

AbstractID: 3919 Title: Effect of daily shifts of IMRT prostate patients on dose to pelvic nodes

**Purpose:** Pelvic lymph nodes are often incorporated en bloc with the prostate as targets in radiation treatment. It is common practice to realign the fields daily before each treatment to account for prostate motion; however, pelvic nodes are relatively immobile such that adjusting the radiation fields to track the prostate may lead to a geographic miss of the nodes. Here, we explore the magnitude of this problem.

**Method and Materials:** Information from two patients was used in this analysis. IMRT plans were created using the NOMOS/Corvus system and PTVs extending 1.0 cm about the nodes CTV in all directions were planned to 45 Gy in only 25 of the approximately 40 total fractions. Daily field shifts were made by pretreatment ultrasounds of the prostate using the B-mode acquisition and targeting system. Dose of each shift was recalculated using Corvus and the results analyzed using Matlab and CERR. In addition, a random number generator used a clustered probability distribution derived from the total 40 or so shifts to produce alternative scenarios to the 25 shifts. This allowed evaluation of multiple scenarios without need for further timely dose calculation.

**Results:** In all simulations, the cumulative dose over all shifts showed little under-dosage, most of which was at the histogram's tail. For the 90% CTV volume there was a reduction of around 0.7% of prescribed dose. In shifted plans the maximums of each fraction no longer overlap in the same tissue so that most under dosage is expected to be at the histogram's tail.

**Conclusion:** These results suggest that current PTV expansions are adequate to provide prescribed dose coverage of CTVs. It may be possible to further refine PTV expansion definitions to reduce radiation to normal tissues while maintaining treatment delivery to target tissues without causing a geographic miss.