AbstractID: 9240 Title: IGRT Prostate: analysis of the effect of body size on setup error

**Purpose:** Daily MV EPI for localization of prostate implanted with gold seeds provided data for analysis of setup error and organ motion for 118 patients. Simultaneous time-course trends of prostate motion and setup error were analyzed fraction-to-fraction for 20 patients. The correlations of setup error and organ motion, setup error and body size, bladder and rectum filling and organ motion were evaluated. **Methods and Materials:** Setup error was determined from bony anatomy mismatch between the EPI and the DRR fraction-to-fraction, while the organ motion was determined from the gold seed displacement relative to bony anatomy. The data are the original setup error *before* positional corrections were applied. **Results:** A Gaussian probability density function is reasonable for modeling geometric uncertainties. Prostate motion occurred independently from bony anatomy displacement. Setup error is more pronounced in the AP direction and correlates with body size. For the 10 patients with setup error larger than 5mm, the correlation coefficient between the AP setup error and AP separation is 0.82. The larger body size leads to larger AP setup error. For prostate AP motion, SD decreased with increasing bladder volume in CT scan. The correlation coefficient of SD of prostate AP motion with bladder volume is -0.67. While SD of prostate AP motion increased with increasing rectal volume in CT scan. The correlation coefficient of SD of prostate AP motion with rectal volume is 0.60 because patients were CT scanned and treated with full bladder and empty rectum. **Conclusions:** A Gaussian PDF is reasonable for modeling geometric uncertainties. There is a correlation of patient size and magnitude of setup error where, the larger a patients body, the larger the potential setup error. Prostate motion occurred independently from bony anatomy displacement during treatment, and correlated with bladder and rectal filling.