



**Baptist Health  
South Florida**

# **Radiation Safety for Nursing Care of Radioactive Patients**

**Alyson Cieply, DABR**

**Radiation Safety Officer, Baptist Hospital of Miami**

## Training Goals and Objectives

### **Goals:**

- 1) To be in compliance with FAC 64E-5.625 “Safety Instructions and Precautions for Radiopharmaceutical Therapy, Brachytherapy and Teletherapy”.
- 2) To enable nurses to deliver safe quality care to radioactive patients.
- 3) To minimize radiation exposure and contamination of patients, visitors, nurses and other health care providers.

## Training Goals and Objectives

### **Objectives:**

By the completion of the training, the participant will be able to:

- 1) Describe the procedures of minimizing radiation exposure by:
  - (a) Patient control
  - (b) Visitor control
  - (c) Contamination control
  - (d) Waste control
  
- 2) Describe the size and appearance of the brachytherapy sources and the safe handling and shielding needed in case of dislodged sources.
  
- 3) Describe the procedures for notification of the radiation safety officer or authorized user in case of patient's death or medical emergency.

## General Radiation Safety Information

### The Radioactive Patient

Patients undergoing a diagnostic or therapy procedure involving radioactive material are radioactive patients.

Some radioactive patients could be a radiation hazard to relatives, nursing staff or other health care providers.

These radiation hazards are due to:

- a) **External Exposure:** irradiation by emissions from radioactive material in the patient.
- b) **External Contamination:** Accidental contamination of objects or the skin by radioactive material.
- c) **Internal Contamination:** Accidental ingestion of radioactive material, which has previously contaminated objects or the environment.

## General Radiation Safety Information

### The Radioactive Patient

Those radioactive patients who can present a radiation hazard require hospitalization under specific radiation safety rules.

There are two kinds of radioactive patients requiring hospitalization:

- a) Patients undergoing therapy with unsealed radiopharmaceuticals.
- b) Patients undergoing therapy with sealed sources of radioactive materials.

## Radioactive Patient

### Therapy With Unsealed Radiopharmaceuticals

The most common therapy is with Iodine-131, which is used in the treatment of hyperactive thyroid, thyroid ablation and thyroid cancer.

The administration is generally by mouth in liquid form or capsules. Injection procedures may also be utilized.

The radioactive iodine is excreted primarily by the kidneys, but also is excreted in perspiration, nasal secretion, stool and is present in emesis.

**All materials handled by the patient are potentially radioactive. Consequently, all waste and materials handled by the patient or used in the patient's room should be considered as radioactive until determined otherwise.**

## Radioactive Patient

### Therapy With Sealed Sources of Radioactive Materials

These patients are treated with sealed sources of radioactive material that are configured for placement directly into tumors or into body cavities.

Such sources, sometimes referred to as implants are configured as needles, wires, seeds, ribbons or other geometric form.

Most common use is the radioactive seed implant for treatment of prostate cancer.

Primary radiation hazard from patients treated with implants is external radiation exposure.

## Minimizing Radiation Exposure and Contamination

### ALARA Policy

ALARA means As Low As Reasonable Achievable and is related to receive the minimal radiation exposure while delivering the proper and safe care to radioactive patients.

The three basic principles of ALARA are:

**Minimize Time:** Minimizing the time spent close to a radioactive patient will reduce the total radiation exposure.

**Maximize Distance:** Maximizing the distance from a radioactive patient will reduce the total radiation exposure.

**Use Shielding:** In some special cases shielding barriers would be required. The medical Physicist or RSO will indicate it. In most situations, patients themselves provide enough shielding.



## Minimizing Radiation Exposure and Contamination

There are four radiation safety procedures for minimizing radiation exposure and the possibility of contamination:

- a) **Patient Control**
- a) **Visitor Control**
- a) **Contamination Control**
- a) **Waste Control**

## a) Patient Control

Patients shall be provided with a private room with private bathroom facilities.

Patients shall be confined to his/her private room and bath facilities until the patient has fulfilled the regulatory criteria for the discontinuation of radiation isolation or until the implant is removed.

