SIGN OFF SHEET

NAME	DATE	SIGNATURE
Jamie Shi	**Feb 09, 2022**	
Yao, Yue	**March 04, 2022**	
Cole, Colin	**March 08, 2022**	
Mahsa Rezazadeh-Shahi	**November 10, 2022**	
Mahsa Rezazadeh-Shahi	**January 09, 2023**	
Jamie Shi	**January 10, 2023**	
Yao, Yue	**January 10, 2023**	
Gentian Cermjani	**September 8,2023**	G C
Marlene McCarthy Reviewed and Revised	**March 13, 2023**	
Genti Cermjani Reviewed and Revised	**April 6, 2024**	
Jamie Shi	**April 2,2024**	JS
Neena Kanwar	**April 5, 2024**	NK

X-RAY ASSOCIATES
Nuclear Medicine MANUAL

All manuals and protocols are reviewed and revised at least annually by the General Manager with input from department leads and final approval by the Quality Advisor.

It is the responsibility of all staff to notify the Lead or General Manager of any error or omissions in any manual. Staff must review all manuals and sign off annually. Staff are notified of updates as they occur, either via email, staff memos or in person.

It is expected that all policies and procedures are followed. They have been written to ensure patient and staff safety and support our Goals and Objectives.

The manual is reviewed and revised annually by Marlene McCarthy May 22, 2015

Revised and/or Reviewed	Date	Name
Revised and Reviewed 	May 22, 2015,	**Marlene McCarthy** RSO: Jamie Shi **Director Of Nuclear Medicine**: Dr. Siow Quality Advisor: Dr. Mok Licensee: Dr. P. Zia
Revised and Reviewed 	April 2016	Marlene McCarthy RSO: Jamie Shi **Director Of Nuclear Medicine**: Dr. Siow Quality Advisor: Dr. Mok Licensee: Dr. P. Zia

Revised and Reviewed	 October 2017	Marlene McCarthy RSO: Jamie Shi **Director Of Nuclear Medicine**: Dr. Siow Quality Advisor: Dr. Mok Licensee: Dr. P. Zia
Revised and Reviewed 	January & July 2019	Marlene McCarthy RSO: Jamie Shi **Director Of Nuclear Medicine**: Dr. Siow Quality Advisor: Dr. Mok Licensee: Dr. P. Zia
Revised and Reviewed 	January 2020	Marlene McCarthy RSO: Jamie Shi **Director Of Nuclear Medicine**: Dr. Siow Quality Advisor: Dr. Mok Licensee: Dr. P. Zia
Revised and Reviewed 	February 2021	Marlene McCarthy RSO: Jamie Shi **Director Of Nuclear Medicine**: Dr. Siow Quality Advisor: Dr. Mok Licensee: Dr. P. Zia
Revised and Reviewed 	January 2022	Marlene McCarthy RSO: Jamie Shi **Director Of Nuclear Medicine**: Dr. Siow Quality Advisor: Dr. Mok Licensee: Dr. P. Zia
	April 2023	Marlene McCarthy RSO: Mahsa Rezazadeh **Director Of Nuclear Medicine**: Dr. Siow Quality Advisor: Dr. Mok Licensee: Dr. P. Zia

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JOB TITLE: RADIATION SAFETY OFFICER (RSO)

The facility must have a designated radiation safety officer as required by the Canadian Nuclear Safety Commission. If the radiation safety officer is a professional other than the physician in medical charge of the facility, the physician in medical charge is available to the radiation safety officer to receive regular reports and for consultation on an emergency basis.

The RSO must be:

- A Fellow of the Royal College of Physicians and Surgeons of Canada (Nuclear Medicine Specialty), or • A Member of the Professional Corporation of Physicians of Quebec certified as a specialist in nuclear medicine, or • A Member or Fellow of the Canadian College of Physicists in Medicine, or • A registered technologist certified in nuclear medicine by the Canadian Association of Medical Radiation Technologists (CAMRT) or CMRITO or by the Ordre des Techniciens en Radiologie du Quebec, or
- A person approved in writing by the CNSC. Submission of Request to Appoint a New Radiation Safety Officer Nuclear Substances and Radiation Devices Licence is required acknowledging his/her willingness to be designated as the applicant's RSO and acceptance of the responsibilities described in the submitted job description.

For additional information, please access the following sites:

- Canadian Nuclear Safety Commission (CNSC)
- CNSC Nuclear Substances and Radiation Devices Licence Application Guide: Nuclear Substances and Radiation Devices

Duties and Responsibilities of the RSO

The person occupying the position of RSO has several responsibilities, including mainly ensuring that all CNSC requirements are followed whenever the activities authorized under the facility's licence are performed. RSO's responsibilities will include those duties listed in the facility's Radiation Safety Manual (RSM) and must also satisfy the CNSC's regulatory requirements.

Duties may include, but are not necessarily limited, to the following:

- ensuring the health and safety of personnel, the public and the environment
- managing the daily aspects of the Radiation Safety Program
- acting as the primary contact with the CNSC for licensing and compliance matters
- identifying radiation safety problems
- implementing corrective actions for identified concerns
- ensuring compliance with the CNSC regulatory requirements
- reporting regulatory non-compliances to the CNSC
- holding the authority to stop any activity that might result in a regulatory non- compliance
- developing procedures and policies related to radiation safety and training
- acting as the signing authority for CNSC licences.

Incumbent: Genti Cermjani

JOB TITLE: LEAD NUCLEAR MEDICINE TECHNOLOGIST
RSO (Radiation Safety Officer)

ACCOUNTABLE TO: General Manager, Diagnostic Imaging Services QUALIFICATIONS:

Satisfactory completion of formal technical training at an approved school for

Nuclear Medicine technology. Must hold a valid membership with the CMRITO.Must have up to date liability insurance.

RESPONSIBILITIES:
Performance of Nuclear Medicine procedures at a technical level that requires independent judgment of he quality of the digital images produced; ensures that all procedures carried out at the best interest of optimum patient care. Verify correct patient with identifiers and administer the correct dose of the correct radiopharmaceutical which has been visually inspected and has not expired.

To have a high level of understanding with respect to the conditions set out in the radioisotope license, adhering to strict radiation safety principles and following ALARA for patients and staff. Additional training in radiation safety preferred.

To read and fully understand the request for an examination and be certain that the requisition complies with minimal acceptable standards.

Maintain a safe working environment at all times, ensuring that all equipment passes all standards for QC prior to use and is mechanically and electronically sound.

Valid certificate in CPR. And a valid certificate in TDG.

Perform all QC procedures on equipment, generator eluate and radiopharmaceuticals according to facility policies and manufacturer's specifications.

Inform the manufacturer, Health Canada, the attending physician and the reporting physician in the case of a possible drug reaction.

Initiate emergency response procedure in cases of adverse reaction to radiopharmaceuticals or injury.

Maintain all drugs for availability and check expiry monthly.

Protect staff, patients and the general public through the correct use, storage and disposal of radiopharmaceuticals according to our policies and the regulations of the CNSC.

Record radiopharmaceuticals dispensed on the appropriate forms

ADMINISTRATIVE RESPONSIBILITIES:

1. Maintain adequate records as directed. I.e. ensure that all patient requisitions have the pertinent data before the examinations are performed. All images should be sent to the PACS system as soon as examination is performed, to be stored permanently and to be retrieved by the radiologist. Co-operates with all personnel in the proper conduct of the office.
2. Maintains ethical Staff/Patient relationship at all times.
3. To be aware that Di-Med Services Ltd. has a policy regarding freedom from workplace violence and that acts or threatened acts of violence will not be tolerated.
4. Responsible for efficient use of all resources.

Lead NM Technologist Responsibilities (across 2 sites)

- Policy and Procedures manual annual review and as required to maintain CPSO standard of care
- Communication of new policies
- Ensure compliance of all staff with CME, current registrations & policies
- Assist with Hiring and training of new staff
- Assist with CPSO assessments
- Equipment review bi-annually and with introduction of new equipment
- Complete peer review annually on all staff
- Assist with marketing of services
- Assist with CME development for annual and special projects.
- Co-ordinate interesting case review across all sites

RSO (Radiation Safety Officer) Responsibilities

- **Liason with Dr. Siow to meet all RSO responsibilities as per CPSO**

CONTINUING EDUCATION: Maintenance as per CMRITO requirements.

OTHER RESPONSIBILITIES: Performs other related duties as directed.

Current Incumbent: Genti Cermjani

MRT Duties and Responsibilities (see also separate Job Descriptions)

As self-regulated professionals and under the CMRITO's Standards of Practice, MRTs can practice only in those areas in which they have the education and experience, and only perform procedures for which they have the necessary knowledge, skills and judgement to perform effectively, safely and ethically. MRTs must comply with the CMRITO Standards of Practice (as described below) as well as facility policies/protocols.
MRTs are responsible for the day-to-day operation of the facility. These responsibilities include, but are not limited to the following:

1. Adhere to all relevant provincial and federal legislation and guidelines governing the practice of the profession, including the following:
   • CMRITO Standards of Practice • CMRITO Code of Ethics• CMRITO By-laws
   • CMRITO's sexual abuse prevention program • Medical Radiation Technology Act
   • Personal Health Information Protection Act • Health Care Consent Act

2. Adhere to the facility policies, procedure and protocols including:
   • Quality Control assessments
   • Cleaning of all equipment including ancillary equipment (e.g. patient tables, imaging machines lead protective equipment, computer keyboards,)
   • Maintain full records of incidents, unusual occurrences, reactions
   • Record and report any equipment faults or problems to the appropriate personnel
   • Use appropriate aseptic techniques and infection prevention and control practices in the course of the diagnostic or therapeutic procedure as per PIDAC/IPAC best practices (refer to 3.3.8 Infection Prevention and Control policies and procedures)

Patient Examination:

• Ensure appropriate delegations (when required), and appropriate knowledge, skills and judgement are in place for all examinations
• Follow facility policy regarding situations where the use of chaperones may be appropriate
• Ensure the room is prepared for the procedure specified in the order
• Select and set up the equipment and materials needed for the procedure specified in the order
• Ensure correct patient identification (e.g. confirmation of patient name, date of birth, examination to be performed, and physician/authorized health professional authorization is present)
• Confirm that the order is appropriate based on the patient history
• Inquire about and record any contraindications (e.g. pregnancy/ anaphylaxis) before starting the exam, as well as obtain and record the direction of the physician/authorized health professional to proceed, modify, or halt the exam as per facility policy
• Ensure that the worklist contains the correct patient information (if applicable)
• Obtain informed consent (oral or written as per facility policy) before each examination (after explaining the procedure and answering any questions)
• Ensure pertinent clinical history is available and supplement as necessary
• Instruct the patient to remove only the clothing and items that will interfere with the procedure, providing the patient with a gown or sheet to cover areas where clothing was removed and explaining to the patient when and where the MRT may touch them and why
• Follow the facility examination protocols
• Follow facility protocols when unexpected findings are found that would require immediate attention (e.g. pneumothorax)

Throughout the Examination:

- Assess the patient's condition before, during and after the procedure or course of treatment and make modifications to procedures based on the patient's physical, medical and/or emotional status and needs
- Maintain patient comfort, privacy and dignity at all times
- Stop procedure if at any time the patient withdraws consent and record withdrawal of consent and reason as per site protocol
- Use radiation protection devices and other patient protection devices, as required, and record
- Use personal protection equipment (masks/gloves etc.) and devices (lead shields) as required for the procedure and as indicated by personal risk assessment
- Make sure right sided markers are present in the field but not within the anatomy of interest
- Ensure appropriate collimation is used- LEHR
- Ensure that the orientation of the body and other pertinent parameters are marked correctly on the image and data
- Ensure the processed image provides diagnostic image quality while using minimal radiation (ALARA – As Low As Reasonably Achievable). Take corrective action if necessary and record explanation of sub-optimal imaging
- Pediatric doses are adjusted downward based on weight for infant, toddler and child.
- Ensure the door to the examination room is self-closing and therefore closed during patient scanning
- Ensure correct anatomy is displayed on image for accuracy of positioning
- Ensure that patient examination images and data contains patient name, ID number, date of examination and type of examination
- Ensure that each patient record has the MRT identifier to verify who performed the examination • Comply with privacy and confidentiality legislation such as the Personal Health Information Protection Act (Ontario).

JOB TITLE: **NUCLEAR MEDICINE TECHNOLOGIST**

ACCOUNTABLE TO: General Manager, Diagnostic Imaging Services

QUALIFICATIONS: Satisfactory completion of formal technical training at an approved school for

Nuclear Medicine technology. Must hold a valid membership with the CMRITO. CAMRT membership recommended.

RESPONSIBILITIES: Performance of Nuclear Medicine procedures at a technical level that requires independent judgment of the quality of the digital images produced; ensures that all procedures are carried out at the best interest of optimum patient care, patient safety and maintains patient confidentiality.

To have a high level of understanding with respect to the conditions set out in the radioisotope license, adhering to strict radiation safety principles and following ALARA for patients and staff. Additional training in radiation safety preferred.

To read and fully understand the request for an examination and be certain that the requisition complies with minimal acceptable standards.

Maintain a safe working environment at all times, ensuring that all equipment passes all standards for QC prior to use.

Valid certificate in CPR. And a valid certificate in TDG.

ADMINISTRATIVE RESPONSIBILITIES:

1. Maintain adequate records as directed. I.e. ensure that all patient requisitions have the pertinent data before the examinations are performed. All images should be sent to the PACS system as soon as examination is performed, to be stored permanently and to be retrieved by the radiologist.
2. Co-operates with all personnel in the proper conduct of the office.
3. Maintains ethical Staff/Patient relationship at all times.
3. To be aware that Di-Med Services Ltd. has a policy regarding freedom from workplace violence and that acts or threatened acts of violence will not be tolerated.
4. Responsible for efficient use of all resources.

CONTINUING EDUCATION: Maintenance as per CMRITO requirements.

OTHER RESPONSIBILITIES: Performs other related duties as directed

JOB TITLE: REGISTERED CARDIAC TECHNOLOGIST

ACCOUNTABLE TO: Manager, Diagnostic Imaging Services

QUALIFICATIONS: Satisfactory completion of formal technical training at an approved school for cardiac technology. Must hold a current certification with CSCT/OSCT and a valid CPR/first aid.

RESPONSIBILITIES: **Key areas of responsibility**

The duties of the Employee to provide services under the direction of Partap Law Medicine Corporation are to include, but shall not be limited to the following:

- Responsible to perform Cardiac Technology procedures within the scope of practice.
- Responsible to maintain professional registration with the Canadian Society Of Cardiology Technologist. CSCT/OSCT.
- Responsible to maintain a valid certification in CPR and First Aid.
- Responsible to maintain the safe operation of all diagnostic and ancillary equipment and to ensure that quality control performance testing meets current standards of practice.
- Responsible to adhere to Di-med's policies and procedures.
- Responsible to act in a professional, courteous manner to patients, clients, colleagues and management as deemed acceptable by the corporate policies.
- Responsible to work in accordance with the company's mission, values, policies and procedures.
- To be aware that Di-Med Services LTD has a policy regarding freedom from workplace violence and that acts or threatened acts of violence will not be tolerated.
- Responsible for efficient use of all resources.
- Responsible to provide service to all regardless of race, national or ethnic origin, color, gender, sexual orientation, religious or political affiliation, age, type of illness, mental or physical ability

Other Responsibilties

- Adhering to the professional code of conduct in order to protect the rights and privacy of the patient.
- Performing quality control procedures
- Implementing policies and procedures
- Cleaning and maintenance of equipment in accordance with company protocols ensuring clinic is neat and clean
- Maintain all annual reviews i.e. WHMIS, AODA and Fire
- Annual review and initial of protocol manual and ongoing usage of protocol manual as a reference source
- ensuring a copy of current license and education log are present in each facility worked and a copy to head office.
- Maintaining all records and reports (e.g. repair, patient, incident) in accordance with X-Ray Associates protocol.

ADMINISTRATIVE RESPONSIBILITIES:

1. Maintain adequate records as directed.
2. Co-operates with all personnel in the proper conduct of the office.
3. Maintains ethical Staff/Patient relationship at all times.
4. Maintenance as per CSCT/OSCT and a valid CPR/first aid.

OTHER RESPONSIBILITIES: Performs other related duties as directed

Introduction Code of Ethics CMRITO

The Code of Ethics is a set of principles that delineates responsible conduct and the ethical and moral behaviour of members of the College of Medical Radiation and Imaging Technologists of Ontario[1] (CMRITO or the "College"). It has as its foremost goal the welfare and protection of patients and the public.

The Code of Ethics provides direction and guidance for all members of the College in the province of Ontario.

In the Code of Ethics, "members" refers to all members of the CMRITO; that is, members in all of the five specialties: radiography, radiation therapy, nuclear medicine, magnetic resonance and diagnostic medical sonography. In the Code of Ethics, "profession" refers to the profession of medical radiation and imaging technology, which includes all of the five specialties: radiography, radiation therapy, nuclear medicine, magnetic resonance and diagnostic medical sonography.

The Code of Ethics shall serve as a guide by which members may evaluate their professional conduct as it relates to patients, health care consumers, employers, colleagues and other members of the health care team. It is meant to serve not only members who provide clinical services, but also managers and educators who may be called upon to make judgments about ethical issues. It will also serve College Committees that may be called upon to make judgments about ethical issues in determining professional misconduct, incompetence or incapacity.

The Code of Ethics is intended to help members choose the right, fair, good and just action. Each member is personally responsible for behaving according to the ethical principles set down in the Code.

The consideration of ethical issues is an essential component of providing service. The Code of Ethics is to be used in conjunction with the College's Standards of Practice. Together, these documents provide a model for ensuring safe, effective and ethical professional performance to ensure safe, effective and ethical outcomes for patients.

