

Annex A to “Monte Carlo calculation of organ dose coefficients for internal dosimetry: results of an international intercomparison exercise” by Zankl et al. in Radiation Measurements:

Tables of master results

Table A.1: Absorbed fractions (AF) for different source and target organ combinations for the male reference computational phantom for photons, together with their coefficients of variance (CV, %). A constant number of decimal points is shown for all entries irrespective of the statistical error for adjustment purposes. AF values equal to zero mean that no interaction in the target organ occurred for the number of particle histories simulated in the source organ for the master solution.

		Target organ													
		Liver		Thyroid		Stomach wall		Urinary bladder wall		Lungs		Red marrow 1 <sup>a</sup>		Red marrow 2 <sup>b</sup>	
Source organ	Photon energy (MeV)	AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)
Liver	0.01	9.705E-01	0.00	0.000E+00	0.00	8.764E-04	0.03	0.000E+00	0.00	3.842E-03	0.02	3.584E-04	0.20	8.720E-04	0.01
	0.05	3.152E-01	0.01	3.212E-05	1.09	5.814E-03	0.08	8.465E-06	2.11	2.691E-02	0.04	8.346E-03	0.02	1.632E-02	0.03
	0.1	1.823E-01	0.01	4.529E-05	0.67	4.017E-03	0.07	2.157E-05	0.97	1.944E-02	0.03	8.353E-03	0.02	1.156E-02	0.03
	0.2	1.698E-01	0.01	4.523E-05	0.52	3.537E-03	0.06	2.725E-05	0.64	1.734E-02	0.03	8.336E-03	0.02	9.251E-03	0.03
	0.5	1.666E-01	0.01	4.674E-05	0.64	3.321E-03	0.08	3.578E-05	0.70	1.632E-02	0.04	8.136E-03	0.02	8.333E-03	0.04
	1	1.510E-01	0.01	4.677E-05	0.76	3.029E-03	0.09	4.123E-05	0.76	1.493E-02	0.04	7.641E-03	0.02	7.702E-03	0.04
	3	1.054E-01	0.01	4.152E-05	0.86	2.317E-03	0.10	4.597E-05	0.72	1.151E-02	0.05	6.238E-03	0.02	6.134E-03	0.05
Thyroid	0.01	0.000E+00	0.00	8.311E-01	0.00	0.000E+00	0.00	0.000E+00	0.00	1.739E-06	0.79	2.779E-06	3.96	5.063E-06	1.51
	0.05	2.835E-03	0.10	5.336E-02	0.03	1.648E-04	0.80	6.303E-08	23.65	2.628E-02	0.04	1.220E-02	0.02	1.979E-02	0.03
	0.1	4.073E-03	0.07	2.749E-02	0.03	2.750E-04	0.27	5.835E-07	5.79	1.960E-02	0.03	1.103E-02	0.01	1.356E-02	0.03
