STANDARD OPERATING PROCEDURES
FOR PATIENTS UNDERGOING TREATMENT
OF IODINE 131

Medical Radiation Surveillance Division
Ministry of Health Malaysia
December 2017
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STANDARD OPERATING PROCEDURES FOR PATIENTS UNDERGOING TREATMENT OF IODINE-131

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STANDARD OPERATING PROCEDURES
PREPARED BY NUCLEAR MEDICINE PHYSICIAN
IODINE 131 (I-131) THERAPY IN BENIGN THYROID DISEASE PROCEDURE

OBJECTIVE
To provide guidelines to Nuclear Medicine Clinicians regarding to treat benign thyroid conditions employing optimal I-131 activities.

SCOPE
This document applies to patients receiving I-131 therapy for benign thyroid disease (I-131 dose activity of ≤ 1100MBq for every therapy).

DEFINITIONS
1. I-131 therapy is defined as the oral administration of I-131 for selective irradiation to reduce functioning thyroid tissue/volume.
2. Benign condition in this context means Graves’ disease (diffuse toxic goitre), toxic multi nodular goiter, solitary hyperfunctioning thyroid nodule and other clinically justifiable conditions.

ABBREVIATIONS AND SYMBOLS
Dr Doctor
I-131 Iodine 131
MBq MegaBecquerel
NMP Nuclear Medicine Physician
SN Staff Nurse
TFT Thyroid Function Test
TSH Thyroid Stimulating Hormone

WORK INSTRUCTION
1. Scheduling For I-131 Therapy.
   1.1 NMP shall review the referral letter/request form with/without ultrasound report.
   1.2 Clinicians shall ensure that the followings are conveyed to the patients:
      1.2.1 Counseling and adherence to pre-treatment preparations.
      1.2.2 Ensure patient is clinically stable and capable of self-care during therapy.
      1.2.3 Ensure latest TFT is available (at least 1 month prior to administration of I-131) for review.
1.2.4 Appointment date for administration is decided, documented and informed to patient.

   2.1 Assessment of patient’s adherence to pre treatment preparations.
   2.2 History taking and clinical examination:
      2.2.1 Full history taking including previous therapy and hyperthyroid related symptoms.
      2.2.2 Assessment of disease severity and its complication in particular Grave’s ophthalmopathy.
      2.2.3 Latest TFT shall be reviewed.
      2.2.4 Record patient’s vital signs including sign of hyperthyroidism and thyroid size.
      2.2.5 Give overview of radioiodine therapy including its short and long term complications and the expected outcomes.
      2.2.6 Post therapy radiation safety precaution and any socioeconomic issue need to be discussed and agreed upon.
      2.2.7 Written consent is required.
   2.3 Pregnancy status. Ten (10) days rule should be applied.
      2.3.1 Urine pregnancy test shall be carried out in female of child-bearing age unless patient history clearly indicates that pregnancy is excluded.
      2.3.2 In the case of uncertainty, treatment is deferred till the next menstruation.
      2.3.3 Result should be documented and recorded.
   2.4 Official prescription for I-131 dose activity is documented.
   2.5 Pharmacist in charge will prepare and give the prescribed I-131 therapy to the patient.

   Refer to Preparation and Dispensing of Iodine-131 (I-131) Solution, page 22.

4. Discharge of Patients from Clinic.
   4.1 Follow up, subsequent management plan and post therapy radiation precautions are informed to patients.
   4.2 Upon discharge, treatment summary, medications and medical certificate shall be given if necessary.
RECORD
Patient medical records or treatment files.

WORKFLOW

WORK SCOPE

Start

Referral letter/request form with/without ultrasound report

Decision of I-131 dose activity and pre administration counseling

Notification of I-131 dose activity to the personnel in charge

Appointment date for administration is decided, documented and informed

Ensure patients adherence to pre administration preparations

General radiation protection counseling

Recent FT4/FT3/TSH should be available

RESPONSIBILITY

Dr/SN

Dr/SN

Dr/SN

Dr/SN

Dr/SN

Dr/SN

Dr/SN

SCHEDULING FOR I-131

PRE ADMINISTRATION OF I-131
STANDARD OPERATING PROCEDURES FOR PATIENTS UNDERGOING TREATMENT OF IODINE 131

WORK SCOPE

Recent FT4/FT3/TSH should be available

History taking and clinical examination

Assessment of adherence of patient’s preparation

Pregnancy status ascertained

Latest FT4/FT3/TSH should be reviewed

The procedure, treatment, complications, side effects, therapeutic alternatives and expected outcome explained to the patient

Radiation safety precaution explained and consent taken

I-131 activity is decided and prescribed

RESPONSIBILITY

Dr/SN

Dr

Dr

Dr

Dr

Dr

Upon discharge, treatment summary, medications and medical certificate shall be given if necessary.

I-131 activity is decided and prescribed.

Administration of I-131

Dr
Pharmacist

Dr

ADMINISTRATION OF I-131

WORK SCOPE

RESPONSIBILITY
IODINE 131 (I-131) THERAPY IN MALIGNANT THYROID DISEASE

PROCEDURE

OBJECTIVES
To provide guidelines on the use of high activity I-131 in the management of malignant thyroid disease.

SCOPE
This document applies to patients receiving I-131 therapy for malignant thyroid disease.

DEFINITION
I-131 therapy is defined as the oral administration of I-131 for selective irradiation of thyroid remnants, microscopic DTC or other non-resectable/incompletely resectable or metastatic disease and certain other identified thyroid malignancies.

ABBREVIATIONS AND SYMBOLS

\[\beta hCG\] Beta Human Chorionic Gonadotropin
\[\mu Sv/hr\] microSievert/hour
\[dxWBS\] Diagnostic Whole Body Scan
DTC Differentiated Thyroid Carcinoma
GBq GigaBecquerel
HPE Histopathology Examination
I-131 131-sodium or Potassium Iodide
NMP Nuclear Medicine Physician
RxWBS Post-therapy Whole-Body Scan
T4 Thyroxine Level
Tg Serum Thyroglobulin
TSH Thyroid Stimulating Hormone
UPT Urine Pregnancy Test
WORK INSTRUCTION

1. Scheduling For I-131 Therapy.

1.1 NMP shall review the referral letter/ request form together with HPE report. Clinicians shall ensure that the followings are conveyed to the patients:

1.1.1 Counselling and adherence to pre-treatment preparations (Attachment 1).
1.1.2 Ensure patient is clinically stable and capable of self care during therapy.