Ethical principles

1. Responsibility to the public

Members act to ensure the trust and respect of the public by:

Indicators

a. maintaining high standards of professional conduct, competence and appearance
b. providing only those services for which they are qualified by education, training or experience
c. not making false, misleading or deceptive statements, orally or in writing
d. advancing and supporting health promotion and research

2. Responsibility to patients

Members act in the best interests of their patients by:

Indicators

a. upholding the principle of informed consent including the right of the patient, or the patient's substitute decision maker, to refuse service
b. respecting the dignity, privacy and autonomy of their patients
c. maintaining clear and appropriate professional boundaries in the member-patient relationship
d. treating all patients equitably, regardless of race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, gender identity, gender expression, age, marital status, family status, disability or type of illness
e. providing individualized, comprehensive and safe treatment during examinations or therapy sessions, taking into account the patient's particular physical and emotional needs, values and cultural background
f. preserving and protecting the confidentiality of information acquired through professional contact with the patient, except to facilitate diagnosis or treatment of the patient, or when legally obliged or allowed to disclose such information

1. Responsibility to the profession

Members promote excellence in the profession by:

Indicators

a. assisting each other and the CMRITO in upholding the spirit and the letter of the law, the *Regulated Health Professions* and *Medical Radiation and Imaging Technology Acts*, their respective regulations and the standards of practice set by the CMRITO
b. contributing to the development of the art and science of the profession through continuing education and research
c. conducting all professional activities, programs and relations honestly and responsibly, and by avoiding any actions that might discredit the profession

3. Responsibility to colleagues and other health professionals

Members develop and maintain positive, collaborative relationships with colleagues and other health professionals by:

Indicators

a. consulting with, referring to and co-operating with other professionals to the extent needed to serve the best interests of their patients
b. ensuring the safety of other health professionals when in practice or in areas under the members' responsibility
c. educating colleagues and other health professionals about practices and procedures relating to the profession

4. Personal responsibility

Members are accountable for all of their professional undertakings and shall:

Indicators

a. aspire to a high level of professional efficacy at all times

b. maintain and apply current and relevant scientific and professional knowledge and skill in every aspect of practice
c. avoid conflict of interest
d. provide professional service only when free from the influence of alcohol, drugs or other substances or any condition that might impede the delivery of safe service

PREVENTION OF SEXUAL ABUSE OF PATIENTS – CMRITO:

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MODULE 1 The Basics of Zero Tolerance

Learning Objectives

At the end of this module, the student should be able to: • Describe the philosophy and principles of Zero Tolerance; • Define sexual abuse, including the wide range of related verbal and physical behaviors.

Background

The College of Medical Radiation Technologists of Ontario ("CMRITO") is committed to a philosophy of Zero Tolerance of sexual abuse of patients, as defined below, and is developing supportive policies, procedures, practices and educational programs.

Philosophy of Zero Tolerance

• No act of sexual abuse (as defined by the RHPA) is ever acceptable and sexual abuse must never be tolerated. • The concept of Zero Tolerance recognizes the seriousness and extent of injury it causes the victim and others related to the victim. • Zero Tolerance does not preclude professional, supportive behaviors that may include physical contact that is nurturing or helpful, and therefore acceptable, to the patient. • The value of the broad definitions of sexual abuse and Zero Tolerance is that they capture a diversity of individual and cultural viewpoints.

Principles for MRTs

Students should be encouraged to: • Value education and seek opportunities to learn about attitudes and behaviors that are appropriate within other cultures so that sexual abuse cannot occur out of ignorance;

• Support sexual abuse victims so that they can express their pain and needs; • Contribute to the victim's healing process by acknowledging the seriousness of the incident; • Accept that nothing that causes others discomfort of a sexual nature will be tolerated; • Recognize that words can be as demeaning as actions to sexual abuse victims; • Understand that the above principles underlie all professional tasks undertaken by MRTs.

The RHPA defines the penalties for a member who has been found guilty of professional misconduct by sexually abusing a patient. The panel of the Discipline Committee shall do the following: • Reprimand the member. • Revoke the member's certificate of registration if the sexual abuse consisted of, or included, any of the following: - sexual intercourse; - genital to genital, genital to anal, oral to genital, or oral to anal contact; - masturbation of the member by, or in the presence of, the patient; - masturbation of the patient by the member; - encouragement of the patient by the member to masturbate in the presence of the member.

The foregoing penalties are in addition to the other penalties which a panel of the Discipline Committee may order, which include: • Requiring the member to pay a fine of not more than $35,000 to the Minister of Finance; • Requiring the member to pay all or part of the College's legal costs and expenses, the College's costs and expenses incurred in investigating the matter and the College's costs and expenses incurred in conducting the hearing; • Requiring the member to reimburse the College for funding provided for the patient under the program for therapy and counselling for patients. Further, an application for reinstatement by a person whose certificate of registration was revoked for sexual abuse of a patient shall not be made earlier than five years after the revocation.

MODULE 2 The Language of Zero Tolerance

Learning Objectives
At the end of this module, the student should be able to:
• Describe the principles that underlie good communication with the patient;
• Demonstrate an understanding of how the communication guidelines support the Standards. Background
It is important for students of medical radiation technology programs to recognize that patients are often under stress when they come for a procedure, and that this fact can impede the communication process. They must learn also that means of communications are not restricted to the words we use, but also how we use them and other body language.
Principles of Communication for MRTs
Students of educational programs in medical radiation technology must be taught:
• To talk to patients before touching
• To treat each patient as an individual
• Never to make assumptions
• To reserve judgement
• To speak directly to the patient
• To maintain confidentiality
• To create a safe environment Guidelines for Talking to Patients
Words This module emphasizes that remarks of a sexual nature constitute the most common form of sexual abuse of patients. Students must learn to avoid jargon and to speak in words that the patient can understand. Therefore, great attention must be paid to the ways in which information is conveyed and words selected when speaking to patients by:
• Employing the correct vocabulary for body parts;
• Using judiciously medical terminology to demonstrate respect for the patient;
• Being particularly sensitive to words which could cause misunderstandings;
• Knowing when to call an interpreter.
For patients with language or conceptual difficulties, anatomical charts and diagrams may enhance the communication process.
Because how we say what we say is as important as the choice of vocabulary, MRTs also need to understand that they must:
• Use tact and consideration in explaining procedures to patients to avoid causing anxiety;
• Not talk about themselves or their problems to patients because this would be unprofessional and might undermine the confidence of the patient;
• Be honest and straightforward in their manner to demonstrate respect and concern for the patient;

• Legitimize patient's fear and embarrassment which are natural emotions when submitting to medical procedures;
• Reassure patient to demonstrate respect and empathy;
• Provide the patient with an opportunity to ask questions;
• Provide the patient with answers within the scope of a MRT's responsibility;
• Talk directly to patients when working with interpreters or members of patients' support networks. Be mindful that an interpreter may not accurately translate what the MRT or the patient has said.

Benefits The benefits associated with these principles of communication include:
• Confidence in the MRT as a professional;
• Relaxed and cooperative patients who will make the MRT's role easier;
• Patients who are unlikely to be angry or abusive;
• A greater understanding of patient's own reactions to procedures;
• An informed patient will be able to make informed decisions.

Ways of Producing Words Even more important than the words themselves is the way they are said. Tone of voice, the speed of speaking, pitch, pacing and inflection can all make a difference to how words are perceived. MRTs must strive, particularly when speaking with the hearing-impaired, for: • A pleasing tone of voice that shows respect, not condescension or other negative attitudes;
• Moderate pitch and volume, avoiding a pitch that is so low that is hard to hear, or one that is too loud and may be offensive;
• Moderate rate of speech to give patients ample time to understand and not feel rushed;
• Pacing and inflection that will not distract the patient.

Benefits Students must recognize that the benefits of paying attention to how they speak will include patients who listen and hear and, that being attentive, will help to ensure successful outcomes.

Body Language Body language, the non-verbal component of language, will convey as much or more to patients as words and the manner in which they are stated. Patients may distrust the message if body language contradicts what is being said. Students must be taught the importance of: • Maintaining appropriate eye contact, depending upon the cultural environment;
• Adopting an appropriate facial expression to convey concern and proficiency;
• Being careful in their use of physical gestures;
• Respecting patient's personal sense of space;
• Appropriate positioning so that patient can easily see the MRT

Benefits Careful use of body language can greatly enhance communication, leading to better understanding and trust, but students must realize that even well-intentioned gestures can easily be misunderstood and leave patients feeling insulted or confused. Patients who are comfortable are more likely to ask and answer the questions needed to enhance the procedure.

Guidelines for Listening to Patients

Since the goal of communication is mutual understanding, listening is just as important as speaking. Students need to learn to communicate with their entire being, to listen and carefully observe patients, and be aware of cultural differences. By learning to listen effectively, they can also learn to modify their speech to match the needs of the patient.

Students must be encouraged to:
• Observe patient's non-verbal communication signals;
• Verify understanding of the intended message by rephrasing the message if necessary, or asking for clarification.

Benefits The benefits of listening and observing are greatly enriched communication and patients who are dignified partners in their care.

MODULE 3 Medical Encounters That Support the Standards of Practice

Learning Objectives
At the end of this module, the student should be able to:
• Describe the principles that underlie appropriate touching behavior;
• Recognize conflicting concepts of privacy;
• State the reasons why talk and touch cannot be separated. Background

Medical procedures are often in conflict with patient's concepts of privacy. For example, medical radiation procedures require an intimate, touching relationship between the technologist and the patient. For this reason, it is important that sexual abuse prevention programs teach students how to convey a professionalism that will leave the patient in no doubt that this is a medical encounter. The principles and techniques contained in this module reflect the Standards and should help the MRT in preventing the patient's potential perception of sexual abuse.

This module on teaching techniques for touching professionally focuses on related communication skills, consent and privacy.

Principles of Communication Relating to Touching
In all of the necessary medical physical encounters, the student must learn to:
• Obtain the patient's consent before touching;
• Acknowledge that patients have the right to change their minds about consenting to procedures;
• Avoid causing unnecessary hurt to the patient by inappropriate touching;
• Show respect by maintaining the patient's dignity;
• Respect, as much as possible, the patient's personal sense of space;
• Use firm and gentle pressure when touching patient to give reassurance and produce a relaxed response;
• Avoid hesitant movements by being deliberate and efficient;
• Understand when to use gloves for reasons relating to quality assurance and, in the case of touching sexual areas, to decrease intimacy that might be interpreted as sexual;
• Touch only when necessary.

Consent to Touch Students must recognize that the patient controls consent and that:
• Consent may be withdrawn at any time during the procedure;
• Agreement, acquired verbally or non-verbally, is required before the patient may be touched;
• The patient is entitled to know why, where and when they are to be touched;
• Special situations must be identified, and possible options anticipated;
• Patient concerns cannot ever be ignored and should be dealt with first.

Benefits By learning about patient's rights, students will prepare themselves for maintaining the required Standards that will protect them and their patients.

Privacy Although privacy is widely revered, each culture has its own norm. Students must become increasingly sensitive to cultural diversity as target populations in health care units become more diverse. Reference has already been made to the frequent conflict between common medical radiation practices and patients' concepts of privacy. Patients may be expected to change out of their own street clothes into institutional gowns, robes and drapes that often leave them vulnerable and exposed, a state that can foster fear and a heightened perception of sexual abuse.

Sexual abuse prevention programs cannot deal with the entire spectrum of cultural groups and thus students can only be taught to:

- Be sensitive to the evolving cultural diversity within their work environment;
- Obtain more feedback from changing cultural groups that will help avoid perceptions of sexual abuse;
- Seek ways of identifying the expressed needs of diverse cultural groups, specifically with respect to consent, privacy, communication and touch;
- Make as comfortable as possible patients who must necessarily be partly or completely unclothed;
- Give patients clear instructions about how to wear the institutional gown or robe;
- Allow patients independence, enough time and privacy while disrobing;
- Touch only those areas needed to facilitate removal of clothing when providing assistance to disrobe;
- Use sheets appropriately to cover and position the patient;
- Inform the patient about who is involved in the procedure and why;
- Request the patient's permission for students to observe;
- Obtain consent for recording of the procedure for any purpose other than diagnosis or treatment.

Benefits If the patient is given a sense of independence and is respected as an individual, cooperation is much more likely.

Communication Skills Specifically Relating to Touching

To avoid perceptions of sexual abuse, students must learn to make touching an acceptable medical encounter by:

- Providing reassurance and explanations throughout procedures;
- Involving patients in some aspects of procedures, such as moving themselves in response to clear instructions;
- Encouraging patients to identify affected areas, or landmarks when possible;
- Constantly checking for level of understanding and consent.

Benefits Procedures requiring touching of patients are very vulnerable to misinterpretation. Ensuring that patients understand at all times what is being done, and why, will greatly reduce the risk of offence. Deft, careful touching of patients will reduce also the likelihood of avoidable pain and will encourage the patient to relax and cooperate in ways that will save time and produce better results.

New Staff Member Name: Sign when complete

Familiarity with the Clinic	**Staff Initials**	**Trainer Initials**
Walk the clinic so you know the area.		
Find all doors into and out of the clinic		
Find all phones and the emergency numbers listing		
Locate the Head Office number, cell of the Manager, cell of RSO		
Locate the list of Dr.'s office numbers and clinic numbers		
Review the fire escape route plan		
Read the fire procedures policy		
Locate the supplies/ordering supplies		
Learn how to do the laundry		
NM equipment		
Learn how to use unit		
Emergency shut off buttons		
Explain about down time protocol for unit		
Log Equipment Failure in Log Book for other Staff and Recording of such		
Locate lists for service numbers and equipment ID numbers		
Get familiar with table and locking mechanism		
Passwords to equipment if required (camera, Xeleris, and PACS workstation)		
Radiation safety		
Locate and understand radiation safety manual		
Learn how to use contamination meter, survey meter, and dose calibrator		
know how to perform wipe tests, stress lab decommissioning		
know when and how to do thyroid screening		
Patient Protocols		
Greeting of the patient		
Checking the patient ID- birth date, correct name etc		
Verify the patient exam ordered		
Check the correct information on the patient label- Dr. order, above info		
Screen for pregnancy and breast feeding, have patient sign on worksheet		
Give a timeline for their Dr. to get a report		
Cleaning of the room and equipment between patients		

PACS	Staff Initials	Trainer Initials
Ensure the correct patient req. is in PACS for the patient you are imaging		
Check all images are in the case		
Verify the case ASAP		
Get a PACS password		
PACS Functions- deleting images, ordering images, annotating etc		
PACS / RIS downtime and the requirements of each		
FORMS / COMPUTER		
Learn all forms/worksheets required and where to find them		
Verbals		
PACS error documentation form		
Pregnancy permission to proceed-ask patient to sign on worksheet		
Staff forms- time sheet variance, mileage, vacation request, etc		
Staff intranet on the computer		
Your X-ray Associates email		
CD burning on Xeleris		
OCCUPATIONAL HEALTH & SAFETY		
Find the health and safety board and familiarize yourself with it		
See minutes etc posted for all staff to read and review		
Know your health and safety reps		
Locate the WHMIS, AODA, Infection control etc- all training manuals		
Training is available on tIntranet		
Fill out the TLD form and receive a TLD		
ADDITIONAL PROTOCOLS		
Understand how to locate Nuclear Medicine Radiologist; check qgenda.com		
What to do with a patient who has a positive finding		

Dress Code

This is a Professional Medical Office. It is important that you represent X-Ray Associates appropriately at all times.
The dress attire is a Uniform or **Business Casual with Lab coat**.

Lab coats are provided and must be worn at all times, if street clothes are worn. All clothes and lab coats should be clean, have no stains, and pressed. (not wrinkled).

Name tags will be provided for all staff and must be worn while on duty.

What is Business Casual Attire?

For women: A reasonable length skirt, mid-thigh or longer (no mini-skirt). Full-length trousers/slacks (not blue jeans) combined with a top (such as a dress shirt, polo, or sweater set) is considered acceptable. An informal dress with appropriate skirt mid- thigh length is acceptable. Yoga pants (leggings) are only acceptable if worn with a long top to mid thigh or skirt to mid-thigh.

For men: A combination of a collared shirt (such as a dress shirt or polo shirt), cotton trousers (such as khakis or blue, green, brown, or black trousers) with a belt, and modest shoes (such as loafers) with socks is acceptable.

Unacceptable clothes for either Gender:

1. Gym clothes 1
2. Hooded tops/Sweat shirts
3. Blue jeans
4. Mini skirts
5. Rumpled or ripped clothing
6. Underwear as outerwear
7. Inappropriately revealing attire
8. Shorts
9. Sweat pants (Wind Pants)
10. No logos or graphics on tops or pants

Unacceptable for Admins: Yoga Pants

Unacceptable Foot Attire ALL staff:

1. Flip flops
2. Boots above the knee

Acceptable Foot Attire for either Gender Technologists/X-Ray Helper:

1. Closed toe is mandatory
2. Running shoes
3. Must be rubber soles, non slip
4. Heels must not be pointed nor greater than 1”

X-Ray Associates **POLICY AND PROCEDURE** LAST REVIEW DATE Nov 2015,Jan 2016 Feb 2018	PROCEDURE **INFECTION CONTROL** **Hand washing/PPE**	CODE/NUMBER
	ISSUING AUTHORITY Dr Peter Zia	PAGE
	SIGNATURE	EFFECTIVE DATE January 2016
	REFERENCE	

General Hand Hygiene:

- Keep nails short
- Remove all jewelry
- Do not use artificial nails
- Make sure sleeves are rolled up and do not get wet during washing
-

When should you wash your hands?

