

Purpose: To review the accuracy and systematic trend of patient-specific plan dose verification by ion chamber measurements for 272 IMRT and RapidArc clinical cases of brain, spine, head-and-neck, prostate, lung, liver and pelvis-non-prostate treatments.

Methods & Materials: A BrainLAB IMRT QA Phantom and a 0.125 cc ion-chamber (PTW 31010) was used to measure composite dose at a high-dose and low-gradient point near iso-center. Measured doses are compared to calculated doses in treatment planning systems for a total of 272 clinical cases, of which 203 are IMRT treatments planned in BrainSCAN and 69 are RapidArc treatments planned in Eclipse. Distributions of percentage differences between measured dose and planned dose are reviewed to extract the mean, standard deviation and range of the differences, from which confidence levels of $|\text{mean deviation}| + 1.96 \times \text{SD}$ are determined and compared to the action levels recommended by AAPM TG-119. **Results:** For the 203 IMRT cases, the mean percentage difference was -1.89%, the standard deviation was 1.28%, the range of the differences was -4.67% to 4.17%, the confidence level was determined to be 4.40%. For the 69 RapidArc cases, the mean percentage difference was -0.17%, the standard deviation was 2.38%, range of the differences was -4.76% to 5.15%, the confidence level was determined to be 4.83%.

Conclusion: The results of ion-chamber dose verification for 272 patient-specific IMRT and RapidArc plans were reviewed. The confidence levels determined from the IMRT cases (4.40%) and the RapidArc cases (4.83%) are better or close to the confidence levels of 4.5%~4.7% established in AAPM TG-119 by planning and delivering multiple IMRT plans on a suite of 7 phantom cases among 9 institutions. Significantly more clinical cases will be included for extracting disease-site specific confidence levels, particularly for RapidArc treatments where DMLC motion speed, gantry speed and dose-rate are all utilized in plan optimization and delivery.