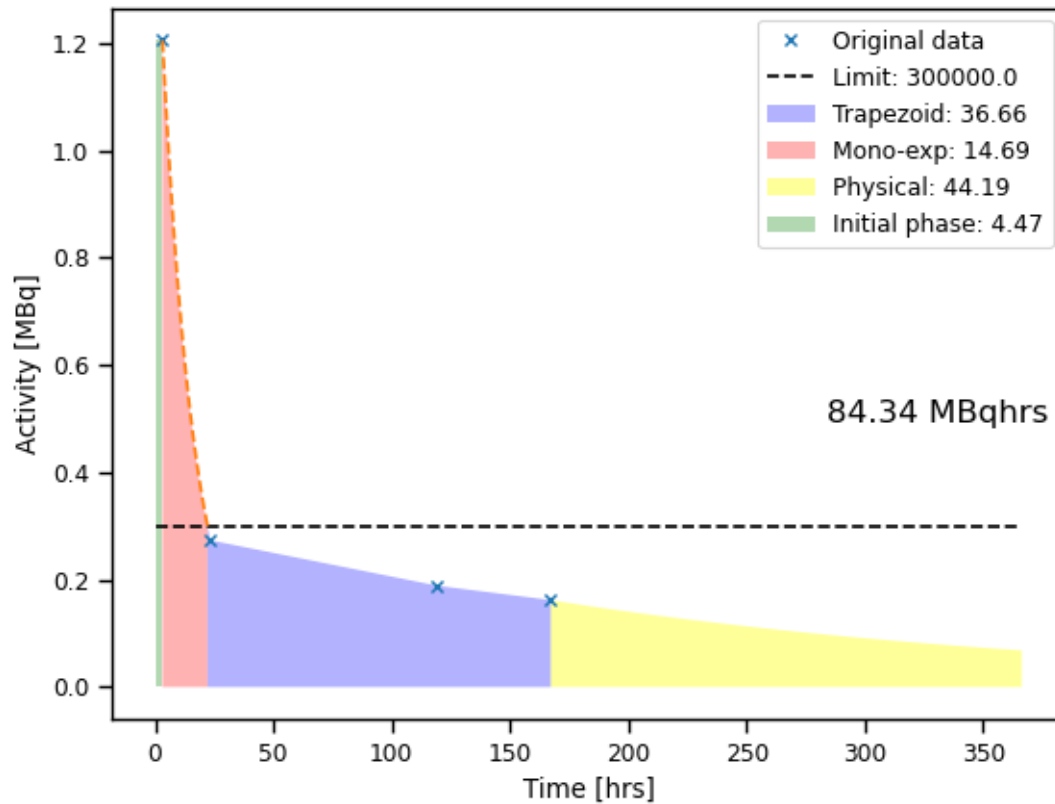


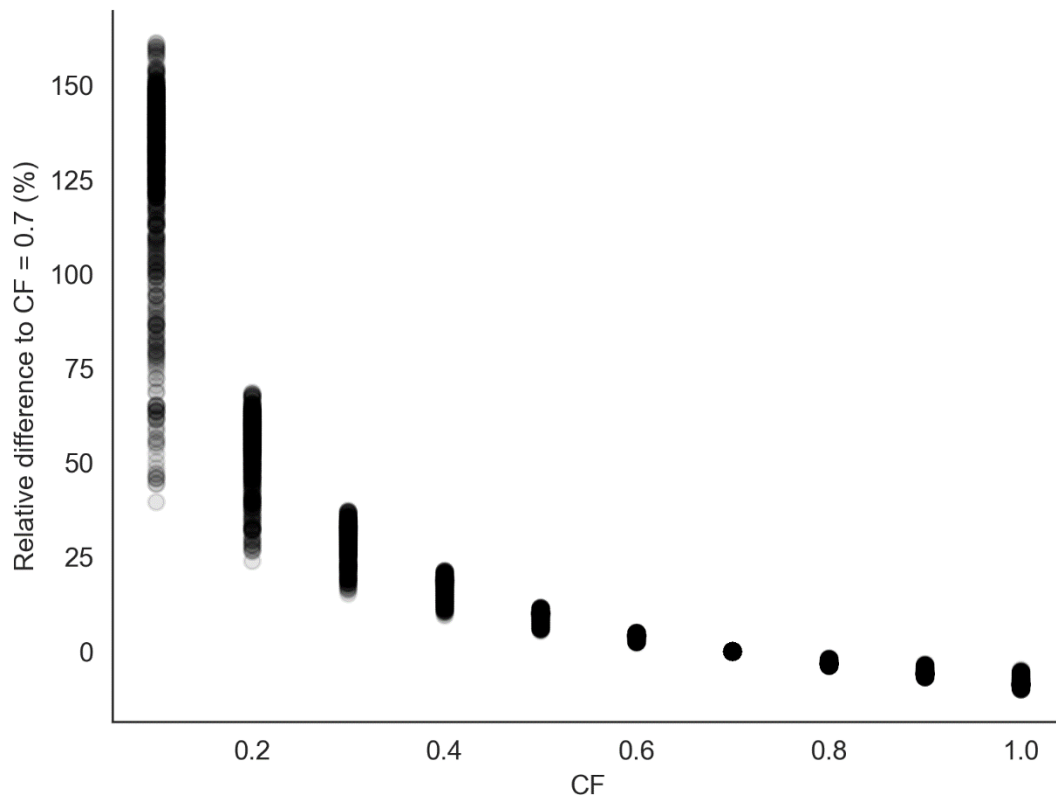
## Supplemental Data

### Supplemental Figure 1



The fitting procedure used in our study for patient 11, vertebra L4 with a red marrow mass at 16.6 grams at 70 % cellularity. Initially, a constant activity is assumed from  $t = 0$  until the first time-activity point. Then, a mono-exponential curve is fitted to the initial three time points. When the fitted curve passed a pre-defined noise threshold of 0.3 MBq, previously established from a phantom study, the integration is done by trapezoid integration until the last time point. Following the last time-point, a mono-exponential tail is fitted to infinity with a half life equal to the physical half-life of  $^{177}\text{Lu}$ .

## Supplemental Figure 2



The relative difference between the absorbed dose calculated with a given cellularity factor (CF) compared to the reference value from ICRP (CF=0.7)

**Supplemental Table 1**  
**Table of p-values for the multivariable analysis.**

Parameter	p-value, main effect	p-value, interaction effect
Gender	0.39	0.16
Age at Treatment (years)	0.38	0.74
Weight (kg)	0.87	0.24
BMI (kg/m <sup>2</sup> )	0.81	0.24
Diabetes? (Y/N)	0.71	0.76
Hypertension? (Y/N)	0.38	0.85
Total tumour volume on 68-Ga-PET	0.51	0.96
Total tumour activity on 68-Ga-PET	0.89	0.62
ECOG	0.66	0.77
Prior systemic treatments (Y/N)	0.28	<b>0.01</b>
White Cell Count (K/cmm)	0.15	0.82
Absolute Neutrophil Counts (K/cmm)	0.16	0.56
Hemoglobin (g/dL)	0.89	0.16
Platelet Count (K/cmm)	0.32	0.46
Estimated Glomerular Filtration Rate (Calculated)	0.05	0.87
Creatinine Score (mg/dL)	0.16	0.67
Chromogranin A (Tumour Marker) (ng/mL)	0.51	0.38
Disease Present in Bone Pre-Lutathera (Based on Dotatate PET)	0.63	0.59
Absorbed dose to spleen (Gy)	0.11	0.44

