AbstractID: 11592 Title: Evaluation of noise and SDNR characteristics of blended ASIR and FBP images obtained with the GE Discovery CT 750 HD scanner.

Purpose: The new GE 750 HD CT scanner utilizes adaptive statistical iterative reconstruction (ASIR), which can be blended in various proportions with the filtered back projection reconstructions.   A study was performed to characterize the dependence of noise and signal-difference-to-noise ratio (SDNR) on %ASIR for a range of doses.

Method and Materials: Scans of the low contrast resolution module in the ACR CT accreditation phantom were acquired using "full-dose", 2/3 dose, ½ dose, and ¼ dose techniques. Scans were obtained in normal resolution mode with the STD, edge, and soft kernels, and in high resolution mode using the STD, HD STD, and edge kernels. ROIs were placed in the 25 mm cylinder and adjacent background region in this module. Images were reconstructed with %ASIR ranging from 0 -100 in steps of 10. For each condition, mean and standard deviations in the ROIs were obtained for 5 central slices in the module. Noise and SDNR were computed and the %ASIR that yielded the same noise and SDNR as in the full-dose cases were determined for the lower doses.

Results: %ASIR and dose had no effect on the mean CT#s in the cylinder and background. Noise was found to linearly decrease with %ASIR, (R^2 >0.997).   SDNR increased quadratically with %ASIR (R^2>0.996) . For normal resolution, STD kernel, the noise and SDNR at full dose were achieved at 2/3 dose, ½ dose and ¼ dose, using 30%, 50% and 84% ASIR, respectively. Corresponding %ASIR for high resolution, HD STD were 23%, 42% and 68%. Values for other kernels will be presented.

Conclusion: ASIR reduces noise and improves SDNR.   By applying appropriate %ASIR, one can achieve similar image quality at reduced dose. The frequency content of the noise is different which can affect the %ASIR that is acceptable in the clinic.