

## AbstractID: 4916 Title: IMRT Quality Assurance: Dosimetric Assessment of Three Current Methods

**Purpose:** To compare traditional IMRT quality assurance using film dosimetry and small volume ionization chamber measurements with two new commercial products, the Wellhofer® MatriXX ionization chamber array and Varian® Portal Dosimetry. Available analysis software, hardware requirements and approximate operator times for data preparation, measurement and analysis will also be examined.

**Method and Materials:** Fluence patterns from several 6X and 18X IMRT treatment plans for pelvis and head and neck radiotherapy patients were measured using radiographic film, the MatriXX array, and the Portal Dosimetry array. In each case the fluence pattern predicted by the treatment planning system was compared to the measured fluence pattern using ordinary  $\gamma$ -analysis. Absolute dose at a point in a low-gradient region of the fluence was also measured in the solid water phantom with an ionization chamber and compared to the dose prediction of the TPS. The absolute dose measured at the same point by the MatriXX array was also compared.

**Results:** The absolute dose measurements made in a region of low-gradient using an ionization chamber were, on the average, within 3% of the TPS predicted dose. The absolute dose measurements made using the MatriXX were, on the average, within 5% of the predicted dose. The ion chamber and MatriXX agreed to within 3%. An average of about 4% of pixels failed an ordinary  $\gamma$ -analysis using 5% dose agreement and 3mm DTA criteria for both film and MatriXX measurements. A smaller percentage of pixels measured using Portal Dosimetry failed. The time spent preparing the data was comparable for all methods. Data measurement and analysis times were significantly reduced using the MatriXX and Portal Dosimeter procedures.

**Conclusions:** This work indicates significant time savings for the new methods. In addition, the MatriXX system measures absolute dose at each chamber position.