

PLANMECA®

RADIOGRAPHY
Patient Overview

Radiation In Everyday LIFE...



What Is Radiation?

Radiation is a form of energy in waves. It exists on a spectrum, with low-frequency radiation (from radio waves and microwaves) on the low end and high-frequency radiation (from gamma rays and x-rays) on the high end. All radiation affects the cells in our bodies to some extent, but the lower the frequency of the waves and the lower the exposure, the less dangerous it is.

Types of Radiation

The term "radiation" is very broad, and includes such things as light and radio waves. In our context it refers to "ionizing" radiation, which means that because such radiation passes through matter, it can cause it to become electrically charged or ionized. In living tissues, the electrical ions produced by radiation can affect normal biological processes.

How Are We Exposed to Radiation?

We encounter radiation each day from a variety of sources. The average American is exposed to about 6 millisieverts (mSv) of radiation annually, according to the United States Nuclear Regulatory Commission (USNRC). Half of this typically comes from background radiation that occurs naturally in the environment, and half comes from medical tests, such as X-rays, mammograms, and CT scans.

According to Kelly Classic, MS, spokesperson for the Health Physics Society, sources of environmental radiation include:

- Radioactive compounds in soil and building materials like concrete, brick, and stone
- Radiation from outer space that you encounter when you fly on airplanes or visit high-altitude places
- The mineral potassium in your own body (a small fraction of potassium, which our bodies need to function, is radioactive)
- Radon gas in the home, which accounts for about 2 mSv of exposure each year, and is the largest contributor of background radiation

Finally, there's the kind of radiation released during nuclear reactions, such as what's disseminating from Japan's Fukushima Daiichi plant.

Here's a look at various sources of radiation exposure, according to data from the Health Physics Society and the U.S. Environmental Protection Agency (EPA).

By way of comparison, a single dose of radiation below 0.01 mSv is considered negligible by the National Council on Radiation Protection and Measurements.

Item	Dose of radiation in millisieverts (mSv)
Banana	0.0001
Dental X-ray	0.005
Living within 50 miles of a nuclear power plant	0.01 (per year)
A flight from New York to Los Angeles	0.04
Smoking 1 ½ packs of cigarettes	0.08
Chest X-ray	0.1
Living at sea level	0.25 (per year)
Mammogram	0.3
Living in Denver	0.5 (per year)
Abdominal CT scan	14
Measures between reactors No. 3 and No. 4 during the March 15 explosion at the Fukushima plant	As high as 400 per hour

According to the World Nuclear Association, annual exposure to 100 mSv or greater carries a measurable, though small, increase in cancer risk. Below that level, it's believed that your body's cells are able to heal themselves from radiation. "There are enzyme systems in the body that repair damage from these low levels of background radiation.

The use of radiation and nuclear techniques in medicine, industry, agriculture, energy and other scientific and technological fields has brought tremendous benefits to society. The benefits in medicine for diagnosis and treatment in terms of human lives saved are enormous. Radiation is a key tool in the treatment of certain kinds of cancer. Three out of every four patients hospitalized in the industrial countries benefit from some form of nuclear medicine. The beneficial impacts in other fields are similar.

No human activity or practice is totally devoid of associated risks. Radiation should be viewed from the perspective that the benefit from it to mankind is less harmful than from many other agents.*

*IAEA International Atomic Energy Agency