Purpose: Monte Carlo (MC) dose modeling techniques are available in the newest version of Brain Lab's IPlan treatment planning system (TPS). Prior to the upgrade, at our facility, BrainLab's BrainScan was the treatment planning system available; pencil beam (PB) modeling is employed by BrainScan. As published in the literature, MC calculations, as compared to the PB algorithm, can generate differences in coverage as much as 20%. With the introduction of the new treatment planning system, treatment parameter comparisons were made with quantitative assessments. Differences due to changes in the dose calculation that could impact patient treatments and outcomes were investigated.

Methods: Beam data was collected for the new BrainLab TPS IPLAN under the conditions as outlined in the manufacturer's Version 1.3 data collection, commissioning and acceptance guidelines. Utilizing BrainLab's treatment planning systems, treatment plan comparisons were made. First, PB modeling treatment plans were assessed for each treatment plan with pencil beam modeling in the BrainScan and IPlan TPS. Treatment plans with MC modeling were then compared to PB models.

Results: Differences in the dose distribution, DVH values, and monitor units were evaluated between the older version software (BrainScan) and the newer treatment planning system (IPlan). As predicted by the literature, the differences in the MC modeling versus PB modeling were significant depending upon the anatomy (tumor site). Modeling comparison for the treatment plans will be presented for SRS (Stereotactic Radiosurgery) and Stereotactic Body Radiation Therapy (SBRT).

Conclusions: Clinical implementation of a new treatment planning system must be approached with caution and with adherence to AAPM recommendations and guidelines.

Whenever a new TPS calculation model is introduced, thorough comparison between former and new models should be obtained. An additional recommended test would be to perform an independent, end-to-end check of the overall system utilizing the RPC (Radiological Physics Center) phantom.

Funding Support, Disclosures, and Conflict of Interest:
none