

## AbstractID: 7747 Title: Monte Carlo based dose calculations for Quality Assurance in the Electronic Medical Record

**Purpose:** To provide Quality Assurance (QA) of patient and treatment plan data transferred to the image-enabled Electronic Medical Record (EMR) before radiation therapy delivery.

**Method and Materials:** With the advent of multi-processor and multi-core workstations and advances in voxel-based Monte Carlo (MC) dose calculations which decrease calculation times, many commercial radiotherapy treatment planning (RTP) companies are implementing MC for primary dose calculations. With increased use of cone beam CT (CBCT) for IGRT, reference CT images and associated (contoured) structures are routinely sent from the RTP system and stored in the patient chart. The RTP system also sends the treatment plan to the EMR as the prescription for treatment field delivery. To ensure that correct data has been sent and imported into the EMR, an independent dose calculation server, based upon the XVMC code is being incorporated.

**Results:** The XVMC dose calculation has been implemented in the IMPAC MOSAIQ EMR and can receive dose calculation requests from RTP systems via DICOM, calculate dose, and return results. The RTP system may be used to compare this QA calculation with the prescribed dose. Alternatively, the MOSAIQ dose may be exported to a hybrid plan QA software application, where it may be compared with RTP calculated or measured (film, diode or ionization chamber array) dose.

**Conclusion:** An independent method of confirming correct transfer of patient and treatment plan data to the EMR and patient chart has been implemented. Advantages include the ability to replace reference CT images with CBCT, hence updating the patient model and the RTP prescription with the delivery parameters in the dose calculation. This EMR-centric data aggregation model provides a process QA check and supports evaluation of patient anatomy and resulting dose changes – and possible therapy adaptation.

**Conflict of Interest (only if applicable):** The authors are employees of IMPAC Medical.