**Johns Hopkins Nuclear Medicine**
**I-131 Therapy Experience for Diagnostic Radiology Residents**

## Background:

The Nuclear Regulatory Committee (NRC) published final revisions to 10 CFR Part 35 in March 2005. This revised document has put forth new guidelines for those individuals wishing to achieve authorized user status. The specific requirements can be found in 10 CFR 35.290 and 35.292. Broadly, the requirements include instruction/training in radiation safety, radionuclide handling, quality control, and medical uses of I-131 that require a WRITTEN DIRECTIVE.

Some of the revisions to 10 CFR Part 35 are more restrictive than in the past and require that various boards update their training requirements if they wish to receive recognition from the NRC. The American Board of Radiology (ABR) has been working to update their training requirements in nuclear medicine for residents in diagnostic radiology in order to comply with the new NRC guidelines.

One of the new requirements is that diagnostic radiology residents participate in and DOCUMENT participation in a minimum of three I-131 therapies ($\leq$ 33 mCi). Johns Hopkins Nuclear Medicine has a very active I-131 therapy clinic staffed by Radiology department faculty (primary and joint appointed). The rest of this document outlines the goals and objectives of the I-131 therapy experience for diagnostic radiology residents at Johns Hopkins and how they practically can meet the requirements.

## Goals:

1. To reliably make the diagnosis of hyperthyroidism and ascertain its cause.
2. To understand the role of I-131 therapy in the management of patients with hyperthyroidism as well as the alternative non-radioactive treatments available.
3. To be able to effectively and safely treat patients with hyperthyroidism with I-131.
4. To understand the NRC guidelines dealing with radiation safety as relates to I-131 therapy.
5. To understand the short and long-term benefits and risks of I-131 therapy.

## Objectives:

Residents should be able to,

1. Obtain a pertinent clinical history regarding the patient's history of hyperthyroidism. Clinical notes, laboratory values and imaging studies should be consulted.
2. Perform an appropriate physical examination of the neck to determine the gland size and the presence or absence of nodularity.
3. Become familiar the indications for I-131 therapy and alternative therapies for hyperthyroidism. Determine if I-131 is an appropriate therapy for this particular patient.
4. Interpret appropriate radionuclide imaging and uptake studies in the evaluation the patient.

5. Discuss the risks and benefits of I-131 therapy with the patient as well as alternative therapies for hyperthyroidism.
6. Discuss patient preparation for therapy, e.g., discontinuation of drugs and fasting.
7. Determine the dose of I-131 to administer to the patient. Be aware that there are different methods for determining that dose.
8. Understand, council and individualize radiation safety issues for the patient receiving a therapeutic dose of I-131.
9. Safely administer therapeutic amounts of I-131 to patients with hyperthyroidism following radiation safety precautions.
10. Follow-up of patients previously treated with I-131 is important so as to assess the efficacy and side effects of the treatments administered as well as whether more treatment is indicated.

## How Do I Practically Participate in I-131 Therapies?

### Overview of Nuclear Medicine Therapy Clinic:

A majority of the patients who receive I-131 therapy for hyperthyroidism at Johns Hopkins are evaluated and treated in Nuclear Medicine Therapy Clinic by Dr. Paul Ladenson, Professor of Internal Medicine (Endocrinology) and Professor of Radiology. This clinic takes place on Thursday afternoons in the nuclear medicine therapy clinic located in the 3rd floor JHOC nuclear medicine area. The number of patients varies from 2-8 each week.

Participation in the treatment of hyperthyroid patients is best accomplished while rotating on Outpatient Nuclear Medicine. Patients often have thyroid nuclear medicine studies performed during the days just prior to therapy. Clinical histories are obtained from patient interviews and the electronic medical record, appropriate physical examinations are performed and nuclear medicine studies interpreted by the outpatient nuclear medicine resident.

