



Massachusetts
Eye and Ear
Infirmary

Department of Safety, Security, and Parking

May 10, 1988

Thomas K. Thompson
Nuclear Materials Safety Section B
Division of Radiation Safety and Safeguards

Reference: Mail Control # 108090

Dear Mr. Thompson:

We are enclosing the answers to your inquiries for the above referenced mail control letter #10890. We hope the information will assist your staff in the on going review of our by product material program at the Massachusetts Eye and Ear Infirmary.

Sincerely,

John P. McGillivray
John P. McGillivray
Director
Safety, Security and Parking

cc: Albert Broseghini, Phd. Vice President for Research
Administration

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Boston, Massachusetts 02114

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May 10, 1988

United States Nuclear Regulatory Commission
Region 1
475 Allendale Road
King of Prussia Pennsylvania 19406

Reference: License No. 20-01212-10
Docket No. 030-01833
Control No. 108090

In response to your recent letter dated March 22, 1988,

1. Employees have the option of attending 2 programs that the Infirmary accepts for minimum formal training.

Program 1 Harvard University Environmental Health and Safety six hour program for non-supervisory employees. The second part of this program is used for the Supervisory/Researchers (see appendix A) for a list of course content.

Program 2 Basic Radiation Protection for Laboratory and Hospital Personnel Part I has a minimum 8 hour course for non-supervisory employees. (see appendix B).

The supervisory employees working with by product material can attend Part II of this program that consists of eight 2 hour lectures with homework assignments. This course is also described under broad license #20-038-14-80.

The Infirmary recognizes both programs and requires each non-supervisory/or supervisory employee to attend any of the two programs. Should a researcher submit their training records and curriculum vitae from another program, the course outline would be required to be reviewed by the Radiation Safety Committee for equivalencies.

2. Laboratory workers are aware that additional surveys are needed separate from the monthly wipe tests and surveys from our Consultant (see appendix C). Examples include but are not limited to package receipts, surveys of work areas before and after all procedures, trash surveys, etc. All records of laboratory surveys separate from the Consultant's monthly surveys, are maintained in each laboratory.



3. Employees are required to obtain film dosimeters from Harvard University Environmental Health and Safety Office which subscribes to Landaur Company system. (See appendix D).

The Radiation Safety Office is in the process of centralizing the issuance of film badges.

4. Safety Manual enclosed. (See appendix C).
5. Presently, therapeutic procedures are not being performed. Radio diagnostic administration does take place time to time in patient room/clinical ward. Nursing personnel have been advised on the proper precautions for handling these patients. (see appendix E)
6. Attached please find the information referenced in question 10. (See appendix F).

APPENDIX A

MEMORANDUM

TO: Users of radioisotopes at Harvard University
FROM: Environmental Health & Safety, Harvard University
SUBJECT: INSTRUCTION IN THE SAFE USE OF RADIOISOTOPES FOR PERSONNEL IN THE
HARVARD RADIATION PROGRAM TO COMMENCE OCTOBER 7, 1986.



This fall, the required lectures in the program of Instruction in the Safe Use of Radioactive Materials will be given Tuesday, October 7, and Thursday, October 9, and Tuesday, October 14 from 1:30 pm to 3:30 pm in Amphitheater "D" at the Harvard Medical School. The remaining lectures will be given at Bldg. D-1, room 437 from 10:00 am to 12:00 noon.

This program is designed for research investigators, graduate students, and technicians at Harvard University and the associated teaching hospitals who need authorization to work independently with radioisotopes. The major objective is to impart the principles and practice of radiation safety as it concerns the use of radioactive materials. Additionally the course will present elementary information on radioactivity, measurements, standardization, monitoring techniques, mathematics and calculations basic to the use and measurement of radioactivity, and on biological effects of radiation. The emphasis of the course is on radiation safety rather than isotopes techniques. Training in these areas is demanded by the Nuclear Regulatory Commission before it will grant a specific license for the use of radioactive isotopes.

The program is in two(2) parts:

1. Elementary introductory material designed for both technicians and investigators. This will be given in the first 3 sessions (Oct. 7, 9, 14)
2. More advanced material designed for investigators only. This program of study may be completed in one of three ways:
 - *a. Study in accordance with a fixed schedule, covering lectures, reading assignments, problem assignments, and a 3 hour final examination. These lectures will be given on Tuesday and Thursday mornings between 10:00 am and 12 noon in Bldg. D1, Rm. 437.
 - b. Study in accordance with a self-paced schedule, except for required attendance at the first 3 sessions and an instrumentation laboratory. Three problem sets and 3 one-hour exams. (Exam may be taken 1 week after submittal of problem set).
 - c. Independent study, except for required attendance at the first 3 sessions, and an instrumentation laboratory. Participants electing this program will have to submit the same problem set and will take the same final 3-hour examination as in *a.

Acknowledgment of completion: A letter acknowledging satisfactory completion of the course will be sent to participants who pass the examination requirements and attend the four required sessions.

Registration Fee: A \$40.00 registration fee will be charged to those taking the complete program. Please make checks payable to Harvard University.

Text: The entire content of the course is given in the text, "Radiation Protection, A Guide for Scientists and Physicians", 2nd edition, J. Shapiro. The text is available at the Medical Area Coop for \$30.00.

J. Shapiro, Ph.D.
Radiation Protection Officer

NOTE: Those who have attended the Summer, 1986 course do not have to attend the Fall Course. However, attendance is mandatory for anyone not having attended the indoctrination courses previously.

9/9/86

STUDY PROGRAM IN THE SAFE USE OF RADIOISOTOPES IN RESEARCH

Sponsored by Environmental Health and Safety, Harvard University

Test: Radiation Protection, A guide for Scientists and Physicians, Second Edition, J. Shapiro

DATE	TUESDAY	DATE	THURSDAY
Oct. 7	Required Lect. - Principles of protection. Pp. 1-64, Prob. Set I 1,2,3,5,6,8,9 **See below	Oct. 9	Required Lect. Practice of radiation protection. Pp. 260-309, Prob. Set I 23,24,25 **See below
Oct. 14	Required Lect. - Emergency procedures and demonstrations of monitoring techniques and examinations. **See below	Oct. 16	Lect. - Beta dose calculations. Pp. 59-64, 110-120, Prob. Set II 11,12,13,16
Oct. 21	Lect. - Gamma dose calculations Pp. 120-143. Prob. Set II -17,19	Oct. 23	Lect. - Use of specific isotopes, calculations of limits, Pp. 143-163 175-178
Oct. 28	Lect. - Radiation counting and standardization Pp. 189-220. Film: Practical procedures of measurement - Prob. Set III, 10,20,21,22	Oct. 30	Lect. - Dose measurements: Pp. 220-252. Film: Roentgen
Nov. 4	Lect. - Standards, Public Health Aspects. Pp. 324-365 - Calculation of limits.	Nov. 5	Required instrumentation laboratory Pulse height analyzers; standardization, and calibration - <u>Science Center</u> NOTE: <u>THIS IS A WEDNESDAY</u>
Nov. 11	HOLIDAY	Nov. 13	Problem discussion
Nov. 18	Final exam for all except self-paced.		