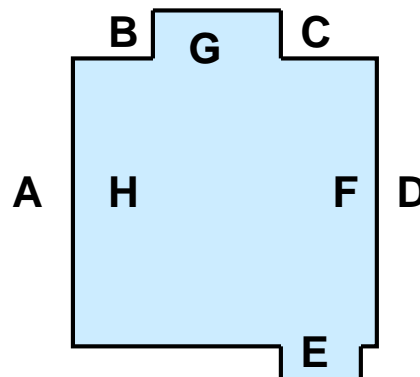
Personnel should not enter the patient's room without consulting medical, nursing or radiation safety staff.

Time spent close to the patient should be limited to the minimum amount of time required to perform duties consistent with effective patient care.

Environmental personnel are not to clean the patient's room.

## a) Patient Control

The room occupied by the patient will be posted with a visible sign bearing the radiation symbol and instructions concerning the radiation exposure and how long and where visitors may remain in the room.



### Exposure Rate in mR/h

**Bkg: 0.013 mR/h**

**A: 0.01 mR/h**

**B: 0.01 mR/h**

**C: 0.01 mR/h**

**D: 0.02 mR/h**

**Time: 10:05 a.m.**

**Instrument: Victoreen 451P**

**Initials: VM**

**E (door): 0.8 mR/h**

**F: 1 mR/h**

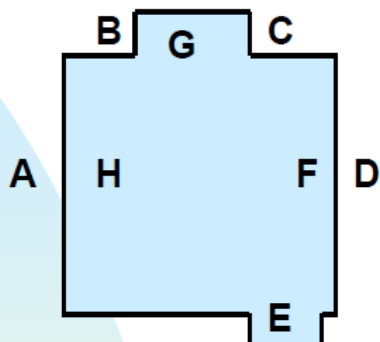
**G (bath): 1 mR/h**

**H: 1.5 mR/h**

**Date: 10/12/08**

Visitors are allowed to visit at \_\_\_ the door or \_\_\_ at a minimum of \_\_\_ feet for no longer than \_\_\_ minutes. Children under 18 are permitted to visit as stated above:  
\_\_\_ Yes \_\_\_ No

## a) Patient Control



### Exposure Rate in mR/h

Bkg: 0.013 mR/h

A: 0.01 mR/h      E (door): 0.8 mR/h

B: 0.01 mR/h      F: 1 mR/h

C: 0.01 mR/h      G (bath): 1 mR/h

D: 0.02 mR/h      H: 1.5 mR/h

Time: 10:05 a.m.      Date: 10/12/08

Instrument: Victoreen 451P

Initials: VM

## Exposure Rate

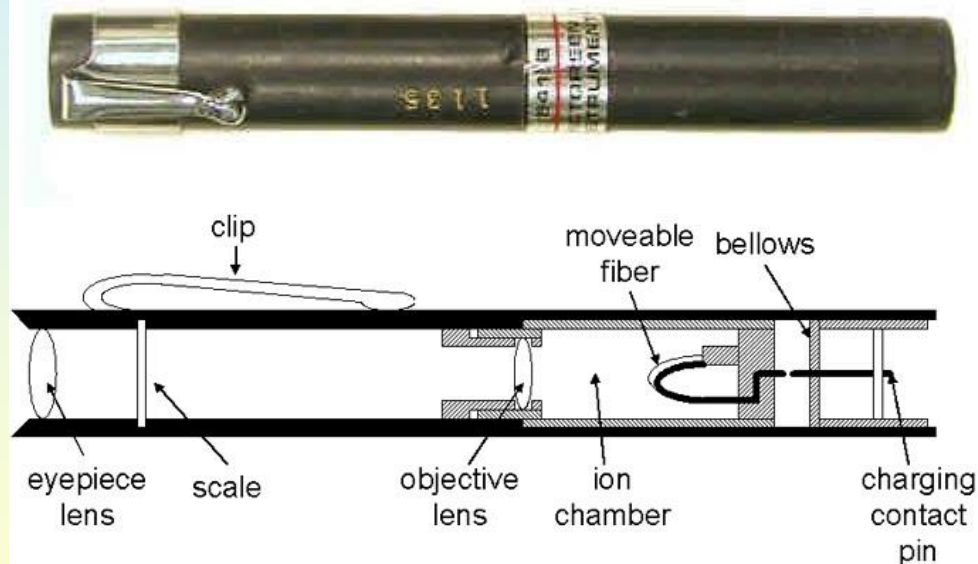
Exposure rate in mR/h is posted at the door and determined inside the patient's room, door and adjacent rooms by radiation safety or radiation oncology personnel using a calibrated survey meter.