	0.2	4.137E-03	0.06	2.839E-02	0.02	2.789E-04	0.21	1.023E-06	3.14	1.822E-02	0.03	1.118E-02	0.01	1.178E-02	0.03
	0.5	4.298E-03	0.07	2.952E-02	0.02	2.930E-04	0.25	2.392E-06	2.61	1.760E-02	0.03	1.117E-02	0.00	1.133E-02	0.03
	1	4.286E-03	0.08	2.570E-02	0.03	3.026E-04	0.29	4.524E-06	2.20	1.614E-02	0.04	1.049E-02	0.02	1.059E-02	0.04
	3	3.730E-03	0.10	1.329E-02	0.04	2.820E-04	0.31	7.543E-06	1.71	1.237E-02	0.05	8.398E-03	0.00	8.362E-03	0.04
Stomach contents	0.01	2.622E-03	0.02	0.000E+00	0.00	5.670E-02	0.00	0.000E+00	0.00	7.475E-04	0.04	1.139E-07	18.21	2.508E-07	0.97
	0.05	5.959E-02	0.02	2.431E-05	1.23	4.756E-02	0.03	9.161E-06	2.03	2.399E-02	0.04	6.399E-03	0.03	1.240E-02	0.04
	0.1	4.230E-02	0.02	3.944E-05	0.72	2.627E-02	0.03	2.304E-05	0.94	1.777E-02	0.03	6.822E-03	0.02	9.645E-03	0.03
	0.2	3.656E-02	0.02	3.911E-05	0.55	2.489E-02	0.02	2.840E-05	0.64	1.560E-02	0.03	6.745E-03	0.02	7.614E-03	0.03
	0.5	3.385E-02	0.02	4.122E-05	0.68	2.477E-02	0.03	3.623E-05	0.69	1.454E-02	0.04	6.550E-03	0.02	6.749E-03	0.04
	1	3.090E-02	0.03	4.185E-05	0.80	2.267E-02	0.03	4.302E-05	0.75	1.335E-02	0.05	6.179E-03	0.02	6.242E-03	0.05
	3	2.382E-02	0.04	3.997E-05	0.88	1.610E-02	0.03	4.590E-05	0.71	1.041E-02	0.05	5.141E-03	0.02	5.061E-03	0.06
Urinary bladder contents	0.01	0.000E+00	0.00	0.000E+00	0.00	0.000E+00	0.00	3.395E-02	0.01	0.000E+00	0.00	2.788E-06	2.20	5.912E-06	0.15
	0.05	3.340E-04	0.29	1.741E-09	51.65	3.775E-05	0.98	2.467E-02	0.04	2.061E-05	1.32	1.245E-02	0.02	2.205E-02	0.03
	0.1	8.747E-04	0.15	2.046E-07	9.54	8.629E-05	0.48	1.317E-02	0.04	9.605E-05	0.46	1.252E-02	0.01	1.673E-02	0.02
	0.2	1.087E-03	0.12	4.286E-07	4.96	1.040E-04	0.33	1.245E-02	0.03	1.567E-04	0.28	1.217E-02	0.01	1.338E-02	0.02
	0.5	1.375E-03	0.12	9.493E-07	4.08	1.282E-04	0.37	1.239E-02	0.04	2.602E-04	0.26	1.146E-02	0.01	1.173E-02	0.03
	1	1.609E-03	0.13	1.901E-06	3.54	1.489E-04	0.42	1.131E-02	0.04	3.628E-04	0.26	1.050E-02	0.02	1.061E-02	0.03
	3	1.711E-03	0.15	3.206E-06	2.96	1.545E-04	0.42	7.917E-03	0.04	4.847E-04	0.25	8.377E-03	0.02	8.265E-03	0.04

