AbstractID: 12716 Title: Estimation of organ doses from kV-CBCT imaging systems used in radiation therapy

Purpose: The purpose of this study was to develop a practical method for estimating organ doses from kilovoltage cone-beam CT (CBCT) that can be performed with readily available phantoms and dosimeters. The accuracy of organ dose estimates made using the ImPACT patient dose calculator was also evaluated. **Method and Materials:** A 100 mm pencil chamber and standard CT dose index (CTDI) phantoms were used to measure the cone-beam dose index (CBDI). A weighted CBDI ($CBDI^{w}$) was then calculated from these measurements to represent the average volumetric dose in the CTDI phantom. By comparing $CBDI^{w}$ to previously published organ doses [J Appl Clin Med Phys., 2010], organ dose conversion coefficients were developed. The measured CBDI values were also used as inputs for the ImPACT calculator to estimate organ doses. All CBDI dose measurements were performed on both the Elekta XVI and Varian OBI using factory installed protocols at three clinically relevant locations: head, chest, and pelvis. **Results:** The head, chest, and pelvis protocols yielded $CBDI^{w}$ values of 0.98, 16.62, and 24.13 mGy for the XVI system and 5.17, 6.14, and 21.57 mGy for the OBI system, respectively. Organ doses estimated with the ImPACT CT dose calculator showed a large range of variation from previously measured organ doses, demonstrating its limitations for use with CBCT. **Conclusion:** The organ dose conversion coefficients developed in this work relate $CBDI^{w}$ values to organ doses previously measured using the same factory installed clinical protocols. Ultimately, these coefficients will allow for the quick estimation of organ doses from routine measurements performed using standard CTDI phantoms and pencil chambers.