6. Supplementary

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| **Supplementary Table 1**: Patient and dose characteristics and clinical information. | | | | | | | | |
| Patient, tumor type | Number of pathological lesions on STD examination  (3.0 MBq/kg, 5 min, HS mode) | Patient characteristics | | | | Dose characteristics | | |
| Body height in cm | Body weight  in kg | BMI  in kg/m2 | Age  in years | Total dose of [18F]FDG  in MBq | Total dose of [18F]FDG  in MBq/kg | Effective dose of scan  in mSv |
| #1 melanoma | 1 | 1.69 | 60.4 | 21.15 | 85 | 164 | 2.72 | 3.12 |
| #2 lymphoma | 5 | 1.65 | 68.6 | 25.20 | 36 | 226 | 3.29 | 4.29 |
| #3 lung cancer | 2 | 1.67 | 83 | 29.76 | 63 | 264 | 3.18 | 5.02 |
| #4 lymohoma | 4 | 1.78 | 71 | 22.41 | 80 | 215 | 3.03 | 4.09 |
| #5 esophageal cancer | 5 | 1.7 | 76 | 26.30 | 68 | 237 | 3.12 | 4.50 |
| #6 anal cancer | 2 | 1.67 | 79 | 28.33 | 61 | 228 | 2.89 | 4.33 |
| #7 lymphoma | 2 | 1.58 | 53 | 21.23 | 92 | 129 | 2.43 | 2.45 |
| #8 lymphoma | 5 | 1.64 | 43 | 15.99 | 67 | 160 | 3.72 | 3.04 |
| #9 CUP (adenocarcinoma) | 5 | 1.7 | 69 | 23.88 | 76 | 245 | 355 | 4.66 |
| #10 lung cancer | 3 | 1.88 | 97.4 | 27.56 | 68 | 306 | 3.14 | 5.81 |
| #11 colon cancer | 2 | 1.8 | 93.6 | 28.89 | 41 | 300 | 3.21 | 5.70 |
| #12 rectal cancer | 4 | 1.84 | 96.1 | 28.38 | 64 | 279 | 2.90 | 5.30 |
| #13 squamous cell carcinoma | 2 | 1.71 | 49.5 | 16.93 | 43 | 157 | 3.17 | 2.98 |
| #14 lung cancer | 2 | 1.68 | 59.1 | 20.94 | 71 | 186 | 3.15 | 3.53 |
| #15 lung cancer | 2 | 1.65 | 74.3 | 27.29 | 76 | 242 | 3.26 | 4.60 |
| #16 lymphoma | 2 | 1.83 | 87.8 | 26.22 | 74 | 262 | 2.98 | 4.98 |
| #17 lung cancer | 3 | 1.64 | 57.7 | 21.45 | 53 | 177 | 3.07 | 3.36 |
| #18 lung cancer | 3 | 1.78 | 121 | 38.19 | 70 | 367 | 3.03 | 6.97 |
| #19 lymphoma | 1 | 1.83 | 71.5 | 21.35 | 27 | 214 | 2.99 | 4.07 |
| #20 lymphoma | 5 | 1.66 | 79.2 | 28.74 | 32 | 233 | 2.94 | 4.43 |
| #21 CUP (squamous cell carcinoma) | 1 | 1.89 | 88.5 | 24.78 | 80 | 268 | 3.03 | 5.09 |
| #22 melanoma | 4 | 1.6 | 57 | 22.27 | 69 | 201 | 3.53 | 3.82 |
| #23 lung cancer | 2 | 1.8 | 75.8 | 23.40 | 71 | 244 | 3.22 | 4.64 |
| #24 melanoma | 2 | 1.74 | 93.5 | 30.88 | 79 | 256 | 2.74 | 4.86 |
| #25 melanoma | 5 | 1.74 | 79.79 | 26.35 | 49 | 235 | 2.95 | 4.47 |
| #26 lung cancer | 5 | 1.76 | 76.6 | 24.73 | 64 | 211 | 2.75 | 4.01 |
| CUP: Cancer of unknown primary; BMI: body-mass index.   |  |  | | --- | --- | | **Supplementary Table 2:** Details of the CT imaging protocol | | | Scan parameters | | | slice thickness | 1 mm | | pitch factor | 0.3 | | twin beam dual energy AuSn120  tube current  tube voltage | 120 kV  Ref. mAs (using CARE Dose 4D) | | contrast media | | | portal venous phase (90 seconds p.i.) | 80-140 mL Ultravist370 (Schering AG, Berlin, Germany) \* | | nativ | any contraindications for contrast media |   \*Weight-adapted intravenous injection at 1.0-2.5 mL/s, followed by a 40 mL saline flush | | | | | | | | |

