AbstractID: 14227 Title: Application of a Simple Transmission Dosimetry for Prevention of Loss of MLC Accident (LOMA) during Record and Verification (R&V) System Upgrade

Purpose: To evaluate the feasibility of a simple cumulative-fluence-measurement-based QA method for the prevention of loss of MLC accident (LOMA) during record and verification (R&V) system upgrade. We define LOMA as an accident IMRT delivery is made with MLC parameters lost. We introduce a simple transmission dosimetry method and its use for LOMA prevention QA.

Methods and Materials: The procedures are; 1) get a baseline cumulative-fluence pattern during regular treatments by therapists before upgrade, and 2) following the upgrade, repeat the same measurement by physicist(s) in QA mode. For the fluence measurement, a film holder was fabricated in a way that it; 1) doesn't interfere with accessory code and can stay in the wedge slot as needed, 2) causes no significant beam perturbation, 3) causes no clearance loss, and 4) can hold a radiochromic film centered. Stress level and execution time were evaluated. Optical density at a point was read and compared. Attenuation and surface dose were measured.

Results: Among six therapists, four expressed "zero" stress and two did "1" in zero to 10 scale with 10 the highest. It needed less than 2 minutes including documentation but additional time to regular treatment was less than 30 seconds because documentation was done in spare time. For physicists, it took about 10 to 20 minutes per patient depending on the number of fields. Attenuation was less than 0.4% and surface dose increases were 0.0, 0.1, and 0.6% (w.r.t dmax dose) for 5x5, 10x10, and 20x20 field, respectively.

Conclusions: The proposed method provided the confidence of data integrity in IMRT delivery during R&V system upgrade. It is simple to implement and will add either "no stress" or "minimal stress" to therapists. No significant time addition is expected for patient treatment. This method can be easily expanded for routine QA for LOMA prevention.