



RADIATION EXPOSURE

Agent information:

Radioactive material is used in health care, industry, energy production, and as warfare agents. Radioactive materials contain unstable atoms that give off radiation as they decay. A spontaneously disintegrating atom emits ionizing radiation as a beta particle, an alpha particle, a gamma-ray or x-ray, neutron, or some combination.

The amount of radioactivity given off by a radioactive material is measured by the number of disintegrating atoms per unit time. In the United States, the unit of measure is called the curie (Ci) which is generally a large amount of radioactivity so other units of measure the millicurie (1/1000) or microcurie (1/1,000,000) are commonly used.

Route of exposure:

Ionizing radiation has sufficient energy to affect the atoms in living cells and thereby damage their genetic material (DNA). The energy the radiation deposits in tissue is called the dose or the absorbed dose (rad). A person can receive an external dose by standing near a gamma or high-energy beta-emitting source. A person can receive an internal dose by ingesting or inhaling radioactive material.

The external exposure stops when the person leaves the area of the source. The internal exposure continues until the body flushes the radioactive material naturally, or until it decays. When a person inhales or ingests a radionuclide, that radionuclide is distributed to different organs and stays there for days, months, or years until it decays or is excreted. The radionuclide will deliver a radiation dose over a period of time. The dose that a person receives from the time the nuclide enters the body until it is gone is the committed dose.

Signs and symptoms:

Exposure to radiation can cause two kinds of health effects: deterministic or stochastic. Deterministic effects are observable health effects occurring soon after receiving large doses. These include hair loss, skin burns, nausea, or death (Acute Radiation Syndrome). Stochastic effects are long-term exposure effects, such as cancer. The radiation dose determines the severity of a deterministic effect and the probability of a stochastic effect in conjunction with the type of emission, which is usually man-made.

**Emergency Medical Services and Preparedness Section
24/7 Emergency Contact Number: 1-888-295-5156
Contact Number: 302-223-2999**

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Transmission:	Only victims contaminated with irradiated particles, either externally or internally, can expose other people to a significant radiation dose.
Protective measures:	Reduce personal exposure through limiting exposure time, maximizing distance from the source and the use of shielding. Self-protection and decontamination depend on the type of radiation particle and the type and length of exposure. Follow appropriate Body Substance Isolation (BSI) precautions, with use of Personal Protective Equipment (PPE). Standard Precautions: Hand washing before and after all patient contacts and contact with patient care equipment. Contact Precautions: Use of gloves, gown, and eye protection. Airborne Precautions: Initiate airborne precautions if environmental exposure contains airborne particles, including wearing masks (fit tested, NIOSH-approved N-95 respirator).
Decontamination of PPE equipment:	Equipment can be decontaminated using soap and water. Also, 0.5% hypochlorite solution (one part household bleach to 10 parts water) can be used as appropriate or if gear had any visible contamination. Note that bleach may damage some types of firefighter turnout gear (one reason why it should not be used for biological agent response actions). After removing gear, response workers should shower using copious quantities of soap and water.
Prophylaxis:	Potassium iodide can be effective as a thyroid-blocking if there is a risk of internal exposure to high levels of radioactive iodine.
Treatment:	Rapid response to nuclear or radiological terrorism is crucial and methods are being developed to improve the effectiveness of the response. Detection and decontamination are critical elements in the event of any radiological incident.
Reporting:	Immediately report any suspect cases to the Division of Public Health, 1-888-295-5156 (24/7 coverage).
Additional information:	For additional information, visit the Centers for Disease Control and Prevention website: https://www.cdc.gov/nceh/radiation/emergencies/index.htm