AbstractID: 12698 Title: Skin dose during radiotherapy: a summary and general estimation technique

Purpose: The skin dose associated with radiotherapy is often of interest for clinical evaluation or examining the risk of late effects. Because the skin dose is difficult to measure, it is of interest to have a general dosimetry system for estimating the skin dose based on treatment parameters. Our objectives were to review the literature, conduct measurements to supplement the literature, and develop a general dosimetry system suitable for estimating the skin dose for clinical situations or epidemiologic evaluation. **Methods:** The literature was supplemented with measurements and Monte Carlo simulations. In particular, the impact of a block tray on skin doses from a cobalt beam was evaluated with TLD measurements. The skin dose outside of the treatment field for MV beams as a function of field size and distance from the edge of the treatment field was examined with Monte Carlo. Using the entirety of available data, a general dosimetry system was developed in the form of a series of equations to evaluate the skin dose based on treatment parameters including the D_{max} dose, treatment modality, and field size. **Results:** While there was little difference in skin dose between MV beam energies, cobalt, electron beams, and orthovoltage produced substantially different skin doses. Within the treatment field, it was found that the skin dose increased with field size, the presence of a block tray, and the obliquity of the incident beam to the patient's surface. Outside the treatment field, the skin dose was highly elevated relative to the dose at depth, increasing with increasing field size and distance from the field edge to as much as a factor of 7. **Conclusions:** On the basis of the literature and the findings of this study we developed a set of general rules and equations that estimate the skin dose for patients receiving radiotherapy.