<sup>a</sup> Red marrow AF evaluated using the methods recommended in Annex D of ICRP Publication 116 (ICRP, 2010), i.e., fluence-to-dose response functions or dose enhancement factors

<sup>b</sup> Red marrow AF evaluated as mass-weighted average of spongiosa AFs

Table A.2: Absorbed fractions (AF) for different source and target organ combinations for the female reference computational phantom for photons, together with their coefficients of variance (CV, %). A constant number of decimal points is shown for all entries irrespective of the statistical error for adjustment purposes. AF values equal to zero mean that no interaction in the target organ occurred for the number of particle histories simulated in the source organ for the master solution.

Source organ	Photon energy (MeV)	Target organ													
		Liver		Thyroid		Stomach wall		Urinary bladder wall		Lungs		Red marrow 1 <sup>a</sup>		Red marrow 2 <sup>b</sup>	
		AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)
Liver	0.01	9.665E-01	0.00	0.000E+00	0.00	2.260E-03	0.02	0.000E+00	0.00	4.631E-03	0.01	1.079E-03	0.02	1.738E-03	0.01
	0.05	2.796E-01	0.01	2.962E-05	1.14	6.655E-03	0.08	5.834E-06	2.60	2.367E-02	0.04	1.068E-02	0.04	1.742E-02	0.03
	0.1	1.589E-01	0.01	4.021E-05	0.72	4.459E-03	0.06	1.610E-05	1.11	1.663E-02	0.03	9.396E-03	0.03	1.196E-02	0.03
	0.2	1.502E-01	0.01	3.839E-05	0.56	4.044E-03	0.06	2.091E-05	0.73	1.492E-02	0.03	8.941E-03	0.03	9.630E-03	0.03
	0.5	1.491E-01	0.01	4.093E-05	0.69	3.886E-03	0.07	2.865E-05	0.78	1.424E-02	0.04	8.698E-03	0.04	8.778E-03	0.04
	1	1.353E-01	0.01	4.126E-05	0.81	3.574E-03	0.09	3.447E-05	0.82	1.312E-02	0.04	8.128E-03	0.04	8.109E-03	0.04
	3	9.380E-02	0.01	3.619E-05	0.93	2.708E-03	0.09	3.906E-05	0.69	1.012E-02	0.05	6.411E-03	0.05	6.379E-03	0.05
Thyroid	0.01	0.000E+00	0.00	8.339E-01	0.00	0.000E+00	0.00	0.000E+00	0.00	3.016E-06	0.79	6.980E-07	2.48	1.344E-06	1.99
	0.05	2.376E-03	0.11	5.324E-02	0.03	1.031E-04	0.61	4.624E-08	31.41	2.413E-02	0.04	1.269E-02	0.03	2.142E-02	0.03
	0.1	3.175E-03	0.08	2.736E-02	0.03	1.736E-04	0.34	3.238E-07	8.04	1.718E-02	0.03	1.048E-02	0.03	1.300E-02	0.03
