

Calculating Your Personal Annual Dose

Directions: Do the exercise below entitled “Your Personal Annual Dose.” You will need to use some of the data in the following table* as well as the information provided within the exercise in order to perform your calculations.

Ionizing Radiation Exposure in the United States	
Source	Estimated average annual exposure in the U.S. population (millirem)
Natural sources:	
Radon	200
Internal radiation	39
Cosmic radiation	31
Terrestrial radiation	28
Manmade:	
X-rays and nuclear medicine*	50
Consumer products	11
Miscellaneous	1
Total	360

Source: U.S. Environmental Protection Agency, *Radiation: Risks and Realities*, August 1993.

*In comparing your exposures with those in the table above and the table *Some Sources of Radiation Exposure in the United States* in the reading lesson, remember that the table reflects numbers obtained by dividing the collective exposures of relevant selected segments of the population by the total population of the United States. Such average numbers do not apply to a single, real individual. For example, doses to patients having nuclear medicine treatments are higher than for persons not receiving such treatments, but nuclear medicine doses are part of the overall national average. (Nuclear medicine is the use of radiation, including specific radionuclides, to treat or cure diseases.) So, too, are doses to residents of the United States who have never had a diagnostic medical or dental X-ray. Thus, your own personal exposure may be somewhat higher, or much lower, than the annual average.

Your Personal Annual Dose

Source of Radiation	Annual Exposure (millirem)
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Cosmic Radiation

Effect of Elevation, in feet (millirem/year):

(Exposures reflect 10% reduction for structural shielding; i.e., buildings are assumed to shield 10% of cosmic radiation from reaching you.)

0 (sea level)	26 millirem	4,000	39 millirem
500	27 millirem	6,000	52 millirem
1,000	28 millirem	8,000	74 millirem
2,000	31 millirem	10,000	107 millirem

For the approximate elevation at which you live, _____ feet above sea level, the average millirem/year from cosmic radiation is _____

Ground Radiation (from Soil, Rocks) (overall U.S. average = 28 mrem/year)

Average ground radiation for various areas:

Atlantic and Gulf Coastal Plain	16 millirem
Colorado Plateau Area	81 millirem
Rest of the United States	32 millirem

Add the ground radiation exposure for the area in which you live:

(Use the dose for the area closest to where you actually live; if none of the areas listed is representative of where you live, use the overall U.S. average.) _____

Radon (see table) _____

Radionuclides in the Body: Air, Water, Food

(total average millirem/year = 39) _____

Building Materials

Add 7 millirem/year (U.S. average)

_____ 7.0 _____

Medical Diagnosis

(Add the exposures for any of the following that you have received in the last year.

Be sure to count each exposure you received; e.g. 2 PET scans = 4,000 millirem.) _____

dental X-Ray (panoramic): 30 millirem

chest X-Ray: 8 millirem

CAT scan: 110 millirem

PET scan: 2,000 millirem

barium enema: 406 millirem

dental (2 bite-wings): 80 millirem

pelvis and hips: 65 millirem

skull, head, neck: 20 millirem

mammogram: 138 millirem

upper gastrointestinal tract: 244 millirem _____

Nuclear Medicine (Add average 430 mrem per treatment you've had.) _____

Jet Plane Travel (Add 0.5 millirem per airborne hour.) _____

Nuclear Fuel Cycle (Maximum of 0.1 millirem/yr; includes manufacture of fuel and operation of power plants) _____

Consumer Products

Natural gas heating, cooking: 2 millirem/year _____

Television viewing: maximum of 1 millirem/year _____

Eyeglasses: 0.4 millirem/year _____

Gas mantles (camping lanterns): 0.2 millirem/year _____

Dental ware (crowns, dentures): 0.1 millirem/year _____

Radioactive Waste Disposal

Low-level burial waste sites: 1 millirem/yr _____

Smoking Cigarettes

(16,000 millirem/year if one and 1/2 packs per day) _____

YOUR TOTAL _____