- BEFORE and AFTER patient exam
- Before eating food
- After using the washroom
- After blowing nose, coughing or sneezing
- After touching garbage
- After removing gloves

****** WHEN IN DOUBT WASH YOUR HANDS OR USE ABHR**

ALCOHOL-BASED HAND RUB (ABHR) with 70- 90% alcohol (check expiry date)

ABHR is the first choice for hand hygiene when hands are not visibly soiled. ABHR is less time consuming to use than washing with soap and water and is the most time-effective protocol for routine patient care.

ABHR is the preferred method for decontaminating hands, when hands are not visibly soiled. Using ABHR is more effective than washing hands (even with an antibacterial soap) when hands are not visibly soiled.

TECHNIQUE FOR USING ABHR:

The following procedure should be used for cleaning hands with ABHR:

- Ensure hands are visibly clean (if soiled, follow hand washing steps) and dry.
- Apply one pump of product onto one palm; the volume should be such that 15 seconds of rubbing is required for drying.
- Spread product over all surfaces of hands, concentrating on finger tips, between fingers, back of hands, and base of thumbs; these are the most commonly missed areas.
- Continue rubbing hands until product is dry. This will take a minimum of 15 seconds if sufficient product is used. Hands must be fully dry before touching the patient, the environment, or equipment for the ABHR to be effective.

The physical actions of scrubbing with soap and water and rinsing are important for effective removal of material from the hands. It has been shown that at least 15 seconds of lathering with soap is required to remove transient flora.

TECHNIQUE FOR HAND WASHING

The following procedure should be used for hand washing:

- Wet hands with warm (not hot or cold) water; hot or cold water is hard on the hands, and will lead to dryness.
- Apply liquid or foam soap.
- Vigorously lather all surfaces of hands for a minimum of 15 seconds. Pay particular attention to finger tips, between fingers, backs of hands and base of the thumbs; these are the most commonly missed areas.
- Using a rubbing motion, thoroughly rinse soap from hands; residual soap can lead to dryness and cracking of skin.
- Dry hands thoroughly by blotting hands gently with a paper towel; rubbing vigorously with paper towels can damage the skin.
- Turn off taps with paper towel, to avoid recontamination of the hands

Personal Protective Equipment

Gloves, masks, gowns and eye-protection must be used where and when necessary to protect both patient and personnel. Reasonable care for infection control must be exercised for all patients.

Gloves must be worn for all examinations where there may be any infection risk or where an endocavity probe is used.

In the event of a respiratory disease outbreak (SARS, H1N1, etc.), staff will be provided with the necessary personal protective equipment.

Sequence for Donning PPE:

Perform Hand Hygiene
Put on gown

Put on Mask or N95 Respirator

Put on eye protection

Put on gloves

Sequence for Removal of PPE:

Remove gloves
Remove gown

Perform hand hygiene

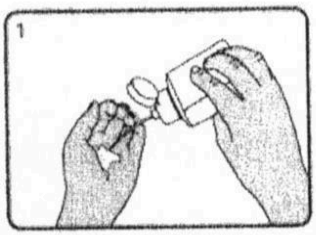
Remove eye protection

Remove mask or N95 Respirator

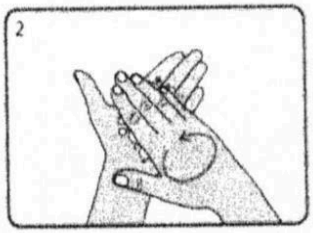
Perform hand hygiene

NHS

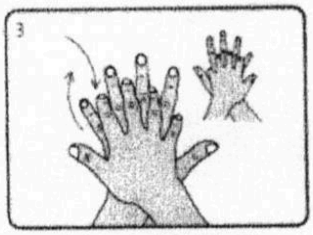
Alcohol handrub hand hygiene technique – for visibly clean hands



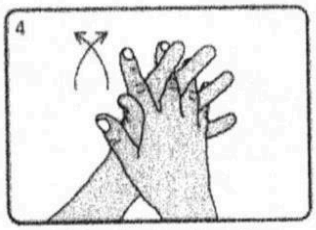
Apply a small amount (about 3 ml) of the product in a cupped hand



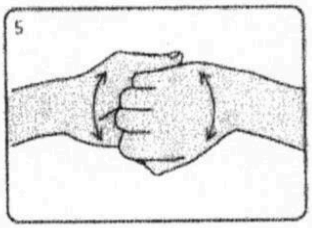
Rub hands together palm to palm, spreading the handrub over the hands



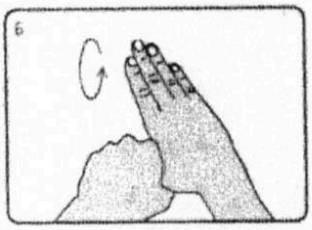
Rub back of each hand with palm of other hand with fingers interlaced



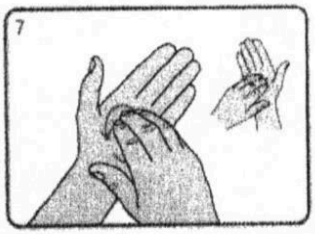
Rub palm to palm with fingers interlaced



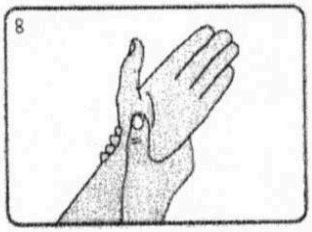
Rub back of fingers to opposing palms with fingers interlocked



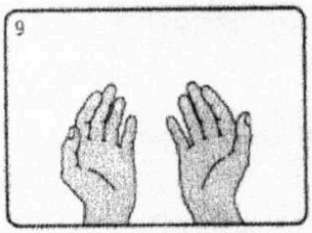
Rub each thumb clasped in opposite hand using a rotational movement



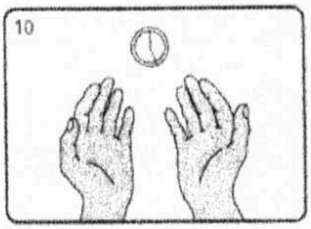
Rub tips of fingers in opposite palm in a circular motion



Rub each wrist with opposite hand



Wait until product has evaporated and hands are dry (do not use paper towels)



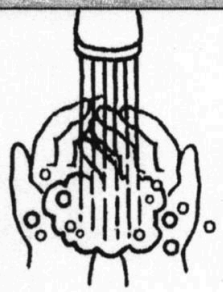
The process should take 15–30 seconds

cleanyourhands campaign

NHS
National Patient Safety Agency

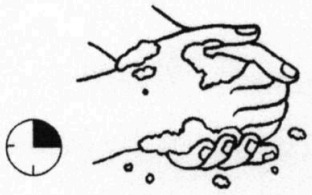
Adapted from World Health Organization *Guidelines on Hand Hygiene in Health Care*

Hand Washing

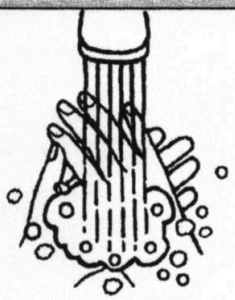


1. Wet hands.

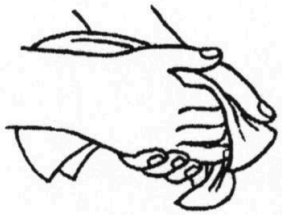
2. Apply soap.



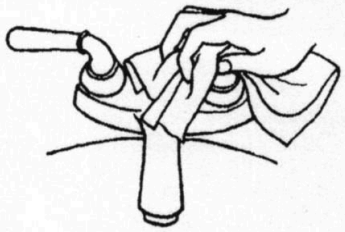
3. Lather for 15 seconds. Rub between fingers, back of hands, fingertips, under nails.



4. Rinse well under running water.



5. Dry hands well with paper towel or hot air blower.



6. Turn taps off with paper towel, if available.

Stop the Spread of Germs

Always Wash Your Hands

After you:

- Sneeze, cough or blow your nose
- Use the washroom or change diapers
- Handle garbage
- Play outdoors

Before and after you:

- Prepare or eat food
- Touch a cut or open sore

PH2016B011

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SEQUENCE FOR DONNING PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required; e.g., Standard and Contact, Droplet or Airborne Infection Isolation.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist

2. MASK OR RESPIRATOR

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit

4. GLOVES

- Extend to cover wrist of isolation gown

SECUENCIA PARA PONERSE EL EQUIPO DE PROTECCIÓN PERSONAL (PPE)

El tipo de PPE que se debe utilizar depende del nivel de precaución que sea necesario; por ejemplo, equipo Estándar y de Contacto o de Aislamiento de infecciones transportadas por gotas o por aire.

1. *BATA*

- *Cubra con la bata todo el torso desde el cuello hasta las rodillas, los brazos hasta la muñeca y dóblela alrededor de la espalda*
- *Átesela por detrás a la altura del cuello y la cintura*

2. *MÁSCARA O RESPIRADOR*

- *Asegúrese los cordones o la banda elástica en la mitad de la cabeza y en el cuello*
- *Ajústese la banda flexible en el puente de la nariz*
- *Acomódesela en la cara y por debajo del mentón*
- *Verifique el ajuste del respirador*

3. *GAFAS PROTECTORAS O CARETAS*

- *Colóquesela sobre la cara y los ojos y ajústela*

4. *GUANTES*

- *Extienda los guantes para que cubran la parte del puño en la bata de aislamiento*

USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

UTILICE PRÁCTICAS DE TRABAJO SEGURAS PARA PROTEGERSE USTED MISMO Y LIMITAR LA PROPAGACIÓN DE LA CONTAMINACIÓN

- *Mantenga las manos alejadas de la cara*
- *Limite el contacto con superficies*
- *Cambie los guantes si se rompen o están demasiado contaminados*
- *Realice la higiene de las manos*

SEQUENCE FOR REMOVING PERSONAL PROTECTIVE EQUIPMENT (PPE)

Except for respirator, remove PPE at doorway or in anteroom. Remove respirator after leaving patient room and closing door.

1. GLOVES

- Outside of gloves is contaminated!
- Grasp outside of glove with opposite gloved hand; peel off
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist
- Peel glove off over first glove
- Discard gloves in waste container

2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield is contaminated!
- To remove, handle by head band or ear pieces
- Place in designated receptacle for reprocessing or in waste container

3. GOWN

- Gown front and sleeves are contaminated!
- Unfasten ties
- Pull away from neck and shoulders, touching inside of gown only
- Turn gown inside out
- Fold or roll into a bundle and discard

4. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- Grasp bottom, then top ties or elastics and remove
- Discard in waste container

SECUENCIA PARA QUITARSE EL EQUIPO DE PROTECCIÓN PERSONAL (PPE)

Con la excepción del respirador, quítese el PPE en la entrada de la puerta o en la antesala. Quítese el respirador después de salir de la habitación del paciente y de cerrar la puerta.

1. GUANTES

- *¡El exterior de los guantes está contaminado!*
- *Agarre la parte exterior del guante con la mano opuesta en la que todavía tiene puesto el guante y quíteselo*
- *Sostenga el guante que se quitó con la mano enguantada*
- *Deslice los dedos de la mano sin guante por debajo del otro guante que no se ha quitado todavía a la altura de la muñeca*
- *Quítese el guante de manera que acabe cubriendo el primer guante*
- *Arroje los guantes en el recipiente de deshechos*

2. *GAFAS PROTECTORAS O CARETA*

- *¡El exterior de las gafas protectoras o de la careta está contaminado!*
- *Para quitárselas, tómelas por la parte de la banda de la cabeza o de las piezas de las orejas*
- *Colóquelos en el recipiente designado para reprocesar materiales o de materiales de deshecho*

3. *BATA*

- *¡La parte delantera de la bata y las mangas están contaminadas!*
- *Desate los cordones*
- *Tocando solamente el interior de la bata, pásela por encima del cuello y de los hombros*
- *Voltee la bata al revés*
- *Dóblela o enróllela y deséchela*

4. *MÁSCARA O RESPIRADOR*

- *La parte delantera de la máscara o respirador está contaminada — ¡NO LA TOQUE!*
- *Primero agarre la parte de abajo, luego los cordones o banda elástica de arriba y por último quítese la máscara o respirador*
- *Arrójela en el recipiente de deshechos*

X-RAY ASSOCIATES PATIENT CARE/CONTACT	PROCEDURE	
	ISSUING AUTHORITY QA	PAGE
LAST REVISION DATE_____ LAST REVIEW DATE _____	SIGNATURE	EFFECTIVE DATE March, 2016

PREAMBLE:*The term "patient" is derived from the Latin word pati—to suffer. A person becomes a patient/client because he or she seeks medical aid.*

Not all patients are suffering, but most are anxious. The anxiety may or may not be recognized by the patient. The patient may be anxious about the exam, the technologist, equipment, what might be discovered, etc.The technologist must attempt to reduce these anxieties. When a technologist greets the patient, the following is expected:

Introduce yourself: SMILE Remember they are nervous and need to be reassured.

Confirm that you have the correct patient, order and referring physician(s): You ***MUST place a*** √ beside the following BEFORE starting your exam:

- Confirm the patient's **name.**
- Ask the patient's **DOB.**
- Confirm that the **order is correct** and matches patient history.
- Confirm that the correct **referring physician(s)** are getting the report.

Explain/confirm the examination prior to starting the patient's exam. Verify the area/side requested from the requisition. (eg. your doctor has requested an x-ray of your left hand)

Patients privacy is a must, use a towel or paper sheet to cover exposed private areas. Provide a gown (or 2) to patients when necessary.

Make the patient comfortable: Tell the patient how you are going to move them or how you want them to move.

When attempting to locate a landmark, let the patient know where and why and that you will be touching them.

Patient Contact in the sense of any procedure relates to the physical hands-on touching of a patient. Technologists are expected to follow all expectations as per their college in regards to patient contact.

Whenever possible, a male technologist doing an examination on a female patient may request the assistance of either a relative or if necessary a clerk. Above all, do no compromise yourself or the patient. (or female with a male patient)

Confirm all female patients are not pregnant and record in PACS. (radiography)

Look professional. Your appearance and attitude will bear significantly on how the patient responds.

Always be cautious of the "at risk" patient and be prepared to respond appropriately

Be calm and sympathetic. This is manifested in your communication techniques and body language.

Beware of "cultural risk" areas and linguistic differences (comprehension) and be sensitive to them.

Listen to the patient. Give patients a chance to speak. Don't rush them.

IPAC UPDATES 2019

Single Use Items: All items marked as single use, cannot be reused under ANY circumstances.

Supply Storage: No supplies can be stored under sinks. This area is damp and may cause contamination.

New Equipment: ALL equipment must be inspected by the General Manager and/or Lead Technologist and/or IT before use.

Equipment Inspection: All equipment should be inspected on a regular basis. TV probes after each use. ANY concerns must be brought to the Lead Technologist and General Manager immediately. The equipment MUST be removed from use immediately.

Equipment Recalls: Any notification of an equipment recall from a manufacturer must be reported to the General Manager and Lead Technologist. All actions must be followed as per notice.

Patient Exam Rooms, MRT Control Areas, Front Reception: Only a drink that has a lid may be in these areas. Eating, storage of food, smoking, application of cosmetics or lip balm and handling contact lenses is NOT permitted in these areas: No

Ancillary Equipment: Any piece of equipment that touches the patient's skin must be wiped with LLD (Accel Wipes) before use on the next patient. i.e. ECG leads, BP cuff, thyroid collar

TECHNOLOGIST IMPRESSION:

A technologist cannot give his/ her own interpretation to a patient or referring physician. If the technologist believes the exam to be positive, the exam is discussed with a radiologist.

PERMISSSION AND TIMING OF FAMILY/FRIENDS IN EXAM ROOM:

There are times when a family member or friend may need to be in the room. For obstetrical exams, the significant other is permitted in the room only after the exam is completed. The sonographer will review the baby anatomy with the couple, give the sex if requested and allow the one screen capture on the phone. If a child is to be imaged, it is best to have only one parent in attendance unless more are required. Patients may require a translator or assistance to perform the exam. At no time should a radiographer hold a patient.

CHAPERONE FOR TV EXAMS & OTHER PATIENT REQUESTS:

Patients may request a chaperone for intimate examinations, i.e. TV ultrasound or some other request related to their examinations/procedures. We must provide options where possible. Ideally, a receptionist (most likely female will be requested) will accompany the patient during the exam. We have signage in the facility. IF we cannot provide a chaperone, patients have the option of rebooking for a new date.
Many languages are spoken at the facility. EVERY attempt must be made to provide patients with an interpreter.

X-Ray Associates **Nuclear Medicine**	PROCEDURE Nuc Med Protocols Reference	CODE/NUMBER
	ISSUING AUTHORITY Dr Peter Zia	PAGE
	SIGNATURE	EFFECTIVE DATE September, 2019
	REFERENCE	

*******Main Policy and Procedure Manual and Employee Handbook is also a reference!**

ALARA:

It is important that all exams follow the ALARA principle, As Low as Reasonably Achievable. This refers to ensuring the correct exam has been ordered, performed, injectables, follow up instructions to patients and general radiation safety guidelines are followed. Never add additional exams without the approval of the referring physician or radiologist.

DOSE MANAGEMENT: Adequate dose management strategies must be adhered to in order to ensure the necessary clinical information is available on images, while ensuring that the patient doses are
reasonable.

SCOPE AND LIMITATIONS:

Vaughan: Tuesday 730-330, Thursday 8-3 and Fridays 8-4pm booked appointments only
Persantine, Exercise Myocardial Perfusion Imaging
Muga

Aurora: Monday 9-5, Wednesday 8-5 and Thursday 8-3 or
Saturday
Persantine, Exercise Myocardial Perfusion Imaging
Muga
Biliary Scan (HIDA)
Whole Body Bone Scan
Renal
Parathyroid
Dat Scan
Brain Spect

SIGNATURE: Every exam must have the MRT name recorded and available in PACS. A check mark must be placed on the label to confirm DOB.

