

# appendix

## E

### Effective Dose Equivalent (mSv/MBq) and Radiation Absorbed Dose Estimates (mGy/MBq) to Adult Subjects from Selected Internally Administered Radiopharmaceuticals

Radiopharmaceutical	Route of Administration	Effective Dose Equivalent (mSv/MBq)	Absorbed Dose for Selected Organs (mGy/MBq)	
			Organ	Dose
<sup>13</sup> N-ammonia	Intravenous	$2.2 \times 10^{-3}$	Bladder wall	$6.9 \times 10^{-3}$
			Brain	$4.7 \times 10^{-3}$
			Liver	$3.8 \times 10^{-3}$
			Gonads	$1.7 \times 10^{-3}$
			Red marrow	$1.8 \times 10^{-3}$
<sup>15</sup> O-water	Intravenous	$1.1 \times 10^{-3}$	Heart wall	$2.2 \times 10^{-3}$
			Kidneys	$1.9 \times 10^{-3}$
			Lungs	$1.9 \times 10^{-3}$
			Gonads	$6.7 \times 10^{-4}$
			Red marrow	$9.0 \times 10^{-4}$
<sup>18</sup> F-fluorodeoxyglucose (FDG)	Intravenous	$3.0 \times 10^{-2}$	Bladder wall	$1.9 \times 10^{-1}$
			Heart wall	$6.0 \times 10^{-2}$
			Spleen	$3.7 \times 10^{-2}$
			Gonads	$1.7 \times 10^{-2}$
			Red marrow	$1.3 \times 10^{-2}$
<sup>67</sup> Ga-citrate	Intravenous	$1.1 \times 10^{-1}$	Bone surfaces	$3.2 \times 10^{-1}$
			LLI wall	$2.6 \times 10^{-1}$
			ULI wall	$1.5 \times 10^{-1}$
			Gonads	$8.7 \times 10^{-2}$
			Red marrow	$1.2 \times 10^{-1}$

Radiopharmaceutical	Route of Administration	Effective Dose Equivalent* (mSv/MBq)	Absorbed Dose for Selected Organs (mGy/MBq) <sup>†</sup>	
			Organ	Dose
<sup>99m</sup> Tc-pertechnetate	Intravenous	$1.1 \times 10^{-2}$	Bladder wall	$3.6 \times 10^{-2}$
			ULI wall	$2.8 \times 10^{-2}$
			LLI wall	$2.7 \times 10^{-2}$
			Gonads	$8.6 \times 10^{-3}$
			Red marrow	$3.3 \times 10^{-3}$
<sup>99m</sup> Tc-MDP	Intravenous	$6.1 \times 10^{-3}$	Bone surfaces	$3.5 \times 10^{-2}$
			Bladder wall	$3.3 \times 10^{-2}$
			Kidneys	$8.6 \times 10^{-3}$
			Gonads	$3.3 \times 10^{-3}$
			Red marrow	$5.4 \times 10^{-3}$
<sup>99m</sup> Tc-sestamibi	Intravenous	$1.5 \times 10^{-2}$	ULI wall	$5.0 \times 10^{-2}$
			Bladder wall	$3.7 \times 10^{-2}$
			LLI wall	$3.7 \times 10^{-2}$
			Gonads	$1.4 \times 10^{-2}$
			Red marrow	$4.5 \times 10^{-3}$
<sup>99m</sup> Tc-DTPA	Intravenous	$8.2 \times 10^{-3}$	Bladder wall	$7.7 \times 10^{-2}$
			Uterus	$1.0 \times 10^{-2}$
			Kidneys	$5.7 \times 10^{-3}$
			Gonads	$5.5 \times 10^{-3}$
			Red marrow	$2.2 \times 10^{-3}$
<sup>99m</sup> Tc-mertiatide (MAG3)	Intravenous	$1.2 \times 10^{-2}$	Bladder wall	$1.4 \times 10^{-1}$
			Uterus	$1.5 \times 10^{-2}$
			LLI wall	$7.1 \times 10^{-3}$
			Gonads	$6.6 \times 10^{-3}$
			Red marrow	$1.1 \times 10^{-3}$
<sup>99m</sup> Tc-exametazime (HMPAO)	Intravenous	$1.4 \times 10^{-2}$	Gallbladder	$5.1 \times 10^{-2}$
			Kidneys	$3.5 \times 10^{-2}$
			Bladder wall	$2.8 \times 10^{-2}$
			Gonads	$7.0 \times 10^{-3}$
			Red marrow	$3.5 \times 10^{-3}$
<sup>111</sup> In-DTPA	Intravenous	$4.1 \times 10^{-2}$	Bladder wall	$4.3 \times 10^{-1}$
			Uterus	$5.4 \times 10^{-2}$
			LLI wall	$2.8 \times 10^{-2}$
			Gonads	$2.5 \times 10^{-2}$
			Red marrow	$8.2 \times 10^{-3}$
<sup>123</sup> I-sodium iodide	Oral	$1.2 \times 10^{-1}$	Thyroid	$3.4 \times 10^0$
			Bladder wall	$9.6 \times 10^{-2}$
			Stomach	$5.5 \times 10^{-2}$
			Gonads	$1.2 \times 10^{-2}$
			Red marrow	$5.8 \times 10^{-3}$
<sup>131</sup> I-sodium iodide	Oral	$1.1 \times 10^1$	Thyroid	$3.4 \times 10^2$
			Bladder wall	$6.2 \times 10^{-1}$
			Stomach	$3.6 \times 10^{-1}$
			Gonads	$4.7 \times 10^{-3}$
			Red marrow	$8.3 \times 10^{-2}$
<sup>201</sup> Tl-thallium chloride	Intravenous	$1.6 \times 10^{-1}$	Thyroid	$6.2 \times 10^{-1}$
			Kidneys	$4.6 \times 10^{-1}$
			Small intestine	$4.5 \times 10^{-1}$
			Gonads	$2.0 \times 10^{-1}$
			Red marrow	$5.5 \times 10^{-2}$

Data from Stabin MG, Stubbs JB, Toohey RE: Radiation Dose Estimates for Radiopharmaceuticals, Oak Ridge Institute for Science and Education, NUREG/CR-6345, 1996. Available electronically at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr6345/>. Accessed 5 November 2011.

DTPA, diethylenetriaminepenta acetic acid; HMPAO, hexamethylpropyleneamine oxime; LLI, lower large intestine; MDP, methylene diphosphonate; ULI, upper large intestine.

\*Effective dose equivalent has now been replaced by the quantity effective dose which uses somewhat different tissue weighting factors (see Chapter 22, Section B.7).

<sup>†</sup>Three organs with highest absorbed doses and the absorbed dose to red marrow and the gonads which are both radiosensitive. Values given for gonads are the higher of the absorbed dose estimates for the testes and ovaries.