

AbstractID: 13303 Title: Confidence limit variation for a single system following the TG119 protocol

Purpose: To evaluate the consistency of TG119-based quality assurance metrics for an IMRT system. **Methods and Materials:** Four planners constructed treatment plans for the five IMRT test cases described in TG119 using iPlan RT Dose 4.1 software. All plans were delivered on a Varian 6EX to a 30x30x15cm solid water phantom in one treatment session in order to minimize session-dependent variation from phantom setup, film quality, machine performance, etc. Composite measurements utilized EDR2 film and an Exradin A1SL ionization chamber (sensitive volume of 0.056 cm³). Each film was developed and digitized immediately after exposure. Per-field measurements were collected using a MapCHECK device at an effective depth of 5cm. All data collected were analyzed using the TG119 specifications to determine quality assurance metrics for each planner separately and then compared. **Results:** The mean variance of ion chamber measurements for each planner was within 1.7% of the planned dose. Resulting confidence limits were 3.77%, 1.98%, 4.50%, and 5.99%. Confidence limit values determined by composite film analysis were 26.43%, 25.02%, 21.50%, and 56.58%. Using normalization to a film point rather than to ionization chamber, these confidence limits were reduced to 12.27%, 12.73%, 6.96%, and 15.75%. Confidence limits from per-field measurements were 1.55%, 0.00%, 0.00%, and 2.89%. **Conclusions:** For a single IMRT system, the accuracy assessment provided by TG119-based quality assurance metrics showed significant variations across all composite and per-field evaluations. Performing the TG119 evaluation a single time may not provide an adequate estimation of IMRT system accuracy.