CONSENT: Verbal consent must be obtained after explaining the procedure to the patient. Ensure that the patient has the knowledge, skills and judgement to make an informed consent. They must understand before they can consent. It can be withdrawn at any time.

PREGNANCY: Every attempt should be made NOT to perform any exam involving radiation on a pregnant person. BEFORE doing so, the radiologist and referring physician must be consulted and limit the radiation. Patients must be asked if there is any chance of pregnancy before the start of the exam. They must initial on the work sheet to confirm not pregnant.

EQUIPMENT QC AND MAINTENANCE: All QC must be performed as per protocol. The Lead Nuclear Medicine Technologist is responsible to ensure that it is being done at both locations, follows up on all deficiencies immediately and where necessary contact the Medical Lead and/or Licensee and General Manager. Annual PMs are done on all equipment and signed off by the Medical Lead. A full-service contract is in place with GE. Records are kept for 6 years for all PMS and service calls.

DRUGS: All drugs should be checked monthly and replaced if outdated. Expired drugs can be returned to the Vaughan pharmacy for disposal.

EMERGENCY SITUATION: If a radiologist or cardiologist is on site, contact them and call 911 and have the crash cart available. Patients will be transferred to Mackenzie Health Hospital or Southlake Regional Health Centre.

TECHNOLOGIST PEER REVIEW: Using the CPSO observation sheets, each MRT will have a live review at least annually. Injection audit will also be done. The General Manager will also make inspections to ensure drugs are not outdated and that the Hot Lab is clean and tidy.

CPR/FIRST AID: All MRTs and DMS are expected to have current and valid certification. A hands-on course is offered every 2 years to assist with certification.

TLD: The RSO is responsible to ensure staff are wearing their TLD properly. The most recent record should be posted in the Lunch Room (Vaughan site) or bulletin board next to front desk (Aurora site).

Cleaning of Nuclear Medicine Room:
The room is cleaned daily after the staff have gone, by the building cleaning staff. The Hot Lab is cleaned only if a technologist is on site. Cleaning staff do not have access.
Hot Lab is maintained by the MRT. The sink must be clean and counter dry. Blue pads are changed if contaminated or dirty or monthly as a minimum. No paper products are stored under the sink. No personal products of any kind are to be stored in this room.
Any blood or body fluids are cleaned up immediately by the Nuclear Medicine Staff immediately using Mr. Clean or wipes as required.
Stethoscopes, ECG leads are cleaned after use with Cavi Wipes, Accel wipes or Alcohol. Computers and all ancillary equipment are cleaned with a cavi wipe after use.
No paper products are to be stored under sinks.

Recalls:
All equipment recalls will be sent to either the General Manager or Lead Nuclear Medicine Technologist. They must be followed up immediately with licensee, QA, Medical Lead and all instructions completed.
Under no circumstances will a single use item be reused, it MUST be discarded after use.
All new equipment must be cleaned as necessary and inspected and approved by Lead Technologist and General Manager before use.

X-Ray Associates **Infection Control: Nuclear Medicine** Revised Feb 2019, February 2020	PROCEDURE Infection Control: Nuc Med	CODE/NUMBER
	ISSUING AUTHORITY Dr Peter Zia	PAGE
	SIGNATURE	EFFECTIVE DATE February, 2016
	REFERENCE	

PREAMBLE:

Please be aware of the following protocols when imaging patients. Your examination rooms must be kept clean and tidy at all times and all hard surfaces must be cleaned between patients.

HANDS: Hands should be washed with soap and water if visibly soiled. Between patients 70% alcohol hand sanitizer can be used.

ROOM CLEANING:

- Pillows must be wrapped with white table paper or a sheet of white table paper put over the pillow for each new case. Pillowcases must be changed frequently throughout the day. If a bare pillowcase is used it is to be changed after each examination.
- Tables must be cleaned between patients with an LLD (Either Accel Wipe or CaviWipe). Remove the paper, clean the table and replace the new paper.
- The camera, treadmill, patient beds and ECG cords are cleaned with Accel wipes or Caviwipes
- Mr.Clean Eraser can be used to remove sticky tape residue.
- Door, door knobs and door jambs should all be wiped throughout the day.
- Chairs / stools should be wiped clean with Accel wipes or soap and water weekly and as required.
- Clean the mouse, keyboard and phone each shift.
- Control counter must be cleaned weekly or when soiled.
- Floors must be kept clean and dry. Watch for mud or water from patient traffic
- Incontinence pads on injection table and injection trolley should be changed on a daily basis.

WASHROOM CLEANING:

- Washrooms must be checked frequently throughout the day. Ensure garbage is not overloaded. Ensure toilet paper and paper towels are stocked.

AUXILLARY EQUIPMENT:

- Tourniquets are disposable and should be changed between patients.

	Latex Free Policy	
XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND** **PROCEDURE** **Manual** LAST REVISION DATE _____ LAST REVIEW DATE _____	SIGNATURE General Manager	EFFECTIVE DATE

LATEX FREE POLICY

PURPOSE:

To provide a latex free environment for staff, visitors and patients.

PROCEDURE:

X-Ray Associates shall not have or use any products containing latex at the clinics.

Any products purchased for office or medical use should be latex free.

All purchases made will be cleared through all vendors to be latex free by our purchasing department.

X-Ray Associates **CONSENT: Nuclear Medicine** Revised Feb 2019, February 2020	PROCEDURE Consent Nuc Med	CODE/NUMBER
	ISSUING AUTHORITY Dr Peter Zia	PAGE
	SIGNATURE	EFFECTIVE DATE July, 2020
	REFERENCE	

PREAMBLE: ***see Consent Policy in Main Policy and Procedure manual.

Consent is obtained after explanation of the exam. All questions should be answered and the patient asked if ok to proceed. The patient must understand what they are being told. Consent can be withdrawn at any time. Verbal consent is fine for all exams but the exception of the exams listed below; these require a written consent.
Two consent forms are available. One for cardiac and another for stress.

Exams requiring written consent:

Dipyridamole cardiolite stress test-1 day protocol
Treadmill cardiolite stress test- 1 day protocol
Dipyridamole thallium stress test
Exercise thallium stress test
Treadmill myoview stress test-2 day protocol
Dipyridamole myoview stress test-2 day protocol
Stress test

X-RAY ASSOCIATES **Nuclear Medicine** **POLICY AND PROCEDURE** **Manual**	PROCEDURE ISSUING AUTHORITY Medical Director Manager SIGNATURE	**CARDIAC IMAGING** EFFECTIVE DATE May 26, 2023
LAST REVISION DATE_____ LAST REVIEW DATE _____	REFERENCE	

CARDIAC AMYLOID SCAN

Purpose:

- To ensure that patients referred to Nuclear Medicine for a cardiac amyloid scan are imaged consistent with current standards.

Indications:

- Suspected cardiac amyloidosis

Contraindications:

- A Nuclear Medicine procedure has been performed within the last 48 hours
- Known or suspected pregnancy

Responsibility:

- Medical Radiation Technologist, MRT(N)
- Radiologist

Equipment:

- Adult dosage: 740 MBq (20mCi) of Technetium Pyrophosphate (^{99m}Tc - PYP)
- Pediatric dosage (under 18 years): Use SNMMI pediatric dose calculator
- GE MG Millenium Dual Head gamma camera
- Xeleris analysis software

Method:

- Identify patient using 2 client identifiers
- Confirm the following with the patient:

- If there is any possibility of pregnancy
- If they have had a Nuclear Medicine procedure within the last 48 hours.

If the patient answered yes to either or both questions, consult the radiologist

- Ensure patient removes all attenuating objects prior to start.
- Acquire initial bloodflow and bloodpool images of chest immediately following intravenous administration of ^{99m}Tc – PYP

Camera System	Collimator	Flow Frame Rate	Flow Matrix Size	Zoom	Bloodpool Acquisition Time	BP Matrix Size	BP Counts
MG Millenium	LEHR	2 secs x 30 frames	64x64	1.00	120 seconds	256x256	500 kcts

- During the waiting period for the delayed amyloid images **(2-3 hours post injection)** instruct the patient to :
  - Drink clear fluids (4-6 cups of water etc.); and
  - Empty their bladder more frequently
- Patient must also empty bladder immediately prior to delayed images.

Whole Body Acquisition

Camera System	Collimator	Length	Start Position	Bed Motion	Bed Speed/Time	Matrix	Zoom
MG Millenium	LEHR	1.90m	1.56m	Auto/Retract	7.9m/s 18 min	256 x 1024	1

- With the patient lying supine, feet first on the imaging bed, cquire a whole body acquisition.
- **Acquire a single, anterior image of the chest for 1000kcts (Stop on counts, not time on scanner)**
- Following planar imaging, acquire a SPECT of the chest/heart

SPECT Acquisition

Camera System	Angular Range (Per head)	Frame time	Zoom	Num Views	Orbit	Total Time (Acquisition)	Matrix
MG Millenium	180	27 sec	1.0	30	Automatic, Clockwise	13:30 minutes	128x128

Processing:

- Take Anterior Chest planar image and open using "Load to New" Protocol. Display using single full page frame.
- Draw an ROI to the left of the sternum (Right of image) using the circular ROI tool in the ROI panel.
- Use the pencil icon to change the colour of the ROI to green and the label to HEART.
- Duplicate the ROI using the copy ROI tool and paste it to the right of the sternum (left of the image). Label this BKGD ROI and change colour to Purple.
- Click one of the ROIs and go to the Statistics Pane. Clicking Values… will show you more information.
- Annotate the information on the image in the colour of the ROI:
    - HEART ROI
    - Counts:
    - Mean:
    - Stddev:
    - Minimum:
    - Maximum:
    - Area, pixels:
- Repeat for the other ROI
- In the colour White below the annotations calculate the HEART/CONTRALATERAL LUNG RATIO by dividing the heart counts by the background ROI counts.
- Take a screencapture of the final calculations.

SPECT Processing

- Open TOMO using Bone SPECT protocol
- Check for motion/image quality
- Click Review tab
- Save and Exit to get BONE SPECT file

TO XELV send all data.

To XELERIS send Flow, Pool, Postvoid Pelvis if acquired, Whole Body, Anterior Chest, Anterior Chest with data screen capture, Sagittal-coronal-transversal-MIP of processed SPECT.

Ensure all images are transferred then archive the case and
set to images attached on Velox

X-RAY ASSOCIATES

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Phone: 905.751.1500 Fax: 905.751.1505

STRESS TEST AUTHORIZATION FORM

You are going to be undergoing stress testing to determine whether or not you have underlying heart disease or possibly to assess your prognosis after you have had a procedure done such as an Angioplasty, or Bypass surgery.

There are certain risks that are entailed. The risks in this particular test have been kept to a minimum and it has been determined by a physician that you are safe to undergo this procedure. There are risks of abnormal heart rhythm (arrhythmia), non fatal heart attack, and rarely death. The risk is approximately 1 in 10,000 of death occurring during the procedure. There is approximately a 3 in 10,000 chance of non fatal heart attack occurring. This means that of 10,000 patients who undergo this procedure, approximately 9,995 will have no complications. The physician who is supervising this test has had extensive training in this test and in resuscitation procedures. There is availability of resuscitation equipment and medications in this office.

Should you have any questions or concerns please discuss these with the physician prior to the test.

I have read and understand the above statements and agree to undergo stress testing as explained to me. I agree to release X-Ray associates from any liability issues that may ensue during the test.

_____ _____

Patient's signature Date

_____ _____

Signature of witness Date

X-Ray Associates

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CONSENT FOR STRESS (EXERCISE OR PERSANTINE) TEST

You are going to be undergoing stress testing (Exercise Tolerance Test or Persantine Test) to determine whether or not you have underlying heart disease or possibly to assess your prognosis after you have had a procedure done such as Angioplasty, or Bypass surgery. This test will also involve using a radiopharmaceutical (thallium/cardiolite).

Your heart rate, blood pressure, and electrocardiogram will be monitored before, during and after the test. There are certain risks that are entailed. The risks in this particular test have been kept to a minimum and it has been determined by a physician that you are safe to undergo this procedure. There are risks of abnormal rhythm, non fatal heart attack and rarely death. The risk is approximately 1 in 10,000 of death occurring during the procedure. There is approximately a 3 in 10,000 chance of a non fatal heart attack occurring. This means that of 10,000 patients who undergo this procedure, approximately 9,995 will have no complications. The physician who is supervising this test has had extensive training in this test and in resuscitation procedures. There is the availability of resuscitative equipment and medications in this office.

Should you have any questions or concerns please discuss these with the physician prior to the test.

I have read and understood the above statements and agree to undergo stress testing as explained to me.

_____ _____

Patient's Signature Date

_____ _____

Signature of Witness Date

XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND** **PROCEDURE** **Manual**	PROCEDURE	**MISCELLANEOUS**
	ISSUING AUTHORITY Medical Director Manager	
	SIGNATURE	EFFECTIVE DATE
LAST REVISION DATE _____ LAST REVIEW DATE _____	REFERENCE	

Dose Optimization Policy

PREAMBLE:

In nuclear medicine and molecular imaging, small amounts of radioactive agents are administered to the patient to allow the physician to examine molecular processes within the body. These procedures are highly effective, safe and painless diagnostic tools that present physicians with a detailed view of the anatomy and physiology of an individual's body at the cellular level. Di-Med Services Ltd. recognizes that the use of low levels of radiation in these procedures entails some possible risk therefore radiation dose for all nuclear medicine and molecular imaging procedures should be optimized so that each patient receives the smallest possible amount of radiopharmaceutical while providing the appropriate diagnostic information. When nuclear medicine imaging procedures are performed correctly on appropriate patients, the benefits of the procedure far outweigh the potential risks. The procedure that provides the most useful clinical information is the one that should be performed.

PROCEDURE:

Di-Med Services Ltd. is committed to the appropriate use off radiopharmaceutical by ensuring:

1. A comprehensive quality control measures is in place such as ALARA and Misadministration policy
2. Nuclear medicine physicians should have up-to-date training
3. Technologists should be appropriately trained and certified.
4. Nuclear medicine procedures should be reviewed on an annual basis to ensure relevancy and accuracy according to clinical standards.

X-Ray Associates **POLICY AND PROCEDURE** LAST REVIEW DATE March 31, 2015, Feb 2016, Dec. 2016	PROCEDURE **EMERGENCY CASES** **Radiologist Contact**	CODE/NUMBER
	ISSUING AUTHORITY Dr Peter Zia	PAGE
	SIGNATURE	EFFECTIVE DATE October 2015
	REFERENCE	

Regular Business Hours: **(**Monday-Friday 8-4 PM)

Our Radiologists are available for consultation on patient studies during regular business hours in the clinics. Usually a radiologist works full days in Aurora and another one afternoons in Vaughan. You may contact them at the numbers below.

Aurora	**Direct Line:**	**Ext. 330**
Vaughan	**Direct Line:**	**Ext 230**

After Regular Business Hours: **(**Monday –Thursday 4-8 PM, Saturday 8-4.)

For after regular business hours you may contact the Radiologist who is scheduled on call at the local hospitals for consultation on patient studies.

X- Ray-If a pathology is suspected, (example fracture)-The x-ray tech can direct the patient to a hospital with a CD of images. However they need to tell the patient that it is a suspected pathology and that a physician has not looked at the images to make a diagnosis.

Technical staff from any modality should **NEVER** give a verbal or preliminary report to a patient or referring physician. If there is ever any concern, the technologist should get in touch with the radiologist on call. (Can ask the clerk to get the Radiologist on the phone.)

Ultrasound should follow policies for urgent medical cases as previously directed.

To contact the afterhours Radiologist:

Call Mackenzie Health Hospital Radiologist office: 905-883-1212, ext. 7925

If no answer call Mackenzie Health Hospital: 905.883.1212, ext. 2310

Then you will get the operator. You then ask to ***Page the radiologist on call****. The clerk may put you on hold or ask your name and number for the radiologist to call you back.*

Optional-Southlake Hospital: 905.895.4521, ext. 2216 for the operator.

Please Post This in All Work Areas

X-Ray Associates **POLICY AND PROCEDURE** LAST REVIEW DATE:	PROCEDURE **Emergency Cases:Patient Sent to ER with CD**	CODE/NUMBER
	ISSUING AUTHORITY Dr Peter Zia	PAGE
	SIGNATURE	EFFECTIVE DATE June 2017
	REFERENCE	

PATIENTS DIRECTED TO EMERGENCY WITH A CD: (ultrasound or x-ray)

If a patient has been sent to the Emergency with a copy of their images (CD) then the following must be done after discussion of exam with radiologist before sending the patient away with the CD.

1) Complete the CD Emergency case form and place **INSIDE** the CD case. (completed example below and forms kept in all offices and intranet)
2) Make a copy of the completed form and give to the receptionist to place in Binder labelled "CDs to ER"
3) Confirm which ER the patient is going to."
4) If the exam is during regular business hours and a report can be expedited, then fax the report to the Emergency Department.
   - Southlake ER Fax #: 905 853-2206
   - Mackenzie ER Fax #: 905 883-2138

Example Form:

Date: Wednesday, June 20, 2017

Preliminary Diagnosis by Dr._Yeung @ X-Ray Associates

Compound fracture right tibia

Radiologist Name and contact #: Dr. Brian Yeung

Aurora 905.751.0615 press #2 □ Vaughan: 289.553.6396 press #2 □ X

Mackenzie Health Hospital: 905 883-1212 ext. 0 and ask for radiologist to be paged □

Southlake Hospital: 905 895-4521 ext. 0 and ask for radiologist to be paged □

Other □ :

Report will be faxed to ER? YES □ NO □ **X**

Please Post This in All Work Areas

FORMS TO PLACE IN CDs OF PATIENTS SENT TO THE EMERGENCY DEPARTMENT.

