AbstractID: 14123 Title: Comparison of a novel transmission detector to a standard measurement technique for patient IMRT quality assurance

Purpose: A new measurement-based, pre-treatment IMRT composite quality assurance (QA) procedure was compared to a standard QA method. The standard QA method consisted of delivering the treatment to a cuboidal IMRT phantom containing dose measuring media. This standard measurement employed Gaf-chromic film sheets for relative dosimetry and an ion chamber for absolute dosimetry. The new method examined here used a novel transmission detector measurement (IBA Dosimetry) designed for *in vivo* patient dosimetry. However, before *in vivo* application, we compare to our standard QA method, which is the focus of this work.
Method and Materials: Treatment plans for ten previously-treated, head and neck IMRT patients were used. All treatment plans were QA'd with the standard method at the treatment beam angles. Measurements with the transmission detector (an array of 1600 IC's) were also performed at the treatment beam angles. The COMPASS software (IBA Dosimetry) converts these 2D-array measurements to incident fluence, and then forward calculates dose in a patient model (ie. CT data). In this work the patient model was a cuboidal shaped solid-water IMRT phantom (MedTec). Absolute doses were compared using isocentre location for the COMPASS/planning system, and a low dose gradient point location for the IC/planning system comparison (near isocentre, but not necessarily due to alignment needs during measurement).
Results: On average, the standard QA method results for absolute dosimetry were different by 1.4±1.8% compared to the planning system (measured above planning system). On average the transmission detector based QA method results for absolute dosimetry were different by 0.3±1.6% compared to the planning system (measured above planning system).
Conclusion: QA results using the COMPASS software with the transmission detector were comparable to the standard QA method.

Conflict of Interest (only if applicable): CancerCare Manitoba has a collaborative research agreement with IBA Dosimetry, although there is not direct financial support.