Place: **The first 3 sessions will be given at Amphitheater "D", Bldg. D. Harvard Medical School from 1:30 to 3:30 pm.
The remaining lectures will be given at Bldg. D-1, room 437 from 10:00 am to 12:00 pm.

Examinations: Self-paced participants may take exam any Friday one week after submittal of associated problem set.
Attendance: Required at sessions on October 7, 9, and 16, attendance by investigators taking complete course is also required at an instrumentation laboratory covering pulse height analyzers, standardization, and calibration to be held on November 6. Problems sets are to be handed in during laboratory.

REGISTRATION FORM

STUDY PROGRAM IN THE SAFE USE OF RADIOISOTOPES IN RESEARCH

NAME: _____
(FIRST) (MIDDLE) (LAST)

DEPT: _____
(INVESTIGATOR)

POSITION: _____

ADDRESS: _____ Tel. No. _____
(OFFICE)

Underline the session in which you are interested:

Sessions 1,2, and 3 are required for both technicians and investigators.

Complete program, including laboratories and examination

Independent study, required sessions, one final examination

Self-paced, three examinations

RETURN THIS FORM TO: Environmental Health & Safety
Harvard University
46 Oxford Street
Cambridge, MA 02138

Attn: Mr. Robert U. Johnson

APPENDIX

~~Control No. 8449~~

RADIATION PROTECTION OFFICE

SURVEY CHECK LIST

MEASUREMENTS

-Meter check for contamination of surfaces and personnel.
-Wipe tests of all suspected areas of contamination including, door handles, floor, telephones, sink faucets.
-Air samples where required.

INSPECTION

-AEC form 3 posted.
-Institutional regulations posted.
-Opening procedures posted.
-Proper signs (radiation area, radioactive material).
-Storage area controlled and posted.
-Hood in operation and flow rate of _____
-Proper labelling of sources, waste, solutions, etc.
-Sink disposal records posted and up to date.
-Film badge worn by personnel.
-Current records of receipt, waste disposal, use and inventory.

MONITORING INSTRUMENTATION

-Available
-Performance check.

REVIEW AND EXPLANATION OF HANDLING PROCEDURES

-Utilization of proper receiving and opening procedures.
-"Washing up" and monitoring of hands routinely performed.
-Personnel monitoring devices worn (review both whole body and hands).
-No pipetting by mouth.
-Review of emergency procedures, including emergency telephone numbers.
-Protective clothing utilized, including gloves, coats.

Date _____ Licensee _____ Location _____
Signed _____

Fig. 1. Radiation Survey Check List Used by the Harvard Radiation Protection Office.

APPENDIX B

LECTURE OUTLINE

LECTURE NO.

TOPIC

- | | |
|---|---|
| 1 | Introduction
The MGH Radiation Safety Office
Natural Radiation
Radioactivity (Principles and Production) |
| 2 | Interaction with Matter
Instrumentation
Dosimetry
Biological Effects |
| 3 | External and Internal Radiation Protection |
| 4 | Principles and Practices of Radiation Safety
Radiation Protection Regulations
Past NRC Inspections
Maximum Permissible Dose
ALARA |

BASIC RADIATION PROTECTION FOR
LABORATORY AND HOSPITAL PERSONNEL - PART II

<u>DAY</u>	<u>LECTURE #</u>	<u>TOPIC</u>
WEDNESDAY	1	EXTERNAL DOSE CALCULATIONS
WEDNESDAY	2	THE STANDARD MAN INTERNAL DOSE CALCULATIONS I
WEDNESDAY	3	INTERNAL DOSE CALCULATIONS II
WEDNESDAY	4	INTERNAL DOSE CALCULATIONS III

APPENDIX C

MASSACHUSETTS EYE AND EAR INFIRMARY

Nursing Care of Patients Receiving Tracer Doses of Isotopes Internally For Diagnostic Studies*

General Principles

1. There is no danger in carrying out routine nursing care.
2. Patients are allowed visitors in accordance with the usual hospital rules.
3. Precautions may be necessary if urine or stools are to be saved for isotope studies. Special orders will be written as indicated.
4. If the patients should vomit within 12 hours of oral ingestion of radioisotopes, call the responsible physician. (See below for special instructions concerning vomitus.)
5. No special precautions are needed for dishes, instruments or utensils.

Special Instructions

1. If there are any special instructions for a particular case, they will be noted on the patient's order sheet.
2. When cleaning up vomitus or handling contaminated articles, the nurse or aide should wear rubber gloves. The R.S.O. should be called at Ext. 2425 for disposal of contaminated paper towels or other articles. These articles should be set aside to await his arrival and should not be disposed of by routine methods.

*This is taken from Massachusetts General Hospital Policies and Procedure Manual.

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3/87

Introduction

Radioisotopes are administered to patients for diagnostic and therapeutic purposes. Only minimum precautions are essential in cases of patients who receive tracer doses of radioactive material for diagnostic reasons. The hazards for hospital personnel, visitors, and other patients increase when large therapeutic doses of radioactive iodine are used. For therapeutic doses, special precautions must be implemented in order to provide the patients appropriate care without exposing attending personnel, visitors and other patients unnecessarily. The full precautions described below are required for those patients receiving 12 mCi (millicuries) or more. The limited precautions are needed for patients receiving less than 12 mCi but more than 1 mCi and are marked with an asterisk. Below 12 mCi, only the contamination problem requires attention. Patients scheduled for therapeutic doses will be admitted to designated rooms in either the Baker Memorial or the Phillips.

I. Summary of Team Responsibilities:

A. Physician

- *1. Inform Admitting Office, at time of scheduling, that the patient is scheduled to receive I-131, so that a Thursday or Friday admission can be planned.
- *2. Confer with the head nurse and unit coordinator regarding patient's admission.
- *3. Use shielded container to transport dose if administered in patient's room.
- *4. Administer I-131 to patient and apply wrist band to patient noting the dose administered, date, time and attending physician.
- *5. Write specific orders in the Doctors' Order Book, regarding the precautions which must be following in the delivery of patient care, depending on the dose administered.
- *6. Deliver lead cart to unit if urine is to be collected.
- *7. Terminate radioactivity precautions.