**Calibrated Radiation  
Survey Meter**

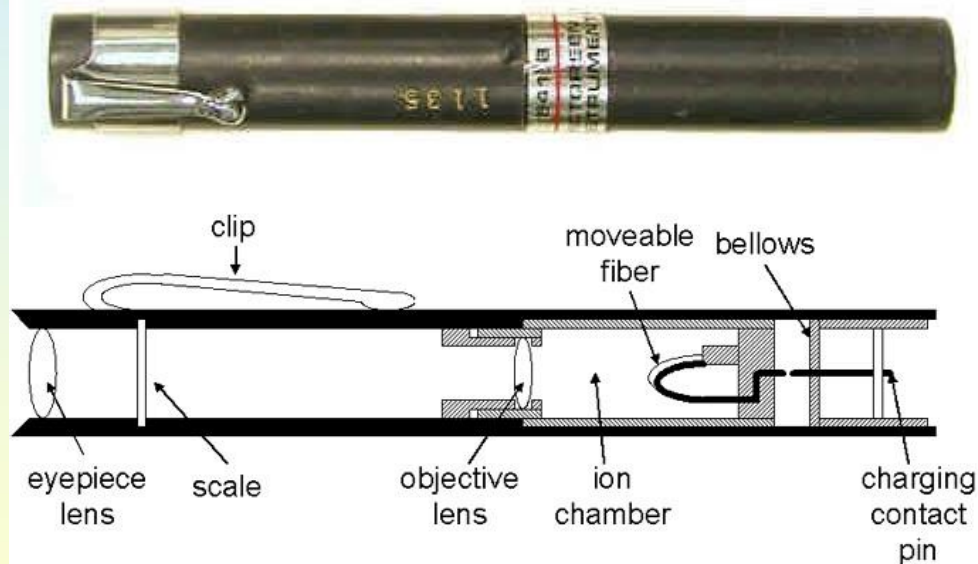
## External Exposure

Nurses shall be supplied with pocket dosimeters for measuring the external exposure.



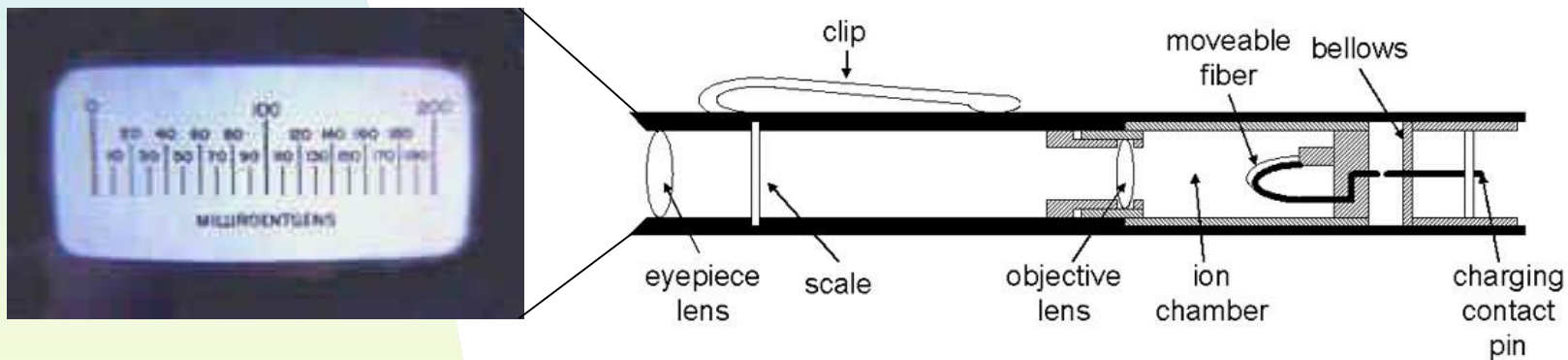
## External Exposure

Pocket dosimeters are direct-reading dosimeters designed to measure the accumulated exposure of moderate radiation levels of gamma radiation.