You are already doing much of the work in preparation for I-131 therapy as part of your usual rotation. Fulfillment of the I-131 therapy certification requires participation in the determination of the amount of radioactivity to be given to a patient, administration of the dose to the patient, radiation safety instructions, follow-up, and DOCUMENTATION!

Since the goal is to be personally involved in the therapy of three patients, the optimal method would be to be involved in the total treatment of one patient on each of three rotations in nuclear medicine. You will not be an observer but an active participant.

### First nuclear medicine rotation 1 (First Time on Outpatient Nuclear Medicine):

1. Monday: Determine which patients will be treated with I-131 on the upcoming Thursday. This is most easily done in conjunction with the nuclear medicine resident assigned to “Therapy”.

2. Interview and examine the patients upon presentation for I-123 thyroid scan and uptake. It is possible that not every patient with hyperthyroidism to be treated with I-131 will have an I-123 scan and uptake at Johns Hopkins. You should have access to this data from clinic notes or through Dr. Ladenson's office.

3. Review the history of the patient and interpret the nuclear medicine scans with the outpatient nuclear medicine attending. Dictate the official report. This dictation should include:

a. Pertinent medical history and physical examination. Review I-123 scan protocol.
b. Radiopharmaceutical administered and dose.
c. Imaging methodology
d. Findings
e. Impression
f. Any recommendations

4. Wednesday: Meet with Dr. Ladenson, along with the nuclear medicine therapy resident, to discuss the week's cases and determine the amount of radioactive I-131 to administer to each patient. During this time consider the following:

a. Appropriateness of therapy for this patient based on the patient's history
b. Imaging studies that the patient has received, and how they influence your decision to treat the patient
c. What is the amount of radioactive I-131 that should be administered?
d. Is the patient able to follow radiation safety precautions after therapy?
e. Discuss patient preparation, e.g., NPO prior to receiving the dose, female of child-bearing age need confirmation that they are not pregnant with a pregnancy test, and the patient should not be breastfeeding.

5. Thursday: Administer I-131 to patients under the supervision of Dr. Ladenson. This should include:

a. Confirm that the patient has been properly prepared to receive the I-131 therapy dose.
b. Obtain informed consent and council a patient on radiation safety issues for the post-therapy period.
c. Accompany the nuclear medicine technologist to retrieve the patient's dose.
d. Perform "Time Out" to be sure that the proper patient is to receive the prescribed amount of I-131.
e. Administer the I-131 to the patient safely.
f. Instruct the patient on when they can eat and resume any medications.
g. Review the case with the outpatient nuclear medicine attending.
h. Dictate the report for the administration of the I-131 therapy dose.

6. Keep log-sheet of the patients in whose treatment you participate. You will need 2 log sheets: 1 with the patients' history number and/or name so that you can obtain follow-up information on the patient and the second "official" log sheet with patient identifiers to be signed off on by the residency program director.

**Rotation 2 (The second time you rotate in Nuclear Medicine, any rotation):**

1. Refer back to the log-sheet you kept during rotation 1.
2. Review any clinical follow-up of your patients with the nuclear medicine attending.
3. Repeat the above on a second and third patient.

**I-131 Therapy Log-Sheet**

Resident's Name _____

| | Case Number | | |
|---|---|---|---|
| | **1** | **2** | **3** |
| **Date of Therapy** | | | |
| **Indication** | | | |
| **Attended "Dose Determination" Session** | | | |
| **mCi of I-131 Administered** | | | |
| **Dictated Therapy Report (attached)** | | | |
| **Authorized Users Initials** | | | |

# Radiology Residency Director Log

_____ _____

Resident Name Program

| | Date | Dose administered | Preceptor name/signature |
|---|---|---|---|
| 1. | _____ | _____ | _____ |
| 2. | _____ | _____ | _____ |
| 3. | _____ | _____ | _____ |

Because of HIPPA concerns, no data that might identify a patient are to be included in the log book.