AbstractID: 3099 Title: Rapid (<15 minutes) Automated Tangential Breast IMRT Treatment Planning With Cutplane Evaluation.

Purpose: To develop an automated, dose-based IMRT planning technique for tangential breast irradiation and to introduce a novel technique for efficient plan evaluation in three-dimensions.

Method and Materials: Patients were CT-simulated using an isocentric SAD technique with the medial and lateral tangents designed to encompass the breast tissue. The CT data and the beam information were transferred to the treatment planning system (TPS). The dose was then calculated for standard open equally weighted split beams. The planar dose rate matrix for a beams-eye-view plane was calculated and exported to a PC. An in-house program was developed to rescale this matrix and automatically create a series of dose-based MLC segments. Creation of the MLC segments took less than a minute. The MLC segments were imported back into the TPS where utilities were used to determine the optimal segment weights. An efficient plan evaluation tool was developed that presented the dose distributions in only three or less cutplanes parallel to the plane formed by the posterior beam border. The mathematical formalism for determining the cutplane orientation will be demonstrated. The planning and evaluation tools were tested on three representative case studies and compared to wedged tangent plans. To ensure unbiased comparison all plans were normalized to identical ICRU Reference Points.

Results: The entire planning process, from CT import to plan completion, took approximately 15 minutes. For all cases studied the IMRT plans demonstrated superior coverage and dose homogeneity as determined by both isodose coverage and the ICRU Conformity Index. Cutplanes through the lung, mid breast, and apex were found to be the most clinically useful.

Conclusion: The automated procedure is able to consistently produce optimized IMRT breast treatment plans within a few minutes. Isodose distributions in three cutplanes parallel to the posterior border are an effective tool for rapid plan evaluation.