Date:

Preliminary Diagnosis by Dr._____@X-Ray Associates

Radiologist Contact #:

Aurora 905.751.0615 press #2 □ Vaughan: 289.553.6396 press #2 □

Mackenzie Health Hospital: 905 883-1212 ext. 0 and ask for radiologist to be paged □

Southlake Hospital: 905 895-4521 ext. 0 and ask for radiologist to be paged □

Other □ :_____ Report will be faxed to ER?
YES NO □

Date:

Preliminary Diagnosis by Dr._____@ X-Ray Associates:

Radiologist Contact #:

Aurora 905.751.0615 press #2 □ Vaughan: 289.553.6396 press #2 □

Mackenzie Health Hospital: 905 883-1212 ext. 0 and ask for radiologist to be paged □

Southlake Hospital: 905 895-4521 ext. 0 and ask for radiologist to be paged □

Other □ :_____

Report will be faxed to ER? YES □ NO □

X-Ray Associates **Nuclear Medicine** **ALARA**	PROCEDURE Nuc Med Protocols Reference	CODE/NUMBER
	ISSUING AUTHORITY Dr Peter Zia	PAGE
	SIGNATURE	EFFECTIVE DATE September, 2019
	REFERENCE	

*******Main Policy and Procedure Manual and Employee Handbook is also a reference!**

ALARA:

It is important that all exams follow the ALARA principle, As Low as Reasonable Achievable. This refers to ensuring the correct exam has been ordered, performed, injectables, follow up instructions to patients and general radiation safety guidelines are followed. Never add additional exams without the approval of the referring physician or radiologist.

DOSE MANAGEMENT: Adequate dose management strategies must be adhered to in order to ensure the necessary clinical information is available on images, while ensuring that the patient doses are reasonable.

SCOPE AND LIMITATIONS:

Vaughan: Tuesday,, Thursdays and Fridays 730-4pm booked appointments only
Persantine, Exercise Cardiac Testing
Muga

Aurora: Monday, 8-5, Wednesdays, Thursdays
Persantine, Exercise Cardiac Testin
Muga
Biliary Scan (HIDA)
Whole Body Bone Scan
Renal
Thyroid and Parathyroid
Dat Scan
Brain Spect

SIGNATURE: Every exam must have the MRT name recorded and available in PACS.

CONSENT: Verbal consent must be obtained after explaining the procedure to the patient. Ensure that the patient has the knowledge, skills and judgement to make an informed consent. They must understand before they can consent. It can be withdrawn at any time.

PREGNANCY: Every attempt should be made NOT to perform any exam involving radiation on a pregnant person. BEFORE doing so, the radiologist and referring physician must be consulted and limit

the radiation. Patients must be asked if there is any chance of pregnancy before the start of the exam.

EQUIPMENT QC AND MAINTENANCE: All QC must be performed as per protocol. The Lead Nuclear Medicine Technologist is responsible to ensure that it is being done at both locations, follows up on all deficiencies immediately and where necessary contact the Medical Lead and/or Liscencee and General Manager. Annual PMs are done on all equipment and signed off by the Medical Lead. A full service contract is in place with GE. Records are kept for 6 years for all PMS and service calls.

DRUGS: All drugs should be checked monthly and replaced if outdated.

EMERGENCY SITUATION: If a radiologist or cardiologist is on site, contact them and call 911 and have the crash cart available. Patients would be transferred to Mackenzie Health Hospital.

TECHNOLOGIST PEER REVIEW: Using the CPSO observation sheets, each MRT will have a live review at least annually. Injection audit will also be done. The General Manager will also make inspections to ensure drugs are not outdated and that the Hot Lab is clean and tidy.

CPR/FIRST AID: All MRTs and DMS are expected to have current and valid certification. A hands on course is offered every 2 years to assist with certification. A JH&S committee is in place.

TLD: The RSO is responsible to ensure staff are wearing their TLD properly. The most recent record should be posted in the Lunch Room.

X-Ray Associates Ultrasound Medical Directives	PROCEDURE **Injection Procedure**	CODE/NUMBER
	ISSUING AUTHORITY Medical Director NM: Dr. Siow	PAGE
LAST REVISION DATE Feb 2019	SIGNATURE	EFFECTIVE DATE April 23, 2014
	REFERENCE CPSO-Delegation of Controlled Acts-February 2007	

Medical Directive: To insert IV catheter and the Intravenous administration of radiopharmaceuticals and/or medications as deemed appropriate by the Medical Director of Nuclear Medicine for routine NM procedures.

Background: All pharmaceuticals to be injected based on individual protocols. Medications are to be administered as directed by physicians on site.

Directive To: MRT Nuclear Medicine

Clinical Conditions Required: Must be a signed order for the NM exam or direct physician order to inject medication/s.

Contraindications:

1) No Patient Consent.
2) Pregnancy
3) If Breastfeeding: Discuss and get written consent if proceeding with the exam

Obtaining a Verbal consent:

Make sure the patient is informed about the procedures ask if they have any questions
The following must be part of obtaining verbal consent:

ASK the question, "May I proceed??" They must say **YES** for you to proceed.

Procedure:

The procedure will be explained to the patient and **consent** must be obtained verbally or written from the patient.

- A new tourniquet is used for each patient
- Palpate the area and find the best site to inject
- Wipe the area with an alcohol wipe
- Allow to air dry
- Insert catheter and secure
- Inject as per exam order

XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND** **PROCEDURE** **Manual**	PROCEDURE	**CARDIAC IMAGING**
	ISSUING AUTHORITY Medical Director Manager	
	SIGNATURE	EFFECTIVE DATE
	REFERENCE	

THALLIUM VIABILITY STUDY

PURPOSE:

To determine presence of viable myocardial tissue (hibernating myocardium).

PREPARATION:

Minimum 48 hours after Sestamibi

DOSE:

IV injection of 3 mCi Tl-201 chloride

INSTRUMENTATION:

GE Millennium MG LEHR

PROCEDURE:

1) Inject Tl-201 intravenously at rest.
Begin SPECT imaging after 15 minutes using Di-Med Thallium viability preset.
Repeat SPECT 3-4 hours post injection. Patient may leave department to eat during wait.
Repeat SPECT images 24 hours post injection. Again patient may eat also.

X-RAY ASSOCIATES Nuclear Medicine POLICY AND PROCEDURE	ISSUING AUTHORITY Medical Director: Dr. Siow	
	SIGNATURE	EFFECTIVE DATE

EJECTION FRACTION AND WALL MOTION-RESTING

PURPOSE:

To evaluate left ventricular function and regional ventricular wall motion.

PREPARATION:

None.

DOSE:

IV injection of gluceptate prepared according to patient's weight and manufacturers'

instructions. 30 minutes later administer 25 mCi (925 MBq) Tc99m Pertechnetate IV.

INSTRUMENTATION:

GE Millennium MG with LEHR collimators

PROCEDURE:

1) Fill out MUGA worksheet and inject patient with gluceptate. Send patient to waiting area for 30 minutes.

After 30 minutes, inject 25 mCi of Tc99m Pertechnetate. Following dose administration, position patient supine on the imaging bed and place 3 electrodes (Limb leads: Rarm, Larm, Lleg) on his/her chest for ECG monitoring.

Acquire LAO 45° (best separation), ANTERIOR and LLAT images, using the predefined acquisition protocol.

To process, choose EF ANALYSIS icon and apply filtering to the images using 'Filter only'. Process LAO 45° image using 'EF-Automatic' function. When defining ROI, make sure to include only the left ventricle. Once EF% is produced, cine image on 'EF summary' page to compare.

X-Ray Associates Nuclear Medicine POLICY AND PROCEDURE	PROCEDURE	**CARDIAC IMAGING**
	ISSUING AUTHORITY Medical Director: Dr. Siow	

	SIGNATURE	EFFECTIVE DATE
REVISED DATE REVIEWED DATE	REFERENCE	**Aurora Clinic Only**

DIPYRIDAMOLE cardiolite STRESS TEST-1 DAY PROTOCOL

PURPOSE:

A significant number of patients are unable to exercise sufficiently to produce a valid test. This group of individuals includes patients with severe arthritic disorders of the lower extremities, severe peripheral vascular disease, respiratory disorders, and of course amputees. In these individuals the non-invasive detection of coronary artery disease may otherwise not be possible.
When injected intravenously, Persantine (DPM) reaches its peak effect at approximately 7 to 9 minutes. The resultant increase in coronary artery blood flow is proportional to the degree of coronary patency. Patients with a Left Bundle Branch Block should also use a Persantine stress as the test of choice for Myocardial Perfusion Imaging.

PREPARATION:

Patients may have a light breakfast and juice 4 hours before test

Patients must be off caffeine for 24 hours (coke, coffee, tea, decafs, chocolate, Tylenol

3) If patient is on Aggrenox, they must have stopped it for 7 days.

Patients should be off oral DPM for 48-hrs prior

Check patient medications prior to first injection to make sure no meds are contra-indicated.

Patients who are asthmatic must bring their own puffers with them. (Depending on severity of asthma condition, DPM may be inappropriate for the patient. Check with physician before beginning stress test)

DOSE:
This study requires 2 Cardiolite injections (1 for the rest images and 1 for the stress images.)
Initial Injection (rest)
10 mCi (370 MBq) 99m Tc Sestamibi IV (Cardiolite)

Second injection (stress)

25 mCi (925 MBq) 99m Tc Sestamibi IV (Cardiolite)

Dipyridamole dose (ml) *(concentration 5mg/ml)* = (#kg x 0.142mg/kg/min x 4min) ÷ 5 mg/ml; dilute to 20 ml with 0.9% NaCl

PRECAUTIONS:

Any patient on Aminophylline or Theophylline must be brought to the physician's attention for assessment prior to study. Dipyridamole is a vasodilator and subsequently syncopal attacks are not

uncommon. The occasional patient may develop a severe anginal attack that can be readily reversed by intravenous Aminophylline. Due to the possibility of inducing severe myocardial ischemia a physician must be in the immediate vicinity during the first 15 minutes of the stress study.

INSTRUMENTATION:

GE Millennium MG with LEHR collimators

PROCEDURE:

1) History form should be completed with full list of current medications, before the REST injection.

2) For REST portion of test, set up an intravenous port and give the first Myoview injection. Instruct the patient to wait for 30 minutes in the waiting room and drink 1-2 cups of water or juice prior to imaging.

3) To begin computer acquisition, search for the patient from the "worklist" and add it to the "to do" list. Select the protocol "1 DAY CARDIAC" under "DI-MED CARDIAC" and choose the RGATE dataset.

4) When the scan is complete, check the raw data for: movement, proper gating, and for bowel activity overlying the myocardium. When the images are satisfactory, bring the patient to the stress room for the stressing stage.

5) Begin the stress test by attaching 10 electrodes to the patient's chest for a 12 lead ECG. Obtain a resting blood pressure with the patient sitting on the stretcher. Have patient lie supine on the stretcher throughout the stress period and continuously monitor the 12 lead ECG and blood pressure every minute.

6) The physician will inject the Persantine through the I.V. port over a 4-minute period. Record injection time on the requisition.

7) At 8 minutes, inject the STRESS Myoview through the I.V. line and record injection time on requisition.

8) Following the stress portion of the study, obtain patient's blood pressure. Ensure patient is in stable condition before letting him/her go. Instruct the patient to eat a light meal (excluding caffeine) and return 1-2 hours later for imaging.

9) Using "1 DAY CARDIAC" protocol again and choose the SGATE dataset for stress imaging. Check images for movement, proper gating and overlying bowel activity before letting the patient go.

10) Remove the intravenous port before letting the patient leave.

11) To process: select QGS/QPS icon.

- Choose rest and stress data. Adjust limits for both sets of images.

Check for patient movement on the sinogram. If the motion is minor, correct using motion correction software. (extensive motion will need to have images repeated)
Adjust the axes (green line) in the VLA limits and HLA limits so that they cut through the center of the ventricle evenly.
Move red limits in close and make sure the number of slices (indicated by the small number next to the red line) is the same for RGATE and SGATE images.
Click on the "REVIEW" icon to proceed.
Click on "Slice" at the top and check for adequate edge detection for the moving slices. If there is bowel activity preventing proper edge detection, use "Manual" function (located at the top left corner) to reconfigure the edges and when completed press "Process" to obtain new results.
Click on "Quantitative Perfusion SPECT" on the left side panel and check for proper edge detection
Click on "Myometrix" on the left side panel again
Align the REST and STRESS slices on the Myometrix page so that they are matching using the scroll function at the bottom

- Select Inverse colour map from the bottom left side menu

Click on File, Save & Exit.
Send files to PACS

PLEASE NOTE: WHEN PROCESSING THALLIUM IMAGES PLEASE

SELECT "THALLIUM TOMO" ICON.

X-Ray Associates **Nuclear Medicine**	PROCEDURE	CODE/NUMBER
	ISSUING AUTHORITY Medical Director: Dr. Siow	PAGE

POLICY AND PROCEDURE		
	SIGNATURE	EFFECTIVE DATE
REVISED DATE May 5, 2015 REVIEWED DATE Feb 17, 2019	REFERENCE	Vaughan Clinic Only

DIPYRIDAMOLE CARDIOLITE STRESS TEST: 1 DAY PROTOCOL

PURPOSE: A significant number of patients are unable to exercise sufficiently to produce a valid test. This group of individuals includes patients with severe arthritic disorders of the lower extremities, severe peripheral vascular disease, respiratory disorders, and of course amputees. In these individuals the non-invasive detection of coronary artery disease may otherwise not be possible.
When injected intravenously, Persantine (DPM) reaches its peak effect at approximately 7 to 9 minutes. The resultant increase in coronary artery blood flow is proportional to the degree of coronary patency. Patients with a Left Bundle Branch Block should also use a Persantine stress as the test of choice for Myocardial Perfusion Imaging.

PREPARATION:

Patients may have a light breakfast and juice 4 hours before test

Patients must be off caffeine for 24 hours (coke, coffee, tea, decafs, chocolate, Tylenol 3)

If patient is on Aggrenox, they must have stopped it for 7 days.

Patients should be off oral DPM for 48-hrs prior

Check patient medications prior to first injection to make sure no meds are contra-indicated.

Patients who are asthmatic must bring their own puffers with them. (Depending on severity of asthma condition, DPM may be inappropriate for the patient. Check with physician before beginning stress test)

DOSE:

This study requires 2 Cardiolite injections (1 for the rest images and 1 for the stress images.)
Initial Injection (rest)
10 mCi (370 MBq) 99m Tc Sestamibi IV (Cardiolite)

Second injection (stress)
25 mCi (925 MBq) 99m Tc Sestamibi IV (Cardiolite)

Dipyridamole dose (ml) *(concentration 5mg/ml)* = (#kg x 0.142mg/kg/min x 4min) ÷ 5 mg/ml; dilute to 20 ml with 0.9% NaCl

PRECAUTIONS:

Any patient on Aminophylline or Theophylline must be brought to the physician's attention for assessment prior to

study. Dipyridamole is a vasodilator and subsequently syncopal attacks are not uncommon. The occasional patient may develop a severe anginal attack that can be readily reversed by intravenous Aminophylline. Due to the possibility of inducing severe myocardial ischemia a physician must be in the immediate vicinity during the first 15 minutes of the stress study.

INSTRUMENTATION:

GE Ventri with LEHR collimators

PROCEDURE:

1. History form should be completed with full list of current medications, before the REST injection.

2. For REST portion of test, set up an intravenous port and give the first Cardiolite injection. Instruct the patient to wait for 30 minutes in the waiting room and drink 1-2 cups of water or juice prior to imaging.

3. To start computer acquisition, search for the patient from "To do" list. Hit "Refresh" to populate list for today's patients.

4. Select desired patient from list and "Acquire Study" from bottom of screen

5. Please note 1: All patients are "Partap Law Medicine Corporation ONE DAY" protocol by default. When you are performing other studies such as MUGA or Thallium, you must manually change protocol by going to "Edit Study" from "To do list" screen.

6. Please note 2: When RIS and/or PACS are down, you must enter patient info manually. Go to "New Study" from "To do list". Enter: Last name, first name, DOB, gender, patient ID. (Note: Patient height/weight not required). Use patient label to obtain this information. If no label is available, use info on requisition and ask reception for temporary ID. Select protocol: "Partap Law Medicine Corporation ONE DAY (User, Cardiology)". "Acquire study" when ready to image patient or "Save and Exit" to enter more patients into "To do list".

7. For resting Cardiolite use RGATE and stressing Cardiolite use SGATE

8. If you need to repeat any images, you may add additional views by going to "Add" from the acquisition window. Add»Protocol»User»Cardiology»Partap Law Medicine Corporation ONE DAY» RGATE or SGATE

9. To begin acquisition: select either RGATE or SGATE from acquisition window and hit "Apply" at bottom

10. By now the P-scope should appear. If you do not see it, hit "Apply" again. Please note: If you change any of the settings such as time/view or gating window, you must press "Apply" again.

11. Attach ECG leads to patient ensuring tall R-waves. Follow directions on the screen.

12. Press "Set" 2 times from hand controller to begin patient positioning.

13. Allow camera to move ^position. Move table in or out to position heart on P-scope; careful not to include too much bowel and/or gallbladder.
14. Move table height up to maximum for thin/moderate size patients and half-way up for large patients.

