



Standardizing I-131 Outpatient Risk Stratification and Workflows

Nathan Busse¹ MS, Kiernan McCullough² MS, Nicole Bunda-Randall² MS, Stephanie Franz² MS

¹Denver Health ²Colorado Associates in Medical Physics



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MEDICAL
PHYSICS

Purpose

Our private practice medical physics group consisting of approximately 20 medical physicists evenly split between therapeutic and diagnostic specialties discovered we were using different methods, forms, and instructions for outpatient I-131 restrictions. The goal of this work was to standardize, simplify, and improve consistency on I-131 thyroid therapy workflows. Practice environments included a mix of site-based and consulting physicists.

Methods

Based on results from a patient questionnaire, patients were placed into one of three categories based on potential risk (see Figure 1 and details below).

Category 1 patients are thyroid cancer remnant-ablation patients with

- Separate bedroom and bathroom at home
- Don't have continual contact with children at home or work
- Don't work in a service industry

Category 2 patients are most thyroid cancer patients that don't meet the requirements of Category 1 or hyperthyroid patients with a separate bedroom and bathroom at home who don't have continual contact with children at home or work.

Category 3 patients are hyperthyroid or cancer patients with complicating factors, including but not limited to,

- Young children at home
- No separate bedroom or bathroom
- Work in food service or around young children
- Undergoing dialysis

Results

Category 1 patients received discharge instructions specific to thyroid cancer treatments with calculations demonstrating compliance with public dose limits completed in advance representing six different scenarios (see Figures 2 and 3).

- Less than 50 mCi
- 50 - 100 mCi
- 100 - 200 mCi
- Each modeled as 2% or 5% slow-clearance compartment uptake depending on the presence or absence of metastatic nodules.

Category 2 and 3 patients had restrictions calculated using the NCRP 155 example spreadsheets. Category 3 patients were handled by a sub-group of four subject matter experts within our larger group with experience handling complex contact-scenario calculations. Fractional uptake in the slow clearance compartment for hyperthyroid patients was assumed to be equal to the 24 hour uptake value. If no uptake study was available, 60% was used.

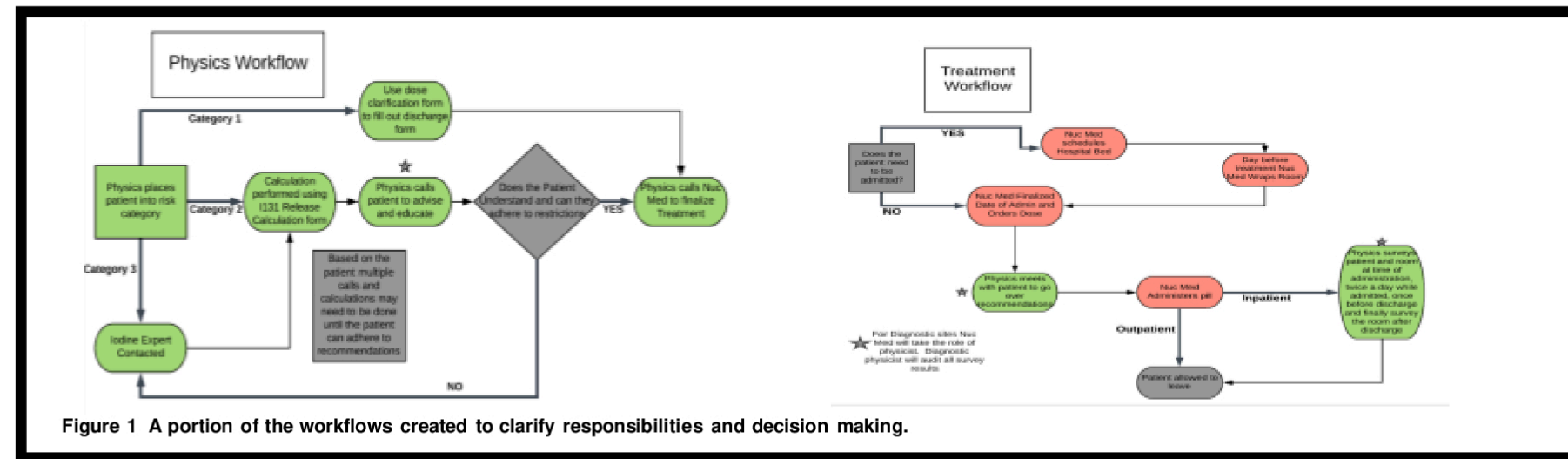


Figure 1 A portion of the workflows created to clarify responsibilities and decision making.