	0.2	3.197E-03	0.07	2.830E-02	0.02	1.830E-04	0.25	7.520E-07	3.68	1.580E-02	0.03	1.013E-02	0.03	1.066E-02	0.03
	0.5	3.402E-03	0.08	2.946E-02	0.02	2.023E-04	0.30	1.814E-06	3.00	1.529E-02	0.04	1.011E-02	0.03	1.012E-02	0.03
	1	3.442E-03	0.09	2.568E-02	0.03	2.189E-04	0.34	3.255E-06	2.61	1.407E-02	0.04	9.493E-03	0.04	9.435E-03	0.04
	3	3.028E-03	0.11	1.324E-02	0.04	2.142E-04	0.35	6.366E-06	1.68	1.078E-02	0.05	7.461E-03	0.04	7.412E-03	0.04
Stomach contents	0.01	2.711E-03	0.02	0.000E+00	0.00	5.854E-02	0.00	0.000E+00	0.00	2.337E-04	0.07	1.189E-06	0.30	1.921E-06	0.30
	0.05	6.660E-02	0.02	1.672E-05	1.49	4.642E-02	0.03	7.861E-06	2.23	1.923E-02	0.05	7.980E-03	0.04	1.331E-02	0.04
	0.1	4.435E-02	0.02	2.688E-05	0.88	2.571E-02	0.03	1.953E-05	1.02	1.391E-02	0.04	7.470E-03	0.04	9.775E-03	0.04
	0.2	3.921E-02	0.02	2.715E-05	0.66	2.466E-02	0.02	2.500E-05	0.68	1.236E-02	0.03	7.047E-03	0.03	7.704E-03	0.03
	0.5	3.721E-02	0.02	2.931E-05	0.80	2.471E-02	0.03	3.177E-05	0.74	1.176E-02	0.04	6.820E-03	0.04	6.909E-03	0.04
	1	3.413E-02	0.03	3.020E-05	0.94	2.271E-02	0.03	3.872E-05	0.77	1.087E-02	0.05	6.406E-03	0.05	6.399E-03	0.05
	3	2.615E-02	0.03	2.874E-05	1.04	1.612E-02	0.03	4.177E-05	0.67	8.509E-03	0.06	5.143E-03	0.05	5.118E-03	0.05
Urinary bladder contents	0.01	0.000E+00	0.00	0.000E+00	0.00	0.000E+00	0.00	3.298E-02	0.01	0.000E+00	0.00	1.358E-04	0.03	2.459E-04	0.03
	0.05	2.464E-04	0.35	2.410E-08	40.54	5.058E-05	0.86	1.896E-02	0.05	1.400E-05	1.61	1.012E-02	0.03	1.662E-02	0.03
	0.1	6.422E-04	0.18	1.609E-07	11.50	1.049E-04	0.44	1.023E-02	0.04	6.460E-05	0.56	9.442E-03	0.03	1.199E-02	0.03
	0.2	8.178E-04	0.13	3.005E-07	6.00	1.246E-04	0.31	9.849E-03	0.03	1.057E-04	0.34	8.849E-03	0.03	9.547E-03	0.02
	0.5	1.091E-03	0.14	7.688E-07	4.70	1.546E-04	0.35	9.908E-03	0.04	1.865E-04	0.31	8.413E-03	0.03	8.507E-03	0.03
	1	1.307E-03	0.14	1.462E-06	4.02	1.795E-04	0.38	9.105E-03	0.05	2.725E-04	0.30	7.770E-03	0.04	7.765E-03	0.04
	3	1.426E-03	0.16	2.823E-06	3.21	1.822E-04	0.39	6.324E-03	0.05	3.782E-04	0.28	6.095E-03	0.04	6.070E-03	0.04

