AbstractID: 9638 Title: Analysis of Scatter dose on a contralateral breast as a function of surface dose and treatment depth

Purpose: To characterize scatter dose, as a function of depth and off-axis distance, on the contralateral breast (CB), during treatment of ipsilateral breast cancer using 6 and 18MV photon beams, utilizing wedge techniques and IMRT. **Method and Materials:** A 30x30x30 solid water phantom was utilized to simulate dose delivery to a right ipsilateral breast. Both surface dose measurements and planar dose distributions at depths (d = 1cm and d = 2cm) were analyzed, as well as dose distributions along the transverse axis of the phantom perpendicular to the beam. Data was taken using EDR2 film, thermal-luminescent dosimeters, and MOSFET detectors. A Varian 2100CD linear accelerator was used. Measurements were performed for the following arrangements: open field ($8x18cm^2$), 30 and 45^o physical wedge, 30 and 45^o Enhanced Dynamic Wedge (EDW), and control points (CP) used in IMRT. **Results:** Analysis of the data shows that for the hard wedges used, a significant increase in scatter dose to the CB during treatment by 5-7% and 12-15% for the 6MV and 18MV respectively is present. At a depth of 1 cm (6MV), data indicates that for a position in the CB, scatter dose is approximately 7% of the central axis dose of the open beam. The relative increase of 2% occurred with the use of EDW. No increase in scatter dose was measured for the CP case. **Conclusion:** This study seems to indicate that it may be possible to quantify scatter dose through a mathematical function, based on beam energy, depth of treatment, and treatment modality. Application of such a function may be of benefit in improving treatment plans and providing guidelines with regard to dose delivery and potential shielding of CB during whole or partial breast radiotherapy.