AbstractID: 1454 Title: Automated Isodose-Based Inverse Planning for Large Mantle Fields

The purpose of this work is to develop a simple, automated, isodose-based inverse planning procedure for large mantle fields. Standard AP and PA mantle fields are entered into a commercially available treatment planning system. A planar dose distribution matrix Dij is calculated at a clinically significant coronal plane and exported to a PC. Values of Dij<50% are considered outside the geometrical field and reset to zero. A program was developed that computes the desired fluence matrix Fij, proportional to the inverse of Dij, which delivers a uniform planar dose. Alternatively, if a nonuniform dose is preferred either to spare a critical structure or to integrate a boost to an involved field, the program scales Fij by a dose-painting factor Pij. A published algorithm is utilized to generate the ideal minimum number of optimized MLC step-and-shoot segments. The algorithm incorporates the physical MLC constraints to compute the largest deliverable aperture per segment. The MLC defined apertures are imported back into the treatment planning system for dose calculation where available utilities optimize the relative segment weights. We have achieved ± 5% uniformity with a total of eleven MLC segments in a 30x40 cm area encompassing the cervical, supraclavicular, axillary, hilar, and mediastinal lymph nodes. Isodose-based inverse planning does not require organ delineation or iterative adjustment of dose-volume constraints. We have demonstrated its ability for the clinically complex inhomogeneities and separations typically found in a large mantle field. This method can be easily applied to other clinical sites such as breast and H&N.