

The implementation of intensity modulated radiation therapy (IMRT) involves the careful, quantitative measurement of complex dose distributions. Because of the temporal nature of IMRT delivery, thorough validation measurements cannot be conducted using traditional measurement techniques, for example using ionization chambers in water phantoms. At the same time, the complex dose calculations and radiation field delivery sequences demand an intensified program of direct measurement-based dose distribution validation.

Dosimetric techniques have been developed that attempt to provide comprehensive, quantitative evaluations while maintaining a reasonable workload. These involve using a combination of dosimeters, each with unique characteristics and limitations. The presentation will describe the current standard of practice in dosimeters and measurement techniques.

Along with an increased reliance on direct dose measurements comes the need to improve the dose distribution comparison techniques. The historical use of manual overlays of printed isodose distributions is insufficient when attempting to determine if both targets and normal structure doses are adequately modeled by the treatment planning system. The presentation will also describe dose distribution comparison methods that are sensitive to both spatial and dosimetric differences.

Course Objectives:

To describe:

1. Dosimeters in use for IMRT validation measurements
2. Methods for selecting an optimal set of dosimeters for routine validation
3. The current standard of practice in IMRT validation measurement approaches
4. Dose distribution comparison tools