AbstractID: 8199 Title: SAF values for internal electron emitters calculated for the RPI-P pregnant-female models using Monte Carlo methods

Purpose: to calculate specific absorbed fraction (SAF) values for internal electron emitters based on more realistic RPI-P serial pregnant female models. **Material and Methods:** The RPI-P series pregnant-female models developed by Xu and coworkers were used for Monte Carlo simulation. Those models are based on boundary-representation method for organ delineation. The image sources are from clinical CT image, VIP-Man image, and public domain images. The pregnant woman models, RPI-P3, RPI-P6, and RPI-P9, were implemented into a previously developed Monte Carlo user code, EGS4-VLSI. In this study, internal electron emitters were considered for the following energies: 10, 15, 20, 30, 50, 100, 200, 500, 1000, 1500, 2000, and 4000 keV. SAF values to the fetus were calculated for each of these energies involving 35 source organs. **Results and Discussion:** SAF factors from source organs to the fetus have been calculated for all the three pregnant female models. Results show that electron SAF values follow linear relationship as equation: $\log(SAF(\mathit{fetus} \leftarrow \mathit{source}) = A \bullet \log(E) + B$, where E is the electron energy, A and B are coefficients. A and B coefficients were calculated. R^2 coefficient, the determination for the linear relationship, is ranging from 0.90~1.00 except source organ=heart for RPI-P3 model. It means the linear relationship between log(SAF) and log(E) is fitting well. **Conclusion:** SAF values have been derived based on a new developed RPI-P series pregnant-female models using Monte Carlo method. For electron emitters ranging from 10 keV to 4000 keV, the log(SAF) and log(energy) relationship can be approximated by linear function.