

Biology - Radiation & Health**RADIATION AND HEALTH**

When large amounts of radiation are released into the air over a short period of time (as from a nuclear blast), it can make people and other living things very sick. Radiation sickness can cause flu-like symptoms, hair loss, skin burns, and even death.

Fortunately, radiation sickness is rare and the risk to people more than a few miles from a blast is extremely low.

If radiation remains in the soil or water supplies, long-term exposure can increase a person's risk of cancer. But even then, it's much lower than the overall risk of cancer to most people living in developed countries today.

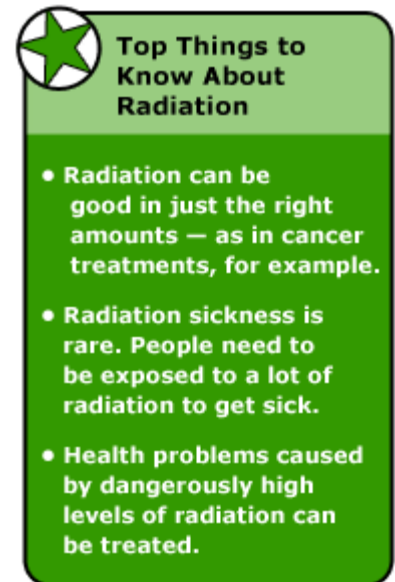
What Is Radiation?

In just the right amounts, radiation is a good thing — and very necessary for life. In fact, radiation is a natural process. It's found in small amounts just about everywhere: in soil, water, food, and even our bodies. We're exposed to this kind of "background radiation" every day.

In the broadest sense, radiation is the act of giving off energy. The sun is one energy source that gives off (or "radiates") energy through its ultraviolet rays.

The two types of radiation are:

1. **Non-ionizing radiation.** This type of energy is mostly emitted through "waves" — like sound waves, radio waves, and ultraviolet (heat) waves. Although non-ionizing radiation can be harmful in very high doses, this type of radiation cannot change the molecular chemistry of a person or thing.
2. **Ionizing radiation.** Some natural sources of ionizing radiation are cosmic rays from the sun and stars, and radon (an element found in soil). Manmade sources include X-ray machines and radiation therapy for cancer treatment. Ionizing radiation is powerful enough to split an atom and change the molecular chemistry of a person or thing. It can be useful (like when it's used for cancer therapy). But ionizing radiation can also be harmful if a person is exposed to too much. It's this type of radiation that can lead to radiation sickness — and even death if the amount of radiation is really high.



How Do People Get Exposed to Too Much Radiation?

It's rare to be exposed to dangerously high doses of radiation in everyday life. But people can be exposed to high doses if there's a nuclear attack or a nuclear power plant failure.

People who are within a few miles of a nuclear disaster are at risk of being exposed to increased levels of ionizing radiation. **But unless someone is standing inside a nuclear reactor building when an explosion or meltdown happens, the chances of developing radiation sickness or dying suddenly are low.** The farther away from the source of radiation a person is, the lower the risk of radiation sickness.

What Happens to Someone With Radiation Sickness?

Radiation sickness usually only happens to people who are exposed to 300 or more times the average yearly dose of background radiation. A person exposed to such high doses of radiation may have:

- a drop in blood cell counts
- hair loss
- nausea
- vomiting
- diarrhea
- skin burns
- an eventual increased risk for blood and thyroid cancers
- eventual death as a result of organ failure

How severe these problems are and when they show up depends on how much radiation the person was exposed to. It also depends on whether the person was exposed to radiation over a short or long period of time.

When exposure is sudden and 100 or more times the average yearly dose, symptoms can be severe and appear within a few hours. A lower dose of radiation over a longer period of time is less likely to cause symptoms right away, but will still increase the risk of cancer later in life.

Treatment

The health problems caused by dangerously high levels of radiation can be treated. But people who are exposed to near-fatal amounts of radiation and still survive can have lifelong health problems. They have an increased risk for developing certain types of cancer.

Usually a medical team of doctors with different health specialties will work together to treat the different areas of the body that were damaged by radiation. If medical personnel are able to treat people quickly (within 24 hours) after a radiation crisis, they may be able to prescribe medications to reduce the chances of certain cancers.

Effects to the Food Supply and Environment

After a nuclear blast, radiation particles can travel on wind currents for miles and settle in water sources, plants, and soil. Livestock and food crops in these areas are likely to be affected, causing food supplies to become contaminated.

Sometimes the level of radiation in food is so minute it poses no risk, but other times it rises above safety levels. So scientists test the levels of radiation in the soil after a nuclear disaster to determine the risks. Food that's deemed unsafe is banned until radiation levels decrease. It can take time for radiation to get back to acceptable levels. Depending on what happened, it may be weeks, months, or even years.

While people can avoid eating contaminated food, wild animals in affected areas cannot. Fortunately, though, studies from previous nuclear disasters have found that while some animals might incur short-term harm from radiation exposure, most do not suffer long-term health problems.