

Quantitative Imaging Network: 12 Years of Accomplishments

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The June 2020 special issue of *Tomography* is a collection of articles from over 20 research teams that are members of the Quantitative Imaging Network (QIN) supported and organized by the National Institutes of Health (NIH).

The core mission of QIN is the creation, optimization, and validation of quantitative image analysis decision-support tools for diagnosis and treatment response monitoring of cancer and prediction of outcome through collaborative efforts. A main goal of this consortium, which currently consists of 26 individual research teams, is the development of methods for harmonization of medical imaging data and the foundational building blocks of quantitative image analysis decision-support tools for improved accuracy and reproducibility. The advances that have been developed as part of these collaborative efforts form the infrastructure for which practicing oncologists and radiologists can derive and use quantitative imaging metrics in decision support for clinical trial assessment of novel therapeutics and ultimately to improve individual patient care.

An important QIN effort targets clinical deployment of quantitative decision-support tools and their translation into clinical workflow. An essential step in this process was the development of a formal system for benchmarking of QIN tools. This process has enabled the Network to prioritize tools and determine the tools that are the most prepared for clinical deployment. In this regard, the Network provides the infrastructure and expertise to assist transition from QIN-developed imaging research tools to support their clinical evaluation and utility. Another critical step in the translation from development to clinical utility is informing appropriate users regarding the availability and functionality of clinically relevant tools and algorithms. The QIN has also advanced effort through which clinically ready tools are continually presented to cooperative groups of the National Clinical Trial Network (NCTN), thus providing exceptional scope and impact.

The QIN celebrates its 12th-year anniversary with this special issue of *Tomography*. The collection of articles emphasizes the importance of quantitative imaging as a field and shows the critical and unique role that QIN has in supporting this critical research effort. This issue disseminates the broadly applicable quantitative decision-support tools that can be used for determination of treatment response assessment for primary and metastatic cancers across organ systems and imaging modalities including computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET)/CT. Research related to harmonization of image data by scanner calibration and unification of image acquisition protocols through the use of digital and physical phantoms is also represented along with topics ranging from radiomics, deep learning, and data mining methods for image information extraction. In aggregate, the productivity of QIN members continues to consistently show that quantitative imaging is an essential component of statistical and analytical methods required for advancing radiological integration of clinical support approaches. Articles reported arose from the many diverse and unique collaborative interactions between group members within the QIN, including multisite evaluation of tool performance characteristics across different clinical environments and imaging platforms.

Overall, quantitative imaging has a crucial role in improving the accuracy of treatment response assessment along with the analysis of important cancer characteristics and features. These approaches continue to expand their impact through integration into an expanded network of clinical trials. The QIN has developed a robust and deep history in advancing the quantitative imaging field and will continue to do so into the future.