15. Bring camera heads closer, stopping at 1 inch from patient.

16. Rotate camera heads to patient's left side checking for collisions and moving heads out if necessary.

17. When the heads stop in this < position, you may press "GO" on hand controller to begin acquisition and camera will move back to starting position ^

18. When the scan is complete, check the raw data using QGS/QPS for: movement, proper gating, and overlying bowel activity. When the images are satisfactory, bring the patient to the stress room for DPM.

19. During DPM, administer the stress dose when instructed by the supervising physician through IV port and flush syringe with 5 cc saline.

20. Upon completion of stress test, instruct patient to eat a light meal (excluding caffeine) and return 1-2 hours later for imaging.

21. For stress imaging: Use SGATE and press "Learn from RGATE" to reuse positioning settings from RGATE. Remember to hit "Apply" at bottom. Press "Set" twice on hand controller to move patient into position. Check clearance by rotating heads to left side and press "GO" to start

22. Remove the IV before letting patient go home.

23. To process images use Myovation Evolution

i) First create "Cardiac SPECT" files by running myovation evolution
ii) Only keep the "CardiacSPECT" file containing "IRNCRR".
iii) Run QGS/QPS to create "Myometrix Results" and "QGSGPS_Results".
iv) Take screen captures of "Slice" screen in colour and label as "EF REPORT"
v) Take screen captures of "Myometrix" screen in black/white and label as "MYOMETRIX REPORT"
vi) Send to PACS: RGATETomo, RGATEGate, SGATETomo, SGATEGate, EF REPORT, MYOMETRIX REPORT
vii) Send to MM_XELV: All files
viii) Mark as archived after sending to PACS and MM_XELV

X-Ray Associates Nuclear Medicine POLICY AND PROCEDURE	PROCEDURE	**CARDIAC IMAGING**
	ISSUING AUTHORITY Medical Director: Dr. Siow	
	SIGNATURE	EFFECTIVE DATE
REVISED DATE REVIEWED DATE	REFERENCE	Aurora Clinic Only!

TREADMILL CARDIOLITE STRESS TEST- 1-DAY PROTOCOL

-

PURPOSE:

To evaluate myocardial perfusion.

PREPARATION:

Patients may have a light breakfast and juice on the morning of the test

Patients must be off caffeine for 24 hours (coke, coffee, tea, decafs, chocolate, Tylenol 3)

Check patient medications prior to first injection to make sure no meds are contra-indicated.

For Treadmill Stress Test:
Ensure patient has followed his/her doctor's instruction to discontinue Beta-Blockers for 24 or 48 hours (depending on type) prior to the stress test.

DOSE:

This study requires 2 injections (1 for the resting stage and 1 for the stressing stage.)

Initial Injection (rest)
10 mCi (370 MBq) 99m Tc Sestamibi IV (Cardiolite)

Second injection (stress)
25 mCi (925 MBq) 99m Tc Sestamibi IV (Cardiolite)

INSTRUMENTATION:

GE Millennium MG with LEHR collimators

PROCEDURE:

1. The test is explained to the patient. Complete the patient history form. Set up an intravenous port and inject the first Cardiolite dose through it.

Instruct the patient to sit in the nuclear medicine waiting room for 30 minutes and drink 1-2 cups of juice or water prior to imaging.

To start computer acquisition, search for the patient from the “worklist” and add name to the “to do” list. Select the protocol “1 DAY CARDIAC” under “DI-MED CARDIAC” and choose the RGATE dataset. Select “Camera on” and follow the on-screen instructions for setting up patient rest scan.

When the scan is complete, check the raw data using QGS/QPS for: movement, proper gating, and overlying bowel activity. When the images are satisfactory, bring the patient to the stress room for the stressing stage.

For the stressing stage, attach 10 electrodes to the patient’s chest for a 12 lead ECG and obtain a resting blood pressure with the patient sitting on a stretcher. The physician and the ECG tech will carry out this portion of the test. Upon instruction from the physician, administer the Myoview through IV port and flush syringe with 3cc saline.

Upon completion of stress test, instruct the patient to eat a light meal (excluding caffeine) and return 1-2 hours later for imaging.

Using “1 DAY CARDIAC” protocol, choose SGATE dataset for the Stress images. Select “Camera on” and follow on-screen instructions for setting up patient stress scan. After the imaging is complete, check the pictures for movement, adequate gating and overlying bowel activity.

Remove the IV before letting the patient go home.

To process: use QGS/QPS icon.

Refer to DIPYRIDAMOLE CARDIOLITE STRESS TEST-1 DAY PROTOCOL for processing details.

X-Ray Associates **Nuclear Medicine**	PROCEDURE	CARDIAC IMAGING
	ISSUING AUTHORITY Medical Director: Dr. Siow	PAGE

POLICY AND PROCEDURE	SIGNATURE	EFFECTIVE DATE
REVISED DATE May 05, 2015 REVIEWED DATE Feb 17, 2019	REFERENCE	Vaughan Clinic Only

TREADMILL CARDIOLITE STRESS TEST- 1-DAY PROTOCOL

PURPOSE:

To evaluate myocardial perfusion.

PREPARATION:

Patients may have a light breakfast and juice on the morning of the test
Patients must be off caffeine for 24 hours (coke, coffee, tea, decafs, chocolate, Tylenol 3)
Check patient medications prior to first injection to make sure no meds are contra-indicated.

For Treadmill Stress Test:
Ensure patient has followed his/her doctor's instruction to discontinue Beta-Blockers for 24 or 48 hours (depending on type) prior to the stress test.

DOSE:

This study requires 2 injections (1 for the resting stage and 1 for the stressing stage.)

Initial Injection (rest)
10 mCi (370 MBq) 99m Tc Sestamibi IV (Cardiolite)

Second injection (stress)
25 mCi (925 MBq) 99m Tc Sestamibi IV (Cardiolite)

INSTRUMENTATION:

GE Ventri with LEHR collimators

PROCEDURE:

1. The test is explained to the patient. Complete the patient history form. Set up an intravenous port and inject the first Cardiolite dose through it.

2. Instruct the patient to sit in the waiting room for 30 minutes and drink 1-2 cups of juice or water prior to imaging.

3. To start computer acquisition, search for the patient from "To do list". Hit "Refresh" to populate list for today's patients. Each patient will appear 7 times on list. Only use the second line for each patient.

4. Select desired patient from list and “Acquire Study” from bottom of screen.

5. Please note 1: All patients are “Partap Law Medicine Corporation ONE DAY” protocol by default. When you are performing other studies such as MUGA or Thallium, you must manually change protocol by going to “Edit Study” from “To do list” screen.
6. Please note 2: When RIS and/or PACS are down, you must enter patient info manually. Go to “New Study” from “To do list”. Enter: Last name, first name, DOB, gender, patient ID. (Note: Patient height/weight not required). Use patient label to obtain this information. If no label is available, use info on requisition and ask reception for temporary ID. Select protocol: “Partap Law Medicine Corporation ONE DAY (User, Cardiology)”. “Acquire study” when ready to image patient or “Save and Exit” to enter more patients into “To do list”.
7. For resting Cardiolite use RGATE and stressing Cardiolite use SGATE

8. If you need to repeat any images, you may add additional views by going to “Add” from the acquisition window. Add»Protocol»User»Cardiology»Partap Law Medicine Corporation ONE DAY» RGATE or SGATE
9. To begin acquisition: select either RGATE or SGATE from acquisition window and hit “Apply” at bottom
10. By now the P-scope should appear. If you do not see it, hit “Apply” again. Please note: If you change any of the settings such as time/view or gating window, you must press “Apply” again.
11. Attach ECG leads to patient ensuring tall R-waves. Follow directions on the screen.

12. Press “Set” 2 times from hand controller to begin patient positioning.

13. Allow camera to move ^position. Move table in or out to position heart on P-scope; careful not to include too much bowel and/or gallbladder.
14. Move table height up to maximum for thin/moderate size patients and half-way up for large patients.

15. Bring camera heads closer, stopping at 1 inch from patient.

16. Rotate camera heads to patient’s left side checking for collisions and moving heads out if necessary.

17. When the heads stop in this < position, you may press “GO” on hand controller to begin acquisition and camera will move back to starting position ^
18. When the scan is complete, check the raw data using QGS/QPS for: movement, proper gating, and overlying bowel activity. When the images are satisfactory, bring the patient to the stress room for treadmill test.
19. During the stress test, administer the stress dose when instructed by the supervising physician through IV port and flush syringe with 5 cc saline.
20. Upon completion of stress test, instruct patient to eat a light meal (excluding caffeine) and return 1-2 hours later for imaging.
21. For stress imaging: Use SGATE and press “Learn from RGATE to reuse positioning settings from RGATE. Remember to hit “Apply” at bottom. Press “Set” twice on hand controller to move patient into position. Check clearance by rotating heads to left side and press “GO” to start
22. Remove IV before letting patient go

Refer to DIPYRIDAMOLE CARDIOLITE STRESS TEST-1 DAY PROTOCOL for processing details.

X-Ray Associates Nuclear Medicine POLICY AND PROCEDURE	ISSUING AUTHORITY Medical Director: Dr. Siow

	SIGNATURE	EFFECTIVE DATE

DIPYRIDAMOLE THALLIUM STRESS TEST

PURPOSE:

A significant number of patients are unable to exercise sufficiently to produce a valid test. This group of individuals includes patients with severe arthritic disorders of the lower extremities, severe peripheral vascular disease, and respiratory disorders and of course amputees. In these individuals the non-invasive detection of coronary artery disease may otherwise not be possible. When injected intravenously, Persantine (DPM) reaches its peak effect at approximately 7 to 9 minutes. The resultant increase in coronary artery blood flow is proportional to the degree of coronary patency. Patients with a left bundle branch block should also use Persantine stress as the test of choice for Myocardial Perfusion Imaging.

PREPARATION:

Patients may have a light breakfast and juice on the morning of the test

Patients must be off caffeine for 24 hours (coke, coffee, tea, decafs, chocolate, Tylenol

3) Patients should be off oral DPM for 48-hrs prior

Check patient medications prior to first injection to make sure no meds are contra-indicated.

Patients who are asthmatic must bring their puffers with them. (Depending on severity of asthma condition, DPM may be inappropriate for the patient. Check with physician before beginning stress test)

DOSE:

Dipyridamole dose (mg) *(concentration 5 mg/ml)* = (# kg x 0.142mg/kg/min x 4min) ÷5 mg/ml diluted to 20 ml with 0.9% NaCl and administered over 4 minutes. (Max. dose is 50 mg).

3.0 mCi (111 mBq) Tl 201 chloride IV

PRECAUTIONS:

A note should be made of patients on Aminophylline or Theophylline and brought to the physician's attention for assessment prior to beginning the study. Dipyridomole is a vasodilator and subsequently syncopal attacks are not uncommon. The occasional patient may develop a severe angina attack that can be readily reversed by intravenous aminophylline.

INSTRUMENTATION:

GE Millennium MG with LEHR collimators

PROCEDURE:

History form should be completed with a full list of current medication.

1. Set up an intravenous port in the patient's arm or dorsal hand to remain for the duration of the stress study.

2. The patient's EKG is to be monitored throughout the Stress period.

3. The nuclear physician will inject the Dipyridamole through the I.V. line. (over a 4 min period). Record the time of injection.

4. Have the patient perform handgrip exercise following Dipyridamole infusion (about 3-4 min.) if requested by the supervising physician.

5. Inject the thallium through the I.V. port at 8 min. post start of DPM injection. Record the time of injection. The supervising physician will administer Aminophylline at 12 minutes post-inception of test to reverse any side effects.

6. Perform immediate SPECT images using the Thallium preset protocol under Di-Med Cardiac; choose SGATE

7. Instruct patient to return for delayed SPECT images 3 hours post-thallium injection time. Also inform patient to consume a light meal (no caffeine) before returning.

8. Using Thallium preset protocol again, choose RGATE. Check images for movement, proper gating, and overlying bowel activity before letting patient go.

9. Remove the intravenous port before letting patient leave.

10. **To process: Select QGS/QPS icon.**

See Dipyridamole Myoview Stress Test-1Day protocol

X-Ray Associates Nuclear Medicine POLICY AND PROCEDURE	ISSUING AUTHORITY Medical Director: Dr. Siow	
	SIGNATURE	EFFECTIVE DATE

EXERCISE THALLIUM STRESS TEST

PURPOSE: To evaluate myocardial perfusion.

PREPARATION:

Patients may have light breakfast and juice on the morning of the test
Patients must be off caffeine for 24 hours (coke, coffee, tea, decafs, chocolate, Tylenol 3)
Check patient medications prior to first injection to make sure no meds are contra-indicated.
For treadmill stress test:
Ensure patient has followed his/her doctor's instruction to discontinue Beta-blockers for 24 or 48 hours (depending on type) prior to the test
DOSE: 3.0 mCi (111 MBq) Tl-201 IV

INSTRUMENTATION

GE Millennium MG with LEHR collimators

PROCEDURE

1. Explain procedure to patient and complete the history sheet. Set up an intravenous port for thallium injection during the stress test.

2. Start stress test by attaching 10 electrodes to the patient's chest for a 12-lead ECG and obtaining a resting blood pressure with the patient sitting on a stretcher. The physician and the ECG technologist will carry out this portion of the test.

3. Upon instruction from the physician, administer the Thallium-201 through the IV port and flush with 3cc of saline.

4. Immediately upon completion of the stress test, bring the patient to the imaging table and begin imaging using the Thallium predefined protocol (choose SGATE).

5. Upon completion of the stress images, instruct the patient to eat a light meal (excluding caffeine) and return 3 hours post-thallium injection.

6. When patient returns, select RGATE from the preset protocol and begin redistribution images.

7. Once images are complete, check the pictures for patient movement, adequate gating and ensure there is no overlying bowel activity.

8. Remove IV and instruct patient to resume normal diet and medication.

9. Use QGS/QPS for processing (refer to Dipyridamole myoview stress test -1 day protocol for processing details.

X-RAY ASSOCIATES **Nuclear Medicine** **POLICY AND PROCEDURE** **Manual**	PROCEDURE	**SKELETAL IMAGING**
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BONE SCAN

PURPOSE: To survey the skeletal system for areas of abnormal bone activity.

PREPARATION: None. Preferably no Barium 72 hrs. prior.

DOSE: 25mCi (925 MBq) Tc-99m-MDP for Whole Body Bone Scan or Single Site Bone Scan where the patient's weight exceeds 200 lb.

20 mCi (740 MBq) Tc-99m-MDP for Single Site Bone Scan where the patient's weight is below 200 lb.

For pediatric patient, follow pediatric dosage table found in "Pediatric Dosage for Nuclear Medicine".

INSTRUMENTATION:

GE Millenium MG with LEHR collimators

PROCEDURE:

1. Fill out a history form and inquire about areas of pain.
2. Inject the patient with MDP and obtain images using the GE Millenium MG. Acquire flow and pool images for the area of interest using '3 PHASE BONE' protocol.
3. After the flow and pool images, inform the patient to return 2½ hours later. Also tell the patient to drink 4-6 cups of water and to void frequently.
4. Instruct the patient to void before beginning the delay images. The patient should also remove any attenuating objects. Use the WHOLE BODY acquisition protocol under '3 PHASE BONE' for Whole Body Bone Scan procedures. If the procedure is Single Site Bone Scan, use STATIC acquisition instead and relabel views according to the body part being imaged.
5. Perform extra views depending on the abnormality present or at physician's discretion.
6. Perform SPECT imaging as directed on requisition or area of most concern.
7. If indication for test is cancer workup, do SPECT for chest and abdomen.
8. For extremity planar views:

- Always mark the right extremity.
- Extremity views must include laterals, medials, plantars/palmars

Other Considerations

- In most cases, SINGLE SITE procedure will be performed as the requisition indicates. However when clinical history reveals any one (1) of the following, a WHOLE BODY procedure will be performed instead:
    i) Two (2) or more sites of pain
    ii) History of cancer
    iii) Arthritic workup
    iv) Osteoporosis
    v) Recent motor vehicle accident

In all cases of low back pain, possible avascular necrosis, possible sacro-iliitis or knee pain, SPECT images are obtained of the region of interest.

For flow studies of the upper extremities (ie. Sympathetic dystrophy RSD), establish an IV in the arm opposite to the pain and inject via a butterfly needle with a saline flush

For Cancer patients, include every bone in the body

Always get a clean post-void view of the pelvis particularly for suspected hip or pelvis fracture and for all cancer patients.

Review any previous bone scan or X-ray reports which may include a specific lesion not mentioned by the patient before the patient leaves.

For Generalized Arthritis, include ALL joints in the FOV, i.e. elbows and hands (with fingers flat).

XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND** **PROCEDURE** **Manual**	PROCEDURE	**ENDOCRINE IMAGING**
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PARATHYROID SCAN

PURPOSE:

To identify and localize parathyroid adenoma.

PREPARATION:

None. No X-ray or CT using barium for 48 hours prior.

DOSE:

IV injection of 20 mCi Tc99m Sestamibi (Cardiolite)

INSTRUMENTATION:

GE Millennium MG

PATIENT POSITIONING:

Patient should lie supine with arms to their side. The camera FOV should include the base of mouth to the top of the heart.
Camera setting: Head first, supine, 30 frames, 27 seconds/frame, automatic, clockwise, 64x64 matrix, 1.6 zoom

PROCEDURE:

Inject 99mTc Sestamibi intravenously.

Acquire 1st SPECT images at 20 minutes post injection using the Di-Med parathyroid preset protocol on

Millennium MG. Patient positioning as indicated above.

Acquire 2nd SPECT images at 2.5 hours post injection using preset on Millennium MG

4) Analyze SPECT images on Xeleris using Bone SPECT protocol.

