

AbstractID: 3037 Title: Dose to the physician's extremity during I-125 prostate seed implant using a commercial loading device

**Purpose:** To evaluate a physician's extremity (mainly finger) dose during clinical I-125 prostate seed implants (PSI) using a Mick<sup>®</sup> loading device.

**Method and Materials:** To establish the location of radiation leakage "hot-spots" a piece of XV radiographic film was wrapped around an applicator loaded with a cartridge containing 15 I-125 seeds each with air-kerma strength of 0.44 U. A phantom assembly was developed to simulate the geometry of the interface between the user's hand and this "hot-spot". A piece of radiographic film was placed in the assembly to simulate the location of the user's finger relative to the "hot-spot" and exposed directly or through 1 or 2 layers of radiographic glove material.

**Results:** The exposure rate was found to be highest directly below the cartridge, probably due to the presence of small openings in the loader through which body fluids are meant to drain. This location is typically in contact with the physician's finger. For a fully loaded cartridge (15 seeds, air-kerma strength of 0.44 U per seed) it was found that the dose-rate on the surface of the finger is 2.4, 1.1 and 0.4 cGy/hr with 0, 1, and 2 layers of lead glove material, respectively, between the finger and cartridge. A theoretical calculation of the dose-rate in this geometry gives similar results.

**Conclusions:** For a volume of 150 PSI cases per year with 120 seconds of finger contact at the "hot-spot" per case, the annual dose to the surface of the finger is expected to be on the order of 12, 5.6, and 2 cGy when the physician wears no gloves, 1 pair, or 2 pairs of gloves, respectively, well within maximum permissible limits for an extremity. This dose can be effectively reduced to zero if the implant needles are manipulated with no finger contact at the "hot-spot".