AbstractID: 2208 Title: Independent dose calculations for IMRT Quality Assurance

Quality assurance (QA) techniques for intensity modulated radiation therapy (IMRT) often include a combination of ion chamber and film measurements. These measurements are performed on a phantom using the leaf sequences defined for a particular patient. A complementary approach involves the use of independent dose calculations. Unlike phantom measurements, these independent calculations provide an additional level of QA by using patient-specific data (such as treatment depths) and may therefore detect errors that would not be observed during a phantom irradiation. Additionally, such systems may detect errors that can be resolved prior a phantom irradiation. Originally, these independent dose calculations were developed to validate the dose to isocenter based on individual leaf motions produced by the planning system. More recently, some programs have been developed to calculate isodose distributions, and use the leaf positions as stored by the treatment machine. The role of independent dose calculations within an IMRT QA program will be discussed along with a survey of the commercially available systems. The practical aspects, limitations and future directions of such programs will also be discussed.

Educational Objectives:

1. To understand the algorithms used in independent dose calculations for IMRT.
2. To appreciate the clinical utility and limitations of such algorithms.
3. To understand how independent dose calculations can be incorporated within an IMRT QA program.

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