



## **RADIATION EXPOSURE**

**Agent Information:** Radiological agents are used in health care, industry, energy production, and as warfare agents, measured by the number of atoms disintegrating per unit time. A disintegrating atom can emit a beta particle, an alpha particle, a gamma ray, or some combination.

**Route of Exposure:** Alpha particles, beta particles, gamma rays, and x-rays affect tissue in different ways. Alpha particles disrupt more molecules in a shorter distance than gamma rays. As radiation moves through the body, it dislodges electrons from atoms, disrupting molecules and depositing energy. The energy the radiation deposits in tissue is called the dose or the absorbed dose. 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. 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.

**Transmission:** Only victims contaminated with irradiated particles, either externally or internally, can expose other people to radiation.

**Protective Measures:** Reduce exposure through shielding, time, and distance. Self-protection and decontamination depends 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).

**24/7 Emergency Contact Number: 1-888-295-5156**

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- 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 agent depending on the type of radiation.
- 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). For additional information, visit the CDC website: [www.emergency.cdc.gov/](http://www.emergency.cdc.gov/).