## External Exposure

Before its use the dosimeter has to be set to zero. To read the dosimeter point the charging contact end toward an external light source. Read the scale through the eyepiece lens.



A fiber line will indicate the radiation exposure in a scale of 0 to 200 mR.

## External Exposure



### THERAPY PATIENT ROOM ADMIT SURVEY

Patient Name: \_\_\_\_\_

Patient Number: \_\_\_\_\_

Procedure: \_\_\_\_\_

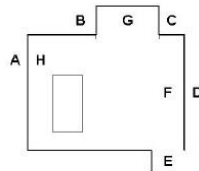
Dosage: \_\_\_\_\_

Assayed on: \_\_\_\_\_

Administered on: \_\_\_\_\_

**In case of emergency notify:**  
**Medical Physicist: Vivek Mishra, PhD**  
**Ext: 66909**  
**Radiation Safety Officer: Juan Franquiz, PhD**  
**Ext: 64592**

Survey of patient room after dose administered (64E-5.312). Exposure rates in mR/hr:



Bkg: \_\_\_\_\_  
 A: \_\_\_\_\_ E (Door): \_\_\_\_\_  
 B: \_\_\_\_\_ F: \_\_\_\_\_  
 C: \_\_\_\_\_ G (Bathroom): \_\_\_\_\_  
 D: \_\_\_\_\_ H: \_\_\_\_\_  
 Time: \_\_\_\_\_ Date: \_\_\_\_\_  
 Instrument: \_\_\_\_\_  
 Initials: \_\_\_\_\_

### BAPTIST HOSPITAL OF MIAMI Radiation Oncology

#### VISITORS MUST FIRST CHECK IN AT THE NURSES STATION

Visitors are allowed to visit at \_\_\_\_\_ the door or \_\_\_\_\_ at a minimum of \_\_\_\_\_ feet for no longer than \_\_\_\_\_ minutes.  
 Children under 18 are permitted to visit as stated above: Yes \_\_\_\_\_ No \_\_\_\_\_

**Nursing Instructions (use universal precautions)**  
 Prioritize patient care and provide food and medication in the usual fashion avoiding any delays when possible. Only disposable utensils may be used. Do not collect urine. Urine and feces should be disposed of in the usual fashion.

All linens and trash are to remain in the patient's room until cleared by the Medical Physicist or RSO. Environmental personnel are not to clean the patient's room.

The RSO or Medical Physicist must clear the patient for discharge. Notify the RSO or Medical Physicist in the event of death or radiation accident (vomitus, dislodge source).

Upon discharge of the patient the room must be surveyed by the RSO or Medical Physicist before being released to another patient.

All personnel caring for the patient are to obtain a pocket dosimeter from the resource nurse before entering the room and log each reading below. Pocket dosimeters should be worn at the employee's chest level and must be returned to the resource nurse upon completion of duties. The dosimeter must not be left in or around the patient's room when not in use. Each attending nurse must initial below indicating that they have read the above guidelines and have received training.

Employee	Date	Dosimeter	Begin Read	End Read	Total Exposure
_____	_____	_____	_____	_____	mR
_____	_____	_____	_____	_____	mR
_____	_____	_____	_____	_____	mR
_____	_____	_____	_____	_____	mR

### EXIT SURVEY AND ROOM CLEARANCE

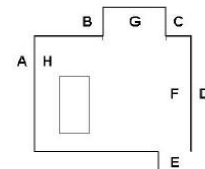
This is to notify that \_\_\_\_\_ has been surveyed and the reading at one meter is \_\_\_\_\_ mR/hr at time \_\_\_\_\_ on date \_\_\_\_\_. The patient may be discharged pending attending referring physician approval.

This is to certify that material and items removed from this patient's room have been monitored for radioactive contamination with instrument \_\_\_\_\_ set on its most sensitive scale. The items removed were: \_\_\_\_\_

Free of radioactive contamination. Or Handled as radioactive waste.

