutions. She is vice chair of the RSNA Quantitative Imaging Biomarker Alliance (QIBA) and co-chair of the Quantitative Imaging for Assessment of Response in Oncology Committee of the International Commission on Radiation Units and Measurements (ICRU).

QIBA Sessions and Activities at RSNA 2022

Please join us for these sessions during the RSNA 108th Scientific Assembly and Annual Meeting, Nov. 27 to Dec. 1, at McCormick Place, Chicago:

- QI for AI on Sunday, Nov. 27, 3:20–3:50 p.m.
- The Quantitative Imaging Symposium sponsored by QIBA on Wednesday, Nov. 30, 2 – 3:30 p.m.
- Robust AI Solutions: Essential Image Acquisition Requirements on Thursday, Dec. 1, 3 – 4 p.m.

Please visit the **QIBA Kiosk** in the Learning Center, Lakeside Center East, Level 3.

For more information: https://www.rsna.org/annual-meeting

Announcement from the European Imaging Biomarkers Alliance (EIBALL)

Have you considered including biomarkers in your clinical trial? The ESR EIBALL Subcommittee Biomarkers Inventory (provided with help from QIBA, ESCR, ESGAR, ESHNR, ESMEMB, ESPR, ESUR, & EUSOBI) provides evidence for their use in radiological trials. The inventory is designed to provide a reference for researchers and trialists so that these biomarkers can be incorporated into clinical trials.

EIBALL Subcommittee members, in conjunction with QIBA representatives on the EIBALL Subcommittee, deployed the inventory, working with specialist European Societies to refine input and expand the resource. Workshops and webinars on biomarkers will be held in the coming year, and a dedicated session is planned for the European Congress of Radiology 2023.

QIBA Promotional Videos

QIBA members developed a series of videos promoting QIBA initiatives and their importance to physicians. We hope to reach new volunteers through these videos, educate the imaging community regarding the benefits of quantitative imaging and grow the QIBA community.

QIBA would like to express its gratitude to the volunteers who participated in the interviews and to the RSNA Public Information and Communications Department staff, who were instrumental in overseeing the production of these videos.

QIBA Volunteer Page

QIBA is seeking volunteers to assist with a variety of ongoing and new committee projects. Details about specific opportunities will be posted as they arise. We will promote these volunteer opportunities on one or more QIBA platforms, e.g., LinkedIn, wiki, and the *QIBA Newsletter*. **Sample opportunities:** Google sign up form.

QIBA Acknowledgments Page

This page has been created for QIBA Leadership to acknowledge the various committee efforts and accomplishments made throughout the year. We realize that producing Profiles takes dedication and hard work from many volunteers working together and would like to acknowledge Profile authors/editors that have advanced Profiles.

QIBA Activities

QIBA Biomarker Committees are open to all interested persons. Meeting summaries, the *QIBA Newsletter* and other documents are available on the QIBA website RSNA.org/QIBA and wiki http://qibawiki.rsna.org/.

QIBA Resources:

- About QIBA
- QIBA Webpage
- QIBA Wiki
- QIBA Biomarker Committees
- QIBA Organization Chart
- QIBA LinkedIn page
- QIBA Twitter page

Please contact qiba@rsna.org for more information. We welcome your participation.

QIBA and QI/Imaging Biomarkers in the Literature

***Please note that the list of references has been migrated to EndNote. *To obtain access to the RSNA EndNote citations, please send an email request to: qiba@rsna.org.**

The list of references showcases articles that mention QIBA, quantitative imaging, or quantitative imaging biomarkers. In most cases, these are articles published by QIBA members or relate to a research project undertaken by QIBA members that may have received special recognition.

New submissions are welcome and may be directed to qiba@rsna.org.