

AbstractID: 8859 Title: An Independent Dose Verification Program for Step-and-Shoot Intensity Modulated Radiotherapy

The IMRT has been implemented in our institution since 2001. The treatment was delivered using the step-and-shoot technique employing dynamic MLCs. Rigorous QA procedure were maintained and applied to each patient before and during IMRT treatment, including portal films, film dosimetry, and ion-chamber measurements.

An independent dose calculation software has been developed in-house, in pursuit of a better dose verification tool, which can directly base on the patient data. Equipped with UNIX tools and C program, it reads in and looks into each segment of the dynamic MLC file. All the leaf positions are analyzed and the open area is computed in each segment. The location of the isocenter, whether exposed under the beam or blocked by the MLC leaves, is carefully investigated and being dealt with accordingly. The dose contribution from each segment to the isocenter is computed, provided that the treatment depth and MU are made available, the dose accumulation from all segments gives rise to the isocenter dose of the whole field.

This verification program was applied to the phantom data, in comparison with the IMRT planning results, as well as with the ion chamber measurements. It further applied to the patient data and compared directly with the planning isocenter dose in the patient. Ten patients were randomly selected and the results provided satisfactory agreement, with deviations ranging from 0.2% to 3.7%, and 1.8% on average. This in-house dose calculation program will be used soon in routine clinic as an independent dose verification tool.