B. Nurses

- 1. Consult with unit coordinator and Building Service Supervisor to see that patient's room is prepared to receive patient, i.e. appropriate floor covering.
- *2. Consult with unit coordinator and Building Service Supervisor to see that special cart with essential equipment and precaution sign for door are available.

*Indicates items also required for patients receiving less than 12 mCi but more than 1 mCi

3. Obtain film badges from unit coordinator, and wear daily when administering care to patient.
4. Collect and label patient's belongings which will be stored by unit coordinator. Note on nursing kardex the location of clothing storage. NOTE: Encourage patient to send all valuables home.
- *5. Perform essential nursing care functions based upon patient's needs.

C. Unit Coordinator

1. Obtain film badges for nursing personnel on unit. See Section C-1 regarding film badges.
2. Obtain and record names of personnel wearing film badges. Upon termination of radioactive precautions, the unit coordinator shall be responsible for collecting and returning film badges.
3. Notify Building Service Department regarding date of patient's admission to:
 - a. arrange for floor covering as indicated.
 - *b. make provisions for obtaining plastic bags, labels for soiled linen, waste and specimens. Extra labels may be obtained by calling Ext. 87-3656, Environmental Control).
- *4. Inform Dietician that disposable utensils will be required for meals during precaution period.
- *5. Check special cart on unit to see that the following items are available for use:
 - a. disposable emesis basins.
 - b. special rubber gloves.
 - c. metal trash can, with hinge cover and plastic liner.
 - d. precaution sign for door of patient's room.
6. Check and make arrangements for storage of patient's belongings during time that patient is on precautions.
7. Supervise unit assistant in the cleaning of bedside equipment.
- *8. If necessary, arrange for transfer of patient to another room, upon termination of precautions (if patient is not discharged at that time.)
- *9. Notify Chief Admitting Officer when the room is ready for another occupant.

D. Radiation Safety Office

1. Monitor patient's room daily, while precautions are in effect.

*Also for 1 to 12 mCi

- *2. Monitor room at time of termination of precautions.
- *3. Supervise decontamination procedure and provide extra film badges, if necessary.
- 4. Supply unit coordinator with film badges on request.
- *5. Inform unit coordinator when room available for another patient.

E. Building Service

- 1. Cover floor of patient's room with special plastic sheeting, if present flooring is unacceptable.
- *2. Wear special rubber gloves when cleaning room.
- *3. Bag, label, and deliver contaminated linen and waste to Radioactive Freezer Room, first floor, Temp. 2 (Mr. Johnson) for storage.
- *4. Implement decontamination procedure under supervision of Radiation Safety Officer, if indicated during hospitalization.
- *5. Clean room and decontaminate after patient discharge.
- 6. Notify unit coordinator that room is ready for monitoring.
- 7. If recommended by Radiation Safety Office, obtain film badge from Radiation Safety Office and wear during cleaning and/or decontamination procedures.

II. Specific Instructions for Nurses

Radioactive Iodine is administered orally. That portion of the dose which is not retained by the thyroid is almost entirely excreted in the urine.

Visitors should be limited to NO MORE THAN ONE HOUR PER DAY PER VISITOR FOR THE FIRST TWENTY-FOUR HOURS unless approval for longer visits has been obtained from the attending physician. They should be advised to maintain as much distance as possible from the patient.

PROCEDURE

A. Nursing Assistant

- 1. Secure film badge and wear while attending patient.
- 2. Rotate the staff in the event that the patient requires frequent or specialized nursing care.

*Also for 1 to 12 mCi

POINTS OF EMPHASIS

*Nurses who are pregnant, should NOT be assigned to the patient. Refer problem of exposure to the attending physician and Radiation Safety Office, should the patient require extensive nursing care. Time of exposure should be kept to a minimum during first 24 hours after I-131 administration.

PROCEDURE

POINTS OF EMPHASIS

B. Emergency Care(i.e., Cardiopulmonary Arrest)

- *1. Implement the usual emergency measures without regard to exposure or contamination.
- *2. The emergency cart may be taken into the patient's room.
- 3. Scrub any non-disposable equipment used with soap and water.
- 4. Notify Radiation Safety Office to monitor equipment after use.

C. Film Badges

- 1. Obtain one from Unit Coordinator and sign for it on appropriate record sheet.
- 2. Wear badge for entire time that patient is on precaution.
- 3. Before reporting off duty each day, store badge in designated area on unit.
- 4. Return the badge to Unit Coordinator when precautions are discontinued.

NEVER exchange badge with another staff member

The individual staff member is responsible for the cost of replacement if a film badge is not returned.

D. Patient Care

- *1. Bath-Unless specifically ordered, postpone bathing patient for first 48 hours.
- *2. Changing of linen-Avoid, if possible, changing patient's bed during first 24 hours after I-131 administration.
 - *Notify Building Service Department to collect soiled/wet linen IMMEDIATELY after changing bed.
- *3. Incontinence/Vomiting-Wear surgical-tight gloves when handling any spill of urine, stool, sputum, or vomitus. Wipe spill with paper towels.
 - Notify Radiation Safety Office IMMEDIATELY so that room can be monitored.
- *4. Care of Excretions
 - *a. Urine-Unless special collections are ordered, the patient should be encouraged to use bathroom in room.
 - If collections are ordered, advise patient to void directly via funnel into the bottle provided which must be secured in lead cart at the bedside. Encourage patient to take care of urine collection if possible.
 - Contact attending physician regarding transport of collections to appropriate laboratory.

*If bed linen becomes wet or soiled, it should be changed IMMEDIATELY and the Radiation Safety Officer notified.
*Wear surgical-tight gloves when handling soiled/wet linen, and transfer to a plastic bag.
*All spillage is a source of CONTAMINATION. Place all paper towels and gloves used for cleaning up spillage in paper bag and deposit in plastic lined metal can.

Advise patient to inform staff IMMEDIATELY regarding any spillage. Notify Radiation Safety Office so that room can be monitored. Provide patient with surgical-tight gloves, if assuming responsibility for his own collection. If bedpan is used, take care not to spill. Rinse bedpan with water after each use.

PROCEDURE

POINTS

EMPHASIS

*b. Stool-May be disposed of in patient's bathroom. Save only if specimen is required.

*c. Vomitus-Collect in plastic emesis basin and store in lead cart.
If collected, call attending physician, for proper instructions regarding disposal.

*d. Sputum-Collect and dispose of in water-proof container and place in labelled trash can with other waste.

*5. Soiled Tissue and Paper Towels
Place in paper bag and deposit in plastic-lined metal can.

