AbstractID: 9292 Title: Workloads for high dose rate brachytherapy facilities

Purpose: Neither NCRP Report 147, *Structural Shielding Design… Facilities* nor NCRP Report 151, *Structural Shielding Design… Facilities* address high dose rate (HDR) brachytherapy facility shielding. From a review of HDR patients treated at a major medical center, we report yearly patient census, treatment times, and workloads, compare them to literature data, and observe the consequences for HDR facility design.
Methods and Materials: For shielding calculations for an HDR vault, the yearly workload is defined as the product of the air kerma strength (Gy m^2/h) at 1 m and the time (h) the source is used yearly. For a conventional 10 Ci HDR Ir-192 source, 0.04 Gy m^2/h is commonly used. Limited literature data on HDR workloads varies between 4 Gy/Yr to 15 Gy/Yr. From a two year (2006, 2007) review of patient treated with HDR, we identify patient treatment dates, anatomic sites, prescribed absorbed doses, fractions, and total treatment times. From these data we extract yearly patient census, workloads by anatomic site and total yearly workloads.
Results: By anatomic site, of 41 patients treated yearly, 14 were vagina, 13 uterus, 7 breast, 3 base of tongue, 2 sarcoma, and 2 head and neck. The average total number of fractions yearly was 232. Excluding quality assurance procedures, the average total yearly treatment time was 16.4 h and the average yearly workload at 1 m was 0.655 Gy/Yr, about 0.013 Gy/Week. These data are well below suggested literature values. This workload is less than 20% of the yearly workload of 4 Gy assuming 200 patients per year and a total yearly treatment time of 100 h used in this HDR facility's design.
Conclusion: Using current popular HDR treatment methodologies, workloads of 1 to 2 Gy/Yr likely are sufficient for HDR facility design, potentially reducing shielding costs.