

## AbstractID: 7177 Title: Cs-131 Prostate Brachytherapy and Treatment Plan Parameters

**Purpose:** While I-125 and Pd-103 have been widely used for low dose-rate prostate brachytherapy, Cs-131 (half-life = 9.7 days) has only recently become available. Due to differences in the radial dose fall-off for Cs-131 relative to I-125 and Pd-103, there are several qualitative differences with Cs-131 treatment plans. We investigate the relationship between plans using different isotopes as a function of prostate size and seed activity.

**Method and Materials:** Treatment plans were generated for ellipsoid prostate volumes using the VariSeed Treatment Planning System (Varian Medical Corporation). Ellipsoid dimensions (width, thickness, and length) were taken from representative averages for prostates in the volume ranges 20-30cc, 30-40cc, and 40-50cc. Appropriate seed activities for the Cs-131, I-125, and Pd-125 plans were found by comparing dose fall off and by direct observation of the sample plans. In order to investigate the effect on plan parameters by seed strength between different isotopes, a higher seed-activity plan and a lower seed-activity plan were developed for a medium volume and small volume prostate. Identical seed arrangements were used for each of the three isotopes.

**Results:** While the D90s for each configuration (lower and higher activity, smaller and larger prostate volume) were within 8% of each other, the V200 range was much greater (within about 26% of each other relative to the prescription dose). The ratio of seeds needed for a large prostate relative to a small prostate was less for Cs-131 compared to I-125.

**Conclusion:** The greater range of Cs-131 results in plans with fewer hotspots. Because the dose falloff is more gradual, these plans should be more robust against seed placement error, at the expense of greater dose outside the prostate. Larger prostates require relatively fewer Cs-131 seeds. The short half-life of Cs-131 presumably outweighs any of these treatment planning considerations.