Room \_\_\_\_\_ along with its private sanitary facility have been surveyed with instrument \_\_\_\_\_. There is no evidence of removable radioactive contamination greater than 200 dpm/100 cm<sup>2</sup> above normal background radiation. Therefore, all restrictions are lifted and the room is hereby cleared for use.

#### EXPOSURE RATE in mR/hr / WIPES in CPM



Bkg: \_\_\_\_\_  
 A: \_\_\_\_\_ E (Door): \_\_\_\_\_  
 B: \_\_\_\_\_ F: \_\_\_\_\_  
 C: \_\_\_\_\_ G (Bath): \_\_\_\_\_  
 D: \_\_\_\_\_ H: \_\_\_\_\_  
 Time: \_\_\_\_\_ Date: \_\_\_\_\_  
 Instrument: \_\_\_\_\_ Initials: \_\_\_\_\_

Write the exposure reading in the dosimetry sheet of the patient.



## b) Visitor Control

Visit duration, frequency and distance to the patient are intended to ensure that radiation exposure to visitors are maintained below regulatory limits on exposure to general public.

Visitors are allowed to visit at \_\_\_ the door or \_\_\_ at a minimum of \_\_\_ feet for no longer than \_\_\_ minutes.  
Children under 18 are permitted to visit as stated above:  
\_\_\_ Yes \_\_\_ No

Visitors are allowed to visit at \_\_\_ the door or \_\_\_ at a minimum of \_\_\_ feet for no longer than \_\_\_ minutes.  
Children under 18 are permitted to visit as stated above:  
\_\_\_ Yes \_\_\_ No

**NO VISITORS**

## c) Contamination Control

### **Radiation Oncology Personnel Responsibilities:**

For treatments with unsealed sources, before the patient is admitted to the room, floors, sinks and other objects will be covered by a suitable removable protective material.

Protective covering will be removed and the room cleaned and surveyed for residual contamination when the patient has been discharged from the room.

Upon discharge of the patient the room must be surveyed before being released to another patient.

## c) Contamination Control

### **Nursing Staff Responsibilities:**

Prioritize patient care and provide food and medication in the usual fashion avoiding any delays when possible.

Personnel shall not eat, drink or smoke in the patient's room.

The protective principles based on the Universal Precautions for Blood and Body Fluids shall be followed.

Protective gloves shall be worn upon entering the patient's room. Hands shall be washed after leaving the patient's room.

Only disposable utensils may be used.

## c) Contamination Control

### **Nursing Staff Responsibilities:**

A laundry bag shall be provided to collect linen when there is the possibility of contamination by vomiting, incontinence or profuse perspiration.

All linens and trash are to remain in the patient's room until cleared by Radiation Oncology personnel.

Do not collect urine. Urine and feces should be disposed of in the usual fashion. If urine has to be collected, follow the instructions of Radiation Oncology personnel.

## d) Waste Control

All materials and items in the room will be monitored by a medical physicist or RSO before removing them from the room.

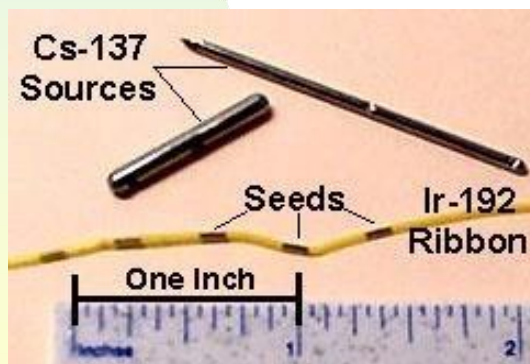
Any vomitus, gastric contents collected by nasogastric aspiration or excessive sputum should be collected in a waterproof container and held for monitoring and disposal by the medical physicist or RSO.

## Dislodged Sealed Sources

In patients receiving therapy with unsealed sources they do not become contaminated in any way. The concern is the elimination of small radioactive seeds.

In these patients, approximately 50 to 150 very small metal seed are placed directly into the tumor.

Seeds are implanted in the operating room. There is a small possibility that seeds may be found in the patient's linen. Seeds may also migrate through the urinary tract and leave the patient's body via the urine.



## Dislodged Sealed Sources

### **If A Seed Is Found:**

Seeds that are found are nearly always in the patient urine.