1.2 Decision made for high dose/ low dose regime based on the assessment of disease extent by reviewing type of thyroidectomy, histopathology report, staging, risk stratification and relevant radiological examination, followed by discussion with patients.

1.3 Notification of the I-131 activity to the pharmacist.

1.4 Appointment date for administration is decided, documented and informed to patient.

1.5 Patient is advised to adhere to the necessary pre-treatment preparation.


2.1 History taking and clinical examination.

2.1.1 Assessment of disease extent by reviewing type of thyroidectomy, HPE report, staging, risk stratification and relevant radiological examination.

2.1.2 Assessment of patient’s adherence to pre treatment preparations.

2.1.3 For low dose therapy (≤ 1100MBq), refer to Work Instruction No. 3 and 4 in Iodine 131 (I-131) Therapy in Benign Thyroid Disease Procedure, page 2. Patient will be allowed home and instructed to return for RxWBS after 48 hours.

2.1.4 For high dose therapy (> 1100MBq), ensure patient is clinically stable and capable of self care to be admitted to the ward.

2.1.5 For dependent patients requiring assistance, the next of kin or care-taker will be involved in treatment discussion. Please Refer to Work Instruction No. 3 in Management of Radioiodine Ward and Patient Discharge, page 38.

2.1.6 Record patient’s vital signs including patient’s weight, pain score and blood glucose (for diabetic patient).
2.1.7 Give overview of the schedule of radioiodine therapy and dxWBS that shall be received by patient in the course of treatment.

2.1.8 Detail of ward admission procedure for high dose therapy should be given by in-ward nurses during admission.

2.1.9 Post therapy radiation safety precaution and any socioeconomic issue need to be discussed and agreed upon.

2.1.10 Consent written is required.

2.2 Pregnancy status. Ten (10) days rule should be applied.

2.2.1 UPT shall be carried out in female of child-bearing age unless patient history clearly indicates that pregnancy is excluded.

2.2.2 In the case of uncertainty, serum βhCG should be requested and the results recorded.

2.2.3 Result should be documented and recorded.

2.3 Investigations.

2.4.1 Blood taking for full blood count, renal profile, TSH, Free T4, serum Tg and Tg antibody. Other blood investigations that deem necessary are also taken.

2.4.2 X-rays, bone scan and other relevant diagnostic imaging examination if indicated.

2.4.3 Urine iodine assay where applicable.

2.4 Official prescription for I-131 activity is documented.

2.5 Admission to the isolation ward is arranged for those receiving high dose activity therapies.

2.6 Pharmacist in charge will prepare and give the prescribed I-131 therapy to the patient.


Refer to Preparation and Dispensing of Iodine-131 (I-131) Solution, page 22.

4. Admission to Isolation Ward.

4.1 Monitoring and ward round shall be performed by the respective team.

4.2 Radiation level of each patient is monitored at periodic intervals after 48 hours post administration.
4.3 Patients are allowed to be discharged if the dose rate is equal to or less than 50 µSv/hr at 1 meter distance.

4.4 RxWBS is acquired and reviewed after 48 hours post I-131 administration therapy.

5. Discharge of Patients.

5.1 Follow up, subsequent management plan and post therapy radiation precautions are discussed with patients.

5.2 Upon discharge, treatment summary, notification letter, medications and medical certificate shall be given if necessary.

**RECORD**

Patient medical records or treatment files.

**ATTACHMENT**

Attachment 1: Pharmaceutical Blocking Radioiodine Uptake and Dietary Sources of Significant Amounts of Iodine
**WORKFLOW**

**SCOPE OF ACTION**

1. Start

   - Request forms and histopathology reports are reviewed

   - Decision made for I-131 activity and pre treatment counseling

   - Notification of I-131 activity to the personnel in charge

   - Appointment date for administration is decided, documented and informed to patient

   - History taking and clinical examination

   - Assessment of adherence of patient’s preparation

   - Pregnancy status is ascertained

   - Radiation safety precaution explained and consent taken

   - Blood/ radiological investigations are performed

**RESPONSIBILITY**

- Dr/SN
- Dr/SN
- Dr/SN
- Dr
- Dr
- Dr
- Dr/SN
- Dr
SOE OF ACTION

Start

Blood/ radiological investigations are performed

I-131 activity is decided and officially prescribed.
- I-131 > 1100 MBq: admission to isolation ward.
- I-131 ≤ 1100 MBq: patient is allowed home and instructed to return for RxWBS after 48 hours.

Administration of I-131

In ward monitoring and ward round.
Radiation level monitoring after 48 hours I-131 administration

Whole body scan is acquired and reviewed 48 Hours post I-131 administration

Patients are allowed to be discharged if the dose rate is equal or less than 50 µSv/hr at 1

RESPONSIBILITY

Dr

Dr

Pharmacist

Dr/SN/Physicist

Technologist/Dr

DR/Physicist

ADMISTRATION OF I-131

ADMISSION TO ISOLATION WARD
REFERENCES

3. David S. Cooper, Gerard M. Doherty, Brian R. Haugan et al. Revised American Thyroid Association Management Guidelines for Patients with Thyroid Nodules and Differentiated Thyroid Cancer. Thyroid 2009 19(11).
**Pharmaceuticals Blocking Radioiodine Uptake**

<table>
<thead>
<tr>
<th>Type of medication</th>
<th>Recommended time of withdrawal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thionamide medications (e.g., propylthiouracil, methimazole carbimazole)</td>
<td>3 d</td>
</tr>
<tr>
<td>Multivitamins containing iodide</td>
<td>7–10 d</td>
</tr>
<tr>
<td>Natural or synthetic thyroid hormones</td>
<td>10–14 d for triiodothyronine</td>
</tr>
<tr>
<td>Saturated solution of potassium iodide</td>
<td>3–4 wk for thyroxine</td>
</tr>
<tr>
<td>Kelp, agar, carrageenan, Lugol solution</td>
<td>2–3 wk, depending on iodide content</td>
</tr>
<tr>
<td>Topical iodine (e.g., surgical skin preparation)</td>
<td>2–3 wk</td>
</tr>
<tr>
<td>Intravenous radiographic contrast agents</td>
<td></td>
</tr>
<tr>
<td>Water soluble</td>
<td>6–8 wk, assuming normal renal function</td>
</tr>
<tr>
<td>Lipophilic</td>
<td>1–6 mo</td>
</tr>
<tr>
<td>Aniodarone</td>
<td>3–6 mo or longer (100)</td>
</tr>
</tbody>
</table>