Patient Instructions

PATIENT NAME received 150 mCi of Iodine -131 on DATE

The radioactive dose that you have received is beneficial to you, but it is desirable that other persons with whom you come in contact are not unnecessarily exposed to radiation. Below are some instructions to help keep exposures to others as low as possible. These precautions should be followed for the number of days indicated. If you have any questions, please call the Nuclear Medicine Department at HOSPITAL NAME.

Ask someone to notify us immediately if you should vomit during the first 8 hours after you receive the Iodine-131, or if you go to the hospital or emergency room, seek medical care, or die within one week of treatment.

Prior to the administration of Iodine-131 on an outpatient basis, you must agree to abide by each of the following instructions. Please initial each item to indicate that you understand and accept the instruction.

Initials For TWO days follow these instructions:

Sleep in a separate room at least 6 feet from where others are sleeping. Have sole use of a room(s) where you can be alone if you share your home with anyone. The purpose is to provide a situation that allows for minimal contact with other individuals, including pets. Do not stay in a hotel. Family members may stay in a hotel. Eat meals in isolation. If provided, wear the wristband indicating you've received I-131.

Have sole use of a bathroom. Men should sit to urinate.

Initials At the end of TWO days:

Shower, wash your hair, and change your clothes. You may also shower and change your clothes during the close-contact restriction period.

Before the bathroom is used by another person, you should thoroughly clean the surfaces of the toilet, sink and bathtub/shower. Please use disposable cloths and disposable rubber gloves when cleaning.

You may return to work. Your contact with adult co-workers should be limited to 6 hours each day at a distance of about 6 feet for one week following administration.

Initials Follow these instructions for SEVEN days:

Wash cups, plates and eating utensils immediately after use. Do not use disposable plates or utensils. Do not share dishes or dishes. Store and launder your soiled/closed clothing and bed linens separately from those of the rest of your household. Wash hands frequently and thoroughly. Rinse the shower stall, tub, or sink after use. Use individual towels and washcloths.

Do not kiss or have intimate contact with anyone. Limit contact with children to an hour or less a day at a distance of 3 feet or more.

Avoid crowds and public places such as movies, restaurants, etc. Refrain from travel by public transportation. Refrain from prolonged automobile travel with others.

Initials Other important notes:

Avoid dental care for two weeks. You should not become pregnant for 6-12 months following I-131 therapy. If you will travel by air in the next 3 months, retain this documentation to bring with you. Radiation detectors at some airports may be set to sense very small levels of radiation.

HOSPITAL NAME AND NUCLEAR MEDICINE CONTACT INFO

Physician: _____

Radiation Safety Officer: _____

I agree to follow the instructions on this form as a condition of being allowed to leave the hospital and go home after my treatment with radioactive Iodine-131. I have had the opportunity to ask questions regarding the limitations on my activities following release. I understand the instructions above and the answers to my questions.

Patient's Signature/Date _____ Authorized User Printed Name / Signature / Date _____

Patient Instructions

PATIENT NAME received 30 mCi of Iodine -131 on DATE

The radioactive dose that you have received is beneficial to you, but it is desirable that other persons with whom you come in contact are not unnecessarily exposed to radiation. Below are some instructions to help keep exposures to others as low as possible. These precautions should be followed for the number of days indicated. If you have any questions, please call the Nuclear Medicine Department at HOSPITAL NAME.

Ask someone to notify us immediately if you should vomit during the first 8 hours after you receive the Iodine-131, or if you go to the hospital or emergency room, seek medical care, or die within one week of treatment.

Prior to the administration of Iodine-131 on an outpatient basis, you must agree to abide by each of the following instructions. Please initial each item to indicate that you understand and accept the instruction.

Initials Days to continue

2 If possible, have sole use of a bathroom. If using a shared bathroom, men should sit to urinate. Make sure to clean any spilled urine.

8 Sleep in a separate room at least 6 feet from where others are sleeping.

7 Wash cups, plates, and eating utensils immediately after use. Do not use disposable plates or utensils. Do not share utensils or dishes.

