AbstractID: 9036 Title: IMRT verification with 3 min/plan, 50 plans/week, 1 radiographer and only EPID dosimetry

Purpose: To provide an overview of 3 years' clinical experience with EPID dosimetry as our only form of plan-specific IMRT verification, used for all curative patient treatments.

Method and Materials: Dose is checked in 2D per field (back-projected to the isocentric plane perpendicular to the beam) or in 3D per plan (summed back-projected images to a volume). The algorithm includes corrections for EPID and patient scatter, attenuation (using CT data) and the inverse square law. Open images for each field are used to calculate the attenuation. For cases with large inhomogeneous regions (e.g. lung), plans are re-calculated with inhomogeneity corrections “off” and compared with an adjusted dose reconstruction. With $\gamma = 1$ for 3.0% (of isocentre dose) and 3.0 mm differences, an alert is raised if $\gamma_{mean} > 0.5$, $\gamma_{max1\%} > 2.0$, $P_{\gamma>1} > 15\%$ or $\Delta D_{isoc} > 3.0\%$.

Results: This year, 50 (IMRT) plans per week are verified by 1 therapist. Physicists perform the initial EPID dose calibration and are available in case errors arise. Checks are performed *in vivo*, except one-fraction treatments and large fields (> EPID), which are verified by EPID in a phantom. Typical total analysis time is 3 minutes (3 fractions *in vivo*). Between 2 and 4 serious errors have been prevented per year, i.e. plans changed based on discrepancies in 2D, or if necessary, 3D dose distributions.

Conclusions: As the sole form of plan verification for a large radiotherapy department, the combination of *in vivo* and pre-treatment EPID dosimetry allows a holistic approach to IMRT verification. Three years of clinical experience has proven the system to be highly efficient, sufficiently accurate and provides a safety net as the final check that all patients are correctly treated. EPID dosimetry solves time and management problems, and should become ubiquitous throughout radiotherapy centres worldwide.