Source: Silberstein et al. The SNM Practice Guideline for Therapy of Thyroid Disease with 131I 3.0*
THE JOURNAL OF NUCLEAR MEDICINE • Vol. 53 • No. 10 • October 2012

**Dietary Sources of Significant Amounts of Iodine**

<table>
<thead>
<tr>
<th>Source</th>
<th>Examples/comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iodized salt</td>
<td>Milk, yogurt, cheese, ice cream</td>
</tr>
<tr>
<td>Dairy products</td>
<td>Not egg whites or egg substitutes</td>
</tr>
<tr>
<td>Egg yolks</td>
<td>Crustaceans and fish, except tuna</td>
</tr>
<tr>
<td>Seafood</td>
<td></td>
</tr>
<tr>
<td>Turkey and liver</td>
<td>Carrageenan, alginate</td>
</tr>
<tr>
<td>Seaweed and kelp products</td>
<td></td>
</tr>
<tr>
<td>Commercial bread</td>
<td>When made with iodide conditioners</td>
</tr>
<tr>
<td>Milk chocolate</td>
<td></td>
</tr>
<tr>
<td>Iodide-containing multivitamins</td>
<td></td>
</tr>
<tr>
<td>FD&amp;C red dyes 3 and 28</td>
<td>Small portions only, e.g., one fourth of a plate</td>
</tr>
<tr>
<td>Grains</td>
<td>Goitrogens in humans so fortified with iodine (f)</td>
</tr>
<tr>
<td>Soy proteins</td>
<td></td>
</tr>
</tbody>
</table>

Most experts recommend a low-iodine diet for 7–14 d before administration of therapy.

Source: Silberstein et al. The SNM Practice Guideline for Therapy of Thyroid Disease with 131I 3.0*
THE JOURNAL OF NUCLEAR MEDICINE • Vol. 53 • No. 10 • October 2012
PROCUREMENT AND RECEIVING OF IODINE 131 (I-131)

OBJECTIVES
Standardisation of practise for procurement and store management procedure in Nuclear Medicine Facilities.

SCOPE
This guideline covers the procurement and stock management for both I-131 oral solution and capsule applicable for government facilities. Other centers may adapt to their own local practices.

DEFINITIONS
Receiving Officer is a Medical Physicist who's appointed by Head of Department.

Verifying Officer is a Pharmacist who's appointed by Head of Department.

Head of Department is the Hospital Director.

ABBREVIATIONS
DO Delivery Order
LPO Local Purchase Order
MOH Ministry of Health
SOP Standard Operating Procedure

WORK INSTRUCTION
1. Regulatory requirement for procurement.
   1.1 Obtain necessary pre requisite requirement (ie: permits or licences) required to operate preparation and dispensing I-131 by governing bodies.

2. Procurement.
   2.1 Check current stock.
   2.2 Estimate the activity needed weekly based on stock balance and the appointment given to the patients.
   2.3 Inform supplier quantity and activity required for the particular week.
   2.4 Fill in ‘Borang Permohonan Untuk Pembelian’ and send to store.
2.5 Procurement shall follow Standard Operating Procurement Procedure set by Treasury Instruction.

*Note:*

i. **Procurement of I-131 follows Central Contract Procurement procedure.**

ii. **For new facility that is not included in the Central Contract, estimation for 1 year usage will determine the procurement procedure use.**

2.6 Obtain LPO number and inform supplier.

3. Receiving I-131

1.3 I-131 shall arrive at Nuclear Medicine Department from supplier and received by Receiving Officer.

1.4 Receiving Officer must check items details received against Delivery Order (DO) and witness by Verifying Officer, as follows:

3.2.1 Quantity
3.2.2 Radioactivity
3.2.3 Batch Number
3.2.4 Expiry Date

3.3 Verifying Officer must then check and verify the DO against LPO then send to store.

3.4 If the DO is signed at a later time, the DO must be stamp with **“Diterima Dengan Syarat Ianya Disahkan Kemudian Secara Diperiksa, Dikira, Diukur, Ditimbang atau Diuji” note.**

3.5 If items received do not meet the specifications (ie: defect, tampered, broken, etc) the Receiving Officer or Verifying Officer must fill KEW.PS-2 [Borang Laporan Terimaan Barang- Barang] (2 copies) and return the items to supplier.

3.6 Verifying Officer must then record items received in KEW.PS-4 [Stock Card].
### RECORDS

<table>
<thead>
<tr>
<th>No.</th>
<th>Record Name</th>
<th>Record Keeping Period</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Local Purchase Order &amp; Delivery Order</td>
<td>Two (2) years</td>
<td>Logistic Pharmacy (Main Store)</td>
</tr>
<tr>
<td>2.</td>
<td>Borang Laporan Terimaan Barang-barang</td>
<td>Two (2) years</td>
<td>Logistic Pharmacy (Main Store)</td>
</tr>
<tr>
<td>3.</td>
<td>Stock Card</td>
<td>Two (2) years</td>
<td>Nuclear Medicine Department</td>
</tr>
</tbody>
</table>

### ATTACHMENTS

Attachment 1: *Borang Permohonan Untuk Pembelian*
Attachment 2: *Borang Laporan Terimaan Barang-Barang* (KEW.PS-2)
Attachment 3: Stock Card (KEW.PS-4)
WORKFLOW

I-131 Procurement

Start

Check current stock

Estimate weekly activity needed

Inform order to Supplier

Fill in ‘Borang Permohonan untuk Pembelian’ for Central Contract

Yes

Included?

No

Fill in ‘Borang Permohonan untuk Pembelian’

Obtain LPO No.

Inform Supplier

End

Estimate Usage for 1 year

Choose Type of Procurement

Direct Purchase

Obtain LPO No.

Inform Supplier

End
I-131 Receiving

Start

Items arrived at facilities

Receiving Officer
Check the items against DO

Receiving Officer
QC Done

QC Pass?

