

SECTION THREE

RADIOLOGICAL

EMERGENCIES

LEARNING OBJECTIVES

By the end of this section, participants will be able to:

- Identify the ways patients can become exposed/contaminated by radioactive materials
- Explain how to control a situation involving a release of radioactive materials

TREATING PATIENTS

If the victims are involved in a radiological incident, move them away from any potential area of contamination, *only if the movement will not increase the risk of injury*.

Remember to treat serious wounds first. Consequently, do not waste time measuring radiation levels. Start first aid immediately, and you can do a quick initial survey for contamination, if time allows and you have the appropriate equipment and training. But remember that conventional life-saving first aid always has priority unless you suspect a high radiation dose (>400 rad). In these cases you should follow your Operating Procedures or contact your medical control facility and obtain guidance from the on duty physician.

Notify the transporting agency and the receiving hospital as soon as you identify that you have or possibly have contaminated victims. This will allow these agencies to prepare their equipment and facilities to handle your victims.

There are a number of ways patients can be contaminated by or exposed to radiation. The patient may be:

- Exposed to an external source
- Contaminated externally
- Contaminated internally
- Have a contaminated wound

Exposure to External Sources

Patients that have been exposed to external sources of gamma, x-ray, or neutron radiation do not pose contamination problems. The degree of injury, from the exposure, depends of the amount of dose received. If the whole body exposure exceeds 100 rem, symptomatic treatment at a specialized hospital may be needed.

An example of an external source would be an Iridium 131 (gamma) source used for radiography or a Californium 252 (neutron) source used to measure moisture in soil.

Externally Contaminated Patients

Contamination means that radioactive materials in the form of gases, liquids or solids are released into the environment and can come in contact with the patient then stay on the patient. Externally contaminated patients should be given any first aid treatment need immediately. You should always wear gloves, gown or coveralls, cap or helmet, and a mask as well as wrap the patient in a blanket or sheet for transport, this will help to prevent or minimize the amount of contamination spread to you.

Save all bedding, clothing and equipment that was in contact with the patient and store in appropriate containers that are marked “RADIOACTIVE MATERIALS, DO NOT DISCARD”. Ensure that all of the personnel and equipment involved with patient care or in the area of patient is surveyed by trained Health Physics personnel before being released from the area.

Internally Contaminated Patients

Patients who are internally contaminated have inhaled, ingested, absorbed or had some radioactive materials injected into their body. Once this happens, the radioactive material is distributed through out the body, based on its chemical properties. For example, radium targets the bones because the chemical properties of radium are very similar to calcium; Iodine 131 is distributed to the thyroid because the body can not distinguish the radioactive iodine from the non-radioactive iodine. Depending on the isotope, treatment can be given to prevent further uptake, or to promote removal of the material from the body. Medications used for this purpose are specific to the radioactive isotope and are given by the receiving hospital. There is little that the first responders on scene can do in these cases, other than help to prevent any additional uptake. It is important to remember that the patient(s) may also be externally contaminated as well.

Contaminated Wounds

Patients with contaminated wounds, your primary concern is to treat the wound, then prevent further spread of contamination and absorption of radiation. For minor wounds you can clean the wound and cover it with a self-adhering surgical drape. Flood the adjacent skin with saline saving the irrigating fluid and tissue for lab analysis to determine the type of contamination in the wound.

Be sure to notify the ambulance and receiving hospital that the patient has been contaminated with or exposed to radioactive materials. For the contaminated patients, the hospital may want to establish a decontamination area away from or outside of the hospital. Once you have turned the patient over to the hospital, you and your equipment must be surveyed for contamination. If you are contaminated, you will be required to remove the contaminated clothing and shower. The contaminated clothing and equipment must be bagged (plastic) and properly marked. You cannot leave the area until you; your equipment and your vehicle have been surveyed and released by a Health Physics representative.

CONTROLLING HAZARDS

Low level radioactive materials generally do not present a significant threat. However, for your safety, as well as the safety of the public is still a concern. So here is a list of primary points to remember when dealing with a radiological incident.

- Rescue, life safety, first aid, control of fire and most other chemical hazards take priority over measuring radiation or contamination levels.
- Notify the appropriate radiation protection authorities.
- Isolate all spills or leaks.
- If the spill is large or of dry materials, consider downwind evacuation.
- If fire is involved, *primary* evacuation should be at least 1000 feet.
- Move intact containers from fire if you can do so safely (do not move damaged packages).
- Cover liquid spills with sand, earth or non-combustible material (dike large spills).
- Cover powder spills with plastic or tarps to prevent spreading.