E. Equipment and Eating Utensils

*1. Use disposable utensils and plates, during treatment period, and deposit in plastic-lined metal can after use.

*2. Both used equipment and soiled linen should be sent to the Radioactive Freezer Room, first floor, Temp.-2 for storage.

Applies ONLY to first 24 hours after therapy.

Applies ONLY to first 24 hours after therapy.

Wear surgical-tight gloves when handling soiled tissue and paper towels.

Call Building Service Department to deliver materials to Temp.-2, first floor.

*Also for 1 to 12 mCi

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Nursing Care Of Patients Receiving Removable Radioactive Implants
Of Radium, Cesium Or Iridium
From the Department Of Radiation Medicine*

GENERAL PRINCIPLES

1. All patients receiving internal radioactive isotope therapy with the above materials must have a yellow RADIATION bracelet on their wrist which may ONLY be removed by the radiation medicine staff physician or resident when the radioactive source is removed from the patient. A radiation warning tag giving isotope information is also placed on the patient's bed. A radiation warning sign with general instructions is placed on the entrance to the patient's room.
2. Radioactive isotopes presently in use are (a) Cesium-137, (b) Iridium-192 and (c) Radium-226. These are all encapsulated in metal and therefore do not enter the body circulation systems.
3. Patients with 10 mg. radium equivalent or more shall normally be in a private room. (See Item 3, Special Instructions for an exception.) The patient's bed must be isolated from other patients. (See below for the rules.)
4. The majority of the radioactive therapy sources are AFTER-LOADED. This means that the radioactive material can be inserted into the non-radioactive applicators after they are in place within the patient. The radioactivity is generally inserted by the Radiation Medicine resident after the patient is in his/her room. The actual loading or unloading of the radioactive material takes approximately 5 minutes or less.
5. Nurses should spend only the necessary time near a patient for routine nursing care but must obtain and wear film badges. (See below.)
6. Visitors must be restricted in accordance with the rules below.
7. Cleaning personnel must not be allowed in the room while radioactivity is present.
8. No special precautions are needed for sputum, urine, vomitus, stools, dishes, instruments, utensils or bedding unless specifically ordered. (Since the radioactivity is encapsulated, there is no risk of contamination.)
9. A lead transport cart of "pig" is used to bring the radioactive material from the Radiation Medicine Radioisotope Laboratory (RIL) to the patient's room. This cart is usually left in the room for the duration of the implant. Nothing is to be put into this cart except the radioactive sources. At the end of the application, the Radiation resident will remove the radioactive material and place it in the cart. He/she will then remove the non-radioactive applicators from the patient and return all of these materials to the RIL.

*This is taken from Massachusetts General Hospital Policies and Procedure Manual.

10. The Radiation Medicine resident will survey the patient and room, after sources are removed, with a Geiger counter to comply with Federal regulations ensuring that all radioactive materials have been removed from the area.

SPECIAL INSTRUCTIONS

A. Patients

1. Patients with the gynecological applications must stay in bed. Patients with iridium interstitial applications may get out of bed unless directed not to do so; however, they must stay in their rooms; their chair should be as far from the door as possible.
2. If a patient is in an individual room, the bed must be arranged so that there is at least six feet distance to occupied beds in neighboring rooms.
3. A 2-bed room may be shared by two patients each receiving therapy from radium (or its equivalent), provided the total amount of radium in the room does not exceed 25 mgs. The MINIMUM clear space between beds must be SIX feet.
4. Women of child-bearing age should not be allocated to rooms next to a brachytherapy patient receiving removable radioactive implants.

B. Nursing Care

1. All nurses involved in the personal care of a patient receiving removable radioactive implants should wear a film badge at waist level. When a nurse receives an assignment to care for such a patient, the film badge should be procured immediately from the Radiation Safety Officer (Ext. 2425, West End House-3). The badges will be collected and replaced monthly. See special instructions re: use of badges on page 154.
2. Pregnant nurses should not be assigned to the personal care of patients with radioactive implants.
3. While the radioactive implant is in place, nurses should spend only the minimum amount of time near the patient necessary for routine nursing care.
4. Bed baths given by the nurse should be omitted while the radioactive implant is in place.
5. Perineal care is given during gynecologic treatment; the perineal pad must be changed when necessary, unless orders to the contrary have been written. Dispose in same manner as surgical dressings.

6. Under most circumstances nurses will never handle the radioactive sources. If a source has become displaced and is seen on the bed or floor, the nurse may pick it up with long forceps (~30 cm) and place it in the lead transport cart. Never pick up radioactive materials directly with your hands. The Department of Radiation Medicine must be notified immediately (see emergency situations).
7. Surgical dressings and bandages used to cover the area of source insertion may be changed only by the attending physician, radiation medicine staff, or resident and MAY NOT BE DISCARDED until directed by the radiation therapist. Dressings should be kept in a basin before disposal by routine methods.
8. Special orders will be written for oral hygiene on patients having radioactive implant therapy to the oral cavity.

C. Visitors

1. Visitors should remain 4 feet or more from a patient during the radioactive implant therapy except for a brief (1-2 minute) moment of greeting. The visitor's chair should be placed near the door.
2. Pregnant (or potentially pregnant) women, and children should not visit patients during this procedure.

D. Emergency Situations

1. If the radioactive needles, capsules or tubing become loose or fall out, call the Radiation Medicine resident on call, Ext. 8650 (days) or 2241 (nights, weekends and holidays).

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Nursing Care of Patients Receiving Radiotherapy with
Radioactive Iodine-125 Seeds

GENERAL PRINCIPLES

Iodine-125 is used in the form of small seeds in which the radioactive material is permanently sealed into a small metal outer casing. There can be no problem due to radioactive contamination. Typically 40 or 50 seeds each with strength 0.5 mCi are injected directly into tumors at operation. The seeds are permanently implanted. Iodine-125 emits radiations with very low penetration which are strongly absorbed locally in the tumor and in overlying tissue. The radiation levels near the patient are therefore very low.

A notice in the patient's record will signify that radioactive material has been administered and the patient will wear a pendant during hospitalization and after discharge indicating internal radioactivity.

NURSING CARE

For the above reasons NO PRECAUTIONS are needed during I-125 seed therapy. There is no need for a radioactive precaution sign on the room door, for special room preparations, for limitations on visitors or neighboring patients, or the procurement and wearing of film badges by nurses or other personnel. It is not necessary that the patient be in a single room.

9/85
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MASSACHUSETTS EYE & EAR INFIRMARY

Safety Office

Radioisotope Safety Policy

Policy: Radioisotopes shall be managed in compliance with the rules and regulations established by the Nuclear Regulatory Commission (NRC).