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| **Supplementary Table 3**: Results of two-way ANOVA between simulated dose reduction and sensitivity modes for uptake parameters and SNR values. | | | | |
| Parameter | Variable | df | F-value | p-value |
| SUVmean | Simulated dose reduction | 4 | 0 | p=0.75 |
| Sensitivity mode | 1 | 0 | p=0.76 |
| Simulated dose\*Sensitivity mode | 4 | 0 | p>0.99 |
| SUVpeak | Simulated dose reduction | 4 | 0 | p=0.92 |
| Sensitivity mode | 1 | 0 | p=0.81 |
| Simulated dose\*Sensitivity mode | 4 | 0 | p>0.99 |
| SUVmax | Simulated dose reduction | 4 | 0.24 | p=0.91 |
| Sensitivity mode | 1 | 4.17 | p=0.0027 |
| Simulated dose\*Sensitivity mode | 4 | 4.04 | p=0.0454 |
| TBR | Simulated dose reduction | 4 | 0 | p=0.99 |
| Sensitivity mode | 1 | 0 | p=0.88 |
| Simulated dose\*Sensitivity mode | 4 | 0 | p>0.99 |
| SNR | Simulated dose reduction | 4 | 1062 | p<0.0001 |
| Sensitivity mode | 1 | 316.0 | p<0.0001 |
| Simulated dose\*Sensitivity mode | 4 | 18.35 | p<0.0001 |

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| **Supplementary Table 4**: Multiple comparisons test for SUVmax and SNR. | | | |
| Dependent variable  (Bonferroni´s multiple comparison test) | Compared reconstructions | 95% Confidence  Interval | Adjusted p-value |
| SUVmax | 3 MBq/Kg :HS Mode vs.  3 MBq/Kg :UHS mode | -2.993 to 4.100 | >0.9999 |
| 3 MBq/Kg :HS Mode vs.  1 MBq/Kg :HS Mode | -3.862 to 3.231 | >0.9999 |
| 3 MBq/Kg :HS Mode vs.  1 MBq/Kg :UHS mode | -3.169 to 3.923 | >0.9999 |
| 3 MBq/Kg :HS Mode vs.  0.5 MBq/Kg :HS Mode | -4.558 to 2.535 | >0.9999 |
| 3 MBq/Kg :HS Mode vs.  0.5 MBq/Kg :UHS mode | -3.481 to 3.612 | >0.9999 |
| 3 MBq/Kg :HS Mode vs.  0.25 MBq/Kg :HS Mode | -5.439 to 1.654 | >0.9999 |
| 3 MBq/Kg :HS Mode vs.  0.25 MBq/Kg :UHS mode | -4.196 to 2.896 | >0.9999 |
| 3 MBq/Kg :HS Mode vs.  0.125 MBq/Kg :HS Mode | -7.550 to -0.4575 | **0.0161** |
| 3 MBq/Kg :HS Mode vs.  0.125 MBq/Kg :UHS mode | -5.416 to 1.677 | >0.9999 |
| SNR  SNR | 3 MBq/Kg :HS mode vs.  3 MBq/Kg :UHS Mode | -3.790 to -2.375 | **<0.0001** |
| 3 MBq/Kg :HS mode vs.  1 MBq/Kg :HS mode | 3.355 to 4.770 | **<0.0001** |
| 3 MBq/Kg :HS mode vs.  1 MBq/Kg :UHS Mode | 1.260 to 2.674 | **<0.0001** |
| 3 MBq/Kg :HS mode vs.  0.5 MBq/Kg :HS mode | 5.025 to 6.440 | **<0.0001** |
| 3 MBq/Kg :HS mode vs.  0.5 MBq/Kg :UHS Mode | 3.510 to 4.925 | **<0.0001** |
| 3 MBq/Kg :HS mode vs.  0.25 MBq/Kg :HS mode | 6.170 to 7.584 | **<0.0001** |
| 3 MBq/Kg :HS mode vs.  0.25 MBq/Kg :UHS Mode | 5.115 to 6.530 | **<0.0001** |
| 3 MBq/Kg :HS mode vs.  0.125 MBq/Kg :HS mode | 6.945 to 8.360 | **<0.0001** |
| 3 MBq/Kg :HS mode vs.  0.125 MBq/Kg :UHS Mode | 6.171 to 7.585 | **<0.0001** |
| 3 MBq/Kg :UHS Mode vs.  1 MBq/Kg :HS mode | 6.438 to 7.852 | **<0.0001** |