X-Ray Associates Nuclear Medicine POLICY AND PROCEDURE	ISSUING AUTHORITY Medical Director: Dr. Siow	**RENAL IMAGING**
	SIGNATURE	EFFECTIVE DATE

BASELINE RENAL SCAN

PURPOSE:

To quantify differential function, detect renal artery stenosis and obstruction, detect renal failure or flank pain, and to rule out a renal mass.

PREPARATION:

None. No X-Ray or CT procedure using barium for 48 hours prior.

DOSE:

10 mCi (370 MBq) Tc99m DTPA

INSTRUMENTATION:

GE Millennium MG with LEHR collimators

PROCEDURE:

1. Ask patient to drink 4 glasses of water 30 minutes before imaging. If the patient is unable to be hydrated orally, then an I.V. should be started with 500 ml of saline on a slow drip over one hour.

2. Patient should void before imaging.

3. Record all medications currently taking and also medication recently discontinued.

4. Acquire an image of the full syringe of Tc99m DTPA (remove from shield) by placing it on the imaging bed and setting the bed height to maximum. The camera heads should also be at the furthest distance apart.

5. The patient should be positioned supine on the imaging bed so that the kidneys will be visualized in the top half of the FOV and the bladder will be at the bottom of the FOV. Ensure the camera is positioned underneath the patient for posterior imaging (for kidney transplant cases, use anterior and posterior acquisition)

6. Use the predefined acquisition protocol:
   Phase 1: 2.0 sec/fr for 60 sec, 30 frames total
   Phase 2: 30.0 sec/fr for 1200 sec, 40 frames total
   Zoom 1.33, 128 x 128 matrix

7. Inject the 99mTc DTPA through an I.V. or butterfly needle followed with a saline push to create a good bolus injection. Do not flush the DTPA syringe. Start imaging.
8. Acquire pre-void, empty syringe, injection site, and post-void images.

9. Process using the 'Renal Analysis' application on Xeleris

X-Ray Associates Nuclear Medicine POLICY AND PROCEDURE	ISSUING AUTHORITY Medical Director	**RENAL IMAGING**
	SIGNATURE	EFFECTIVE DATE

CAPTOPRIL ENHANCED RENAL SCINTIGRAPHY

PURPOSE:

To identify renovascular hypertension due to renal artery stenosis.

PREPARATION:

Before appointment day:

1) When booking for Captopril appointment, the reception will obtain list of medication from the patient's referring physician.

1) Review the patient's medication list at time of booking appointment:

    a) If patient is on Angiotensin II Receptor Blockers and/or ACE-inhibitors instruct patient to stay on meds for test.

    a) If patient is not on Angiotensin II Receptor Blockers and/or ACE-inhibitors then Captopril will be administered during this test by Nuclear Medicine Physician.

2) Always ensure Nuc Med Physician is available and on site before scheduling this appointment.

On day of appointment:

2)The patient should not eat any solid food for at least 4 hours prior to test. They can drink only water.
3)If patient is on ACE-inhibitors and/or Angiotensin II Receptor Blockers, check that patient has taken
them before coming. Make sure to record the most recent time and dosage that patient has taken his/her meds.
4) Obtain a detailed history from the patient upon arrival, a complete list of his/her medications and ask about any allergic reaction to medications.
5) If patient does not take Angiotensin II Receptor Blockers and/or ACE-inhibitors, Captopril will be administered by the Nuc Med Physician.
6)Obtain paient's height and weight.
7) If Captopril is required, obtain a resting blood pressure and set up an intravenous line with saline drip.
8) Review patient history with Nuc Med Physician who will then administer Captopril (Ensure Captopril is crushed and mixed in water before giving)

INSTRUMENTATION:

GE Millennium MG with LEHR collimator, Zoom of 1.33, 128x128 matrix

DOSE:

- The Nuclear Medicine physician will give Captopril 25mg orally with water.
- 10mCi (370 MBq) 99mTc DTPA IV antecubital. Flush IV tubing with saline to give a good bolus. DO NOT flush DTPA syringe at end of the injection.

PROCEDURE:

1. Use worksheet and record all medications currently taken or recently discontinued.
2. Obtain accurate height and weight in metric units.

3. If Captopril is to be administered, record blood pressure with the patient supine. Be sure to use the same arm for all subsequent blood pressure measurements. (Do not use the arm which will have the IV)

4. Start an IV line to hydrate the patient with 500 ml of normal saline by IV drip over one hour (10 ml/kg body weight) 1 hour prior to imaging. This will equal 9ml/min- with current IV sets, 1ml
   = 10 drops, therefore 90 drops/minute.

5. Have the Captopril tablets, a glass of water, and the mortar and pestle ready for the Nuc. Med. Physician to administer the Captopril to the patient. Record time of Captopril administration. Do not allow the patient to leave the NM imaging area after this point. (Continue hydrating patient for 60 minutes).

6. Blood pressures are monitored every 15 min. Report any drastic BP changes to the physician immediately.

7. If no Captopril is given, steps 4, 5, 6 are omitted. Patient will have intravenous, and hydrate for 30 minutes with 4 cups of water instead of saline drip.

8. After 1 hour post-Captopril (30 minutes without Captopril), position patient on imaging table for DTPA injection. At this point, patient should void prior to isotope injection.

9. Choose the predefined “Di-Med Renal GATES GFR” protocol for the acquisition. Computer acquisition set up: Phase 1=2.0 sec/fr for 60 sec, # of frames=30
   Phase 2=30.0 sec /fr for 1200 sec, # of frames= 40

10. Position the patient supine on the ECT table so that the kidneys will be visualized in the top half of the field of view and the bladder included in the bottom.

11. Inject 99mTc DTPA through the I.V. Flush IV tubing with saline to give a good bolus. DO NOT flush DTPA syringe at end of the injection. Start computer acquisition immediately.

12. Record the post-test blood pressure and the time elapsed since the initial Captopril dose.

13. Process using the ‘Renal Analysis’ application on Xeleris

14. If patient needs to return for baseline renal scan after captopril study, he/she must discontinue all ACE-inhibitors and angiotensin II receptor blockers for the length of time equal to 3½ half- life of the drug.

ACE-INHIBITORS:

Diovan (Valsaratan)
Cozaar (Losartan)
Micardis
Atacand
Tevetan
Avapro
Avalide (Inbesartan)

ANGIOTENSIN II RECEPTOR BLOCKERS:

Lotensin (Benazepril)
Inhibase (Cilazapril)
Vasotec (Enalapril)
Monopril (Fosinopril)
Zestril, Prinivil
(Lisinopril) Coversyl
(Perindopril) Accupril
(Quinapril) Altace
(Ramipril)

XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND** **PROCEDURE** **Manual**	PROCEDURE	**RENAL IMAGING**
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DIURESIS RENOGRAPHY

PURPOSE:

In patients with dilated collecting systems (e.g. hydronephrosis and hydroureter) to distinguish which systems are obstructed.

PREPARATION:

The patient should be normally hydrated and not receiving any intravenous diuretics. Have the patient void prior to the study.

DOSE:

10 mCi (370 MBq) 99m Tc DTPA IV followed by the I.V. administration of a diuretic (Lasix) once the collecting system is seen (about 20 minutes into the study).

Lasix (furosemide 10mg/ml) dose = 1.0 mg/kg
** If a serum creatinine level is available on the chart, report the value to the Nuclear Physician as this information may alter the lasix dose calculation. Max. 40 mg Lasix.

Please ensure that a Nuc Med Physician is on site before commencing Lasix injection

NOTE: there is a cross-reactivity between Sulfa and Furosemide. Therefore, an allergy to sulfa drugs may prevent usage of furosemide. (?lasix can still be given in an adult but be aware that the **patient may develop hypotension and require more fluids** before leaving the department.)

INSTRUMENTATION:

GE Millennium MG with LEHR collimators

PROCEDURE:

1. Pt. should be hydrated before imaging. Give 4 glasses of water 30 min. prior to scanning. Patient should void before imaging. If the patient is unable to be hydrated orally, then an I.V. line should be started. Administer 500ml saline over 1 hour. (10ml/kg). This will equal 9ml/min with current I.V. sets. 1ml=10 drops, therefore 90drops/min.

2. Record all meds currently taken or recently discontinued.

3. The pt. should be positioned supine on the imaging table, such that the kidneys will be visualized in the top half of the FOV and the top of the bladder will be at the bottom of the FOV. The camera is centered under the table (orientation = 0 degrees.)

4. Use the predefined Acquisition protocol: Phase 1: 2.0 sec/frame for 60 sec, # of frames = 30
Phase 2: 60.0 sec/frame for 1200 sec, # of frames = 40
Zoom of 1.33, 128 x 128 matrix

5. **For kidney transplant cases**, use Anterior acquisition because the kidney is placed lower and anteriorly. **For a horseshoe kidney or a pelvic kidney**, try to acquire on a Dual-head system to get Ant and Post flows. Process Ant and Post separately. Check with Doctor before beginning the acquisition.

6. Inject the DTPA through the I.V. followed with a saline push to create a good bolus injection. Start digital imaging. Leave I.V for administering Lasix.

7. Monitor the passage of the radiotracer through the kidneys. The Nuclear Physician should inject the diuretic when the renal pelvis and calyces are fully visualized, typically 15 to 20 minutes post-tracer injection. Have the Lasix and a saline flush ready and note the time of Lasix injection on the computer acquisition. Monitor the passage of the radiotracer through the kidneys.

8. Try to get *at least 20 min. of dynamic a*cquisition post-lasix administration. Terminate data collection if the pt. is unable to tolerate full acquisition**. A blood pressure measurement prior to sitting the patient up for the post void image, to ensure the patient is not hypotensive and at risk for fainting. Notify the physician if BP is very low.** Encourage patient to increase their fluid intake today.

9. Have the pt. void and collect a post-void image. If there is residual activity in the renal pelvis or in the ureters, be sure to check the images with the Nuclear Physician before sending the patient away.

10. **To Process**: Use the Renogram Analysis Predefined Protocol.

XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND** **PROCEDURE** **Manual**	PROCEDURE	**HEPATOBILIARY IMAGING**
	ISSUING AUTHORITY Medical Director Manager	
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LIVER SCAN FOR HEMANGIOMA

PRINCIPLE:

Cavernous hemangioma is the most common benign tumor of the liver occurring in 1-7% of the population. Radiolabeled RBC scintigraphy has become the procedure of choice for the non-invasive diagnosis of the lesion. Typically the scintigraphic pattern is characterized by an initial hypovascular defect in the liver which accumulates RBC's gradually over time (usually 1 hour).

PURPOSE:

To identify and localize hemangiomas in the liver.

PREPARATION:

None. No X-Ray or CT using barium for 48 hours prior.

DOSE:

IV injection of 0.9-1.0 ml stannous pyrophosphate prepared according to manufacturers' instructions. Pyro should be injected direct IV, not into catheter to increase labeling efficiency.

20-30 minutes later, administer 20-25 mCi (740-925 MBq) 99mTc Pertechnetate IV

INSTRUMENTATION:

Dual-head camera with LEHR

PROCEDURE:

1. Immediately following the injection of 99mTc Pertechnetate IV, acquire dynamic images 3 sec/frame x 60 sec. ** Consult previous ultrasound or CT studies to determine if Ant or Post flow. Acquire a pool image (3000K cts).

2. Two hours (or more) post-injection collect a SPECT study of the liver (360°, 64 stops, 15 sec/stop, 64x64 matrix, abdomen scan).

XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND**	PROCEDURE	**HEPATOBILIARY IMAGING**
	ISSUING AUTHORITY Medical Director Manager	
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LIVER/SPLEEN SCAN

PURPOSE:

Flow Study
- to evaluate vascularity of suspected hepatic mass lesions.
- to detect vascular abnormalities of the abdomen (i.e. aneurysm).

Static Study
- to define liver and spleen morphology and function.

- to rule out space occupying lesions.

PREPARATION: No X-Ray or CT procedure using barium for 48 hours prior.
DOSE: 6 mCi (222 MBq) Tc99m Sulphur Colloid (SC) bolus I.V. antecubital.

INSTRUMENTATION:

Dual-Head gamma camera with LEHR collimator

PROCEDURE:

1. Position the patient supine with the camera over the lower thorax and upper abdomen. The landmarks are the xiphoid, which should coincide with the top 1/3 of the field of view and the iliac crest, which should coincide with the bottom of the field. The patient's midline should be aligned with the middle of the field of view.

2. Immediately following the SC IV bolus, acquire 3 sec/frame for 60 seconds.

3. Immediately following the flow study, acquire 800K count pool images of the liver:

Anterior	Posterior
LAO 45º	RPO
RAO 45º	LPO(optional if trauma to the spleen is suspected)
Rt. Lateral	Lt. Lateral (optional for the spleen)

4. Perform a SPECT acquisition.

XRAY ASSOCIATES **Nuclear Medicine** **POLICY**	PROCEDURE	**HEPATOBILIARY IMAGING**
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HEPATOBILIARY SCAN

PURPOSE:

To assess gallbladder function, and cystic duct and common bile patency.

PREPARATION:

NPO at least 4 hours prior to the exam.

DOSE:

5-6 mCi (185-222MBq) Tc99m DISIDA bolus I.V. antecubital.

INSTRUMENTATION:

Large field of view gamma camera

PATIENT POSITIONING:

Supine, with upper abdomen in field of view and detector rotated to LAO 30°. This is to minimize overlap between the gallbladder and the small bowel and common bile duct.

PROCEDURE:

1. Inject 99mTc DISIDA as a bolus and start acquisition.
2. Immediately after the injection, acquire a 30 minute dynamic acquisition (60 sec/fr).
3. Anterior & right lateral statics for 70 sec @ 45 and 60 minutes (RLAT acquired preferably with patient turned on their side)
4. Check the images with the NM physician.

**** NOTE: when the liver, gallbladder and small bowel are definitely visualized at any time the study may be terminated.**

5. If a bile leak is suspected, do pelvis view @ 60mins, have patient void, repeat ant abd and pelvic views, then turn patient right side down for 10 mins and repeat ant abdomen and pelvis views at 90 mins.

	PROCEDURE	CODE/NUMBER
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Nuclear Medicine **DaT scan**	Dr. Brian Yeung/ Dr. Siow	

DaT scan

Reason for Exam:
DaTscan (Ioflupane I-123 injection) is a radiopharmaceutical indicated for striatal dopamine transporter visualization using SPECT to evaluate patients with suspected Parkinsonian syndromes (PS). To differentiate essential tremor from tremor due to PS (idiopathic Parkinson's disease, multiple system atrophy and progressive supranuclear palsy).

Indications:
Parkinsonian syndromes such as tremor.

Contraindications:
Known hypersensitivity to iodine.
Reduced renal or hepatic function
Sensitive to potassium iodide or Lugol's solution
Pregnancy or breastfeeding (consult with radiologist to determine best course of action)

Precaution:
Administer thyroid-blocking agent such as Lugol's solution, potassium iodide or potassium perchlorate before DaTscan administration to reduce thyroid uptake. Blocking agent must be given at least 1 hour prior to DaTscan administration.

Drug interaction:
The following medication may interact with DaTscan. Confirm with radiologist if these could be stopped prior to test.

Amozapine	Buspirone	Methamphetamine	Phentermine
Amphetamine	Citalopram	Methylphenidate	Phenylpropanolamine
Benztropine	Cocaine	Norephedrine	Selegiline
Bupropion	Mazindol	Paroxetine	Sertraline

Clinical Information/History:
- See requisition.
- Obtain relevant previous imaging results if done elsewhere and scan results into PACS.

Patient Preparation:

- Patient to stop interfering-medications
- Wear comfortable clothing for SPECT imaging (30 minutes)
- Patient to hydrate before and after administration of DaTscan to permit frequent voiding

Radiopharmaceutical:

3-5 mCi DaTscan (I-123 Ioflupane) intravenous

Equipment Selection:
GE Millennium MG camera with LEHR collimator. For SPECT imaging, remove leg extender and replace with head holder placed on the imaging table.

Procedure:

Part 1 Injection:

1. Set up IV in patient's arm.
2. Inject DaTscan slowly through intravenous.
3. SPECT imaging should be performed 3-6 hours post injection.

Part 2 SPECT Imaging:

1. Press "Camera on" on acquisition computer. Follow on-screen prompts and use hand control set up SPECT imaging.
2. Patient's head in head holder. Ensure head is straight. Ensure entire brain is in field of view and that the patient's head is not tilted. Try not to move patient into camera to much in order to maintain minimal circular orbit. Raise/lower the bed to centre the patient in the FOV. This is to be done with the cameras in the lateral position.
3. Parameters: 128 x 128 matrix
   1.14 Zoom (pixel size 3.5-4.5)
   Step and Shoot
   30 sec/view for 60 views
   159 keV +/- 10 window
   H-mode
   Head first supine
   Contour Off
   Circular orbit 360 deg– Be sure to pass the cameras around the patient in the head holder before beginning exam to ensure that you will not touch his/her shoulders when scanning. Adjust the cameras as necessary.
   Radius of rotation should be minimal with maximum radius set at 15cm

Analysis:

- Process the SPECT using the Brain SPECT protocol.

  Processing procotol:
  - Iterative reconstruction (OSEM)
  - Butterworth filter
  - Filter power factor 8-10
  - Cutoff 0.5 to 0.6 cycles/cm
  - Chang attenuation correction 0.11/cm
  - Colour scale: GE colour, rainbow, cool

- Make Save Screen of the processed data.
- Send raw images and Save Screens to PACS.
  -

XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND**	PROCEDURE	CODE/NUMBER
	ISSUING AUTHORITY Dr. Brian Yeung	PAGE

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BRAIN SPECT

Reason for Exam:
To assess for brain perfusion abnormalities.

