AbstractID: 12651 Title: Quality assurance of VMAT treatment delivery: comparison of four different dosimetric equipments for the verification of plans created by two treatment planning systems.

Purpose: To compare four dosimetric techniques for the QA of VMAT plans created by two TPS. **Method and Materials:** 46 VMAT plans for treatment of anatomical sites of various complexity were created using ERGO++TPS (Elekta) (35 plans) and Oncentra VMAT module (Nucletron) (11 plans) for a 6 MV Elekta Synergy. Gamma analysis was used to compare calculated dose distributions with doses measured by 4 equipments: films (EDR2 and EBT2) in a solid water phantom, a 2D diode array (Mapcheck and Mapphan phantom), 2 crossing diode arrays in a cylindrical phantom (Delta4 system), an ion chamber array (PTW seven29 and Octavius). Mapcheck, delta4 and seven29 sensitivity to possible delivery errors was evaluated introducing +-3mm shifts along the 3 directions and a 3º gantry offset. **Results:** The average fraction of passed gamma values with a 3% and 3 mm criteria was above 95% for both TPS and all detectors except EBT2 which yielded an average of 91.0%. For 45 out of 46 plans a pass-rate above 93% was obtained by at least one of the 4 equipments. Shrinking the tolerance to 3% and 2mm the average pass rate by Mapcheck, delta4 and seven29 was still above 95% for ERGO, but lower for Oncentra. The detectors sensitivity to 3 mm shifts and to gantry angle offset was strongly plan and partially detector dependent: the obtained pass-rate reduction ranged from 2% to 30%. **Conclusion:** The presented results for VMAT plans QA assess the reliability of the delivered doses for both TPS. The slightly lower pass rate obtained for Oncentra can be attributed to a higher complexity of some of the created plans. The results by different dosimetric techniques are coherent, apart from a few measurements by EBT2. The detectors sensitivity to delivery errors, being strongly plan dependent, is not easy to evaluate.