| 3 MBq/Kg :UHS Mode vs.  1 MBq/Kg :UHS Mode | 4.342 to 5.757 | **<0.0001** |
| 3 MBq/Kg :UHS Mode vs.  0.5 MBq/Kg :HS mode | 8.107 to 9.522 | **<0.0001** |
| 3 MBq/Kg :UHS Mode vs.  0.5 MBq/Kg :UHS Mode | 6.592 to 8.007 | **<0.0001** |
| 3 MBq/Kg :UHS Mode vs.  0.25 MBq/Kg :HS mode | 9.252 to 10.67 | **<0.0001** |
| 3 MBq/Kg :UHS Mode vs.  0.25 MBq/Kg :UHS Mode | 8,197 to 9.612 | **<0.0001** |
| 3 MBq/Kg :UHS Mode vs.  0.125 MBq/Kg :HS mode | 10.03 to 11.44 | **<0.0001** |
| 3 MBq/Kg :UHS Mode vs.  0.125 MBq/Kg :UHS Mode | 9.253 to 10.67 | **<0.0001** |
| 1 MBq/Kg :HS mode vs.  1 MBq/Kg :UHS Mode | -2.803 to -1.388 | **<0.0001** |
| 1 MBq/Kg :HS mode vs.  0.5 MBq/Kg :HS mode | 0.9623 to 2.377 | **<0.0001** |
| 1 MBq/Kg :HS mode vs.  0.5 MBq/Kg :UHS Mode | -0.5527 to 0.8620 | >0.9999 |
| 1 MBq/Kg :HS mode vs.  0.25 MBq/Kg :HS mode | 2.107 to 3.522 | **<0.0001** |
| 1 MBq/Kg :HS mode vs.  0.25 MBq/Kg :UHS Mode | 1.052 to 2.467 | **<0.0001** |
| 1 MBq/Kg :HS mode vs.  0.125 MBq/Kg :HS mode | 2.883 to 4.297 | **<0.0001** |
| 1 MBq/Kg :HS mode vs.  0.125 MBq/Kg :UHS Mode | 2.108 to 3.523 | **<0.0001** |
| 1 MBq/Kg :UHS Mode vs.  0.5 MBq/Kg :HS mode | 3.058 to 4.473 | **<0.0001** |
| 1 MBq/Kg :UHS Mode vs.  0.5 MBq/Kg :UHS Mode | 1.543 to 2.958 | **<0.0001** |
| 1 MBq/Kg :UHS Mode vs.  0.25 MBq/Kg :HS mode | 4.203 to 5.617 | **<0.0001** |
| 1 MBq/Kg :UHS Mode vs.  0.25 MBq/Kg :UHS Mode | 3.148 to 4.563 | **<0.0001** |
| 1 MBq/Kg :UHS Mode vs.  0.125 MBq/Kg :HS mode | 4.978 to 6.393 | **<0.0001** |
| 1 MBq/Kg :UHS Mode vs.  0.125 MBq/Kg :UHS Mode | 4.204 to 5.619 | **<0.0001** |
| 0.5 MBq/Kg :HS mode vs.  0.5 MBq/Kg :UHS Mode | -2.222 to -0.8077 | **<0.0001** |
| 0.5 MBq/Kg :HS mode vs.  0.25 MBq/Kg :HS mode | 0.4373 to 1.852 | **<0.0001** |
| 0.5 MBq/Kg :HS mode vs.  0.25 MBq/Kg :UHS Mode | -0.6173 to 0.7973 | >0.9999 |
| 0.5 MBq/Kg :HS mode vs.  0.125 MBq/Kg :HS mode | 1.213 to 2.628 | **<0.0001** |
| 0.5 MBq/Kg :HS mode vs. 0.125 MBq/Kg :UHS Mode | 0.4384 to 1.853 | **<0.0001** |
| 0.5 MBq/Kg :UHS Mode vs.  0.25 MBq/Kg :HS mode | 1.952 to 3.367 | **<0.0001** |
| 0.5 MBq/Kg :UHS Mode vs.  0.25 MBq/Kg :UHS Mode | 0.8977 to 2.312 | **<0.0001** |
| 0.5 MBq/Kg :UHS Mode vs.  0.125 MBq/Kg :HS mode | 2.728 to 4.143 | **<0.0001** |
| 0.5 MBq/Kg :UHS Mode vs.  0.125 MBq/Kg :UHS Mode | 1.953 to 3.368 | **<0.0001** |
| 0.25 MBq/Kg :HS mode vs.  0.25 MBq/Kg :UHS Mode | -1.762 to -0.3473 | **<0.0001** |
| 0.25 MBq/Kg :HS mode vs.  0.125 MBq/Kg :HS mode | 0.06842 to 1.483 | **0.0162** |
| 0.25 MBq/Kg :HS mode vs.  0.125 MBq/Kg :UHS Mode | -0.7062 to 0.7085 | >0.9999 |
| 0.25 MBq/Kg :UHS Mode vs.  0.125 MBq/Kg :HS mode | 1.123 to 2.538 | **<0.0001** |
| 0.25 MBq/Kg :UHS Mode vs.  0.125 MBq/Kg :UHS Mode | 0.3484 to 1.763 | **<0.0001** |
| 0.125 MBq/Kg :HS mode vs.  0.125 MBq/Kg :UHS Mode | -1.482 to -0.06727 | **0.0165** |