<sup>a</sup> Red marrow AF evaluated using the methods recommended in Annex D of ICRP Publication 116 (ICRP, 2010), i.e., fluence-to-dose response functions or dose enhancement factors

<sup>b</sup> Red marrow AF evaluated as mass-weighted average of spongiosa AFs

Table A.3: Absorbed fractions (AF) for different source and target organ combinations for the male reference computational phantom for electrons, together with their coefficients of variance (CV, %). A constant number of decimal points is shown for all entries irrespective of the statistical error for adjustment purposes. AF vales equal to zero mean that no interaction in the target organ occurred for the number of particle histories simulated in the source organ for the master solution.

Source organ	Electron energy (MeV)	Target organ											
		Liver		Thyroid		Stomach wall		Urinary bladder wall		Lungs		Red marrow	
		AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)
Liver	0.01	1.000E+00	0.00	0.000E+00	0.00	4.481E-07	4.57	0.000E+00	0.00	2.444E-06	2.13	5.586E-07	2.51
	0.05	9.995E-01	0.00	0.000E+00	0.00	9.528E-06	1.19	0.000E+00	0.00	4.514E-05	0.55	1.178E-05	0.64
	0.1	9.985E-01	0.00	1.332E-08	37.28	3.181E-05	0.74	5.031E-09	50.98	1.501E-04	0.34	3.676E-05	0.42
	0.2	9.954E-01	0.00	2.430E-08	22.83	9.490E-05	0.49	7.881E-09	34.81	4.521E-04	0.22	1.089E-04	0.28
	0.5	9.837E-01	0.00	6.637E-08	9.81	3.535E-04	0.27	2.574E-08	14.38	1.642E-03	0.12	3.847E-04	0.17
	1	9.640E-01	0.00	1.304E-07	6.28	8.605E-04	0.18	7.283E-08	7.15	3.874E-03	0.08	8.604E-04	0.12
	3	8.953E-01	0.00	4.783E-07	3.89	2.929E-03	0.09	3.605E-07	4.51	1.262E-02	0.05	3.269E-03	0.06
Thyroid	0.01	0.000E+00	0.00	1.000E+00	0.00	0.000E+00	0.00	0.000E+00	0.00	0.000E+00	0.00	0.000E+00	0.00
	0.05	3.207E-08	30.82	9.980E-01	0.00	0.000E+00	0.00	0.000E+00	0.00	2.244E-06	2.84	1.320E-06	2.94
	0.1	4.953E-07	5.14	9.920E-01	0.00	2.704E-08	24.64	0.000E+00	0.00	6.918E-06	1.44	4.695E-06	1.32
	0.2	1.659E-06	2.36	9.747E-01	0.00	1.004E-07	10.53	0.000E+00	0.00	1.512E-05	0.75	1.027E-05	0.68
	0.5	5.267E-06	1.05	9.084E-01	0.00	3.575E-07	3.76	1.654E-09	40.85	3.440E-05	0.38	2.334E-05	0.35
	1	1.177E-05	0.75	8.032E-01	0.00	8.238E-07	2.67	1.801E-09	55.50	6.413E-05	0.29	4.281E-05	0.26
	3	4.180E-05	0.47	5.076E-01	0.01	2.924E-06	1.59	2.684E-08	15.25	1.869E-04	0.20	2.621E-04	0.16
Stomach contents	0.01	1.492E-06	2.62	0.000E+00	0.00	4.700E-05	0.47	0.000E+00	0.00	4.267E-07	5.33	0.000E+00	0.00
	0.05	3.170E-05	0.65	2.235E-10	0.00	8.303E-04	0.12	0.000E+00	0.00	9.521E-06	1.30	6.227E-07	3.34
	0.1	1.024E-04	0.43	5.252E-09	47.53	2.692E-03	0.07	0.000E+00	0.00	3.226E-05	0.88	2.448E-06	1.61
	0.2	3.007E-04	0.29	9.693E-09	22.96	8.195E-03	0.04	1.193E-08	26.00	9.512E-05	0.59	5.931E-06	0.84
	0.5	1.099E-03	0.17	5.802E-08	9.16	2.932E-02	0.02	2.878E-08	14.85	3.361E-04	0.34	1.430E-05	0.41
	1	2.656E-03	0.11	1.245E-07	7.12	6.257E-02	0.02	9.304E-08	8.14	7.756E-04	0.23	2.661E-05	0.30
	3	1.052E-02	0.06	3.915E-07	4.14	1.362E-01	0.01	3.465E-07	4.42	2.536E-03	0.10	7.659E-05	0.21
Urinary bladder contents	0.01	0.000E+00	0.00	0.000E+00	0.00	0.000E+00	0.00	3.146E-05	0.58	0.000E+00	0.00	0.000E+00	0.00
	0.05	6.569E-09	0.00	0.000E+00	0.00	0.000E+00	0.00	5.627E-04	0.15	0.000E+00	0.00	1.005E-06	2.64
	0.1	4.760E-08	18.01	0.000E+00	0.00	7.068E-09	60.01	1.824E-03	0.08	5.180E-09	49.80	4.589E-06	1.13
	0.2	2.968E-07	5.69	0.000E+00	0.00	3.786E-08	15.85	5.544E-03	0.05	3.163E-08	17.14	1.124E-05	0.57
	0.5	1.196E-06	2.48	5.225E-10	0.00	1.078E-07	6.48	1.964E-02	0.03	1.715E-07	7.00	2.621E-05	0.29
	1	2.987E-06	1.53	1.706E-09	41.89	2.676E-07	4.06	4.057E-02	0.02	4.818E-07	3.51	4.857E-05	0.21
	3	1.373E-05	0.85	1.460E-08	28.15	1.281E-06	2.49	7.166E-02	0.01	2.695E-06	1.85	2.266E-04	0.15

Table A.4: Absorbed fractions (AF) for different source and target organ combinations for the female reference computational phantom for electrons, together with their coefficients of variance (CV, %). A constant number of decimal points is shown for all entries irrespective of the statistical error for adjustment purposes. AF vales equal to zero mean that no interaction in the target organ occurred for the number of particle histories simulated in the source organ for the master solution.