Verifying Officer
Verify items

Verifying Officer
Record items in KEW.PS-4

Fill KEW.PS-2 and return the items to the supplier

No

Yes

End

REFERENCES

5. Garis Panduan Pengurusan Stor Farmasi di Hospital, Klinik Kesihatan, Kementerian Kesihatan Malaysia 2009, Bahagian Perkhidmatan Farmasi.
7. Central Contract between KKM and supplier/vendor.
BORANG PERMOHONAN PESANAN KERAJAAN (AM 75E)

<table>
<thead>
<tr>
<th>BIL</th>
<th>BUTIRAN PEROLEHAN (NAMA BARANG/JENIS KERJA)</th>
<th>BAKI (ITEM) TERKINI (JIKA BERKAITAN)</th>
<th>KUANTITI YANG DIPOHON</th>
<th>HARGA SEUNIT (RM)</th>
<th>HARGA KESELURUHAN (RM)</th>
<th>JUSTIFIKASI</th>
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<td>JUMLAH BESAR (RM)</td>
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Tandatangan Pemohon : 

Nama /Jawatan/Tarikh: 

Pengesahan Ketua Jabatan/Unit :

Nama /Jawatan/Tarikh: 

UNTUK DIISI BAHAGIAN KEWANGAN

|--------------|----------------|------------------|----------------|----------------|

Disahkan Oleh: 

Aktiviti : 

Kod Perbelanjaan : 

Peruntukan : 

Perbelanjaan : 

Tanggungan : 

Baki : 

Disahkan Oleh :

UNTUK DIISI UNIT LATIHAN (JIKA BERKAITAN)

<table>
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Perbelanjaan : 

Baki : 

Disahkan Oleh : 

KELULUSAN

PERMOHONAN *DILULUSKAN / TIDAK DILULUSKAN

Diluluskan oleh Pengarah, Institut Kanser Negara:

Nama /Jawatan : 

Tarikh : 

UNTUK DIISI BAHAGIAN PEROLEHAN

<table>
<thead>
<tr>
<th>No Pesanan Kerajaan</th>
<th>Disahkan Oleh:</th>
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Nama dan Alamat Pembekal yang diluluskan:

Nama /Jawatan : 

Tarikh : 

1. Semua ruang hendaklah dilengkapi dan (*) potong yang tidak berkaitan.
2. Bagi Perolehan tenus, borang permohonan hendaklah disertakan persama 3 sebutharga daripada pembekal untuk dimiliki, salinan silii pada shaf dengan Kementerian Kewangan bersela kod bisang yang bersesuaian dan salinan silii Bumiputera.
3. Tuan juga bertanggungjawab untuk memastikan perolehan tenus ini terikat kepada SPP 12/2007 yang mana pembelian dibenturkan bagi mana-mana pembekal yang bertaftar atau tidak bertaftar dengan Kementerian Kewangan sama ada bertaftar Bumiputera atau bukan Bumiputera sehingga RM50,000 setahun bagi setiap jenis item.
BORANG LAPORAN TERIMAAN BARANG-BARANG
(Tatacara Pengurusan Stor 43)
(Disediakan dalam 2 salinan oleh Pegawai Penerima)

<table>
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<tr>
<th>Nama dan Alamat Pembekal/ Agen Penghantaran</th>
<th>No. dan Tarikh Pesanan Kerejaan</th>
<th>Butir-butir Pengangkutan</th>
<th>Butir-Dutir Penghantaran</th>
<th>Butir-butir Bungkusen</th>
<th>No. Ruj. Penerimaan</th>
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<table>
<thead>
<tr>
<th>No. Kod</th>
<th>Perihal Barang</th>
<th>Kuantiti</th>
<th>Sebab-sebab Penolakan</th>
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<td></td>
<td>Dipesan</td>
<td>Diterima</td>
<td>Kurang/Lebih</td>
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Pegawai Penerima

Akuan Terima Pembekal/ Agen Penghantaran

Disahkan barang-barang ini diterima untuk tindakan atas sebab-sebab berikut:

Nama:
Jawatan:
Tarikh:
Cop Jabatan:

☐ Kuantiti Ditolak
☐ Kuantiti Kurang
☐ Kuantiti Lebih

Nama:
Tarikh:
Cop Syarikat:

Salinan 1 – Kepada Pembekal/ Agen Penghantaran
Salinan 2 – Untuk simpanan Stor
**KAD PETAK**  
(Tatacara Pengurusan Stor 53)

<table>
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<tr>
<th>Ruj. Kawalan Stok*</th>
<th>Nombor Kod:</th>
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**Perihal Stok:**

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<tr>
<th>Kumpulan Stok:</th>
<th>Lokasi Stok:</th>
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<th>Bil.</th>
<th>Tarikh</th>
<th>No. Ruj. BTB atau No. Ruj. BPPS</th>
<th>Kuantiti</th>
<th>Tandatangan Pegawai Stor</th>
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<tbody>
<tr>
<td></td>
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<td>Terima</td>
<td>Keluar</td>
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Baki dipindahkan ke hadapan

Nota:
* Diisi oleh Stor Pusat/Utama sahaja  
BTB – Borang Terimaan Barang-Barang (KEW.PS-1)  
BPPS – Borang Pesanan Pengeluaran Stok (KEW.PS-10/KEW.PS-11)
PREPARATION AND DISPENSING OF IODINE 131 (I-131) SOLUTION

OBJECTIVES

1. Guidelines for preparation and dispensing of Iodine 131 (I-131) solution according to the Good Preparation Practice.

2. Standardisation of practise for preparation and dispensing of I-131 solution procedure in all Institutions that provides radioiodine services.

3. General reference in developing local standard operating procedures (SOP) for institutions that provide radioiodine services in Malaysia.

SCOPE

This document covers the preparation and dispensing of I-131 solution to patient.

DEFINITIONS

Manufacturer batch number – Also known as lot number set by manufacturer.

Radiopharmacy batch number – The identification number assigned by user.

Secondary operator – Another qualified personnel that may include doctor, pharmacist, physicist and nuclear medicine technologist.

ABBREVIATIONS AND SYMBOLS

- BPR: Batch Processing Records
- MBq: MegaBecquerel
- mCi: milliCurie
- ml: millilitre
- MRN: Medical Record Number
- RO: Reverse Osmosis
- SOP: Standard Operating Procedure
- WFI: Water for Injection
1. Dose Preparation.

1.1 Prior to entering the hot lab for the I-131 dispensing session, perform the following tasks for personnel preparation:

1.1.1 Obtain your personnel radiation monitoring ring & badge.
1.1.2 Wash hands using the proper hand washing technique.
1.1.3 Wear personal protective equipment accordingly.

1.2 Set up the preparation work place by placing the new adsorbent paper inside the fume hood.

1.3 Assign the I-131 stock solution lead pot with the radiopharmacy batch number accordingly.

1.4 Fill up the BPR for Preparation and Dispensing of I-131 Oral Solution with the details of the I-131 stock solution by referring to the label on the related lead pot:

1.4.1 Delivery date
1.4.2 Reference date
1.4.3 Expiry date
1.4.4 Manufacturer
1.4.5 Manufacturer batch number
1.4.6 Radiopharmacy batch number
1.4.7 Reference activity (mCi/MBq)

1.5 Make sure the fume hood is operating for minimum of half an hour.

1.6 Place the lead pot in the fume hood, open the lead pot cover and allow venting for five minutes.

1.7 Ensure the dose calibrator is set for I-131. Measure the activity of the I-131 stock solution in the dose calibrator and record into the BPR.

