Purpose: To investigate the setup reproducibility in an initial series of 18 patients treated with inverse planned IMRT to the chestwall plus regional mammary nodes. We report on setup errors, required PTV expansion and the factors affecting them.

Methods: Eighteen post-mastectomy, chest-wall patients undergoing daily kV to guide positioning during 566 treatment fractions were studied. Patients were positioned by aligning bony anatomy and surgical clips when present (n=14). All patients were immobilized with custom-fabricated upper and lower alphacradle molds. The couch shifts resulting from kV images were analyzed offline; only shifts subsequent to correction for rotations were included. Systematic and random components of setup errors and PTV margins were computed following the methodology of van Herk. The effect of factors such as body mass index (BMI) and presence of clips on setup errors was also investigated.

Results: For patients with clips, the mean (standard deviation) shifts in the anterior-posterior (AP), superior-inferior (SI) and left-right (LR) directions were: 1.8 (2.4), 2.5 (2.5) and 2.3 (2.4) mm. The resulting PTV margins were: 3.5, 6.3, 6.3 mm along the AP, SI and LR directions, and were comparable for patients with and without clips to within 0.5 mm. For patients with clips and immobilization without a slantboard (n=12), a strong correlation between patient BMI and average daily 3D shifts (r=0.71) was found. Rotational adjustments of patients were required in 35% (16%) of treatment sessions.

Conclusions: In our patient cohort, a non-uniform PTV margin of 4 mm AP, 7 mm SI and 7 mm LR could be used to adequately cover intended targets in the absence of daily imaging for chestwall patients irradiated with IMRT. However, patient rotations would remain uncorrected for in approximately one-third of treatment fractions by forgoing daily kV imaging.