Types of Radiation Exposure

Regardless of where or how an accident involving radiation happens, three types of radiation-induced injury can occur:

- External irradiation
- Contamination with radioactive materials
- Incorporation of radioactive material into body cells, tissues, or organs.

EXTERNAL IRRADIATION

External irradiation occurs when all or part of the body is exposed to penetrating radiation from an external source. During exposure the body can absorb this radiation or it can pass completely through. A similar thing occurs during an ordinary chest x-ray when the radiation passes through your body and exposes an x-ray film. Following external exposure, an individual is not radioactive and can be treated like any other patient

CONTAMINATION

The second type of radiation injury involves *contamination* with radioactive materials. Contamination means that radioactive materials in the form of gases, liquids, or solids are released into the environment and people are contaminated externally and/or internally. An external surface of the body, such as the skin, can become contaminated. If radioactive materials get inside the body through the lungs, gut, or wounds, the contaminant can become deposited internally.

INCORPORATION

The third type of radiation injury that can occur is *incorporation* of radioactive material. Incorporation refers to the uptake of radioactive materials by body cells, tissues, and target organs such as bone, liver, thyroid, or kidney. In general, radioactive materials are distributed throughout the body based upon their chemical properties. Incorporation cannot occur unless contamination has occurred.

These three types of exposures can happen in combination and can be complicated by physical injury or illness. In such a case, serious medical problems always have priority over concerns about radiation, such as radiation monitoring, contamination control, and decontamination.

Biological Effects of Acute, Total Body Irradiation	
Amount of Exposure	**Effect**
50 mGy (5 rads)	No detectable injury or symptoms.
1 Gy (100 rads)	May cause nausea and vomiting for 1-2 days and temporary drop in production of new blood cells.
3.5 Gy (350 rads)	Nausea and vomiting initially, followed by a period of apparent wellness. At 3-4 weeks, there is a potential for deficiency of white blood cells and platelets. Medical care is required.
Higher levels of exposure can be fatal. Medical care is required.	

Information courtesy of the CDC.

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