1.8 Prepare a stock solution label with the following details and attach to the top of the respective lead pot:

1.8.1 Radiopharmacy batch number
1.8.2 Measured activity (mCi/MBq)
1.8.3 Measurement date
1.8.4 Measurement time
1.8.5 Measured by
2. Preparing the Patient’s Dose.

2.1 Receive the written order and screen to ensure that it is complete. Clarify with the prescriber if there is any inquiry.

2.2 Fill up the patient’s particulars in the BPR for Preparation and Dispensing of I-131 Oral Solution:

   2.2.1 Patient’s name
   2.2.2 Patient’s MRN
   2.2.3 Requested activity
   2.2.4 Administration date
   2.2.5 Indication

2.3 Calculate the volume of stock required for the requested activity using formula below:

   \[
   \text{Volume need to be withdraw (ml)} = \frac{\text{Volume of I-131 (ml)}}{\text{Measured activity (mCi)}} \times \text{Required activity (mCi)}
   \]

2.4 Place drinking water (Reverse Osmosis (RO) Water / Water for Injection (WFI) / Distilled Water) inside the fume hood.

2.5 Place an empty glass vial for I-131 into the dispensing lead pot and place them inside the fume hood.

2.6 Add about 3 - 5ml of drinking water to the shielded vial.

2.7 Draw up the calculated volume of I-131, measure the activity, ensure the dispensed dose should be within ± 10% of the prescribed dose and place into the shielded vial.

2.8 Countercheck the preparation by secondary operator.

2.9 Prepare a dose label with the following details:

   2.9.1 Radiopharmaceutical name
   2.9.2 Name of patient
   2.9.3 I-131 radiopharmacy batch number & unit dose number
   2.9.4 Date of supply
   2.9.5 Measured activity (mCi/MBq) and time measured
   2.9.6 Prepared by and checked by
   2.9.7 Radioactive materials symbol

2.10 Attach the dose label to the dispensing lead pot.
2.11 Fill up the details of the dose prepared into the BPR for Preparation and Dispensing of I-131 Oral Solution:

2.11.1 Activity measured (mCi/MBq)
2.11.2 Prepared by
2.11.3 Checked by

2.12 Transfer the dispensing lead pot containing the I-131 solution to the dispensing area.

3. Dispensing to the Patient.

3.1 Place adsorbent paper at dispensing area.

3.2 Place the lead pot containing patient’s radiiodine dose at the dispensing area.

3.3 Call the patient and confirm the patient’s identity by asking full name and identification document.

3.4 Ask patient to sit and counsel on how to take the I-131 solution.

3.5 Ask patient to drink the I-131 solution.

3.6 Rinse the vial with drinking water and request the patient to drink again.

3.7 Discard the dispensing vial and straw into radioactive waste container.

3.8 Transfer the dose label to the patient’s case note.

3.9 Check for any contamination regularly especially on the hands. Change gloves if necessary.

3.10 Discard all waste accordingly after finish dispensing to all patients.

**RECORDS**

<table>
<thead>
<tr>
<th>No.</th>
<th>Record Name</th>
<th>Record Keeping Period</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>BPR for Preparation and Dispensing of Sodium Iodide (I-131) Oral Solution</td>
<td>Seven (7) years</td>
<td>Designated Site</td>
</tr>
</tbody>
</table>

**ATTACHMENT**

Attachment 1: Batch Processing Records for Preparation and Dispensing of I-131 Oral Solution
**WORKFLOW**

Dose Preparation

**SCOPE OF ACTION**

![Flowchart diagram showing the steps of dose preparation, including personnel preparation tasks, setting up the preparation work place, filling the BPR with details of the I-131 stock solution, assigning the I-131 stock solution lead pot, placing the lead pot in the fume hood and allowing venting, measuring the I-131 stock solution activity, and preparing a stock solution label.]

**RESPONSIBILITY**

- Pharmacist
- Pharmacist
- Pharmacist
- Pharmacist
- Pharmacist
- Pharmacist
- Pharmacist
- Pharmacist

**SCOPE OF ACTION**

1. **Start**
2. Carry out personnel preparation tasks
3. Set up the preparation work place
4. Assign the I-131 stock solution lead pot with the radiopharmacy batch number
5. Fill up the BPR with the details of the I-131 stock solution
6. Place the lead pot in the fume hood, open the cover and allow venting for 5 minutes
7. Measure the I-131 stock solution activity in the dose calibrator and record into BPR
8. Prepare a stock solution label and attach to the top of the lead pot
9. **End**
Preparing the Patient’s Dose

**SCOPE OF ACTION**

1. **Start**
2. Receive the written order and screen for errors
   - **Responsibility**: Pharmacist
3. Fill up the patient’s particulars in the BPR
   - **Responsibility**: Pharmacist
4. Calculate the volume of stock required
   - **Responsibility**: Pharmacist
5. Place drinking water inside the fume hood. Place an empty glass vial into the dispensing lead pot and place them inside the fume hood
   - **Responsibility**: Pharmacist
6. Add 3 - 5ml of drinking water to the shielded vial
   - **Responsibility**: Pharmacist
7. Draw up the volume of I-131, measure the activity and place into the shielded vial
   - **Responsibility**: Pharmacist
8. Countercheck the preparation
   - **Responsibility**: Secondary operator
9. Prepare a dose label and attach to the dispensing lead pot
   - **Responsibility**: Pharmacist
10. Fill up the details of the prepared dose into the BPR
    - **Responsibility**: Pharmacist
11. **End**

