



VMMC & Safdarjung Hospital,
Ministry of Health & Family Welfare,
Government of India, New Delhi.



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Document No.	TITLE		
E/ NABH/ SJH/ SOP/ 06	SOP of Nuclear Medicine Department		
Effective Date: 20/07/2020			
Function	Name	Designation	Signature
Prepared By	Dr. Padma A Namgyal	Member Quality Cell	
Reviewed By	Dr. K. C. Tamaria	Nodal Officer NABH	
Approved By	Dr. Balvinder Singh Arora	Medical Superintendent	

Distribution: Quality Cell, Medical Superintendent, HOD Nuclear Medicine

REVISION SUMMARY		
Version No.	Effective Date	Revision History
1.0	20/07/2020	00

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1.0 INTRODUCTION

All users of radioactive isotopes are required to follow specific rules and regulations in order to promote the security and safe use of radioactive materials in research nuclear medicine.

2.0 PURPOSE:

The objective of the current SOP is to outline the minimum requirements and general rules to be adhered to in nuclear medicine suites.

Vision

The Vision of Nuclear Medicine Dept has been identified as to be a centre of excellence in providing timely, cost-efficient and high quality Nuclear Medicine Imaging.

Mission

The Mission is to provide excellent clinical imaging that improves diagnosis and treatment of patients with a focus on Thyroid disorders for a diverse patient population specially catering to all the patients of Government Hospitals.

3.0 SCOPE:

This SOP applies to all users working with radionuclides, or anyone on hospital or college premises potentially exposed to radiation.

4.0 RESPONSIBILITY:

All users are responsible for;

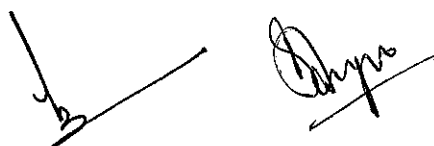
Following all applicable safety rules and practices

Reporting all potential hazards, unsafe conditions or safety issues to the medical imaging manager designate or RSO.

Using and wearing personal protective & dosimetry equipment.

Attending all training courses as directed by AERB

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Organogram

Ministry of Health and Family Welfare

- Medical Superintendent, VMMC & Safdarjung Hospital
- Head- Dr R.S.Sethi
- Faculty- Dr. Padma A Namgyal (CMO,NFSG and RSO of NM Dept.)

Dr. Aditi Khurana (SMO)

- Senior Residents- Dr Arpana
- Technologists- Ms. Vaishali Vaish

Shri Surendra Kumar Sharma

Ms. Bharti Maurya

Mr Mukesh Kumar

5.0 SERVICES AVAILABLE

Nuclear Medicine Imaging (Appendix I)

Low Dose Radio Iodine Therapy

6.0 QUALITY INDICATORS

Waiting Time- 1week to 1.5 months depending on the test

Imaging Results-Good

Report Dispatch Time- 4 to 5 days

Error in Report - Nil

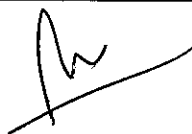

Number of times study repeated- 3-4/ year due to technical reasons

Critical Results- Register- GI Bleed, Bile Leak in post trauma/post surgical cases, Testicular Torsion, Pulmonary embolism

Discharge Summary of Low Dose Iodine Therapy is given in Bilingual (Appendix-II).

Proper Radioactive signages giving instructions to general public, pregnant and lactating females are in place in the dept. Sign is posted where radioactive materials are handled or where radiation-producing equipment is used. Sign is used as a warning to protect people from being exposed to radioactivity.

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Proper consent is taken before injecting radiopharmaceutical.

Log Books of every procedure maintained meticulously.

Safety Manual

- Radiation Safety (TLD monitoring, Radiation Survey of the Dept. conducted weekly on preferably
- Fire Safety (6 Fire Extinguishers, Smoke detectors and Fire Exit door)
- Disaster Manual (Revised in March 2010) - Displayed on the notice Board
- Emergency - Basic Life Saving Skills Training done by all the doctors and technologists

7.0 PROCEDURE:

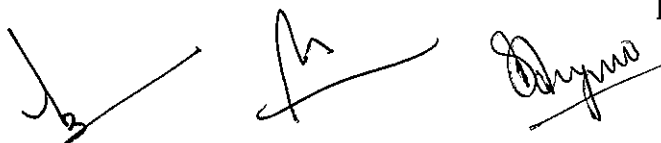
The following must be adhered to when working in nuclear medicine suites.