Background: Radioisotopes are powerful research, diagnostic and therapeutic tools. They also pose physical and chemical hazards to people and the environment. This Policy and Procedure establishes general Radioisotope Safety Practices within the Infirmary. Every person listed on the NRC license shares in the responsibility to ensure protection to themselves, to colleagues, other occupants of the Infirmary and the community at large.

References:

- United States Nuclear Regulatory Commission Rules and Regulations including but not limited to Title 10, Chapter 1:
- o Part 2 - Rules of Practice for Domestic Licensing Proceedings
 - o Part 19 - Notice, Instruction and Reports to Workers
 - o Part 20 - Standards for Protection Against Radiation
 - o Part 30 - Rules of General Application to Domestic Licensing of Byproduct Material

Definitions:

Authorized User - each person named on the NRC License issued to the Infirmary.

Licensee - Massachusetts Eye & Ear Infirmary, NRC # 20-01212-10

Radioisotope Laboratory - a room or series of rooms that by physical design and control, will preclude unauthorized access to radioisotopes. Control can be achieved by locked doors, or secured radioisotope materials, or surveillance to ensure that exposure is as low as reasonable achievable and that unauthorized access prohibited.

Secure Storage - any means of control that prohibits at any time, unauthorized people access to radioisotope materials or exposure to radiation.

Procedure:

1.0 Emergency/Urgent Assistance

- 1.1 Emergency help will be obtained as listed below to respond to spills, contamination, and other urgent needs.
 - o Radiation Safety Officer - x3333
(Emergency line to Page Operator)
 - o Harvard University Environmental Health & Safety
495-2061 (office) or 495-5711 (Emergency)
 - o Safety Officer - x3333
 - o Boston Fire Department - Hazardous Materials Response
Group - 911
 - o Nuclear Regulatory Commission - (215)-337-5000
- 1.2 The Radiation Safety Officer shall maintain, with the Communications Department, a list of people and page numbers to fulfill 1.1.

2.0 General

- 2.1 It is the responsibility of all persons who handle or use radioisotopes to comply with safety practices to ensure as low as reasonably achievable (ALARA) exposure to people and the community.
- 2.2 The President shall appoint (and reappoint annually) a Radiation Safety Officer (RSO) who shall administer the radioisotope safety program. The RSO shall have authority established by the Safety Committee Authority Statement to take actions necessary to ensure the safety of the Infirmary, its occupants and the community.
- 2.2 The RSO shall establish a Radioisotope Safety Subcommittee to provide input to and dissemination of safety practices. The Subcommittee shall meet quarterly and report its activities to the Safety Committee and to sanction the actions of the RSO.
- 2.3 The RSO shall establish and maintain a consultation and services relationship with Harvard University Environmental Health & Safety - Radiation Protection Office.

2.4 The RSO shall maintain records pertaining to the management of the Radioisotope Safety Program.

2.5 The Infirmary shall provide allocation of funds to ensure adequate response to the program.

3.0 Administrative Procedures

3.1 The RSO shall maintain and disseminate copies of the NRC license that empowers the Infirmary use of radioisotopes. The RSO shall undertake amendments to the License as directed by the Subcommittee.

3.2 The RSO shall maintain a profile of all people involved in the use of radioisotopes. The Authorized User shall fulfill requests of the RSO to maintain an accurate list of people to ensure that appropriate records and monitoring are maintained.

3.3 The RSO and/or Harvard University shall perform monthly surveys of radioisotope laboratories (and other areas designated by the RSO) to ensure compliance and control of materials.

3.4 Violations shall be documented and action undertaken to ensure correction of the violation and maintenance of a safe environment. The process shall include:

- o notification to the Authorized User, the RSO and Harvard University of the violation.
- o a first violation requires the Authorized User to address the people/procedures involved to ensure correction.
- o a second violation within the past 12 months (or moderate level first violation) requires the Authorized User to present to the RSO a plan of action to ensure correction of the infraction.
- o a third violation within the past 12 months (or a severe level first violation) requires suspension of the Authorized User's access to or use of radioisotope materials, and presentation to the RSO, Radioisotope Safety Subcommittee and Harvard University by the Authorized User and her/his supervisor of a plan of action to ensure correction of the infraction.

- 3.5 The RSO shall maintain and update monthly, an inventory of all radioisotopes within the Infirmary that reflects the information provided by Authorized Users (see Exhibit A).
- 3.6 The RSO shall maintain a liaison with the RSO of the Massachusetts General Hospital (MGH). The MGH NRC License allows the administration of radioisotopes to patients for diagnostic and therapeutic purposes within the Massachusetts Eye & Ear Infirmary (Exhibit D).

4.0 Purchase of Radioisotopes

- 4.1 Any Authorized User may requisition radioisotopes within the limitations imposed by the NRC License. The Authorized User must complete a MEEI purchase requisition (or equivalent requisition, e.g., Harvard University Simplified Order System) that specifies the isotope, quantity of radioactivity, and the signature of the Authorized User.

The date to receive the order shall be indicated for short half life radioisotopes. The Authorized User ordering the material shall ensure that a knowledgeable person will be available to receive the package by specifying the contact person and telephone extension on the requisition.

- 4.2 The requisition shall be forwarded to the RSO (or designated alternate) for authorization to order the isotope. The RSO shall deny an order if:
- o the Authorized User is restricted from using the specific or any radioisotopes, or
 - o receipt of the order will cause the total Infirmary inventory to exceed the maximum amounts allowed on the NRC License, or
 - o receipt of the order would compromise some other special safety consideration.

The RSO shall expeditiously authorize the purchase (if none of the above conditions exist) by stamping the requisition with the NRC License number, signing the requisition, entering the purchase into the inventory, and returning the requisition to the respective laboratory business office.

NOTE: Purchase of exempt quantities of radioisotopes shall be handled as outlined in 4.2.

- 4.3 The RSO shall photocopy the authorized requisition and distribute as follows:

- o original to the laboratory business office,
- o copy to the Authorized User,
- o copy to Receiving Supervisor, and
- o copy to RSO file.

5.0 Receipt of Radioisotopes

Steps 5.1 through 5.6 must be addressed before the shipping agent leaves the Infirmary.