**RESPONSIBILITY**

- Pharmacist
- Secondary operator
SCOPE OF ACTION

Start

Place adsorbent paper at dispensing area

Place the patient’s dose at the dispensing area

Call the patient and confirm the patient’s identity

Ask patient to sit and counsel on how to take the I-131 solution

Ask patient to drink I-131 solution

Rinse the vial with drinking water and request the patient to drink again

Discard the dispensing vial and straw

Complete the BPR

Transfer the dose label to the patient’s case note

Check for contamination

Discard all waste accordingly

End

RESPONSIBILITY

Pharmacist

Pharmacist

Pharmacist

Pharmacist

Pharmacist

Pharmacist

Pharmacist

Pharmacist

Pharmacist
REFERENCES

### ATTACHMENT 1

**BATCH PROCESSING RECORDS FOR PREPARATION AND DISPENSING OF I-131 ORAL SOLUTION**

<table>
<thead>
<tr>
<th>Delivery Date</th>
<th>Manufacturer</th>
<th>Radiopharmacy Batch No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer Batch No.</td>
<td>Reference Date</td>
<td>Reference Time</td>
</tr>
<tr>
<td>Reference Activity</td>
<td>mCi/MBq</td>
<td>Expired Date</td>
</tr>
<tr>
<td>Measured Activity</td>
<td>mCi/MBq</td>
<td>Measurement Date</td>
</tr>
<tr>
<td>Measured By</td>
<td>Initial</td>
<td>Date</td>
</tr>
<tr>
<td>Checked By</td>
<td>Initial</td>
<td>Date</td>
</tr>
<tr>
<td>Approved By</td>
<td>Initial</td>
<td>Date</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Administration Date</th>
<th>Requested Activity (mCi/MBq)</th>
<th>Name of Patient</th>
<th>MRN</th>
<th>Activity (mCi/MBq) &amp; Time</th>
<th>Indication*</th>
<th>Prepared by</th>
<th>Checked By</th>
<th>Notes</th>
</tr>
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<tbody>
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</table>

*Indication*: T = Thyrotoxicosis; A = Ablation; WB = Whole Body Scan
DISPENSING OF IODINE 131 (I-131) CAPSULE

OBJECTIVES

1. Guidelines for dispensing of Iodine 131 (I-131) capsule according to the Good Preparation Practice.

2. Standardisation of practise for dispensing of I-131 capsule procedure in all Institutions that provides radioiodine services.

3. General reference in developing local Standard Operating Procedures (SOP) for institutions that provide radioiodine services in Malaysia.

SCOPE

This guideline covers the dispensing of I-131 capsule to patient.

*the technical procedure may vary depending on the brand of sodium iodide [I-131] capsule.

DEFINITION

Manufacturer batch number – Also known as lot number set by manufacturer.

Secondary operator – Another qualified personnel that may include doctor, pharmacist, physicist and nuclear medicine technologist.

ABBREVIATIONS AND SYMBOL

BPR Batch Processing Records
MBq MegaBecquerel
mCi milliCurie
ml millilitre
MRN Medical Record Number
SOP Standard Operating Procedure

WORK INSTRUCTION

1. Receive the written order and screen to ensure that it is complete. Clarify with the prescriber if there is any inquiry.

2. Check the activity and reference date on the designated I-131 lead pot label.
3. Fill up the dose details and patient’s particulars in the BPR for Preparation and Dispensing of I-131 Oral Capsule:

3.1 Delivery date
3.2 Manufacturer
3.3 Manufacturer batch number
3.4 Reference date
3.5 Expiry date
3.6 Administration date
3.7 Patient’s name
3.8 Patient’s MRN

4. Ensure the dose calibrator is set for I-131.

5. Measure the activity of I-131 capsule in the dose calibrator and record into the BPR. The dispensed dose should be within ± 10% of the prescribed dose.

6. Countercheck the capsule activity by secondary operator.

7. Prepare a dose label with the following details:

7.1 Radiopharmaceutical name
7.2 Name of patient
7.3 I-131 capsule batch number
7.4 Date of supply
7.5 Measured activity (mCi/MBq) and time measured
7.6 Prepared by and checked by
7.7 Radioactive materials symbol

8. Return the I-131 capsule to the lead pot and attach the dose label to the lead pot.

9. Fill up the details of the dose into the BPR:

9.1 Activity measured (mCi/MBq)
9.2 Prepared by
9.3 Checked by

10. Transfer the lead pot containing the I-131 capsule to the dispensing area.

11. Call the patient and confirm the patient’s identity by asking full name and identification document.

12. Ask patient to sit and counsel on how to take the I-131 capsule.

13. Ask patient to take a small sip of lukewarm water, swallow the capsule, then to finish drinking the water.

14. Transfer the label to the patient’s case note.
## RECORDS

<table>
<thead>
<tr>
<th>No.</th>
<th>Record Name</th>
<th>Record Keeping Period</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>BPR for Preparation and Dispensing of Sodium Iodide (I-131) Oral Capsule</td>
<td>Seven (7) years</td>
<td>Designated Site</td>
</tr>
</tbody>
</table>

## ATTACHMENT

Attachment 1: Batch Processing Records For Dispensing of I-131 Oral Capsule
WORKFLOW

SCOPE OF ACTION

Start

Receive the written order and screening for errors

Check the activity and reference date on the designated I-131 lead pot label

Fill up the dose details and patient's particulars in the BPR

Ensure the dose calibrator is set for I-131, measure the activity of I-131 capsule and record

Countercheck the capsule activity

Prepare a dose label

Return the I-131 capsule to the lead pot and attach the dose label to the lead pot

Fill up the details of the dose into the BPR

Call the patient and confirm the patient's identity

Counsel the patient and ask to take the capsule

Transfer the label to the patient's case note

End

RESPONSIBILITY

Pharmacist

Pharmacist

Pharmacist

Pharmacist

Secondary operator

Pharmacist

Pharmacist

Pharmacist

Pharmacist

Pharmacist
REFERENCES

### Processing Records for Dispensing of I-131 Oral Capsule

<table>
<thead>
<tr>
<th>No.</th>
<th>Administration Date</th>
<th>Name of Patient</th>
<th>MRN</th>
<th>Indication*</th>
<th>Activity (mCi/MBq) &amp; Time</th>
<th>Prepared by</th>
<th>Checked By</th>
<th>Remark</th>
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*Indication*: T = Thyrotoxicosis; A = Ablation; W B = Whole Body Scan
STANDARD OPERATING PROCEDURES
PREPARED BY MEDICAL PHYSICIST
MANAGEMENT OF RADIOIODINE WARD AND PATIENT DISCHARGE

OBJECTIVE
To provide a quality care to inpatient administered with Iodine 131 (I-131) for therapeutic purposes.

SCOPE
Patient therapy in radioiodine ward.

