

# Management of Patients Receiving Therapeutic Amounts of Radionuclides

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## Introduction

### Overview

This Chapter will list the responsibilities of the various health care personnel involved with or in support of the administration of non-sealed sources of radionuclides in therapeutic amounts. The health care personnel addressed in this section include:

- ❖ Radiation Protection
- ❖ Nuclear Medicine
- ❖ Radiation Oncology
- ❖ Nursing Services

### Forms of Radionuclides

Non-sealed sources are used in different forms such as:

- ❖ Solutions
- ❖ Colloidal suspensions
- ❖ Microspheres
- ❖ Capsules

A variety of radionuclides may be employed, such as:

- ❖ Iodine-131 ( $^{131}\text{I}$ )
- ❖ Phosphorous-32 ( $^{32}\text{P}$ )
- ❖ Strontium-89 ( $^{89}\text{Sr}$ )

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## Source of Information

The information presented in this section is based on the recommendations of the National Council on Radiation Protection and Measurements, Report No. 37 (NCRP 37) entitled, *Precautions in the Management of Patients Who Have Received Therapeutic Amounts of Radionuclides*.

## General Information

### Precautions

Hospitalized patients treated with therapeutic amounts of radiopharmaceuticals (e.g.  $^{131}\text{I}$  antibodies, etc.) will be placed in a private room with a bathroom.

### Contaminated Areas

Patients treated with therapeutic amounts of radiopharmaceutical (e.g.  $^{131}\text{I}$  antibodies, etc.) may contaminate areas of their room through perspiration, urine, feces, or vomitus. Any area that is likely to become contaminated will be covered with protective material appropriate to the amounts of contamination expected.

### Removal of Contaminated Items

The following procedures should be followed for disposal of contaminated items from these patients.

Item	Procedure
Linens	Radiation Protection will survey all linens for contamination before removal from the patient's room and, if necessary, hold them for decay.
Disposable	Disposable plates, cups, eating utensils, tissues, surgical items dressings and other waste items will be placed in a specially designated container. The material will be collected, checked for contamination and disposed of as normal or radioactive waste.

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Non-Disposable Items	Non-disposable items, such as sphygmomanometers and other patient care equipment, will be held in the patient's room and checked for contamination by Radiation Protection. These items will be returned to normal use, held for decay or decontaminated, as appropriate for the level of contamination.
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## Radiation Protection Staff Responsibilities

### Training Design

Radiation Protection will determine the needs for training and establish a system to provide training consistent with the recommendations of:

- ❖ National Council on Radiation Protection and Measurements (NCRP)
- ❖ Joint Commission on the Accreditation of Healthcare Organizations

Radiation Protection will provide training to the following personnel regarding patients undergoing radiopharmaceutical therapy:

- ❖ Nursing Service
- ❖ Housekeeping Staff
- ❖ Physicians

### Management of Patient Rooms

Radiation Protection will determine that radioactive contamination in the patient's room is at acceptable levels prior to clearing and releasing the room and its contents.

### Patient Discharge

Nuclear Medicine or Radiation Oncology will provide information concerning home care for those patients released from the hospital with significant amounts of radioactive material remaining.

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## Regulatory Compliance

Radiation Protection is responsible for ensuring compliance with the recommendations of the NCRP, JCAHO and CRCR, and will maintain documentation to show compliance with these regulations.

## Nuclear Medicine/Radiation Oncology Staff Responsibilities

### Procedure for Administration of Radiopharmaceuticals

When a patient who is to receive radiopharmaceutical treatment is admitted to the hospital, the Nuclear Medicine or Radiation Oncology staff will perform the following procedures:

Step	Procedure
1	Notify Radiation Protection at least 1/2 working day before the admission and discharge of all hospitalized patients receiving therapeutic doses over 10 mCi.
2	Meet with the patient to:  discuss the purpose of the treatment. describe the risks associated with the treatment. obtain a signed consent form from the patient. discuss steps to be taken by the patient to prevent the spread of contamination.
3	Inform the Nursing staff about details of the treatment:  approximate dose. estimated dose rate. reminder of visitor rules. precautions for nurses.
4	Post appropriate radiation notices:  warning sign on or by the patient room door. warning sign on trash/linen bags in patient's room. warning sign on patient's chart.
5	Place <i>Nursing Instruction Sheet</i> in chart.

