

AbstractID: 2756 Title: Commissioning of tissue inhomogeneity correction of Eclipse radiation treatment planning system using a lung phantom

**Purpose:** It has been noted that dosimetric difference due to tissue inhomogeneity is significant for a lung patient. If there is no tissue inhomogeneity correction (IC) made, the treatment plan could mislead treatment. Commercial radiation treatment planning (RTP) systems have the capability to include tissue IC. To utilize IC, each correction method should be reviewed and verified in advance. This study presents the commissioning of tissue IC in the Eclipse RTP system for three methods; Batho power law (Batho), Modified batho (Mo-Batho), and Equivalent TAR (E-TAR).

**Method and Materials:** Treatment plans were mapped onto CT images of a lung phantom. Dose was calculated once without IC and three times with different correction methods each time. Doses were measured at three different locations, one inside of the lung in the phantom, one in the body in between lungs, and the last one in the bone.

**Results:** The results demonstrate that the calculated without tissue IC could be significantly different from the measured dose in the treatment room. This difference varies depending on the extent to which each radiation field passes through inhomogeneous tissues. This study proves that the currently available correction methods reduce the error made due to tissue inhomogeneity. The calculated dose without IC was 5 – 10 % from the measured dose at the point inside of the lung or in between the lungs. The difference ranges 2 – 3 % using Batho, 1 – 3 % using Mo-Batho, and 0 – 4% using E-TAR. However, the calculated dose to the point inside of the bone was about 2 – 5 % different from the measured dose regardless of the use of IC.

**Conclusion:** This study overall favors the use of inhomogeneity correction for treatment plans. Among all correction methods in Eclipse, Modified batho is recommended based on this study.