- 5.1 Normal business hours for receiving radioisotopes include 8:00 a.m. to 4:30 p.m., Monday through Friday on normal Infirmary business days. See step 5.9 for receipt of radioisotopes at other than normal business hours.
- 5.2 All radioisotope packages shall bear hazard warning labels (see illustration in Exhibit A). The Infirmary shall only receive radioisotope packages that display one (1) or two (2) red, vertical bars.
- THE INFIRMARY PERSONNEL SHALL REFUSE TO RECEIVE AND INSIST THE THE DELIVERY AGENT RETURN ALL RADIOISOTOPES PACKAGES THAT DISPLAY THREE (3) RED VERTICAL BARS.
- 5.3 The package shall not be handled without wearing disposable gloves.
- 5.4 The package shall be placed into a transport container (specifically designated for transport of radioisotopes, leak-proof, and labelled). Gloves used to handle the package also shall be placed into the transport container.
- 5.5 The package shall be inspected for damage immediately upon arrival. If the package is crushed or exhibits release of internal contents or security seal is broken, then the Receiving Staff shall contact the Page Operator (x3333) and notify them of a "Radioactive Material Spill - CODE YELLOW." The Hazardous Materials Spill Response Team shall manage the situation (see Step 1.1). DO NOT allow the shipping agent to leave the Infirmary if there is a suspicion of a spill.
- 5.6 The receiving papers shall be compared with the copy of the authorized purchase requisition or the Purchase Order to ensure that the correct material and quantity has been received.

5.7 The Receiving Supervisor shall notify the ordering Authorized User of the receipt of the radioisotope material. The Authorized User (or designated knowledgeable, responsible person) shall pick up the materials immediately (not to exceed 2 hours) from the Receiving Area.

5.8 Transport of radioisotope material shall be restricted to the ground floor, second floor, and other floors where radioisotope laboratories exist. Vertical transport shall be restricted to Main Building elevators A, B, C, and Connecting Building elevators.

Materials shall not be taken into an elevator where a patient is being transported in a bed or stretcher. It is the responsibility of the Authorized User to ensure that radioisotope materials and patients confined to a bed or stretcher are not transported in an elevator simultaneously.

There shall be no vertical transport of radioisotopes via stairways designated as emergency exits.

5.9 Receipt of radioisotope materials can be arranged through the Information Service Front Desk under the following conditions:

- o the Authorized User notifies the Director, Information Services of the need to receive radioisotopes at other than normal hours,
- o the Director, Information Services approves of the request,
- o the Front Desk Staff shall notify the Authorized User upon arrival of radioisotope material,
- o the Shipping Agent must remain until the Authorized User responds,
- o the Authorized User (or designated staff) shall perform steps 5.2 through 5.6 within ten (10) minutes of notification; if the Authorized User does not respond within ten (10) minutes, then the Front Desk Staff shall instruct the Shipping Agent to return the materials, and
- o the Authorized User shall transport intact materials as specified in step 5.8.

5.10 The Authorized User (or responsible, knowledgeable designee) shall perform and record an incoming inspection of the radioisotope package as outlined:

- o inspection must be completed within three (3) hours (or within eighteen (18) hours or at the beginning of the next normal working day if received at other than normal business hours),
- o always wear gloves before handling radioisotope package,
- o radiation level shall not exceed dose rate as follows:
Radioactive I - < 0.5 mrem/hr. at the surface,
Radioactive II - < 50 mrem/hr at the surface and
 < 1.0 mrem/hr at one (1) meter,
- o wipe the package surface for scintillation counting which shall not exceed 0.01 microcurie per 100 cm²,
- o open the package and remove the packing materials; keep all materials on disposable bench cover or in transport container,
- o ensure that radioisotope container is securely closed and properly labelled,
- o wipe the surface of the radioisotope container for scintillation counting,
- o if the survey meter and scintillation results indicate that the material is secure and not contaminated, then the radioisotope shall be securely stored; and the packing material defaced and discarded with regular rubbish along with gloves,
- o if the survey meter readings and/or the scintillation results indicate that radioisotope material is not secure or may be contaminated, then call x3333 and report a "Radioisotope Material Spill".

6.0 Radioisotope Use

6.1 All Authorized Users shall develop and maintain current laboratory procedures that ensure the safe use, storage and disposal of radioisotopes in their care and specific to the laboratory tasks to be accomplished. These procedures shall incorporate at least the following:

- o laboratory procedure preparation,
 - o personal protection equipment,
 - o protective handling tools,
 - o monitoring devices,
 - o area controls during procedures,
 - o survey equipment,
 - o equipment and laboratory ware cleaning,
 - o waste storage,
 - o personal surveys,
 - o recordkeeping,
 - o radioisotope secure storage,
 - o physical diagram of laboratory space with key radioisotope related features highlighted (Exhibit C), and
 - o emergency procedures.
- 6.2 All Authorized Users shall ensure that all personnel under their direction be trained and retrained in radiation safety procedures. Copies of the training material and rosters shall be forwarded to the RSO.
- 6.3 The RSO shall coordinate training of all non-laboratory personnel who regularly have need to work inside a radioisotope laboratory, e.g., Building Services, Maintenance and Safety personnel.
- 6.4 All personnel entering a radioisotope laboratory shall wear or use appropriate dose monitoring devices or procedures. Minimum requirement for personal registration and monitoring are as follows (refer to Exhibit B) for registration with Harvard University Environmental Safety and Health):

General Requirements

- o Any radioisotope user (someone who works with isotopes - under the direction of a Authorized User) shall be registered through Harvard for monitoring purposes. Monitoring includes film badges, thyroid scans (iodine users) and urine assays.
- o For gamma and high energy beta emitter (^{32}P , ^{33}S , ^{51}Cr , ^{57}Co , and ^{86}Rb) laboratories, all people who work or reside in the laboratory must be registered. Those working with radioisotopes also shall have "finger ring" monitors.
- o For low energy emitters (^3H and ^{14}C) laboratories, only the people who actually work with the isotope need register (principal investigator-Authorized User, laboratory assistants and technicians).

- o Anyone handling (opening and using) tritiated materials that exceed 10 mCi activity must submit a urine sample for assay within 24 hours of opening the container. Call the Safety Office on Harvard (495-2061).
- o Occasional entry should not warrant a monitoring badge, however, this must be evaluated for each isotope.

Specific Requirements

- o Tritium (^3H)
registration - all personnel who handle radioisotopes
monitoring - semiannual urine assay - all personnel
who handle radioisotope,
urine assay within 24 hours of opening any tritiated
material equal to or greater than 10. mCi.
- o Phosphorous (^{32}P), Sulphur (^{35}S)
registration and film badge monitoring - all persons
who enter unescorted into the radioisotopes
laboratory
monitoring - extremity dose monitors - all personnel
who handle radioisotope,

- 6.5 All Authorized Users shall maintain suitable survey equipment to monitor the radiation created by the radioisotope use. The survey instruments shall be calibrated at least annually, through the Harvard University Environmental Health and Safety Office.