#### **Bone value fraction variation as measured by CT in spongiosa**

The resulting bone value fraction (BVF) calculated for the included vertebrae were analyzed and compared with previous phantom values. An inter-cycle and intra-vertebra analysis was also performed. The vertebra-averaged BVF for the included vertebrae ranged from 0.11 to 0.26 with an average  $\pm$  standard deviation of 0.17  $\pm$  0.03. This is somewhat higher, although comparable to the values found for example in the University of Florida data set of approximately 0.113, depending on vertebra and sex (1,2)

The relative standard deviation of the voxel BVF within each vertebra was on average 37.2 %  $\pm$  8.8 %. The inter-cycle deviation of the BVF was evaluated for a total of 197 vertebrae that was part of the field of view for all cycles. The average relative inter-cycle standard deviation was 3.2  $\pm$  2 %.

The average BVF for each patient and cycle are given in supplementary Table 2

**Supplemental Table 2: Average BVF for each patient and cycle**

Patient	Cycle1	Cycle2	Cycle3	Cycle4
P11	0.196	0.192	0.187	0.187
P12	0.201	0.195	0.190	0.185
P13	0.205	0.200	0.202	0.201
P14	0.173	0.159	0.170	0.168
P15	0.150	0.145	0.139	0.135
P16	0.174	0.172	0.170	0.165
P20	0.181	0.181	0.173	0.173
P21	0.139	0.137	0.136	0.138
P22	0.177	0.166	0.167	0.167
P23	0.155	0.150	0.150	0.135
P24	0.151	0.151	0.139	0.139
P25	0.185	0.183	0.176	0.176
P26	0.157	0.155	0.155	0.151
P27	0.171	0.171	0.162	0.161
P28	0.176	0.170	0.170	0.168
P30	0.228	0.223	0.222	0.223
P33	0.148	0.149	0.144	0.144
P34	0.148	0.145	0.144	0.147
P36	0.207	0.203	0.200	0.196
P38	0.184	0.171	0.159	0.151

## References

1. Hough M, Johnson P, Rajon D, Jokisch D, Lee C, Bolch W. An image-based skeletal dosimetry model for the ICRP reference adult male - Internal electron sources. *Phys Med Biol.* 2011.
2. O'Reilly SE, Deweese LS, Maynard MR, et al. An image-based skeletal dosimetry model for the ICRP reference adult female - Internal electron sources. *Phys Med Biol.* 2016.