

FAQs: Radiation's health effects

[CBC News](#)

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What is radiation?

We are all naturally exposed to background radiation from [radon](#), a colourless, odourless gas found in soil, water and air. Unnatural sources of exposure such as medical X-rays deliver about 10 days' worth of naturally occurring radiation.

Symptoms of radiation sickness occur when the body is damaged by a very large dose of radiation over a short period of time. Workers at a nuclear power plant or emergency responders on site of a nuclear disaster are at greatest risk of exposure to high levels of radiation.

The more radiation a person absorbs, the sicker he or she will get. That's why the first step in preventing harm is to prevent exposure. In Japan, authorities expanded the evacuation zone for people living near the Fukushima Daiichi nuclear plant, which was damaged by the devastating March 11 earthquake and subsequent tsunami.

Once exposed, people are screened to establish how much radiation they were exposed to. Their bodies, clothes and shoes are then washed with soap and water.

Potassium iodide tablets are often given out to people at risk of contamination or who have been exposed. The compound prevents or reduces absorption of radioactive iodine, a byproduct of nuclear fission, through the thyroid gland, which uses iodine to produce thyroid hormones.

But potassium iodide cannot prevent radioactive iodine from entering elsewhere in the body and does not affect the absorption of other radioactive elements, such as cesium, which stays in organs, tissue and the environment much longer than iodine.

Health officials advise people against taking potassium iodide unnecessarily since it may cause allergic reactions and side-effects such as nausea and vomiting. If taken in pregnancy, the fetus runs a higher risk of developing goiter or abnormal thyroid function. High levels of potassium in the blood can cause arrhythmias, said B.C. Health Officer Dr. Perry Kendall.

Radiation sickness

Radiation sickness, also called radiation poisoning, is serious but rare. Since the Second World War, most cases of radiation sickness have resulted from industrial accidents, such as the Chernobyl meltdown in 1986.

Radiation dosage is measured in sieverts (Sv). Short-term exposure of the whole body to about 10,000 mSv or 10 Sv would cause immediate illness, such as nausea and decreased white blood cell count, and subsequent death within a few weeks, according to the World Nuclear Association.

Health Canada [lists the exposure limits](#) for licensed sources of radiation as 100 mSv over five years and 50 mSv in a year for workers and 1mSv in a year for members of the public.

Comparing radiation levels

- Airline crew flying from Tokyo to New York by polar route: 9 mSV/year.
- CT abdomen: 8 mSV.
- Vomiting, nausea: 1,000 mSV.
- Death within a month for about half exposed to a single dose: 5,000 mSV.
- Short-term, whole body exposure resulting in immediate illness and death within a few weeks: 10,000 mSV

Sources: FDA, Reuters, World Nuclear Association

People living in two villages near the Chernobyl plant were exposed to, on average, 300 mSv of radiation. The average cumulative exposure for the general population in various affected regions of Belarus, Russia and Ukraine over a 20-year period after the accident is estimated to be between 10 and 30 mSv, according to the Merck Manuals reference publication for health professionals.

Symptoms

The strength of the radiation itself and distance from it are key factors in the severity of radiation sickness.

Nausea and vomiting often begin within hours of exposure, followed by diarrhea, headaches and fever.

Since radiation destroys infection-fighting white blood cells, the greatest short-term risk after exposure is infection and the spread of infectious diseases.

Health impacts

Our bodies are able to repair effects of radiation on tissues, said Dr. Michael Milosevic, a radiation oncologist at Princess Margaret Hospital in Toronto. But too much radiation can cause damage to the DNA that the body can't repair, which sometimes leads to cancer in the future, he said.

Ionizing radiation can damage the body's internal chemistry. When damage is severe, the body's natural repair systems can be overwhelmed.

Vulnerable areas include:

- Thyroid gland.
- Bone marrow.
- Cells lining the intestine and stomach.

Babies and young children can be more sensitive to radiation exposure because their cells typically divide faster than in an adult, thereby increasing their risk of developing a radiation-related cancer later in life, said Prof. Miriam Diamond, an environmental chemist at the University of Toronto.

Treatment

Drugs can stimulate the growth of white blood cells and help people fight off infections. Exposed individuals can also be given capsules containing a dye that binds to thallium and cesium and helps the body get rid of these radioactive elements.

Sources: Mayo Clinic, CDC, FDA, Radiological Society of America

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