Source organ	Electron energy (MeV)	Target organ											
		Liver		Thyroid		Stomach wall		Urinary bladder wall		Lungs		Red marrow	
		AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)	AF	CV (%)
Liver	0.01	1.000E+00	0.00	0.000E+00	0.00	2.086E-06	2.11	0.000E+00	0.00	4.239E-06	1.65	1.364E-06	2.14
	0.05	9.995E-01	0.00	0.000E+00	0.00	3.507E-05	0.61	0.000E+00	0.00	7.512E-05	0.41	2.436E-05	0.55
	0.1	9.982E-01	0.00	6.836E-09	38.90	1.101E-04	0.36	0.000E+00	0.00	2.473E-04	0.24	7.964E-05	0.34
	0.2	9.947E-01	0.00	1.107E-08	20.82	3.347E-04	0.22	2.292E-09	82.01	7.345E-04	0.16	2.383E-04	0.22
	0.5	9.815E-01	0.00	5.838E-08	9.36	1.185E-03	0.13	2.159E-08	14.57	2.519E-03	0.09	8.431E-04	0.13
	1	9.603E-01	0.00	1.171E-07	6.83	2.554E-03	0.09	6.200E-08	8.36	5.265E-03	0.07	1.860E-03	0.09
	3	8.841E-01	0.00	4.036E-07	4.03	5.989E-03	0.06	3.169E-07	5.14	1.295E-02	0.04	5.478E-03	0.05
Thyroid	0.01	0.000E+00	0.00	9.998E-01	0.00	0.000E+00	0.00	0.000E+00	0.00	0.000E+00	0.00	0.000E+00	0.00
	0.05	2.378E-08	23.11	9.974E-01	0.00	0.000E+00	0.00	0.000E+00	0.00	2.091E-06	2.88	1.502E-06	2.40
	0.1	3.484E-07	6.59	9.917E-01	0.00	1.989E-08	35.84	0.000E+00	0.00	6.421E-06	1.47	5.162E-06	1.20
	0.2	1.443E-06	2.50	9.749E-01	0.00	6.226E-08	11.85	2.206E-11	0.00	1.395E-05	0.77	1.118E-05	0.64
	0.5	4.175E-06	1.21	9.115E-01	0.00	1.945E-07	5.11	1.075E-09	0.00	3.086E-05	0.40	2.376E-05	0.34
	1	9.279E-06	0.83	8.115E-01	0.00	5.249E-07	3.15	2.439E-09	24.62	5.728E-05	0.31	4.211E-05	0.25
	3	3.363E-05	0.53	5.081E-01	0.01	2.036E-06	2.03	1.575E-08	16.39	1.739E-04	0.22	2.980E-04	0.17
Stomach contents	0.01	1.215E-06	2.85	0.000E+00	0.00	4.972E-05	0.46	0.000E+00	0.00	1.895E-08	6.95	0.000E+00	0.00
	0.05	2.897E-05	0.69	0.000E+00	0.00	8.876E-04	0.12	0.000E+00	0.00	2.158E-06	2.87	7.196E-07	3.40
	0.1	9.346E-05	0.48	5.067E-09	0.00	2.870E-03	0.07	0.000E+00	0.00	7.022E-06	1.73	2.795E-06	1.67
	0.2	2.622E-04	0.33	8.332E-09	34.38	8.701E-03	0.04	5.304E-09	29.61	1.671E-05	1.16	6.523E-06	0.84
	0.5	9.615E-04	0.19	3.064E-08	10.43	3.076E-02	0.02	1.889E-08	21.52	4.764E-05	0.76	1.527E-05	0.41
	1	2.407E-03	0.12	8.115E-08	7.82	6.505E-02	0.02	6.850E-08	10.16	1.287E-04	0.50	2.787E-05	0.30
	3	1.678E-02	0.04	2.763E-07	5.04	1.402E-01	0.01	3.078E-07	4.95	2.137E-03	0.10	1.166E-04	0.24
Urinary bladder contents	0.01	0.000E+00	0.00	0.000E+00	0.00	0.000E+00	0.00	3.424E-05	0.55	0.000E+00	0.00	1.348E-07	4.70
	0.05	0.000E+00	0.00	0.000E+00	0.00	0.000E+00	0.00	5.862E-04	0.14	0.000E+00	0.00	3.646E-06	1.18
	0.1	3.859E-08	21.96	0.000E+00	0.00	1.470E-08	38.92	1.897E-03	0.08	3.315E-10	0.00	1.286E-05	0.79
	0.2	2.282E-07	6.48	0.000E+00	0.00	2.412E-08	20.73	5.736E-03	0.05	2.832E-08	19.20	3.623E-05	0.55
	0.5	8.741E-07	2.78	1.956E-09	0.00	1.430E-07	6.11	2.012E-02	0.03	8.305E-08	7.83	1.236E-04	0.33
	1	2.387E-06	1.82	7.140E-10	54.97	4.106E-07	4.28	4.038E-02	0.02	3.198E-07	4.51	2.890E-04	0.22
	3	1.102E-05	0.99	7.770E-09	21.49	1.615E-06	2.24	6.298E-02	0.01	2.019E-06	2.25	1.920E-03	0.07

Table A.5: S-values (in Gy (Bq s)<sup>-1</sup>) for different source and target organ combinations for the male reference computational phantom for <sup>18</sup>F, together with their coefficients of variance (CV, %). A constant number of decimal points is shown for all entries irrespective of the statistical error for adjustment purposes.

