AbstractID: 4985 Title: Observed inter-camera variability of clinically relevant performance characteristics for SIEMENS Symbia® gamma cameras

Purpose: To evaluate the inter-camera variability of clinically relevant performance characteristics for Symbia® gamma cameras (Siemens Medical Solutions, USA).

Materials and Methods: Evaluation of the inter-camera variability was based on measurements made with nine separate systems. Performance characteristics measurements were based on NEMA standards and AAPM Reports (#22 and #52). All of the measurements were performed using Tc-99m (except Co-57 for extrinsic resolution) and low-energy high-resolution collimation. Of the nine cameras, 4 have 3/8" and 5 have 5/8" crystals. Energy resolution, intrinsic and extrinsic spatial resolution, intrinsic integral and differential flood uniformity over the useful field-of-view, pixel size, deadtime, sensitivity, SPECT resolution, and SPECT integral uniformity were evaluated. The mean, standard deviation, and coefficient of variability (CV) of each metric were computed for each crystal thickness.

Results: The mean (standard deviation) of the measured metrics for the 3/8" and 5/8" crystal systems, respectively, were as follows: energy resolution [FWHM-%] of 9.5 (0.2) and 9.5 (0.3); intrinsic resolution [FWHM-mm] of 3.46 (0.08) mm and 3.87 (0.09) mm; extrinsic resolution [FWHM-mm] of 4.39 (0.09) mm and 4.70 (0.10) mm; integral uniformity [%] of 4.5 (0.4) and 4.7 (0.7); differential uniformity [%] of 2.6 (0.3) and 2.7 (0.2); pixel size [mm] of 0.601 (0.001) and 0.602 (0.001); maximum count rate [kcps] with 20% deadtime loss of 125 (18) and 130 (13); sensitivity [cpm/μCi] of 203 (5) and 217 (8); SPECT resolution [FWHM-mm] of 13.2 (0.1) and 13.4 (0.1); and SPECT integral uniformity [%] of 0.14 (0.02) and 0.13 (0.01). The mean and maximum CV were determined to be ~6% and ~17%, respectively, with the intrinsic uniformity, deadtime, and SPECT uniformity displaying the greatest CV amongst the different systems.

Conclusions: All of the tested gamma cameras exhibited performance characteristics within specifications and the inter-camera variability was observed to be low.