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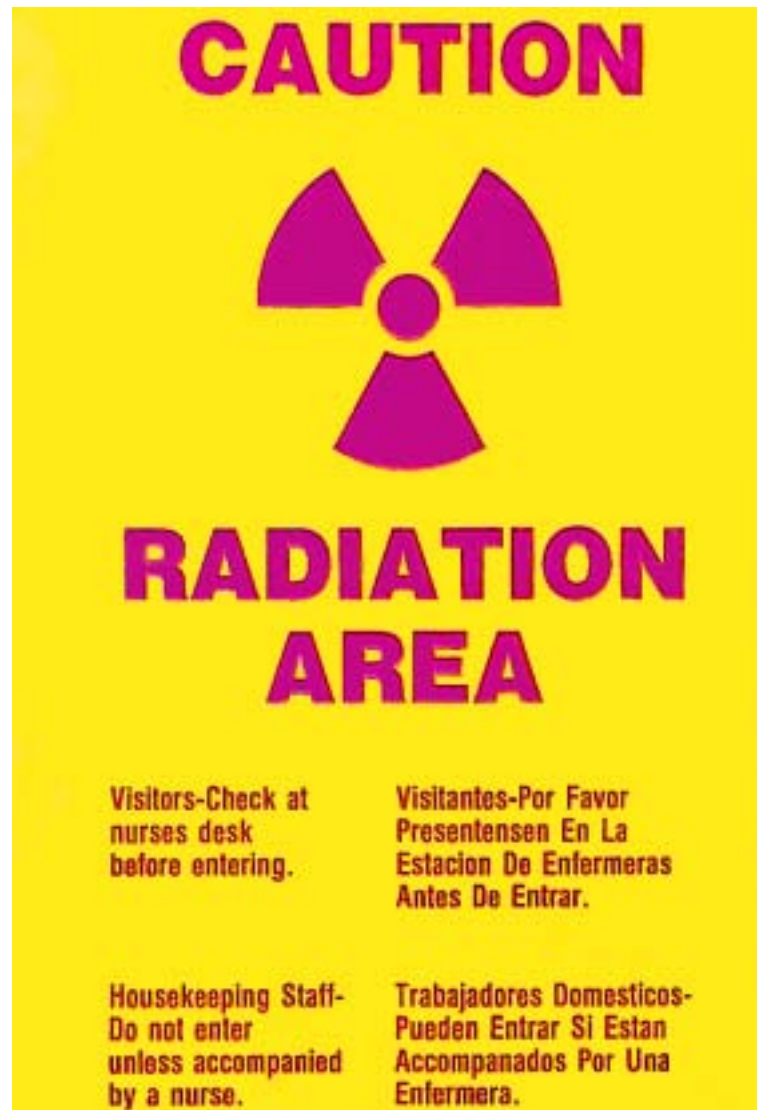
6	Post <i>Nursing Instructions</i> on patient's door.
7	Measure the exposure rate at one meter from the patient immediately after administration, and then on a daily basis thereafter. Record these rates on the Nuclear Therapy form in the chart.
8	<p>Measure the exposure rate in all surrounding areas along the walls common to the patient's room. Notify Radiation Protection immediately if the levels cannot be maintained within specified limits. Record all survey results.</p> <p>Radiation levels in unrestricted areas will be maintained at less than the limits specified in the CRCR and the USC License.</p>
<b>Note:</b>	Alternatively, radiation levels may be measured with a source equal to the maximum amount to be administered. Records of these surveys must be available for inspection.
9	Report to Radiation Protection for a bioassay within 3 days after administration of a therapeutic dose of $^{131}\text{I}$ in liquid form.
10	After the patient is discharged, notify Radiation Protection to survey the room for contamination and release, as appropriate.

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## Warning Signs

This warning sign is to be placed on the door to a patient's room who is receiving radiotherapy.



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## **Nursing Service Staff Responsibilities**

### **Knowledge of Procedure**

All nursing staff working with radiotherapy patients are responsible for understanding and following all procedures and instructions. Personal safety and the safety of patients will depend on the use of proper techniques in the care of patients receiving radiopharmaceutical.

### **Exposure Time**

Nurses should spend only the time required for ordinary nursing care near the patient.

### **Precautions For Visitors**

Visitors must:

- ❖ be 18 years old or older (unless other instructions are noted in the physician's orders on the patients chart).
- ❖ remain at least six feet from the patient except for a brief exchange of greetings or to say good-bye.

Visitors must not:

- ❖ remain in the patient's room for more than three hours per day.
- ❖ be pregnant; all female visitors should be asked if they are or might be pregnant (no pregnant visitor will be allowed in the patient's room).

### **Precautions For Hospital Staff**

In general, unless specific instructions to the contrary are written, non-health care staff and employees not directly associated with the treatment of the patient should not be permitted to enter the patient's room. If in doubt, call Nuclear Medicine or Radiation Oncology, as appropriate and Radiation Protection.

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## Activity of Patients

Patients whose treatment involves therapeutic doses of radiopharmaceutical (e.g.  $^{131}\text{I}$ , etc.) in excess of 30 mCi are confined to their rooms except for special medical or nursing purposes approved by Nuclear Medicine or Radiation Oncology.

## Special Instructions For Patients

For those patients undergoing treatment involving therapeutic doses of radiopharmaceutical (e.g.  $^{131}\text{I}$ , etc.) there are several special precautions required, as outlined in the table below.

