

## AbstractID: 7441 Title: Evaluation of a New Radiochromic Film/Flatbed Scanner System for Planar Clinical Dosimetry

**Purpose:** To assess the accuracy and practicality of using GAFCHROMIC® EBT Film in combination with an Epson flat-bed scanner for the verification of advanced treatment techniques in radiation therapy. The combination of EBT with flat-bed scanner may represent a low cost and convenient alternative to currently used dosimetry systems.

**Methods and Materials:** First the scanner temporal stability and variability of light source over the scanning area was investigated. Next the dependence on color bit-depth was investigated by conducting scans of the same film using different bit-depth parameters. The dose response and stability of EBT film was investigated in the range 0 to 8Gy with 6MV photon beams, and a depth-dose comparison was made using 16x electrons to known ion chamber measurements. Intra and inter-batch film reproducibility was investigated as well as dependence of OD on temperature at irradiation over a range of 10°C.

**Results:** The reproducibility of the Epson scanner was found to be highly stable, to within 1.01%, over all ranges of OD studied. A slight non-uniformity in background was observed, but this background was consistent enabling efficient correction. 48-bit color depth was adopted for all experiments. The dose response curve of EBT film was found to be non-linear but stable (within 1.06%) from immediately after irradiation to within one week after irradiation. The electron PDD curve showed excellent agreement with clinical PDD tables at all depths with the linac data. A maximum intra-batch OD difference of 1.88% was observed, while a maximum OD difference of 5.76% was observed for samples from the same batch. The temperature sensitivity was found to be small, with maximum difference of 1.03% in optical density over the range of 10°C.

**Conclusions:** The Epson® 4990 Scanner/ GAFCHROMIC® EBT Film dosimetry combination appears an accurate and convenient dosimetry system for radiation therapy.