General Rules

All users are responsible for:

- All members of staff, researchers, and students have a legal responsibility to protect themselves and their colleagues from radiation hazards arising from their work.
- All radiation exposures to members of staff, researchers, students, and visitors must be kept as low as reasonably achievable (ALARA).
- Radionuclides must be handled only by authorized members of staff, researchers, and students who have received training in radiation safety.
- Visitors and research participants entering radionuclide laboratories must be accompanied by authorized member of staff.
- Eating, drinking, smoking and all application of cosmetics are forbidden in laboratories at all times.
- Protective clothing must be worn when manipulating radionuclides.
- Laboratory coat (fastened at the front) or a surgical gown.
- Disposable gloves.
- Protective clothing is to be removed at the end of the procedure. Before commencing work, cuts and hand breaks in the skin on hands should be covered with adhesive plasters.
- Personal monitors (Dosimeter) issued to staff, researchers, and students must be worn. A personal monitor provided to measure the dose to the trunk should be worn at shoulder or

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wrist level. Extremity monitors, if provided must be worn on finger. Care is to be taken to prevent personal monitors becoming wet or damaged, or inadvertently sent to the laundry.

Preparation, Handling & Administration of radioactivity

- A lead shield designed to fit around the generator and other areas where a radioactive source is used to prevent radiation exposure to technologist
- A lead glass assembly (L-bench) is used during the preparation and dispensing radiopharmaceutical kits and individual patient doses.
- Contamination monitoring **MUST** be performed for background, work surface, floor area, disposal sink, and equipment before and after work .
- Personal contamination monitoring of the body must be performed following a contamination incident. Results of monitoring must be recorded. If contamination is detected decontamination procedures are to be followed.
- Personal contamination monitoring of the hands must be performed on leaving the Hot Lab
- When manipulating unsealed radionuclides a suitable contamination monitor must be at hand and regularly used to check for personal and laboratory contamination.

Particular attention is to be given to the hands, clothing, bench surfaces and floor around the work area. The thyroid must be monitored 24 hours after any procedures involving manipulation of an unsealed radioiodine source having an activity greater than 1MBq or when intake of radioactive iodine is suspected. The result must be recorded in writing. Any sealed sources should be treated as unsealed sources unless satisfactorily wipe tested.

- Contamination monitoring of surfaces and apparatus must be performed before and after any procedure involving unsealed radioactive materials. The result of monitoring must be recorded. The only exception to this rule may be applied when the undue delay in performing a thorough contamination monitoring check would adversely affect a research participant's investigation. In this circumstance only, an operator may leave without monitoring for contamination provided that arrangements are made with Hot Lab staff to monitor for them immediately after the manipulation. If Hot Lab staff are not available the operator must perform the contamination monitoring.

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- Radioactive material must at all times be clearly identified with radioactive material hazard warning tape, and marked with details of the radionuclide, date, approximate activity, and name of member of staff or group responsible for it.
- The syringe containing radioactivity is provided in syringe shield in order to avoid unnecessary irradiation to staff.
- Users must utilize the radioactive materials tracking database on the Hot Lab computer.
- Work with radioactive material must be carried out over a containment tray lined with absorbent wipes laid over plastic-backed absorbent paper .
- All accidents (including spills) involving radioactivity must be reported to the RSO radiation Safety Officer) and managed as per the Appenix IV.
- All patients administered activity are made to wait in a separate waiting lounge till the imaging is carried out to avoid irradiation to general public coming to the department.
- All patients who have received Low dose Radioiodine Therapy are made to wait in a separate waiting lounge till their radiation exposure level achieved is under permissible limit as per AERB guidelines so as to avoid irradiation to general public.

Storage & Disposal of radioactive material

Radioactive materials, when not in use must always be stored in a secure location, taking special care to minimize the possibility of accidental contamination during storage.

Laboratories in which radioactive materials are used or stored must be locked when unoccupied. Radioactive waste generated during diagnostic & therapy procedures in the form of contaminated syringes, needles, vials & gloves are to be stored for at least 10 half-live radioactive decay in the radioactive storage room.

Following storage for a period of 10 Half-lives the radioactive waste can be disposed off as a normal waste along with other non- radioactive waste of the Dept. as per Bio Medical Waste management Rules.

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Procurement of Radioactive Material

Radioactive material (Tc99m and I-131) is procured by our department through BRIT (Board of Radiation and Isotope Technonlgy), INMAS, Delhi.

