# AbstractID: 10611 Title: Evaluation of the Delta4 ™ 3D Cylindrical Phantom for Delivery Quality Assurance of Stereotactic Body Radiotherapy (SBRT) Treatments using Helical Tomotherapy

**Purpose:** To evaluate the use of the ScandiDos® Delta$^{4}$™ cylindrical 3D phantom for delivery quality assurance (DQA) of stereotactic body radiotherapy (SBRT) treatments using helical tomotherapy.

**Method and Materials:** Five (n=5) patients with single or multiple lesions in either the lung or liver were treated with SBRT techniques using the Hi-Art II™ unit in our Institution. SBRT plans delivered dose per fraction doses in the range of 10.0-20.0Gy. For DQA plan creation, the Delta$^{4}$ ™ was scanned using the MVCT of tomotherapy and imported into the tomotherapy database as a phantom. A "fine" dose grid resolution was used for the dose calculation. Patient plan, structures, and dose were exported via DICOM RT protocol and uploaded into the ScandiDos® software platform. Profiles and gamma index analysis were used for plan validation.

**Results:** Good agreement between calculated and measured doses was observed using the Delta$^{4}$™. Results were consistent among the ten treatment plans evaluated over a period of 6 months. No diode calibration drift was noticed. For all the cases, good agreement in the high and low dose regions were recorded. All of the DQA measurements passed with at least 95% of the diode measurements within the gamma analysis criteria of 3% or 3mm. Additionally, a 20-30 minute time saving per DQA was noted using the Delta$^{4}$ ™ when compared to film and ion chamber techniques. Time reduction primarily occurs during post-delivery processing since analysis is performed instantly after measurement.

**Conclusion:** Our results indicate that the ScandiDos® Delta$^{4}$ ™ cylindrical phantom is an effective and efficient method for the delivery quality assurance of SBRT treatments using helical tomotherapy. The capability of measuring large doses per fraction eliminates the necessity of scaling the DQA procedure thus minimizing any possible scaling errors such as those associated with MLC latency.