

# AbstractID: 3709 Title: Reproducibility Of A Method For The Quantitative Assessment Of The Agreement Between Planned And Measured Dose Distributions

**Purpose:** To introduce a new quality assurance parameter, the index of agreement (IOA), with which to quantify the agreement between planned and measured radiation dose distributions, and to assess the reproducibility of the parameter.

**Method and Materials:** One IMRT radiation portal, consisting of three segments, was used to irradiate twenty separate pieces of calibrated EDR film. The field was delivered with a Siemens PRIMUS linear accelerator with 10 MV photons. A planar dose file was generated with the ADAC Pinnacle RTP system at a resolution of 2 mm by 2 mm to represent the dose distribution of the field. Both the planar dose file and the measured dose distributions derived from the film were imported into MATLAB for processing and analysis. At each pixel of the planned dose distribution, the pixel of the measured dose distribution, within a closed neighborhood of radius  $c$  (chosen to be 3 mm) that exhibits the smallest absolute fractional dose deviation was found. If the absolute deviation was less than  $p\%$  (chosen to be 3%), the pixel was assigned a score of zero, while if the absolute fractional deviation exceeded the tolerance value, the pixel was assigned a score of zero. The index of agreement (IOA) was then calculated as the ratio of the sum of the score values of all clinically relevant pixels divided by the total number of clinically relevant pixels.

**Results:** The IOA values were approximately normally distributed, with a mean value of 0.9330 and a standard deviation of 1.1%. Areas of poor agreement were reproduced during each irradiation.

**Conclusion:** The IOA is a promising new quantitative quality assurance tool, and its value is highly reproducible.

**Conflict of Interest (only if applicable):**