

RADIATION

What is radiation?

Radiation is a form of energy. It comes from the sun and outer space, from man-made sources such as X-ray machines, and from some radioactive materials in soil.

How can someone come into contact with radiation?

Radiation cannot be spread from person to person. Small quantities of radioactive materials occur naturally in the air, drinking water, food and our own bodies.

People also can come into contact with radiation through medical procedures, such as X-rays and some cancer treatments.

Radiation as a weapon: Attacks using radiation as a weapon may occur in three ways:

- Explosion of a “dirty bomb”
- Explosion of a nuclear bomb or device
- Destruction of a nuclear power plant

Please note: Just because you come into contact with radiation does not mean you will get sick from it.

What is a “dirty bomb”?

A dirty bomb combines explosives, such as dynamite, with radioactive materials in powder or pellet form. The intent of a dirty bomb is to spread radioactive material in the area of the explosion, frighten people and make buildings or land unusable for a long period of time. The primary danger from a dirty bomb is the explosion itself. It is unlikely that the material used to make a dirty bomb would have enough radiation to cause severe illness from exposure.

What is a nuclear bomb or device?

Examples of nuclear bombs/devices are the bombs dropped on Hiroshima and Nagasaki, Japan, at the end of World War II. When a nuclear bomb/device explodes, a large fireball is created. Everything inside of the fireball vaporizes, including soil and water, and is carried upwards. This creates the mushroom cloud that is associated with a nuclear blast. Radioactive material from the nuclear device mixes with the vaporized material in the mushroom cloud. As the vaporized radioactive material cools, it forms particles, such as dust. The radioactive material then falls back to the earth, a process known as fallout. Because fallout is in the form of small particles, it can be carried long distances by the wind and end up miles from the site of the explosion. Fallout is radioactive and can cause contamination of anything on which it lands, including food and water supplies.

What could the destruction of a nuclear power plant do?

The destruction of a nuclear facility (or a meltdown) could cause a large amount of radioactive material to be released. People at the facility would probably be contaminated with radioactive material and possibly could be injured if there was an explosion. Those people exposed to a large dose of radiation might develop acute radiation syndrome. People in the surrounding area could also be exposed as a result of “fallout.” Because fallout is in the form of small particles, it can be carried long distances by the wind and end up miles from the site of the explosion. Fallout is radioactive and can cause contamination of anything on which it lands, including food and water supplies. An example of a meltdown at a nuclear facility is the disaster that occurred at Chernobyl in 1986.

(Radiation continued)

How can someone be protected from radiation?

Some basic ways to reduce exposure to radiation include the following:

1. Decrease the amount of time spent near the source of radiation
2. Increase the distance from a radiation source
3. Increase the shielding between you and the radiation source. Shielding is anything that creates a barrier between people and the radiation source. Depending on the type of radiation, the shielding can range from something as thin as a plate of window glass or as thick as several feet of concrete.
4. People who live near but not in the immediate area of a radiation event may be asked to stay home and take shelter. This action is called "sheltering in place." Staying in your home may actually be safer and may protect you from exposure to the radiation outside.

What happens if someone gets sick from radiation?

The effects of radiation may not be seen for many years. Health effects can be mild (such as skin reddening) or serious (such as cancer and death). The severity of the effects depend on—

- the amount of radiation absorbed by the body (the dose);
- the type of radiation;
- the route of exposure; and
- the length of time a person is exposed.

Exposure to very large doses of radiation may cause death within a few days or months. Exposure to lower doses of radiation may lead to an increased risk of developing cancer or other adverse health effects.

Acute radiation syndrome (ARS): People exposed to radiation will get ARS only if—

1. The radiation dose is high (doses from chest X-rays are too low to cause ARS; however, doses from radiation therapy to treat cancer may be high enough to cause some ARS symptoms);
2. The person is exposed to the radiation in a short time period, usually within minutes;
3. The radiation is penetrating (able to reach internal organs); **and**
4. The person's entire body, or most of it, received the dose.

Immediate symptoms of ARS are nausea, vomiting and diarrhea. Later effects may include the following:

- loss of appetite
- loss of energy
- fever
- nausea
- vomiting
- diarrhea
- seizures
- possible coma
- destruction of bone marrow
- internal bleeding

Children exposed to radiation may be at greater risk than adults. Exposure to an unborn child is of special concern because a fetus is very sensitive to radiation.

How likely is someone to die from exposure to radiation?

The survival rate depends on the radiation dose; the higher the dose, the more likely a person is to die. For those who do survive, full recovery may take from a few weeks to years.

People are more likely to die from ARS when the amount of radiation is high. Most people who do not recover from ARS will die within several months of exposure. The cause of death in most cases is the destruction of the person's bone marrow, which results in infections and internal bleeding. For the survivors, the recovery process may last from several weeks up to two years.

(Radiation continued)

What is the treatment for radiation?

- **Prevention of illness after exposure:** Potassium iodide (KI) is used for individuals who are exposed to radioactive iodine (such as from fallout from a nuclear power plant). It decreases the chance of getting thyroid cancer. The local health department will give out potassium iodide, usually in pill form, to be taken at home.
- **Treatment of illness:** People who have been exposed to large amounts of radiation because of a “dirty” bomb, nuclear bomb or a nuclear power facility explosion may need to seek medical treatment. Health care providers will decide what course of treatment, if any, is needed. Supportive care (intravenous fluids, medicine to control fever and pain, and monitoring of blood tests) also is standard treatment.

A medicine called PPTA may be given to remove radioactive materials, such as plutonium, from the body. Another medicine, Prussian blue, may be used to remove radioactive thallium or cesium from the body.

Is there a vaccine for radiation?

No, there is no vaccine for radiation.

What should be done if someone comes into contact with radiation?

If you think that you or someone you know may have come into contact with large amounts of radiation, contact the local county health department right away. (Visit www.idph.state.il.us//local/alpha.htm for a listing of all county health departments in Illinois or check your local phone book.)

If you or someone you know is showing symptoms of radiation exposure, call your health care provider or the Illinois Poison Center right away. The toll-free number for the poison center is 1-800-222-1222.

Where can one get more information about radiation?

- U.S. Centers for Disease Control and Prevention www.bt.cdc.gov/radiation/index.asp
- Illinois Department of Public Health www.idph.state.il.us
- Illinois Poison Center www.IllinoisPoisonCenter.org