

Radiation Around You



Radiation is around us all the time. It is as much a part of our everyday environment as the light and heat of the sun's rays. Scientists call this background radiation and measure it in units called millirems.



Earth has always been radioactive. In fact, the natural radioactivity in the environment is just about the same today as it was at the beginning of the Neolithic Age, more than 10,000 years ago.



The water we drink, the food we eat, the air we breathe - all contain radioactive elements that occur naturally and always have been on Earth.



People living in Denver (high elevations) get more cosmic radiation from the sun than people in Dallas (low elevations).



Television depends on radiation to form the picture, yet modern sets give off a barely detectable level of radiation.



There are many different kinds of radiation that can be both beneficial and harmful under some circumstances. For example, while none of us would be alive without radiant energy from the sun, excessive exposure can cause skin cancer.



A person traveling on a transcontinental flight at an altitude above 33,000 feet receives about 3 to 5 millirems of radiation per trip. This is more than you would receive if you spent 24 hours a day at the gate house of a nuclear power plant for an entire year.



For most people, the biggest single source of man-made radiation exposure is medical tests.



Mother Nature's Reactor! In 1972, scientists found the remains of a natural nuclear reactor located in a uranium mine in Oklo, Gabon, Africa. Evidence shows that a nuclear chain reaction occurred in the mine 1.5 billion years ago.



A portion of each person's annual dose of radiation, about 40 mrem, comes from inside the human body. This results from the decay of naturally occurring radioactive atoms found in such elements as potassium contained in our bodies.



American Nuclear Society

Communications and Outreach
555 North Kensington Ave.
La Grange Park, IL 60526-5592
708-352-6611 telephone
outreach@ans.org e-mail
www.NuclearConnect.org

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Radiation

is a part of our world



**Estimate Your Personal
Annual Radiation Dose**

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Factors	Common Sources of Radiation	Your Annual Dose (mrems)
Where You Live	Cosmic Radiation (from outer space) Exposure depends on your elevation (how much air is above you to block radiation). Amounts are listed in mrem (per year). At sea level.....26 mrem 2-3000 ft35 mrem 6-7000 ft66 mrem 0-1000 ft.....28 3-4000 ft41 7-8000 ft79 1-2000 ft.....31 4-5000 ft47 8-9000 ft96 5-6000 ft52 (Elevation of cities (in feet): Atlanta 1050; Chicago 595; Dallas 435; Denver 5280; Las Vegas 2000; Minneapolis 815; Pittsburgh 1200; St. Louis 455; Salt Lake City 4400; Spokane 1890.)	_____ mrem
	Terrestrial (from the ground) If you live in a state that borders the Gulf or Atlantic Coasts, add 16 mrem If you live in the Colorado Plateau area, add 63 mrem If you live anywhere else in the continental US, add 30 mrem	_____ mrem
	House Construction If you live in a stone, adobe, brick or concrete building, add 7 mrem	_____ mrem
	Power Plants If you live within 50 miles of a nuclear power plant, add 0.01 mrem If you live within 50 miles of a coal-fired power plant, add 0.03 mrem	_____ mrem
		_____ mrem
Food, Water, Air	Internal Radiation² From food (Carbon-14 and Potassium-40) & from water (radon dissolved in water) From air (radon)	_____ 40 mrem _____ 228 mrem
How You Live	Jet Plane Travel0.5 mrem per hour in the air	_____ mrem
	If you have porcelain crowns or false teeth ³0.07 mrem	_____ mrem
	If you go past luggage x-ray inspection at airport.....0.002 mrem	_____ mrem
	If you view a TV or computer screen which uses CRT technology ⁴1 mrem	_____ mrem
	If you smoke 1/2 pack of cigarettes every day of the yearadd 18 mrem	_____ mrem
	If you have a smoke detector.....0.008 mrem	_____ mrem
Medical Tests	Medical Diagnostic Tests — Number of millirems per procedure⁵ X-Rays: Chest-10 mrem, Mammography (2 views)-72, Skull-10, Cervical Spine-20, Lumbar Spine-600, Upper GI-600, Abdomen (kidney/bladder)-700, Barium Enema-800, Pelvis-60, Hip-70, Dental Bitewing/Image-0.5, Extremity (hand/foot)-0.5	_____ mrem
	CT Scans: Head-200 mrem, Chest-700, Abdomen/Pelvis-1000, Extremity-10, Angiography (heart)-2000, Angiography (head)-500, Spine-1000, Whole Body-1000, Cardiac-2000	_____ mrem
Your Estimated Annual Radiation Dose		_____ mrem

We live in a radioactive world - humans always have. Radiation is part of our natural environment. We are exposed to radiation from materials in the earth itself, from naturally occurring radon in the air, from outer space, and from inside our own bodies (as a result of the food and water we consume). This radiation is measured in units called millirems (mrems). The average dose per person from all sources is about 620 mrems per year. It is not, however, uncommon for any of us to receive less or more than that in a given year (largely due to medical procedures we may undergo). Standards allow exposure to as much as 5,000 mrems a year for those who work with and around radioactive material.¹

1. See <http://www.nrc.gov/about-nrc/radiation/health-effects/info.html>
2. Average values.
3. Some of the radiation sources listed in this chart result in an exposure to only part of the body. For example, false teeth or crowns result in a radiation dose to the mouth. The annual dose numbers given here represent the "effective dose" to the whole body.
4. The value is less than 1, but adding a value of 1 would be reasonable.
5. Exposures for medical tests vary depending upon equipment and the patient. The doses listed are an average for an actual exposure.

Primary sources for this information are National Council on Radiation Protection and Measurements Reports: #92 Public Radiation Exposure from Nuclear Power Generation in the United States (1987); #93 Ionizing Radiation Exposure of the Population of the United States (1987); #94 Exposure of the Population in the United States and Canada from Natural Background Radiation (1987); #95 Radiation Exposure of the U.S. Population from Consumer Products and Miscellaneous Sources (1987); #100 Exposure of the U.S. Population from Diagnostic Medical Radiation (1989); and #160 Ionizing Radiation Exposure of the Population of the United States (2009).

