Table 14.1 Radiation Weighting Factors, w_R, from NCRP Report No. 116

Radiation	w_R
X and γ rays, electrons, positrons, and muons	1
Neutrons, energy <10 keV	5
10 keV to 100 keV	10
>100 keV to 2 MeV	20
>2 MeV to 20 MeV	10
>20 MeV	5
Protons, other than recoil protons and energy >2 MeV	2[a]
Alpha particles, fission fragments, and nonrelativistic heavy nuclei	20

[a] ICRP Publication 60 recommends $w_R = 5$.

Table 14.2 Tissue Weighting Factors, w_T

Tissue or Organ	w_T
Gonads	0.20
Bone marrow (red)	0.12
Colon	0.12
Lung	0.12
Stomach	0.12
Bladder	0.05
Breast	0.05
Liver	0.05
Esophagus	0.05
Thyroid	0.05
Skin	0.01
Bone surface	0.01
Remainder*	0.05

* Note: The data refer to a reference population of equal numbers of both sexes and a wide range of ages. In the definition of effective dose, they apply to workers, to the whole population, and to either sex. The w_T are based on rounded values of the organ's contribution to the total detriment.

Table 14.4 Exposure Limits from NCRP Report No. 116 and ICRP Publication 60

	NCRP-116	ICRP-60
Occupational Exposure		
Effective Dose		
Annual	50 mSv	50 mSv
Cumulative	10 mSv × age (y)	100 mSv in 5 y
Equivalent Dose		
Annual	150 mSv lens of eye; 500 mSv skin, hands, feet	150 mSv lens of eye; 500 mSv skin, hands, feet
Exposure of Public		
Effective Dose		
Annual	1 mSv if continuous 5 mSv if infrequent	1 mSv; higher if needed, provided 5-y annual average ⩽1 mSv
Equivalent Dose		
Annual	15 mSv lens of eye; 50 mSv skin, hands, feet	15 mSv lens of eye; 50 mSv skin, hands, feet

Table 14.5 Exposure limits from NCRP Report No. 91

	NCRP-91
Occupational Exposure	
Effective Dose Equivalent	
Annual	50 mSv
Cumulative	10 mSv × age (y) guidance
Dose Equivalent	
Annual	150 mSv lens of eye; 500 mSv all other tissues and organs

Absorbed Dose per Unit Cumulated Activity (rad/μCi-hr) for Tc-99m with a Half-Life of 6.03 hr.

Target Organs	Source Organs			
	Stomach Contents	SI Contents	ULI Contents	LLI Contents
GI stomach wall	1.3×10^{-4}	3.7×10^{-6}	3.8×10^{-6}	1.8×10^{-6}
GI SI wall	2.7×10^{-6}	7.8×10^{-5}	1.7×10^{-5}	9.4×10^{-6}
GI ULI wall	3.5×10^{-6}	2.4×10^{-5}	1.3×10^{-4}	4.2×10^{-6}
GI LLI wall	1.2×10^{-6}	7.3×10^{-6}	3.2×10^{-6}	1.9×10^{-4}

Table 16.1 Reference Values for Organ and Tissue Masses (grams) from ICRP Publication 89

Organ/tissue	Newborn	1 year	5 years	10 years	15 years		Adult	
					M	F	M	F
Adipose	930	3,800	5,500	8,600	12,000	18,700	18,200	22,500
Alimentary system								
Stomach wall	7	20	50	85	120	120	150	140
Stomach contents	40	67	83	117	200	200	250	230
Small intestine wall	30	85	220	370	520	520	650	600
Small intestine contents	56	93	117	163	280	280	350	280
Liver	130	330	570	830	1,300	1,300	1,800	1,400
Integumentary system								
Skin	175	350	570	820	2,000	1,700	3,300	2,300
Muscle, skeletal	800	1,900	5,600	11,000	24,000	17,000	29,000	17,500
Respiratory system								
Lung with blood	60	150	300	500	900	750	1,200	950
Lung tissue only	30	80	125	210	330	290	500	420
Spleen	9.5	29	50	80	130	130	150	130
Thymus	13	30	30	40/30	35	30	25	20
Thyroid	1.3	1.8	3.4	7.9	12	12	20	17
Urogenital system								
Kidneys (2)	25	70	110	180	250	240	310	275
Testes (2)	0.85	1.5	1.7	2	16		35	
Ovaries (2)	0.3	0.8	2.0	3.5		6		11
Uterus	4.0	1.5	3	4		30		80
Total body	3,500	10,000	19,000	32,000	56,000	53,000	73,000	60,000

Table 16.3 Effective Dose Coefficients ($Sv\,Bq^{-1}$) for Inhalation and Ingestion, $e_{inh}(50)$ and $e_{ing}(50)$, from ICRP Publication 68

Nuclide	Inhalation				Ingestion	
	Type†	f_1	$e_{inh}(50)$ (1 μm AMAD)	$e_{inh}(50)$ (5 μm AMAD)	f_1	$e_{ing}(50)$
^{90}Sr	F	0.300	2.4×10^{-8}	3.0×10^{-8}	0.300	2.8×10^{-8}
	S	0.010	1.5×10^{-7}	7.7×10^{-8}	0.010	2.7×10^{-9}
^{131}I	F	1.000	7.6×10^{-9}	1.1×10^{-8}	1.000	2.2×10^{-8}
^{137}Cs	F	1.000	4.8×10^{-9}	6.7×10^{-9}	1.000	1.3×10^{-8}
^{226}Ra	M	0.200	1.6×10^{-5}	1.2×10^{-5}	0.200	2.8×10^{-7}+

† Rate of absorption into blood from respiratory tract: F = fast, M = moderate, S = slow.

Table 16.2 Specific Absorbed Fraction (g^{-1}) of Photon Energy in Several Target Organs and Tissues for Monoenergetic Photon Source in Thyroid (from ICRP Publication 23)

Target	Photon Energy (MeV)		
	0.010	0.100	1.00
Stomach wall	2.07 E-25	1.90 E-07	4.62 E-07
Small intestines plus contents	4.58 E-35	1.97 E-08	1.38 E-07
Lungs	1.52 E-13	3.67 E-06	3.83 E-06
Ovaries	2.33 E-23	1.09 E-08	9.62 E-08
Red marrow	2.68 E-09	4.87 E-06	2.57 E-06
Testes	2.48 E-28	7.87 E-10	2.46 E-08
Thyroid	4.29 E-02	1.44 E-03	1.54 E-03
Total body	1.43 E-05	4.71 E-06	4.26 E-06

Section of GI tract	Mass of walls* (g)	Mass of contents* (g)	Mean residence time (d)	λ (d^{-1})
Stomach (ST)	150	250	1/24	24
Small Intestine (SI)	640	400	4/24	6
Upper Large Intestine (ULI)	210	220	13/24	1.8
Lower Large Intestine (LLI)	160	135	24/24	1

*From ICRP Publication 23 (1975).

Fig. 16.8 Dosimetric model for the gastrointestinal system. Table gives masses of the sections and their contents and clearance-rate data. [Reprinted with permission from *Annals of the ICRP*, Vol. 2, No. 3/4, ICRP Publ. 30, Part I, p. 33, International Commission on Radiological Protection, Sutton, England (1979). Copyright 1979 by ICRP.]