ABBREVIATION AND SYMBOLS
\( \mu \text{Sv/hr} \quad \text{microSievert/hour} \)
\( \text{MBq} \quad \text{MegaBecquerel} \)

WORK INSTRUCTION
1. Pre Admission.
   1.1 Prepare the room as follows:
      1.1.1 Use suitable protector to cover the bed and pillow that are likely to be contaminated.
      1.1.2 Use proper labels to differentiate radioactive waste from general/clinical waste.
      1.1.3 Ensure all facilities are well function.
   1.2 Before using the isolation room for subsequent occupancy, the areas or items that should be checked are outlined as below (if applicable):
      1.2.1 Phone/nursing call button
      1.2.2 Toilet including sinks
      1.2.3 Door Handle
      1.2.4 Chair
      1.2.5 TV remote controller
      1.2.6 Patient’s linen and clothes
      1.2.7 Floor

   2.1 Medical physicist shall measure the exposure rate at 1 meter from patients, by using a proper radiation detector.
   2.2 The medical physicist shall notify the physician or medical officer incharge when the radiation level from the patients falls below 50 \( \mu \text{Sv/hr} \) at 1 meter or 1100 MBq.
2.3 Patients shall not be transferred outside isolation room or discharged without the approval of the nuclear medicine physician/designated specialist.

2.4 If there are contaminations of I-131 inside the patient’s isolation room, medical physicist shall conduct decontamination procedure as mentioned in radioactive spillage and decontamination procedure. Please refer to Standard Operating Procedure for Contamination and Decontamination at Workplace.

2.5 The medical physicist shall release the room when radiation level falls below 5 μSv/hr at surface and notify authorised personnel for room clearance.

2.6 Hospital’s linen and clothes shall be collected by the authorised personnel and those items can be released for laundry when the dose rate is less than 5 μSv/hr at surface.

2.7 Patient’s food waste is measured and released whenever the dose rate measurement is less than 5 μSv/hr at surface.

3. Next of Kin/Care taker.

3.1 Patients receiving more than listed in Table 1 (Attachment 3) who needs special attention, the next of kin is allowed to accompany patient during the treatment session inside the radionuclide therapy room by filling Consent Form (Attachment 4). In order to prevent personnel contamination to the next of kin, RPO shall advise the next of kin to wear appropriate attire and personnel protective equipment at all times when handling the patient.

3.2 RPO shall inform the dose received by next of kin during accompanying patient inside the radionuclide therapy room by filling Notification of Received Dose Record form as Attachment 5.

**RECORD**

<table>
<thead>
<tr>
<th>No.</th>
<th>Record Name</th>
<th>Record Keeping Period</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Room Clearance Record</td>
<td>3 Years</td>
<td>Designated site</td>
</tr>
<tr>
<td>2.</td>
<td>Patients Release Record</td>
<td>7 Years</td>
<td>Designated site</td>
</tr>
<tr>
<td>3.</td>
<td>Consent Form</td>
<td>7 Years</td>
<td>Designated site</td>
</tr>
<tr>
<td>4.</td>
<td>Form of Radiation Exposure Dose Received By Care Taker</td>
<td>7 Years</td>
<td>Designated site</td>
</tr>
</tbody>
</table>
ATTACHMENTS

Attachment 1: Patients Release Record
Attachment 2: Room Clearance Record
Attachment 3: Activities and Dose Rates For Authorizing Patient Release
Attachment 4: Consent of Accompanying Patient Received I-131 Treatment With More Than 1100 MBq.
Attachment 5: Radiation Exposure Dose Received By Care Taker During Assisting and Taking Care of the Patient on I-131 Treatment with more than 1100 MBq.
Start

Prepare patient room with regard to radiation safety

Medical physicist shall measure radiation level for patient discharge

> 50 μSv/hr at 1 meter

Patient remains admitted

≤ 50 μSv/hr at 1 meter

Patient can be discharged after getting confirmation from nuclear medicine specialist or clinical oncologist

Medical Physicist shall measure radiation level for room clearance

> 5 μSv/hr

Do the decontamination procedure

≤ 5 μSv/hr

Isolation room safe to be release

End
REFERENCES

## PATIENTS RELEASE RECORD

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>Dose Rate Measurement at 1m (µSv/hr)</th>
<th>Date and Time of Measurement</th>
<th>Done By</th>
<th>Verified By</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
## ROOM CLEARANCE RECORD

<table>
<thead>
<tr>
<th>No.</th>
<th>Date &amp; Time</th>
<th>Room No.</th>
<th>Reading (µSv/hr)</th>
<th>Release For Housekeeping</th>
<th>Done By</th>
<th>Remark</th>
<th>Verified By</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Phone</td>
<td>Bed</td>
<td>Toilet</td>
<td>Door Handle</td>
<td>Chair</td>
</tr>
</tbody>
</table>

**ATTACHMENT 2**

STANDARD OPERATING PROCEDURES FOR PATIENTS UNDERGOING TREATMENT OF IODINE 131
Table 1: Activities and Dose rates for Authorizing Patient Release

<table>
<thead>
<tr>
<th>Radioisotope</th>
<th>COLUMN 1 Activity at or Below Which Patients May Be Released</th>
<th>COLUMN 2 Dose Rate at 1 Meter, at or Below Which Patients May Be Released</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(GBq)</td>
<td>(mCi)</td>
</tr>
<tr>
<td>Ag-111</td>
<td>19</td>
<td>520</td>
</tr>
<tr>
<td>Au-198</td>
<td>3.5</td>
<td>93</td>
</tr>
<tr>
<td>Cr-51</td>
<td>4.8</td>
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<td>8.4</td>
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<td>Cu-67</td>
<td>14</td>
<td>390</td>
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<td>Ga-67</td>
<td>8.7</td>
<td>240</td>
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<tr>
<td>I-123</td>
<td>6.0</td>
<td>160</td>
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<tr>
<td>I-125</td>
<td>0.25</td>
<td>7</td>
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<tr>
<td>I-125 implant</td>
<td>0.33</td>
<td>9</td>
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<td>I-131</td>
<td>1.2</td>
<td>33</td>
</tr>
<tr>
<td>Ir-111</td>
<td>2.4</td>
<td>64</td>
</tr>
<tr>
<td>Ir-192 implant</td>
<td>0.074</td>
<td>2</td>
</tr>
<tr>
<td>P-32</td>
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<td>**</td>
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<tr>
<td>Pd-103 implant</td>
<td>1.5</td>
<td>40</td>
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<tr>
<td>Re-186</td>
<td>28</td>
<td>770</td>
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<td>Re-188</td>
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<td>Sc-47</td>
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<tr>
<td>Se-75</td>
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<td>Sm-153</td>
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<tr>
<td>Sm-117m</td>
<td>1.1</td>
<td>29</td>
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<tr>
<td>Sr-89</td>
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<tr>
<td>Tc-99m</td>
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<tr>
<td>Tl-201</td>
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<td>430</td>
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<tr>
<td>Y-90</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>Yb-169</td>
<td>0.37</td>
<td>10</td>
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</table>
CONSENT OF ACCOMPANYING PATIENT RECEIVED I-131 TREATMENT
WITH MORE THAN 1100 MBq.