If a seed is found, it has to be removed for proper disposal.

Do not touch the seed with your hands.

Call the RSO or medical physicist immediately.

Use forceps to pick up and secure the seed(s) until removed by the RSO or medical physicist.

# Radiation Safety for Nursing Care of Radioactive Patients

Seeds should be placed in a cup or other container and kept away from staff areas until removed by the RSO or medical physicist.

**Seeds Appearance**





# Radiation Safety for Nursing Care of Radioactive Patients

## Nursing Instructions

(Nursing Department)

### General Guidelines:

Nurses should minimize the amount of time spent near the patient. Special restrictions may be noted on the precautions sheet in the patient's chart.

Call the Radiation Therapy department if you have any question about the care of radioactive patients.

Visitors will be limited to persons of 18 years of age or older, unless other instructions are noted on the precautions sheet in the patient's chart and on the door of the patient's room.

All visitors must report to the nursing station before entering the patient's room.

# Radiation Safety for Nursing Care of Radioactive Patients

## Nursing Instructions

(Nursing Department)

### General Guidelines:

Patients treated with radioactive material are to be confined to their rooms except for special medical or nursing procedures approved by the Radiation Therapy department.

No nurse, visitor or care tech, who is pregnant should be permitted in the room until or unless the patient is no longer a radioactive hazard.

Attending personnel must wear rubber or disposable gloves while handling urinals, bedpans, emesis basins or other containers having any material obtained from the patient. Wash gloves before removing and then wash hands. The gloves must be left in the room in the designated waste container.

# Radiation Safety for Nursing Care of Radioactive Patients

## Nursing Instructions

### General Guidelines:

Disposable items should be used in the care of these patients whenever possible. These items will be placed in the designated waste container. Contact the Radiation Therapy department for proper disposal of the contents of the designated waste container.

All clothes and bed linens used by the patient will be placed in the laundry bag provided and left in the patient's room to be checked by Radiation Therapy personnel.

All non-disposable items should be placed in a plastic bag and left in the patient's room to be checked by the Radiation Therapy personnel.

Surgical dressing should be changed only as directed by the physician. Gold-98 leaking from a puncture wound will stain the dressing dark red or purple. Such dressing should not be discarded but should be collected in a plastic bags and turned over Radiation Therapy personnel. Handle these dressings only with tongs or tweezers. Wear disposable gloves.

# Radiation Safety for Nursing Care of Radioactive Patients

## Nursing Instructions

### **SPECIFIC FOR Iodine-131 (I-131) PATIENTS:**

Blood, urine, feces or any body secretion should not be collected during this isolation. Specimens will be collected only in extreme emergency.

If the nurse collects, or helps to collect, any specimen from a patient who has received I-131, the nurse must wear disposable gloves. After obtaining the specimen, the nurses should wash hands with the gloves on and again after the gloves are removed.

Disposable plates, cups and eating utensils will be used by patients who are treated with I-131.

Vomiting within 24 hours after oral administration, urinary incontinence or excessive sweating within the first 48 hours may result in contamination of linen and of floor. In any such situation, or in case of spilled urine or feces, call the Radiation Therapy department at x66900. Meanwhile, handle all contaminated material with disposable gloves and avoid spreading contamination.

# Radiation Safety for Nursing Care of Radioactive Patients

## Nursing Instructions

### **SPECIFIC FOR Iodine-131 (I-131) PATIENTS:**

All vomitus, urine and feces need not be routinely saved unless ordered to do so. The same toilet should be used by the patient at all times and it should be flushed well (3 times).

Utmost precautions must be taken to see that no urine or vomitus is spilled on the floor or the bed. Notify the Radiation Therapy department if any part of the patient's room is suspected to be contaminated.

If a nurse or anyone else knows or suspects that his or her skin or clothing (including shoes) is contaminated, notify the Radiation Therapy personnel immediately. This person should remain in the patient's room and not walk around the hospital. If the hands become contaminated, wash immediately with soap and water.

If a radioactive patient should need emergency surgery or die, notify the Radiation Therapy department immediately.

# Radiation Safety for Nursing Care of Radioactive Patients

## Nursing Instructions

### **SPECIFIC FOR Iodine-131 (I-131) PATIENTS:**

All personnel entering a radiation isolation patient room will use a personal dosimeter.

