

## AbstractID: 8700 Title: Clinical impact of applying heterogeneity correction to dose calculations for esophageal sites

**Purpose:** Many studies of the effects of tissue heterogeneity corrections exist for lung sites, but relatively few have focused on the esophagus. In this study, we characterize the differences between heterogeneity corrected and uncorrected esophageal cancer treatment plans in terms of physical and equivalent uniform dose (EUD). The aim is to provide guidance on prescription formulation when corrections are utilized, in order to connect past observed clinical outcomes to future planning calculation methods.

**Method and Materials:** Seven patients with esophageal tumors superior to the diaphragm and inferior to the carina were evaluated. All plans used a four field 3D conformal technique, with a dose of 50.4 Gy prescribed to cover, at minimum, 93% of the PTV in 28 fractions. Three treatment plan variations were developed for each patient: (1) with heterogeneity correction, (2) without, and (3) with heterogeneity correction, but prescribed such that the monitor units were the same as the uncorrected plan. The corrected plan was taken to reflect the actual delivered dose and utilized as a reference for comparison.

**Results:** The mean dose to the PTV was on average 2.6% higher in the corrected homo plan compared to the uncorrected plan (range: 0.9% to 5.8%). The standard deviation of the mean dose difference was 1.6%. The standard deviation of the PTV dose increased on average by 39.7% and volume of lung receiving 20 Gy increased by an average of 2.2%. The EUD of the PTV increased by an average of 2.2 percent (range: 0.0% to 5.7%).

**Conclusion:** Using a homogeneous model will result in an increase in the EUD to the PTV as well as greater dose inhomogeneity within the PTV, a greater lung volume receiving at least 20 Gy, and a higher uncertainty in the PTV mean dose.