Transport of radioactive Material

Transport of radioactive material is done by two methods. One is doorstep delivery by BRIT. Second is by sending vehicle at the Airport. Radioactive material is provided to us at doorstep by BRIT, INMAS.

Restricted Access Area

Certain areas such as the Gamma Camera, and the radiotracer preparation laboratory (Hot Lab) in the Imaging Suite will be inaccessible in the absence of a technologist or Nuclea Energy Worker as per regulations. Any access to such area will need to be approved by the Radiation Safety Officer on a daily basis. The Medical Imaging Department is identified as restricted area to which access is restricted to authorized Persons only. Those authorized to work within restricted area must have completed appropriate safety training and must comply with all

Nuclear Medicine Technologist

All Nuclear Medicine Technologists are trained as per AERB guidelines.

The Nuclear Medicine Technologist must be certain all female participants are not pregnant before radiopharmaceutical injection.

The nuclear medicine technologist must be present at all times and will verbally monitor the participant throughout the procedure.

The nuclear medicine technologist has the authority to stop procedures when they are deemed to be unsafe.

8.0 VALIDITY STATEMENT

This document is valid for one year from the date of issue.

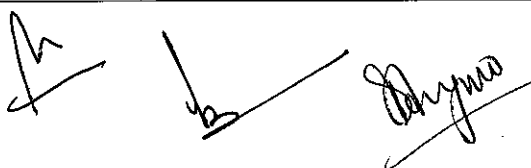
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9.0 APPENDICES AND FORMS

- * Annexure A: NAME OF THE INVESTIGATIONS
- * Annexure B: LOW DOSE 131 IODINE THERAPY DISCHARGE SUMMARY
- * Annexure C: LOCAL RADIATION SAFETY COMMITTEE
- * Annexure D: RADIOACTIVE SPILL MANAGEMENT
- * Annexure E: Amendment sheet
- * Annexure F: Training log

ANNEXURE A

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NAME OF THE INVESTIGATIONS

S.No.	
	PULMONARY
1.	Lung Perfusion & Perfusion Scan (V/Q Scan)
2.	Lung Ventilation Scan.
	OSTEOLOGY
3.	Whole Body Bone Scan with SPECT
4.	Three Phase Bone Scan.
	NEUROSCIENCES
5.	Brain Perfusion SPECT Scan with Technetium 99m radiopharmaceuticals.
6.	Radionuclide Cisternography for CSF leak
	GASTRO AND HEPATOBILIARY
7.	Gastro esophageal Reflux Study (G.E.R. Study)
8.	Gastro intestinal Bleed (G.I.B.) Study with Technetium 99m labeled RBCs
9.	Hepatobiliary Scintigraphy
10.	Meckel's Scan with Technetium 99m Pertechnetate
11.	Hepatosplenic Scintigraphy with Technetium 99m radiopharmaceuticals
12.	Gastric Emptying
13.*	Salivary Gland Scintigraphy
	GENITOURINARY
14.	Renal cortical Scintigraphy with Technetium 99m D.M.S.A.
15.	Dynamic Renography. (DTPA / EC)
16.	Dynamic Renography with Diuretic
17.	Dynamic Renography with Captopril / ACEI
18.	Testicular Scan
19.*	Direct Radionuclide Cystourethrography (D.R.C.G.)
	ENDOCRINOLOGY
20.	Thyroid Uptake measurements with 131- Iodine.
21.	Thyroid Scan with Technetium 99m Pertechnetate
22.	Iodine-131 Whole Body Scan.
23.	Whole Body Scan with M.I.B.G.
24.	Parathyroid Scan
	RADIO-ISOTOPE THERAPY
25.	131-Iodine Therapy <15mCi
26.	Phosphorus-32 therapy for metastatic bone pain palliation
27.	Samarium-153 therapy for metastatic bone pain palliation
	CARDIOLOGY
28.	Stress thallium / Myocardial Perfusion Scintigraphy
29.	Rest thallium / Myocardial Perfusion Scintigraphy
30.	Venography (Radionuclide)
31.*	Radionuclide Ventriculography (M.U.G.A. Scan)

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32.*	Lymphoscintigraphy
	TUMOUR IMAGING
33.	Scintimammography
	IN-VIVO Studies
34.*	Cr-51 RBC mass
35.*	Cr-51 RBC Survival
A	Gallium scan
B	Tumor imaging (MIBI / Thallium)
C	Sentinel Lymph Node Mapping
D	Peritoneopleural Scan
E	Samarium0153 Therapy
F	Infection Imaging with Leukocytes
G	Brain static scan
H	Liver Blood pool scan

