AbstractID: 5051 Title: A simple scoring method of dose homogeneity for IMRT treatment planning

Purpose: The goal of this study was to develop new index for effectively evaluating dose homogeneity with the target-volume dose–volume histogram (DVH) of intensity-modulated radiotherapy (IMRT) treatment plans.

Method and Materials: The newly defined homogeneity index for assessing dose homogeneity in a target volume, named the *sigma*-index (*s*-index), was developed using a normalized differential-DVH (*d*DVH) with statistical analysis.

Results: The *s*-index, determined as the standard deviation of the normalized *d*DVH, was found to vary from 0.80 to 3.15 for the DVHs of brain tumor at out institution. It has been shown that the dose homogeneity for target volume could be also evaluated based on the functional approximation of a target volume DVH to a modified step function and a normalized differential-DVH to a Gaussian function. The *s*-index was compared with these functional approximations in addition to the conventional homogeneity indices.

Conclusions: The results showed that the *s*-index gives a consistent method for quantifying the degree of homogeneity and has been demonstrated to be more accurate than the conventional methods in evaluating the dose homogeneity. A guide line of the treatment plan based on dose homogeneity is discussed with relation to equivalent uniform dose (EUD).