7.0 Radioisotope Waste

- 7.1 All Authorized Users shall maintain storage capability within their laboratory for waste products produced during experimental work. The waste shall be labelled and securely stored in a fashion to prevent accidental release and preclude radiation exposure.
- 7.2 Each Authorized User is responsible for transporting waste material to the Harvard University Radioisotope Waste Station in the Shipping/Receiving area of the Massachusetts General Hospital for pick up on Tuesday or Friday from 10:00 to 11:00 a.m. The material minimally shall be sealed in two 4.0 mil thick plastic bags and labelled. The waste shall be transported through the basement level corridors from the Infirmary Connecting Building to the Waste Station in a fashion to preclude accidental release.

7.3 "Hot" sinks may be used to dispose limited amounts of radioisotope waste. The following guideline was developed based on the number of "hot" sinks (10), the annual waste water (6,220,000 cubic feet per year), and NRC limitations. Waste containing radioisotopes must:

- o be readily soluble/dispersible in water,
- o not contain other hazardous materials restricted by other than NRC regulations, and
- o be diluted in at least one (1) litre of water and flushed with at least five (5) litres of water.

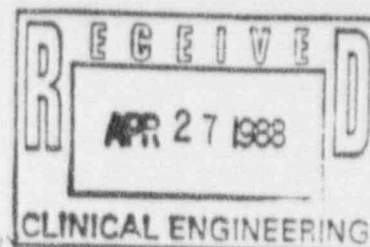
The maximum activity that may be disposed in this manner per hot sink is

- o tritium (^3H)
 - 1,000 microcurie per day,
 - 1,500 microcurie per week, and
 - 75 millicurie per year,
- o carbon (^{14}C)
 - 100 microcurie per day,
 - 400 microcurie per week, and
 - 20 millicurie per year.

Other isotopes only can be disposed via the sanitary waste water system with the approval of the RSO.

APPENDIX D

HARVARD UNIVERSITY
 RADIATION PROTECTION SYSTEM SUMMARY
 RSD SUMMARY DATE: 04/20/88 TIME: 08.48.22



SURVEYS CONDUCTED DURING THE PERIOD 880301 TO 880331
 FOR: MASS EYE AND EAR INFIRMARY
 UNDER THE NRC LICENSE FOR: MASS EYE AND EAR INFIRMARY

UP	LICENSEE	BUILDING	LAB	TECH	DATE	DETAIL	ACTION
---	-----	-----	---	----	----	-----	-----
1	ANDERSON	NEW	545	JA	88/03/21		
	DRYJA	CONNECTING	610A	JA	88/03/21		
		CONNECTING	611	JA	88/03/21		
		CONNECTING	621	JA	88/03/21		
		NEW	521	JA	88/03/21		
		NEW	521A	JA	88/03/21		
	RICHARDSON	CONNECTING	705	JA	88/03/21		
	SCHEIN	CONNECTING	619	JA	88/03/21		
	SCHMIDT	NEW	518	JA	88/03/21		
		NEW	530	JA	88/03/21		
	WELLS	CONNECTING	619	JA	88/03/21		
		CONNECTING	620	JA	88/03/21		
		CONNECTING	624	JA	88/03/21		
	WOLFE	CONNECTING	701	JA	88/03/21		

An arrow pointing from a handwritten signature "John W. McG" towards the table data.

MA 02138

Landauer

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DISKETTE TO FOLLOW THIS REPORT 30 - PR 3773 - 95967

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weight. ¹⁰ Do not start any abdominal exercises.

© 1997 American Psychological Association 0893-3200/97/\$12.00 DOI: 10.1037/0893-3200.11.4.565

1. *Journal of the American Medical Association*, 271, 1993, 1555-1556.

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Journal of Internal Medicine 247: 115-121

Results: Managing Change

APPENDIX E

MASSACHUSETTS EYE AND EAR INFIRMARY

Volume II

Section III - Radiation Policies

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INSTRUCTIONS FOR USE OF FILM BADGES

INTRODUCTION. The purpose of the film badge is to provide information on the radiation dose received by personnel, particularly when the dose may approach the permissible limits.

Film badges should be worn by all nurses who will be in close contact with patients who contain radioactive material except where the radiation levels are too low to be recorded or so far below applicable limits to be insignificant. Thus badges will not be issued for nursing care of patients with:

- a. diagnostic levels of radioactivity
- b. I-125 as encapsulated seeds
- c. p-32 for radiotherapy
- d. low levels of I-131 (less than 12 mCi) for therapy of hyperthyroidism.

1. All nursing personnel who are involved in the patient's care shall wear badges. Each badge shall be worn by one person only.
2. Badges are recommended to be worn on trunk of body, preferably at waist level.
3. When radioactive precautions are discontinued, return badges to Unit Coordinator.
4. Badges shall be kept by the Radiation Safety Office.
5. Upon learning of a patient who will require radiation precautions, the Unit Coordinator, or Charge Nurse, shall obtain badges from the Radiation Safety Office (West End House - 3 - X2425) (page 2241).
6. Badges shall be supplied to personnel on the unit who are involved in the patient's care. Personnel shall sign for, and be responsible for badges. Each recipient shall print his/her name on the badge and on the back of the instruction sheet supplied with the badges.
7. Upon the loss of a badge, the nurse who signed for that badge shall be charged for a new badge (\$3.75)
8. The Radiation Safety Office shall make badges available until 5:00 p.m., Monday through Friday.

HAZARDS OF RADIOACTIVE ISOTOPES

Hazards may arise from three sources:

1. Contamination of the skin with radioactive materials.
2. Inhalation
3. Irradiation of the body from outside by radiations emitted by these materials.

NO PRECAUTIONS WHATSOEVER are needed for these patients who have received tracer doses of radioactive materials for DIAGNOSTIC TESTS.

In general, precautions should be taken when therapeutic doses of radioactivity above 1 mCi (millicurie) are used.

The hazards increase with increased level of the dose.

Information about special hazards should be obtained from the physician responsible for the administration of the radioactive material.

GENERAL PRINCIPLES OF PROTECTION

1. Skin contamination, ingestion, or inhalation is prevented in part by practicing good housekeeping, handwashing and clean work habits.
 - a. Radioactive materials should not be allowed to come into contact with the skin.
 - b. Where radioactivity is present, personnel should not be allowed to eat, drink or smoke.
 - c. Monitoring, i.e., checking equipment or work areas for radioactivity with a geiger counter is necessary when contamination is suspected. (Call Ext. 2425, 2241, page for Radiation Safety Officer.)
2. External irradiation of the body may be reduced to permissible limits by:
 - a. Taking precautions in handling contaminated equipment.
 - b. Spending the minimum of time close to patient with therapeutic doses of radioactivity.

