

**Objective:** For a given set of constraints, IMRT optimization searches for a minimum of the cost function to within the user specified convergence limit. The efficacy of segmentation and subsequent delivery may be dependent on the design and the leaf width of the MLC. The objective of the present study is to investigate if leaf resolution affects the quality of the treatment plan.

**Materials & Methods:** Two accelerators with different MLC leaf resolution (10mm and 5 mm) are chosen in this study for three different cases (prostate, lung and head and neck). The dosimetry of the two machines are identical to within  $\pm 1\%$ . With identical beam angles and dose grid (2 mm), IMRT plans are generated for the same set of constraints for both machines. The DVHs of the PTV and the relevant organs-at-risk (OAR) are compared.

**Results:** Figure 1(a, b, c) shows the DVH for prostate, lung, and head and neck. There are very little differences between PTV coverage and OARs except for small structures ( $< 2 \text{ cm}^3$ ) for which the differences are appreciable.

**Conclusions:** For treatment sites which involve small structures (volume  $< 2 \text{ cm}^3$ ), the use of 5 mm MLC is more beneficial as demonstrated in this study in the head-and-neck IMRT. For IMRT treatments with reasonable size OARs, MLC resolution does not appear to be a significant factor for all practical purpose. Thus in general, IMRT optimization and segmentation is relatively insensitive to the leaf width.