# AbstractID: 8894 Title: Calculation of the dose of the day using megavoltage cone-beam CT

**Purpose:** The purpose of this work is to show that megavoltage cone-beam CT (MVCBCT) images can provide accurate dose recalculation and be used to verify the daily dose distribution received by patients treated for head-and-neck (H&N) and prostate cancers.

**Method and Materials:** Corrections for the cupping and missing data artifacts seen on MVCBCT images were developed for both H&N and pelvic imaging. MVCBCT images of six H&N and two prostate patients were acquired weekly during the course of their treatment. Several regions of interest were contoured including: the prostate and rectum and for H&N cases the spinal cord and parotids. Dose calculation was performed with the corrected MVCBCT images using the planned treatment beams and variations from treatment plan dosimetric endpoints were analyzed.

**Results:** MVCBCT image correction and calibration for the H&N (pelvic) region shows standard deviations in dose calculations between kVCT and MVCBCT images of 1.9% (0.6%). The mean dose to the right parotid of H&N patients had an average increase of 18% during treatment. Increases of up to 52% were observed. The maximum dose to 1% of the spinal cord went up by 2% on average, although increases of up to 10% were noted. For prostate patients on one fraction an undetected setup error caused the dose received by 95% of the prostate to diminish by 3%. One patient had an average increase of 3.6% of the maximum dose received by 1% of the rectum.

**Conclusion:** MVCBCT was used succesfully to verify the daily dose distribution for H&N and prostate patients. A substantial increase in the mean dose to the parotid glands was observed during treatment. For prostate patients the impact of setup errors on the prostate dose coverage was observed, along with the dosimetric consequences of volume changes in normal tissues.

**Conflict of interest:** Supported by Siemens.