# 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) |
|---|---|

**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 | dental (2 bite-wings): 80 millirem |
| chest X-Ray: 8 millirem | pelvis and hips: 65 millirem |
| CAT scan:110 millirem | skull, head, neck: 20 millirem |
| PET scan: 2,000 millirem | mammogram: 138 millirem |
| barium enema: 406 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** _____