GENERAL PRECAUTIONS

1. The length of time personnel should remain at any particular distance from the patient will be determined by the doctor.
2. Wash hands after contact with patient. Give particular attention to fingernails. Avoid working with open cuts.
3. The R.S.O. (Ext. 2425) shall be informed if articles are likely to be contaminated. If the R.S.O. is not immediately available, the articles shall be stored in a metal container (e.g. trash barrel) to be provided by the Building Services, and will be monitored later by the R.S.O.
4. It is not necessary to limit visitors in general. In circumstances where very large doses are used and there may be possible contamination, limitations shall be specified by the doctor. (See especially the Special Instructions for Radium, Cesium, Iridium and Iodine-131).
5. In the event of a spill of radioactive liquids (including excreta) containing Iodine-131 or Phosphorus-32 (e.g. in the urine of a patient), call the Radiation Safety Officer, Ext. 2425. Outside normal working hours, call Ext. 2241.

MASSACHUSETTS EYE AND EAR INFIRMARY

Nursing Care of Patients Receiving Radioactive Phosphorus in Therapeutic Doses

GENERAL PRINCIPLES

1. If the p^{32} (radioactive phosphorus) is given intravenously, there is no radiation hazard near the patient and no special precautions are necessary.
2. If the p^{32} is given orally, there is not radiation hazard unless the patient vomits during the first 12 hours. If the patient vomits during the first 12 hours, follow the instructions given below under "Special Instructions", paragraph #2.
3. Nurses may spend whatever time necessary near a patient for routine nursing care.
4. Patients are allowed visitors in accordance with the usual hospital rules.
5. No special precautions are needed for sputum, stools, dishes, instruments or bleeding. See below ("Special Instructions", paragraph #2) for precautions to be used for vomitus. Urine is usually radioactive and should be handled with care, using rubber gloves. (See paragraph #3 below and also Emergency Situations.)

SPECIAL INSTRUCTIONS

1. If the p^{32} has been given intravenously and the patient vomits, no special precautions are necessary.
2. If the p^{32} has been given orally and the patient vomits within 12 hours, the vomitus and any soiled clothing, bedding and utensils should be collected and put into any available covered metal can which should be labeled "RADIOACTIVE". Wear rubber gloves to do this, and then still wearing the gloves, wash them with soap and water at any sink. Use plenty of water to wash down the sink. Place the gloves after removal with other contaminated items. Call the radiation therapist (or radiation medicine resident on call) and the Radiation Safety Officer who will arrange for disposal of the contaminated items. (See "Emergency Situations" below.)
3. If a urinal or bedpan is used, care should be taken to avoid spillage in transferring urine to the toilet. RUBBER GLOVES are essential when handling urine. If urine collection has been ordered, carefully transfer it to a 5-pint bottle. The bottle should be labeled with the patient's name, number, and time of collection and sent to the ordering physician. Urine spillage should be wiped up immediately with paper tissues and these may be flushed through the nearest toilet. (See below for large spills.) Gloves should be thoroughly washed with soap and water while still on the hands and then disposed of in the usual way. Likewise the urinal should be thoroughly washed at any sink before re-use.

4. If the p^{32} is used topically (direct application to the skin under a surgical dressing. DO NOT TOUCH the dressing. If the dressing becomes loose or needs changing, call the radiation therapist or the radiation medicine resident on call, as noted below.

EMERGENCY SITUATIONS

1. In case of loose dressings or any problems or questions not answered above, CALL THE RADIATION THERAPIST (OR THE RADIATION MEDICINE RESIDENT ON CALL), Ext. 8650 (days) or 2241 (nights, weekends and holidays).
2. In the case of a large spill of urine or vomitus, call the Radiation Safety Officer, Ext. 2425 (days) and 2241 (outside normal working hours).

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MASSACHUSETTS EYE AND EAR INFIRMARY

Nursing Care of Patients Receiving Phosphorus 32 - For Eye Tumor Identification

GENERAL PRINCIPLES:

1. In the P32 eye tumor identification test - 10 MCi/KG of P32 is administered orally or intravenously as sodium phosphate P32. Up to a maximum of 700 microcuries per patient. The P32 content of the suspected area is determined at 48 hours with a specialized instrument. There is no external radiation hazard. The only source of radiation exposure will be the urine which is contaminated with P32.
2. It is not necessary to wear a film badge.

Nursing Care:

1. Following intravenous administration, 5-10% of P32 is excreted in the urine during the first 24 hours and about 20% within one week. A minimal amount is excreted in the feces. Hand precautions (use of gloves) should be maintained whenever handling the urine of these patients.
2. Following oral administration, a percentage of P32 is excreted in urine and feces during the first 4-6 days. The fecal activity represents primarily unabsorbed material.

Emergency Situations:

1. If there is any question of contamination of linen, furniture, instruments, clothing, floor utensils, etc. immediately call the radiation safety officer (ext. 8328) who will monitor the area for radiation hazard and determine what protection or disposal methods are indicated.
2. The radiation therapist (or radiation medicine resident on call) may be reached at Ext. 8650 (days) or Ext. 2241 (nights, weekends and holidays).

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Care Of Patients Receiving Radioactive Chronic Phosphate P³²
For Tumor TherapyGENERAL PRINCIPLES

In these rare cases a liquid containing insoluble radioactive particles is instilled directly into a tumor or into the pleural or peritoneal cavity. Since P³² emits beta rays that are completely absorbed within the body, there is no external radiation level. The only source of contamination will be from drainage from the puncture wound or incision. Excreta from the patient will not be contaminated.

1. It is not necessary to wear a film badge.
2. No special precautions are needed for vomitus, sputum, urine, stools, or dishes.

NURSING CARE

1. Surgical dressings and bandages may be changed only as directed by the radiotherapist. During the first few days, dressings used over the wound may not be discarded until directed by the radiotherapist. If there is no drainage from the wound, dressings may be handled in the usual manner after the first 2 or 3 days.
2. Bedding may be changed as usual unless there has been drainage from the wound, in which case radiotherapist (Ext. 8650) and the Radiation Safety Officer must be notified. They will give directions for its disposal (See "Emergency Situations" below.)

EMERGENCY SITUATIONS

1. If there is any questions of contamination of bedding, furniture, instruments, clothing, floor, utensils, etc., immediately call the Radiation Safety Officer who will monitor the area for radiation hazard and determine what protection or disposal methods are indicated.
2. If the surgical dressing becomes damp or blood because of drainage or leakage from the wound, do not touch the dressing but call the attending physician or radiotherapist. Keep all removed wet dressings (together with all instruments or utensils used) in a covered dressing basin in the patient's room and do not discard until so directed by the radiotherapist.

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