

AbstractID: 4707 Title: A New Software Tool for Plan Analysis and Comparison

Purpose: To develop a simple software tool which allows quantitative analysis and comparison of multiple treatment plans using physical and biological parameters.

Method and Materials: When comparing multiple IMRT and/or conventional radiotherapy plans, it is often difficult to choose the best plan by visual inspection of DVHs and associated statistics such as “hot spots” and “cold spots”. Comparison of multiple rival IMRT and 3D plans can become a cumbersome process, particularly if different planning systems are used for each. To overcome these problems, we developed a Java-based software tool called MPACT (Multi-parameter Plan Analysis and Comparison Tool) to evaluate treatment plans using physical and biological parameters. MPACT directly imports patient and DVH information from the treatment planning system(s) and calculates gEUD (generalized Equivalent Uniform Dose), HI (Homogeneity Index), and CI (Conformity Index). The user may import as many plans as desired and compare these parameters for all plans on one screen.

Results: MPACT has been used to assess the clinical advantage of breast IMRT for the first 10 patients treated at our center. While DVH analysis did not often reveal significant differences or provide an easy means for quantitative comparison, MPACT revealed that IMRT provided an 8% increase in the average target gEUD, 3% and 1% decreases in lung and heart gEUD, respectively, and a 3% increase in the average HI and CI in comparison to conventional compensator plans.

Conclusion: MPACT provides a convenient mechanism for plan comparison for any treatment site, and facilitates an objective, quantitative decision-making process. It has proven to be a valuable tool for comparison of conventional and IMRT radiotherapy plans or multiple competing IMRT plans. The addition of TCP and NTCP calculation functionality is currently underway, and MPACT will ultimately serve as a platform for a plan optimization system using these calculated parameters.