AbstractID: 7970 Title: The emerging role of imaging as a biomarker for response

Radiologic images have been used for decades to gauge the effectiveness of various therapeutic interventions. In the areas of oncology, cardiovascular disease, neurology, arthritis and osteoporosis, imaging plays a vital role in decision-making regarding effectiveness of therapy for an individual patient. Increasingly, imaging also is being utilized during all phases of therapeutic drug development, resulting in speedier drug discovery and, in some instances, ensuring a drug's safety. There has been an "explosion" in use of *biomarkers* in drug discovery.

Many imaging biomarkers are already commonly used, such as tumor size measured at CT to reflect tumor burden;T2 hyperintensity detected at brain MR imaging to reflect the burden of Multiple Sclerosis; and bone density determined on DEXA studies to assess for osteoporosis. One major benefit of imaging biomarkers is that the findings may be evaluated and quantified for changes over time. Newer imaging biomarkers are also playing a role in drug discovery, such as dynamic contrast-enhanced MR imaging to assess for vascular flow to tumors; molecular imaging in the functional evaluation of cardiac, neurologic and oncologic processes; and CT in the evaluation of cystic fibrosis. The complexity in imaging biomarkers is increasing not only with the number of available imaging and post-processing techniques, but perhaps even more importantly, with the number and diversity of relevant therapeutic options. Increasingly, it is becoming clear that a single imaging biomarker alone can be misleading, but is more robust when combined with other imaging or non-imaging biomarkers.

<u>Educational objectives</u>

1. Understand the role of imaging in monitoring response to therapy
2. Understand the issues and clinical complications of imaging as a biomarker

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