

AbstractID: 13741 Title: Calculation and evaluation of internal and external radiation exposure to adult and pediatric patients from PET/CT examinations

**Purpose:** To assess organ and effective dose for patients undergoing whole-body F-18 FDG PET/CT examinations using available software. **Materials and Methods:** The OLINDA/EXM 1.1 code was used in conjunction with an F-18 FDG biokinetic model to assess PET dose for adult male/female and pediatric patients of various ages. For the PET emission scan it was assumed that 555 MBq of F-18 was administered to adults and that the activity for pediatric patients ranged from 18.5 to 370 MBq according to weight. The dose from the CT portion of the exam was assessed using the recently developed VirtualDose dose-reporting software. The calculations assume a GE LightSpeed 16 scanner was used to perform a CT attenuation correction scan at 140 kVp and 25 mAs and a diagnostic CT at 140 kVp and 200 mAs. **Results:** The effective doses for adult male and female patients undergoing PET/CT procedures were estimated to be ~30 mSv and ~40 mSv respectively with the CT portion contributing two-thirds of the overall dose. A disadvantage of the OLINDA/EXM 1.1 code is that it utilizes stylized phantoms which are not anatomically realistic and does not use the recently adopted ICRP 103 tissue weighting factors. VirtualDose does not have these shortcomings, but a potential weakness is that the current version does not calculate CT dose for pediatric phantoms. If F-18 was administered by weight at 8 MBq/kg, the effective dose from the PET portion of the scan for the 1-, 5-, 10-, and 15-year-old phantoms was 6.9, 8.3, 9.5, and 10.8 mSv respectively. **Conclusions:** This work has identified that there is a need for a single software package for assessing PET/CT dose which combines the strengths of OLINDA/EXM 1.1 and VirtualDose and utilizes state-of-the-art voxel phantoms of various ages/sizes as well as up-to-date ICRP effective dose schemes.