

AbstractID: 13378 Title: A comparison of four IMRT quality assurance techniques

A comparison of four methods of intensity-modulated radiation therapy (IMRT) quality assurance (QA) is described. A single nine field IMRT plan was evaluated using two planar arrays, the MapCheck diode array and PTW seven29 ion chamber array, and two different types of film (GAFChromic radiochromic film and Kodak Verification silver-halide film) with an ion chamber. Both field-by-field (in which the dose map for each field was measured and evaluated separately) and composite measurements (in which all fields were summed) were performed. The composite measurements were performed with each beam at the planned gantry angle. The PTW and MapCheck arrays were used for single beam and composite measurements. Each type of film was used for a composite measurement with planned gantry angles. For each type of film, two sheets of film and the ion chamber were placed in a stack of water-equivalent plastic slabs, so that a relative dose map in two planes and the absolute dose at a single point in a third plane were measured simultaneously. All measurements were compared to the dose predicted by the Varian Eclipse treatment planning system, which was used to map the fluence to a CT image of each phantom. For measurements made with the planar arrays, the software provided by the vendor was used for the comparison. The software packages rt-image and FilmQA were used for the film measurements. All the software packages calculate a gamma factor for each measured point from a relative dose difference (ΔD) and distance-to-agreement (DTA). The pass rates (percentage of measured points with $\gamma \leq 1$) varied considerably among the software packages used for comparison. Nevertheless, all methods showed that the treatment was delivered as planned.