ANNEXURE B

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LOW DOSE 131 IODINE THERAPY DISCHARGE SUMMARY

रोगी को निर्देश:

Instructions to the Patient:

- कैप्सूल निगलने के बाद 2 घंटे तक मुख से कुछ ना लें।
- Nil orally till 2 hrs after capsule ingestion.
- 2 घंटे के बाद बहुतायत में तरल पदार्थ लें।
- Plenty of fluids after 2 hrs.
- बेवजह 7 दिनों तक थूकने से बचें।
- Avoid spitting unnecessarily for 7 days.
- अलग बर्तन का इस्तेमाल करें और 7 दिन तक किसी के साथ कपड़े और बिस्तर साझा न करें।
- Use separate utensils and do not share clothing and bed with anyone for 7 days.
- जैसा कि समझाया गया है, बच्चों और गर्भवती महिलाओं से दूरी रखें।
- Keep distance from children and pregnant females, as explained.
- अगर अलग शौचालय उपलब्ध नहीं है तो 7 दिन तक शौचालय को कम से कम दो बार फ्लश करें।
- Flush toilet atleast twice if separate toilet not available for 7 days.
- 5 दिनों के बाद टैब (Tab.carbimazole) 40 मिलीग्राम लें।
- Start Tab.carbimazole 40 mg in divided doses after 5 days.
- 6 सप्ताह तक टैब सिप्लार (Tab. Ciplar40) (एमजी लेना जारी रखें)।
- Continue Tab.Ciplar 40mg OD for 6 weeks.
- जब भी कभी आवश्यकता हो फॉलोअप करें और अपने चिकित्सक/एंडोक्राइनोलॉजिस्ट से थायराइड फंक्शन टेस्ट के साथ 6 सप्ताह के बाद सलाह लें।
- Follow-up as and when required / consult your physician/ Endocrinologist after 6 weeks with Thyroid Function Test.

ANNEXURE C

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LOCAL RADIATION SAFETY COMMITTEE

Members- a) Dr R.S.Sethi

b) Dr. Padma A Namgyal

c) Dr. Aditi Khurana

d) Ms. Vaishali Vaish

e) Sh. Surendra K Sharma

f) Ms. Bharti Maurya

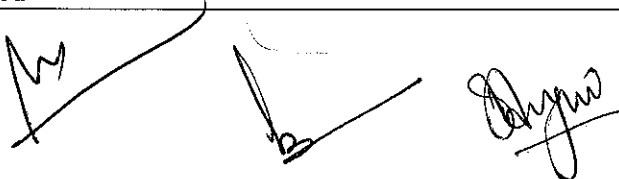
g) Mr Mukesh Kumar

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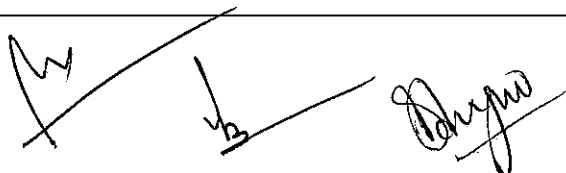
ANNEXURE D
RADIOACTIVE SPILL MANAGEMENT

1. Notify all occupants in the area about the spill, if contaminate is volatile evacuate the area immediately.
2. Secure the area and keep all individuals from entering.
3. Ensure prompt first aid treatment is administered for injured personnel.
4. Remove all contaminated clothing and place in a plastic bag.
5. Attempts must be made to remove all external contamination as soon as possible. Flush the area for a minimum of 15 minutes, if contamination is splashed in the eyes, mouth, or on skin.
6. Report the spill to Manager, Security and RSO immediately.
7. Contain large volumes of non-volatile liquid spills to prevent further spreading.
8. Ensure proper personal protective equipment is being worn.
9. Remain in the area to provide information and assistance in the clean-up.
10. Ensure that all spilled and contaminated materials are properly packaged for disposal and are treated as hazardous wastes.
11. Ensure that all other items used in the clean-up process are decontaminated.

Annexure E

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AMENDMENT SHEET

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Sr No.	Page No.	Clause No.	Date of Amendment	Amendment Made	Reasons	Signature of Officer In-charge	Signature of Medical Superintendent
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Annexure F

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TRAINING LOG (Contents, Deviation and Amendment)



Sr .No	Training Attendee	Date	Signature
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Officer In-charge

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