	Target organ											
	Liver		Thyroid		Stomach wall		Urinary bladder wall		Lungs		Red marrow	
Source organ	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)
Liver	3.656E-14	0.00	3.897E-16	0.46	3.719E-15	0.06	1.195E-16	0.49	2.285E-15	0.03	1.190E-15	0.03
Thyroid	3.984E-16	0.05	2.076E-12	0.00	3.263E-16	0.18	8.422E-18	1.81	2.437E-15	0.02	1.611E-15	0.02
Stomach contents	3.134E-15	0.02	3.436E-16	0.48	3.140E-14	0.02	1.234E-16	0.49	2.021E-15	0.03	9.580E-16	0.03
Urinary bladder contents	1.282E-16	0.09	8.824E-18	2.78	1.438E-16	0.27	4.920E-14	0.03	3.641E-17	0.19	1.664E-15	0.02

Table A.6: S-values (in Gy (Bq s)<sup>-1</sup>) for different source and target organ combinations for the female reference computational phantom for <sup>18</sup>F, together with their coefficients of variance (CV, %). A constant number of decimal points is shown for all entries irrespective of the statistical error for adjustment purposes.

	Target organ											
	Liver		Thyroid		Stomach wall		Urinary bladder wall		Lungs		Red marrow	
Source organ	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S value (Gy (Bq s) <sup>-1</sup> )	CV (%)
Liver	4.490E-14	0.01	4.004E-16	0.49	4.794E-15	0.05	1.203E-16	0.56	2.545E-15	0.03	1.642E-15	0.03
Thyroid	4.054E-16	0.06	2.444E-12	0.01	2.419E-16	0.22	7.847E-18	2.13	2.674E-15	0.03	1.871E-15	0.02
Stomach contents	4.427E-15	0.02	2.790E-16	0.58	3.388E-14	0.02	1.363E-16	0.52	2.055E-15	0.03	1.276E-15	0.03
Urinary bladder contents	1.307E-16	0.10	7.859E-18	3.20	1.850E-16	0.25	5.156E-14	0.03	3.288E-17	0.22	1.574E-15	0.02

Table A.7: S-values (in Gy (Bq s)<sup>-1</sup>) for different source and target organ combinations for the male reference computational phantom for <sup>99m</sup>Tc, together with their coefficients of variance (CV, %). A constant number of decimal points is shown for all entries irrespective of the statistical error for adjustment purposes. S-values equal to zero mean that no interaction in the target organ occurred for the number of particle histories simulated in the source organ for the master solution.

	Target organ											
	Liver		Thyroid		Stomach wall		Urinary bladder wall		Lungs		Red marrow	
Source organ	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)
Gamma contribution												
Liver	2.240E-15	0.04	4.500E-17	1.87	5.541E-16	0.19	8.981E-18	2.60	3.332E-16	0.09	1.437E-16	0.05
Thyroid	4.474E-17	0.20	3.586E-14	0.08	3.642E-17	0.74	2.136E-19	17.63	3.347E-16	0.09	1.910E-16	0.04
Stomach contents	4.815E-16	0.06	3.911E-17	1.99	3.880E-15	0.07	9.057E-18	2.57	3.030E-16	0.09	1.165E-16	0.06
Urinary bladder contents	9.444E-18	0.43	2.781E-19	27.07	1.147E-17	1.32	5.879E-15	0.10	1.576E-18	1.26	2.143E-16	0.04
Beta contribution												
Liver	1.438E-15	0.06	0.000E+00	0.00	5.578E-19	4.97	0.000E+00	0.00	3.832E-19	2.08	9.085E-20	2.74
Thyroid	2.437E-22	45.70	1.284E-13	0.06	1.801E-21	0.00	0.000E+00	0.00	1.820E-20	7.85	1.131E-20	8.32
Stomach contents	1.748E-19	2.77	0.000E+00	0.00	5.400E-17	0.42	0.000E+00	0.00	8.936E-20	5.53	7.561E-21	9.19
Urinary bladder contents	0.000E+00	0.00	0.000E+00	0.00	0.000E+00	0.00	1.106E-16	0.51	0.000E+00	0.00	1.116E-20	6.19
Total (sum of gamma and beta contributions)												
Liver	3.678E-15	0.03	4.500E-17	1.87	5.547E-16	0.19	8.981E-18	2.60	3.336E-16	0.09	1.437E-16	0.05
Thyroid	4.474E-17	0.20	1.643E-13	0.05	3.642E-17	0.74	2.136E-19	17.63	3.347E-16	0.09	1.910E-16	0.04
Stomach contents	4.817E-16	0.06	3.911E-17	1.99	3.934E-15	0.07	9.057E-18	2.57	3.030E-16	0.09	1.165E-16	0.06
Urinary bladder contents	9.444E-18	0.43	2.781E-19	27.07	1.147E-17	1.32	5.989E-15	0.10	1.576E-18	1.26	2.143E-16	0.04