7 Use individual towels and washcloths. Store and launder your soiled/closed clothing and bed linens separately from those of the rest of your household.

8 Do not return to work.

7 Do not kiss or have intimate contact with anyone.

8 Contact with children. Refrain from contact with children.

3 Minimum time in crowds and public places such as movies, restaurants, etc.

3 Minimize travel by public transportation. Refrain from prolonged automobile travel with others.

2 If provided, wear the wristband that indicates that you have received a radioactive isotope.

14 Avoid dental care for two weeks.

Other important information: You should not become pregnant for 6-12 months following I-131 therapy. If you will travel by air in the next 3 months, retain this documentation to bring with you. Radiation detectors at some airports may be set to sense very small levels of radiation.

HOSPITAL NAME AND NUCLEAR MEDICINE CONTACT INFO

Physician: _____

Radiation Safety Officer: _____

I agree to follow the instructions on this form as a condition of being allowed to leave the hospital and go home after my treatment with radioactive Iodine-131. I have had the opportunity to ask questions regarding the limitations on my activities following release. I understand the instructions above and the answers to my questions.

Patient's Signature/Date _____ Authorized User Printed Name / Signature / Date _____

Figure 2 Discharge instructions specific to thyroid cancer (left) and hyperthyroid treatments (right) .

Figure 3 Examples of two of the six calculation summaries generated in advance for Category 1 patients.

COLORADO ASSOCIATES in MEDICAL PHYSICS, LLC

Olivier Bissi, M.S. Mike Hard, M.S.
Gregory P. Patis, M.S. Brad Lofth, M.S.
Nicole Bunda-Randall, M.S. Kate Lofth, M.S.
Nathan Busse, M.S. Kiernan McCullough, M.S.
Renae Butler, M.S. Richard McCowan, M.S.
Catherine Fosse, DMP James Slah, M.S.
Stephanie Franz, M.S. Courtney Stanley, DMP
Gregory L. Goble, M.S. Jennifer Stickle, PhD
Kenneth Harper, M.S. Gerald White, M.S.
Diplomates American Board of Radiology

To Whom It May Concern:

This letter represents the consensus recommendations of the medical physicists listed above, all Diplomates of the American Board of Radiology, regarding radiation safety considerations for the discharge of patients receiving iodine-131 for treatment of thyroid cancer or hyperthyroidism.

As state and federal recommendations change, along with advances in our understanding of radiation in medicine, it has become evident that there is a need for a more patient-specific approach to our discharge instructions. Our goal is to address each patient individually and work with them to make the treatment process as safe, easy, and stress-free as possible.

In order to accomplish this, we have developed a tiered system that categorizes each patient based on their unique risk factors and contact patterns which will allow us to focus our attentions appropriately.

Category of Patient	Description
1	Cancer patients with access to separate space at home and no continual contact with children
2	Cancer patients with no access to separate space at home and/or children in the home. Hyperthyroid patients with separate space and no continual contact with children
3	Any patient with complicated living/working situations. Examples include, but aren't restricted to: <ul style="list-style-type: none">• Hyperthyroid patients with young children• Patient that works directly with children• Patient that needs dialysis

A mandatory isolation period will still be expected of all post-thyroidectomy cancer patients, apart from this however, most Category 1 & 2 patients will require minimal changes made to their daily routine. Recommendations to Category 3 patients will be based on the physician's discussion with the patient and can be expected to vary considerably, with some restrictions potentially lasting up to a month. In order to appropriately address the needs of these Category 3 patients a specialized Iodine-131 expert within our group will work directly with them to create a workable discharge plan.

As always, we look forward to working with you and offering all patients the safest care possible.

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Figure 4 Letter explaining changes in workflow and expectations sent to referring physicians

Conclusion

In spite of regulatory permissiveness, generic discharge instructions should be discouraged for all hyperthyroid patients. Keeping doses to children below 1 mSv results in restrictions for hyperthyroid patients that will be substantially longer than those for thyroid cancer. In our group, we chose to limit restriction calculations with Category 3 patients to a sub-group of four physicists with more experience in challenging scenarios. This allows the use of more complex contact patterns to be modeled.

Changes in discharge instructions should be communicated to authorized users and referring physicians to ensure consistent patient expectations for the treatment. Figure 4 is the letter our group used to inform physicians of our new process.