Item	Procedure
Urine	Urine is not routinely collected. If orders are written to collect urine, special containers will be provided by Nuclear Medicine or Radiation Oncology. The patient should collect his own urine in the container. If the patient is bedridden, a separate urinal or bedpan should be provided and flushed several times with hot soapy water after use. Handle the urinal or bedpan with double disposable gloves on. After flushing, remove the gloves, being careful not to touch the outside of the gloves with bare hands. Dispose of gloves in the designated radioactive waste container. Wash hands thoroughly.
Feces	Feces need not be routinely saved, unless ordered by Nuclear Medicine or Radiation Oncology. If the nurse collects the excreta, disposable gloves should be worn. After assisting the patient, remove the gloves, being careful not to touch the outside of the gloves with your bare hands. The gloves should be placed in the designated radioactive waste container for disposal.
Meal Utensils	Disposable plates, cups and eating utensils will be used by patients who are treated with therapeutic doses of radiopharmaceuticals.
Vomitus	All vomitus must also be kept in the patient's room for disposal. Call Nuclear Medicine or Radiation Oncology if the patient should vomit.

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## **Blood and Urine Samples**

Routine blood and urine samples are not to be obtained while the patient is undergoing this therapy unless specifically authorized by a Nuclear Medicine or Radiation Oncology physician.

## **Use of Gloves**

All staff should wear disposable gloves when handling bed linens, urinals, bedpans, emesis basins, or other containers having any material obtained from the body of the patient. The gloves do not need to be sterile or surgical gloves. After use, these gloves should be left in the patient's room in the designated waste container. Hands should be washed thoroughly with soap and water.

## **Dressing Changes**

Surgical dressing should be changed only as directed by the physician. Such dressings should not be discarded but should be collected in plastic bags and labeled as radioactive waste. Handle these dressings only with tongs or tweezers. The tongs or tweezers should be placed in a separate plastic bag to be checked for radioactive contamination by Nuclear Medicine or Radiation Oncology. Staff handling these dressings should wear disposable gloves.

## **Disposable Items**

Disposable items should be used in the care of these patients whenever possible. After use, these items should be placed in the designated waste container. Contact Radiation Protection for proper disposal of the contents of the container.

## **Non-Disposable Items**

All non-disposable items, such as sphygmomanometers and other patient care equipment, should be left in the patient's room to be checked before release.

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## **Clothes and Linens**

All clothes, towels and bed linen used by the patient should be placed in the laundry bag provided and should be left in the patient's room to be checked by Radiation Protection. Bed linens will not normally be changed, since the period for radiation safety precautions is usually only 2-3 days.

## **In Case of Spillage**

Exercise care to ensure that no urine or vomitus is spilled on the bed or floor. If there is suspected contamination from the patient's excreta or vomitus, spillage or other causes:

- ❖ Notify Nuclear Medicine or Radiation Oncology and Radiation Protection immediately.
- ❖ Take the necessary precautions until Radiation Protection or a representative from Nuclear Medicine or Radiation Oncology arrives.

## **Suspected Personnel Contamination**

If a nurse, attendant or anyone else knows or suspects that his or her skin or clothing is contaminated:

- ❖ Notify Nuclear Medicine or Radiation Oncology, or Radiation Protection.
- ❖ Remain in the area near the patient's room and do not walk around the hospital.
- ❖ If your hands have become contaminated, wash them immediately with soap and water.

## **Precautions After Suspected Contamination**

After a suspected contamination, follow these guidelines:

- ❖ Mark off the entire area of potential contamination. This must be done to prevent further spread or personnel contamination.

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- ❖ Control access to and traffic through the area.
- ❖ Make sure that personnel inside the area or those who have entered the area remain for monitoring.
- ❖ Use absorbent material such as paper towels or diapers to contain the spill and prevent further contamination. Do not remove the materials until a representative of Nuclear Medicine, Radiation Oncology, or Radiation Protection arrives.

## Emergencies

If a radiotherapy patient should need emergency surgery or should die, notify Nuclear Medicine or Radiation Oncology, and Radiation Protection immediately (refer to the physician's order sheet for emergency numbers). Patient resuscitation and stabilization should be pursued immediately.

## Discharge of Patient

When the patient is discharged, call Radiation Protection and request that the room be surveyed for contamination before remaking the room. After the room has been surveyed and declared free of contamination, all signs and labels will be removed from the room and chart. Until then, treat the room as a radiation area even if the patient is no longer present.

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## Emergency Procedures for Patients Containing Radioactive Material

To ensure prompt emergency care for patients that contain radioactive materials, the following steps should be followed.

Step	Procedure
1	Life support measures are initiated immediately as specified by code blue policy and procedure, with the following special instructions:  Do not delay any life saving treatment simply because a patient is being treated with radioactive material. Any exposure of 30 minutes to a patient containing radioactive material is usually within permissible limits. It is suggested that personnel be rotated whenever possible.
2	Do not attempt to remove any radioactive material.
3	Tracheotomy may be performed if indicated.
4	Use an ambu-bag rather than mouth-to-mouth resuscitation.
5	Do not allow unnecessary personnel to remain in the patient room.
6	Do not remove anything from the patient's room unless it has been cleared by the Radiation Safety Officer.
7	Notify the Radiation Safety Officer.
8	If the patient expires, the body will remain in the room until released by the Radiation Safety Officer.