Table A.8: S-values (in Gy (Bq s)<sup>-1</sup>) for different source and target organ combinations for the female reference computational phantom for <sup>99m</sup>Tc, together with their coefficients of variance (CV, %). A constant number of decimal points is shown for all entries irrespective of the statistical error for adjustment purposes. S-values equal to zero mean that no interaction in the target organ occurred for the number of particle histories simulated in the source organ for the master solution.

	Target organ											
	Liver		Thyroid		Stomach wall		Urinary bladder wall		Lungs		Red marrow	
Source organ	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)	S-value (Gy (Bq s) <sup>-1</sup> )	CV (%)
Gamma contribution												
Liver	2.537E-15	0.05	4.777E-17	1.95	6.662E-16	0.18	8.089E-18	3.02	3.620E-16	0.09	2.116E-16	0.09
Thyroid	4.486E-17	0.23	4.205E-14	0.08	2.430E-17	0.92	1.395E-19	23.54	3.713E-16	0.09	2.370E-16	0.09
Stomach contents	6.561E-16	0.06	3.047E-17	2.41	4.073E-15	0.07	9.460E-18	2.72	3.001E-16	0.10	1.669E-16	0.10
Urinary bladder contents	8.989E-18	0.50	9.849E-20	29.46	1.469E-17	1.21	5.734E-15	0.11	1.316E-18	1.55	2.113E-16	0.08
Beta contribution												
Liver	1.848E-15	0.06	0.000E+00	0.00	2.272E-18	2.38	0.000E+00	0.00	7.404E-19	1.59	2.530E-19	2.31
Thyroid	2.411E-22	58.78	1.511E-13	0.06	0.000E+00	0.00	0.000E+00	0.00	1.745E-20	9.11	1.543E-20	7.10
Stomach contents	1.963E-19	3.20	1.681E-20	0.00	6.178E-17	0.41	0.000E+00	0.00	2.034E-20	9.39	1.017E-20	9.52
Urinary bladder contents	2.826E-22	56.73	0.000E+00	0.00	0.000E+00	0.00	1.434E-16	0.49	0.000E+00	0.00	4.203E-20	5.09
Total (sum of gamma and beta contributions)												
Liver	4.385E-15	0.04	4.777E-17	1.95	6.684E-16	0.18	8.089E-18	3.02	3.627E-16	0.09	2.118E-16	0.09
Thyroid	4.486E-17	0.23	1.931E-13	0.05	2.430E-17	0.92	1.395E-19	23.54	3.713E-16	0.09	2.370E-16	0.09
Stomach contents	6.563E-16	0.06	3.049E-17	2.41	4.135E-15	0.07	9.460E-18	2.72	3.002E-16	0.10	1.669E-16	0.10
Urinary bladder contents	8.989E-18	0.50	9.849E-20	29.46	1.469E-17	1.21	5.878E-15	0.11	1.316E-18	1.55	2.113E-16	0.08