Please be informed, ______________________________ (patient’s name), IC no. ________________________ will receive I-131 treatment with more than 1100 mbq. ______________________________ (Next of Kin name), will accompany the patient throughout the treatment period in ______________________________ (ward, Hospital’s name).

He/She *agreed/disagreed to stay in the ward for assisting and taking care of the patient. He/She is subject to a maximum acceptable exposure based on the Atomic Energy Licensing Act 1984 (Act 304): Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010; 9 (5) and 9 (6).

This radiation exposure record will be notified and kept in the department in accordance with the regulations set by the authorities.


9 (5) The limit on effective dose for a person who knowingly assists in the support of a patient shall not exceed 5 mSv during the period of diagnostic examination or treatment of the patient.

9 (6) A person specified in subregulation (5) shall not be allowed to continue to assist in the support of a patient when he has received the effective dose exceeding the limit of 5 mSv, unless the approved registered medical practitioner gives strong clinical justification and has reasonable reasons for allowing the person to continue with such support.

Verification by Next of Kin:

I, ______________________________ hereby declared that I understand the risks of radiation exposure throughout assisting and taking care of ______________________________ (patient’s name) in ______________________________ (ward, Hospital’s name).

I will take full responsibility for the risks and not take any action against the Ministry of Health for any further issues.

Signature : ______________________________
Name : ______________________________
IC no. : ______________________________
Date : ______________________________
Recognition by Nuclear Medicine Physician:

I, ________________________________ as Nuclear Medicine Physician had explained the risks might occur during accompanying patient received I-131 treatment in ______________________________ (ward, Hospital's name).

Signature : ___________________________________
Name : ___________________________________
Designation : ___________________________________
Date : ___________________________________

Validation by Radiation Protection Officer (RPO):

Signature : ___________________________________
Name : ___________________________________
Designation : ___________________________________
Date : ___________________________________
RADIATION EXPOSURE DOSE RECEIVED BY CARE TAKER DURING ASSISTING AND TAKING CARE OF THE PATIENT ON I-131 TREATMENT WITH MORE THAN 1100 MBq.

Please be informed, ________________________________
(Next of Kin name), IC no.: ______________________ has received radiation exposure dose of _____________ during assisting and taking care of ___________________________________ (patient’s name). The maximum acceptable exposure is based on the Atomic Energy Licensing Act 1984 (Act 304): Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010; 9 (5) and 9 (6).

This radiation exposure record will be notified and kept in the department in accordance with the regulations set by the authorities.


9 (5) The limit on effective dose for a person who knowingly assists in the support of a patient shall not exceed 5 mSv during the period of diagnostic examination or treatment of the patient.

9 (6) A person specified in subregulation (5) shall not be allowed to continue to assist in the support of a patient when he has received the effective dose exceeding the limit of 5 mSv, unless the approved registered medical practitioner gives strong clinical justification and has reasonable reasons for allowing the person to continue with such support.

Verification by Next of Kin:

I, ___________________________________________ have been informed about the dose received during assisting and taking care of ___________________________________________ (patient’s name) in ___________________________________________ (ward, Hospital’s name).

I am aware of the radiation exposure risks and will take full responsibility for the risks and not take any action against the Ministry of Health.

Signature  : __________________________________
Name      : __________________________________
IC no.    : __________________________________
Date      : __________________________________
Recognition by Physician:

I, ___________________________________ as Nuclear Medicine Physician, notified radiation exposure dose received by the patient’s care taker during assisting and taking care of the patient received I-131 treatment in ______________________ (ward, Hospital’s name).

Signature : ___________________________________
Name : ___________________________________
Designation : ___________________________________
Date : ___________________________________

Validation by Radiation Protection Officer (RPO):

Signature : ___________________________________
Name : ___________________________________
Designation : ___________________________________
Date : ___________________________________
MANAGEMENT OF THYROID BIOASSAY ON NUCLEAR MEDICINE PERSONNEL WORKING WITH IODINE 131 (I-131)

OBJECTIVE
To define procedures to assess uptake of radioactive iodine and thyroid burden in the thyroid.

SCOPES
1. The maximum Annual Limit Intake I-131 is 1 MBq and DAC = 416.67 Bq/m³. Determination of the internal dose received from I-131 shall be in accordance with the IAEA, Assessment of Occupational Exposure Due to Intakes of Radionuclides Safety Guide RS-G-1.2 documents.

2. Thyroid uptake screening must be performed between 24 to 72 hours following exposure to I-131 on individuals who meet the following criteria:
   a) 2.5 MBq (67 μCi) in an open room
   b) 200 MBq (5.4 mCi) in a fume hood
   c) 20,000 MBq (540 mCi) in a glove box

ABBREVIATIONS & SYMBOLS
- MBq: MegaBecquerel
- DAC: Derived Air Concentration
- IAEA: International Atomic Energy Agency
- Bq/m³: Becquerel per meter cubed
- μCi: microCurie
- mCi: milliCurie
- kBq: kiloBecquerel

WORK INSTRUCTION
1. The personnel shall seat in front of the thyroid uptake counter probe.

2. Background Count: Hold detector as close as possible without contact to the arm or leg for 2 minute and record the reading.

3. Thyroid Count: Hold detector close to thyroid at suitable distance for 2 minutes and record the reading.

4. The thyroid uptake net reading equal to thyroid count-background count.
5. Any self-screening that indicates greater than 100 kBq should be reported to the Medical Physicist for further evaluation.

**RECORD**

<table>
<thead>
<tr>
<th>No.</th>
<th>Record Name</th>
<th>Record Keeping Period</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thyroid Uptake Reading (I-131)</td>
<td>3 Years</td>
<td></td>
</tr>
</tbody>
</table>

**ATTACHMENT**

Attachment 1: Thyroid Uptake Reading I-131
WORKFLOW

Start

Radiation worker prepare radionuclide I-131

Medical physicist perform the thyroid uptake screening to radiation worker between 24 to 72 hours after the preparation

> 100 kBq

Report to Medical Physicist for further evaluation

≤100 kBq

End

REFERENCES


ATTACHMENT 1

THYROID UPTAKE READING I-131

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Name</th>
<th>Background (right thigh)</th>
<th>Thyroid</th>
<th>Net</th>
<th>Bq = Net/ Correction Factor (CF) *CF=0.0014</th>
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STANDARD OPERATING PROCEDURES FOR PATIENTS UNDERGOING TREATMENT OF IODINE 131