Blood pressure will be monitored QD or per physician order. Blood pressure cuff will be kept at the bedside during the patient's stay and will be surveyed by Radiation Therapy personnel before it can be used on another patient.

Every time personnel enter the patient's room, the person's name, time entered and dosimeter reading will be entered into the dosimetry sheet of the patient. Again upon leaving the room after caring the patient, record the time and dosimeter reading.

When the patient is discharged, call the Radiation Therapy department and request that the room be surveyed for contamination before clearing the room.

# Radiation Safety for Nursing Care of Radioactive Patients

## Nursing Instructions

(Nursing Department)

### CHECKLIST FOR PATIENT'S ROOM:

Manual blood pressure (sphygmomanometer) machine  
Stethoscope  
Thermometer  
Large trash can

### OUTSIDE OF PATIENT'S ROOM:

Gloves  
Disposable gowns  
Shoe covers

**SUMMARY: CARING FOR I-131 PATIENTS**

# Radiation Safety for Nursing Care of Radioactive Patients

## Nursing Instructions

### BEFORE THE PATIENT IS DOSED:

1. Take all vital signs
2. Take any needed specimens
3. Get shoe covers, gloves and disposable paper gowns and place them outside the patient's room.
4. Get disposable food trays.
5. Put linens on the bed after the room has been prepared. Also provide towels and washcloths.
6. Offer the patient a gown or pajamas so that their clothes will not be contaminated. Provide them with toiletries (toothpaste, toothbrushes, soap, shampoo) for the same reason.
7. Provide the patient with a variety of drinks. Drinking lots of fluids will help them get rid of the radioactive material more quickly.
8. Get a radiation dosimeter.

### **SUMMARY: CARING FOR I-131 PATIENTS**



# Radiation Safety for Nursing Care of Radioactive Patients

## Nursing Instructions

### AFTER THE PATIENT IS DOSED:

1. Put your dosimeter on before entering the room. If you take care of the patient on more than one day, use the same dosimeter each time.
2. Do not take specimens after the patient has been dosed, unless it is absolutely necessary. Blood and urine will be radioactive and will need to be labeled with “Caution, Radioactive Material” label. These labels may be obtained from Radiation Therapy.
3. Always put on gloves and shoe covers before entering the room. Use barrier protection.
4. Also wear a disposable gown if you need to change the linens or handle anything in the room that might touch or your clothing.
5. After leaving the room, place shoe covers, gloves and gowns in the marked radioactive waste container outside the room. Stay on the floor where the plastic covering extends until you are ready to remove your shoe covers. Step onto the clean area after removing the shoe covers so as not to contaminate the uncovered floor with radioactive material. Since the plastic-covered area could be contaminated, do not stand on it without first putting on shoe covers.

### **SUMMARY: CARING FOR I-131 PATIENTS**

# Radiation Safety for Nursing Care of Radioactive Patients

## Nursing Instructions

### AFTER THE PATIENT IS DOSED (continuation):

6. Nothing must leave the room after the patient has been dosed. Once a day, Radiation Therapy staff will come to remove trash.
7. Put patient's food on disposable trays.
8. Leave linens in the room after changing the sheets.
9. If the patient vomits, place any contaminated items in a large plastic bag, seal it with tape and leave it in the room. Contact the Radiation Therapy staff member who is in call for his patient and tell them that the patient has vomited. If the patient vomits within six hours of being dosed, they may need to be dosed again.
10. After the patient has gone home, do not enter the room until Radiation Therapy has decontaminated and taken the "Caution, This Patient has been administered radioactive materials" door sign down.

## Death or Emergency

In the patient dies or has a medical emergency, radioactive spill or any kind of contamination, call immediately the medical physicist or the RSO.

If the patient dies, the patient should not be removed from the room until the medical physicist or RSO have been consulted. Radiation precautions should be continued.

**In case of Death or Emergency Notify:**

**(Radiation Therapy) RSO: Vivek Mishra,**

**ext.: 66909/ after hours: (786) 525-8423**

**(BHM) RSO: Alyson Cieply**

**After hours: (305) 282 5446**