# AbstractID: 6632 Title: Commissioning and Validation of a Beam Model for Calculating Megavoltage CT Dose from Imaging with a Helical Tomotherapy Unit.

**Purpose:**
To commission and validate an MVCT beam model that allows for the calculation of dose received by patients due to megavoltage imaging on a helical tomotherapy unit (Tomotherapy, Inc., Madison, WI).
**Method and Materials:**
Percent depth dose and profile data were collected in order to commission a new MVCT beam model. The fluence output for the beam model was adjusted to match the measured dose in phantom. The model was then verified through a series of absorbed dose measurements in three phantoms (20-cm cylindrical phantom, CIRS anthropomorphic phantom, and 30-cm "cheese" phantom). The multiple scan average dose was recorded for all three phantoms with various changes to CT collimator pitch and ion chamber location (central versus peripheral points).
**Results:**
The delivered doses and the computed doses were on average within 1.5% for all three phantoms, when the ion chamber was centrally located; and within 3.5%, when the chamber was located on the peripheral edge of the phantoms. The measured dose in the anthropomorphic phantom was 2.3 cGy with a pitch of 1.0 (4 mm couch movement per gantry rotation), 1.4 cGy with a pitch 2.0, and 0.90 cGy with a pitch of 3.0, these matched within 1% to the calculated dose. The computed versus measured dose was also within 1% when calculating dose in different tissue densities (lung and bone).
**Conclusion:**
This study has shown that with the development of a new MVCT beam model, dose delivered from MVCT imaging can be calculated. Validation measurements, in phantom, have verified that the computed dose can be reported to within 1.5% of the measured dose. The rationale for implementing this MVCT beam model is to provide a future method for calculating patient-specific MVCT dose.

**Conflict of Interest:**
Co-authors are either funded by a research grant or employed by TomoTherapy, Inc.