Indications:
Brain blood flow, organic brain disease, dementia, Alzheimer's disease, perfusion abnormalities.

Clinical Information/History:
- See requisition.
- Obtain relevant previous imaging results if done elsewhere and scan results into PACS.

Patient Preparation:
- Patient to avoid caffeine, alcohol, cannabis for 24 hours prior to exam (If caffeine, alcohol, or cannabis was consumed, make note and still proceed with test)
- Patient to avoid smoking the day of the study (If patient is smoking, make note and proceed with test)
- Patient to remain on all current medications unless otherwise specified, including opiods, antidepressants, anxiolytics, and anti-psychotics (make note and proceed with test)
- Patient to remove all metallic items from head area, including hair pins, jewelry, hearing aids, etc.

Radiopharmaceutical:
99m Tc HMPAO (Exametazime/Ceretec) – 20 mCi Intravenous Injection

Special Instructions:
- A completed requisition is required, as per departmental policy.
- No Nuclear Medicine studies within the 48 hours prior to exam.
- This exam is not to be performed on pregnant patients without prior approval of a Radiologist.
- For patients who are breastfeeding, please see Nuclear Medicine protocol "Breast feeding policy".
- Requests for an ECD (Neurolite) Brain Scan on pediatric patients (less than or equal to 18 years of age) need prior approval of a Radiologist. Should a pediatric exam be performed, dose reductions will be required, refer to "Pediatric dose policy".
- Hand hygiene procedures will be followed as per clinic policy.
- IV reseal insertions and injections will be administered as per hospital clinic policy.

Equipment Selection:
GE Millennium MG camera with LEHR collimator. For SPECT imaging, remove leg extender and replace with head holder placed on the imaging table.

Procedure:

Part 1 Injection:

1. Patient is to be lying supine on stretcher/imaging table, in a quiet, darkened room for injection. Insert 24 G IV in patient's arm. Instruct patient to keep arm still.
2. Wait 10 minutes post insertion of IV before injecting Exametazime or ECD. Try not to speak to patient during injection, as patient is to be calm and quiet during injection to allow proper localization of radiopharmaceutical.
3. Acquire an anterior head flow 3sec/frame for 20 frames, 128 x 128 matrix, 1.0 Zoom, as you are injecting. Acquire anterior pool image 128 x 128 matrix, 1.0 Zoom for 5 minutes.
4. Leave patient in darkened room for 10 minutes post injection before removing IV.
5. Patient is to wait at least 60 minutes post Exametazime injection or 30 minutes post ECD injection before imaging. The patient can wait in waiting room after IV has been removed.

Part 2 SPECT Imaging:

1. Press "Camera on" on acquisition computer. Follow on-screen prompts and use hand control set up SPECT imaging.
2. Patient's head in head holder. Ensure head is straight. Ensure entire brain is in field of view. Try not to move patient into camera to much in order to maintain minimal circular orbit. Raise/lower the bed to centre the patient in the FOV. This is to be done with the cameras in the lateral position.
3. Parameters: 128 x 128 matrix
   1.6 Zoom
   Step and Shoot
   30 sec/view for 60 views
   H-mode
   Head first supine
   Contour Off
   Circular – Be sure to pass the cameras around the patient in the head holder before beginning exam to ensure that you will not touch his/her shoulders when scanning. Adjust the cameras as necessary.

Analysis:

- Process the SPECT using the Brain SPECT protocol. Make Save Screen of the processed data.
- Send raw images and Save Screens to PACS. Send SPECT results file to SYNC secure cloud storage for brain surface-rendering.

X-RAY ASSOCIATES
Sharps Safety Program

Feb 16, 2012

Commitment Statement

Xray Associates is committed to providing a safe and healthy working environment for all Staff and clients. Our organization will demonstrate its commitment by providing financial, Physical and human resources to reduce the risks of injury from sharp medical devices and Exposure to blood and body fluid. To this end, the organization will implement the use of safety engineered medical sharps and other safe work practices aimed at reducing the risks of injury from sharp objects wherever possible.

Goals

- To decrease the risk of transmission of blood-borne pathogens through injuries from sharp medical devices
- To promote and support the health and safety of all employees through a Comprehensive program of safety engineered medical sharps
- To provide equipment, resources and effective training

Definitions

Sharp: Any sharp object used during the care, treatment or diagnosis of patients that could cause an injury to a worker or other person.

Roles and Responsibilities of Workplace Parties

Employer

- Enforce the policy, procedures and program
- Provide equipment, necessary resources and initial and ongoing staff training
- Maintain the sharps safety program through continuous quality improvement
- Ensure that all staff use safety engineered medical equipment when such devices are available and provided
- Ensure that an appropriate training program on sharps safety, including the use of safety engineered medical sharps, is developed in consultation with the joint health and safety committee and implemented in the workplace.
- Evaluate and update the program annually

Managers

- Enforce program through regular monitoring strategies
- Conduct accident/incident investigations
- Ensure all staff are trained in the use of safety engineered medical sharps (SEMS) and in safe work practices required to reduce the risk of exposure to blood and body fluids
- Maintain training records for a three-year period
- Ensure all new staff receive general and site-specific orientation to the policy and program
- Include the auditing of worker practice in the planned inspections and report on findings to senior management

• Take every reasonable precaution for the protection of the worker

Workers

Comply with policy and procedures at all times; non-compliance will result in progressive discipline

• Participate in regular training as established by the organization
• Report any unsafe acts, hazards, equipment problems or any other untoward issue immediately to the supervisor or delegate
• Report any incidents, accidents and near misses to the supervisor immediately and cooperate in the investigation as required by management

Joint Health and Safety Committee

• Review quarterly incident/accident data related to sharps injuries or exposures to blood and body fluids
• Review policy and program annually
• Participate, through consultation, in the development of a sharps safety program
• Participate, through consultation, in the development of an education and training program that supports the sharps safety program
• Make recommendations in writing to management

Evaluation

The sharps safety program will be evaluated annually, as per HCRFR, sec. 9(2). The following indicators will be collected in a timely manner by the designated authority and forwarded to the program leader, who will collate, analyze and summarize the data and make recommendations for program enhancements to senior management:

• Employee incidents/accidents
• Accident investigations
• Near misses/hazards
• Planned monthly inspections – auditing of worker practice

General Provisions

Each department where medical sharps are used or are otherwise present shall develop specific procedures outlining the use and disposal of the product as appropriate and in keeping with the following general provisions:

• All needles and sharps shall be handled and disposed of in a manner that will not endanger the health or safety of the user or others.
• It is the responsibility of the user to ensure appropriate handling and safe disposal of needles and medical sharps.
• Needle-less products and products with inherent safety features shall be used when such alternatives are available. **Exception**-radioisotope syringes and needles are not safety products due to the lead shield containers which do not allow space.
• Needles will not be recapped, bent or removed.
• Uncapped needles, scalpels or other medical sharps must not be left unattended or covered with a towel/drape.
• All needles and medical sharps shall be disposed of properly in appropriate sharps containers by the person who used the device.
• All sharps injuries must be reported immediately to a supervisor and occupational health nurse. A risk assessment shall be performed and appropriate follow-up measures taken as per policies and procedures related to blood and body fluid exposures.

Failure to comply with provisions of this policy or department-specific procedures developed in support of this policy may result in disciplinary action being taken.

X-RAY ASSOCIATES

Feb 16, 2012

PROTOCOL TO BE FOLLOWED AFTER A NEEDLE STICK INJURY OR BLOOD/BODY FLUID EXPOSURE.

1. FIRST AID

- Contaminated Wound - Encourage bleeding from the skin wound and wash the injured area with copious soapy water, disinfectant, scrub solution or water.
- Contaminated Intact Skin - Wash the area with soap and water.
- Contaminated Eyes - Gently rinse the eyes while open with Saline or water.
- Contaminated Mouth - Spit out any fluid - rinse the mouth with water and spit out again.

2. REPORT ACCIDENT

3. BLOOD TESTING (Consent required)

Health Care Worker: HIV, Hep B and Hep C status

Source: HIV, Hep B and Hep C status

4. IMMEDIATE ACTION

If the patient is known to be HIV positive then the exposed Health Care Worker should be given counseling and offered Post exposure prophylaxis (PEP).

Post Exposure Prophylaxis (PEP) pdf information sheet

- PEP is the administration of 2 or 3 antiretroviral HIV medications for 28 days, commenced within 72 hours of possible exposure to HIV infection.
- PEP has been shown to reduce the risk of HIV infection following needle stick injuries to healthcare workers by 81%.
- To be at risk of HIV you need to have had risky contact (eg penetrative sex, sharing a syringe) with a person who has HIV.

5. FURTHER ACTION

1. If status of Patient and Health Care Worker is unknown and immune status can't be obtained within 48 hours then give:-
   (a) Hepatitis B. Immune Globulin
   (b) Hepatitis B. Vaccine (first dose).

2. If the Health Care Worker is HBV immune then no further Hep B Vaccine is required. Check Hep B antibody titre of health care worker and if low give Hepatitis B booster.

3. Give Tetanus Toxoid booster if indicated.

6. FOLLOW UP

i. complete the course of Hepatitis Vaccine.
ii. follow up HIV serology 1, 3 months and 6 months.

X-RAY ASSOCIATES **Nuclear Medicine** **POLICY AND PROCEDURE** **Manual**	PROCEDURE	**MISCELLANEOUS**
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PHARMACEUTICAL TRACKING POLICY

PURPOSE:

- To provide an adequate and safe supply of emergency and procedure drugs for patient use.

PROCEDURE:

1. It is the responsibility of the Nuclear Medicine technologist to maintain and adequate supply of emergency and procedure drugs in the clinics.

2. It is the responsibility of the Nuclear Medicine technologist and/or Cardiac technologist to document all drug inventories on a Pharmaceuticals tracking form on a monthly basis or more frequently as needed when new inventory is received or disposed.

3. It is the responsibility of the Nuclear Medicine technologist and/or Cardiac technologist to store a copy in the stress lab for all the view.

4. It is the responsibility of the Nuclear Medicine technologist to ensure that drugs are not available for use past their expiry dates and are not administered to patients.

X-RAY ASSOCIATES **Nuclear Medicine** **POLICY AND PROCEDURE**	ISSUING AUTHORITY Medical Director: Dr. Siow	
	SIGNATURE	EFFECTIVE DATE

PEDIATRIC DOSAGE FOR NUCLEAR MEDICINE

To determine pediatric dose, please obtain patient's weight and refer to chart below.

Weight in kg (lb)	Fraction	Weight in kg (lb)	Fraction
3 (6.6)	0.1	28 (61.6)	0.58
4 (8.8)	0.14	30 (66.0)	0.62
8 (17.6)	0.23	32 (70.4)	0.65
10 (22.0)	0.27	34 (74.8)	0.68
12 (26.4)	0.32	36 (79.2)	0.71
14 (30.8)	0.36	38 (83.6)	0.73
16 (35.2)	0.4	40 (88.0)	0.76
18 (39.6)	0.44	42 (92.4)	0.78
20 (44.0)	0.46	44 (96.8)	0.8
22 (48.4)	0.50	46 (101.2)	0.83
24 (52.8)	0.53	48 (105.6)	0.85
26 (57.2)	0.56	50 (110.0)	0.88

Reference:
Saha G.B. Fundamentals of Nuclear Pharmacy 5th Edition. Springer-Verlag New York, Inc. 2004; 186

DOSE CALIBRATOR QUALITY CONTROL

DAILY QC:

The daily QC should be conducted at the beginning of each working day, prior to measuring any samples, which will be administered to patients. These tests consist of an Auto Zero operation, a Background Check, a Chamber voltage test, a Data check, and Accuracy test, and a Constancy test.

To begin follow steps below:

1. Ensure there are no external radiation sources nearby before beginning.
2. From the measurement screen , press TEST.

3. Select DAILY to begin the daily test and follow on-screen prompts.
4. When asked for radioactive source, insert Cs-137 S/N 3333-80-1 (stored in large lead container)
5. Record all results. Check that the Accuracy (Dev: %) does not exceed more than 5%. Ensure constancy results for Tc99m and I-123 are not deviated from previous by more than 10%.

LINEARITY QC:
The purpose of linearity QC is to test that accurate reading can be obtained from the high to low activity range. The procedure involves measuring the activity of a strong Tc-99m source (50-60 mCi) and tracking its decay over the course of 3 days. This test is performed initially after installation of a new dose calibrator and every 6 months thereafter.

To begin follow steps below:

1. Measure a high activity Tc-99m source (50-60 mCi) at 8:30 and record results into spreadsheet.
2. At every hour after 8:30 measure and record activity of this same Tc-99m source until 16:30.
3. Continue measurements starting at 8:30 for the next 2 days at every hour.
4. Input all results into spreadsheet.
5. Calculate the Ln functions for each dataset and plot to graph against elapsed time in the x-axis.
6. Next calculate the theoretical activity for each hour by using the initial dataset from day 1 as reference and using the following formula:
   $$\text{Theoretical activity} = \text{reference} \times (1/2)^{(\text{elapsed hour from start}/6)}$$
7. Plot theoretical activity to the same graph in step 5.
8. Compare the two graphs and ensure there is no large deviation.

QUALITY CONTROL FOR SURVEY METER AND CONTAMINATION METER

Survey Meter:

The following quality control steps must be followed at the beginning of the day and before the survey meter is used.

1. Turn dial on Model 3 survey meter to BAT and check in the display panel that the needle deflects to the middle of BAT TEST area.
2. Turn dial to the x1 multiple and hold probe close to a radioactive source (ie. Co-57 sheet source). Check that the needle is deflecting sharply.
3. Turn speaker on by switching the AUD into ON position and check that there is clicking sound.
4. Model 3 survey meter is now ready for use.

Contamination meter:

Follow the steps below for quality check on the Model 3 contamination meter

1. Turn dial on Model 3 contamination meter to BAT and check in the display panel that the needle deflects to the middle of BAT TEST area.
2. Turn dial to the x1 position and hold probe close to a radioactive source (ie. Co-57 sheet source). Check that the needle is deflecting sharply.
3. Turn speaker on by switching the AUD into ON position and check that there is clicking sound.
4. Model 3 contamination meter is now ready for use.

Annual Recalibration:
Both Survey Meter and Contamination Meter are sent to Stuart Hunt for recalibration every year. Calibration due dates are found on the stickers attached to the meters themselves.

For policy on the use of survey meter and contamination meter please refer to Radiation Safety Manual section 3.0.2 and 3.0.3

Policy on Contamination Monitoring

As per Di-Med Services Ltd. Nuclear Medicine Radiation Safety Manual section 2.2

Policy:

Monitoring for Contamination can be done by **indirect or direct methods.**

The **indirect** method of contamination monitoring involves systematically collecting and counting **wipe samples** from workplace surfaces and measuring removable contamination. A wipe test result that exceeds the criteria the area or equipment must be cleaned/decontaminated and re-wiped to determine that it does not remain above the criteria. The re-wipe results must be recorded as well.

The **direct** method involves using portable instruments, in areas with low background radiation, to measure removable and fixed contamination. Appropriate corrective actions (decontaminate-remonitor) must be taken if the measured contamination exceeds limits specified in conditions of the license. Records must be kept of results.

Contamination monitoring should be performed once per day, after spills or accidents, before equipment is released for non-radioactive use, before a decommissioned room is released for non-radioactive use, and on sealed sources.

CNSC Contamination Criteria: The licensee shall ensure that the levels of loose, removable gamma radioactive contamination on all normally accessible working surfaces in a radioisotope laboratory do not exceed the criteria specified. Contamination limits are specific to the radionuclide, see below for classification and limits.

Controlled areas, hotlabs etc.

Class A radionuclides	3Bq/cm2	Cs-137, all alpha emitters and daughters
Class B radionuclides	30Bq/cm2	
Class C radionuclides	300Bq/cm2	Ga-67, Tc99m, Tl-201, Co-57

Supervised public areas, waiting rooms, camera rooms, patient rooms, injection areas.

Class A radionuclides	0.3Bq/cm2	Cs-137, all alpha emitters and daughters
Class B radionuclides	3Bq/cm2	
Class C radionuclides	30Bq/cm2	Ga-67, Tc99m, Tl-201, Co 57

If radionuclides are not used for a prolonged period, a lab not in operation (i.e., >2 weeks) and all radioactive materials are securely stored for the same period, contamination monitoring need not be done, but a record must be kept stating why monitoring was unnecessary for the period involved.

Revised: Sep 17, 2018

Procedure:

Contamination monitoring at Di-Med Services Ltd. will be performed using the indirect monitoring and direct monitoring methods.

Indirect Method	Direct Method
1. Obtain a list of wipe areas for check contamination 2. Wear gloves 3. Lightly moisten wipe with water or alcohol 4. Wipe an area of 100 cm2 using uniform pressure 5. Count wipe using Ludlum Model 44-17 Scintillator/Model 3 Ratemeter and record results in cpm 6. Enter results into Excel spreadsheet to convert cpm to Bq/cm2 7. If contamination is found, decontaminate and repeat wipe 8. Report to RSO if limits are exceeded	1. Obtain a list of areas for checking 2. Wear gloves 3. Check contamination meter (Ludlum Model 44-17 Scintillator/Model 3 Ratemeter); perform battery test, note background level, turn on speaker, and check with source. 4. Switch meter to lowest multiplier, usually x 1 5. Hold probe window 1cm from surface 6. Move probe over surface at rate of 1cm/sec 7. Record results in cpm and enter results into Excel Spreadsheet to convert cpm to Bq/cm2 8. Decontaminate if necessary and repeat wipe 9. Notify RSO if limits are exceeded

Formula for indirect method:

Removable Activity in Bq/cm2=N-NB/E x 60 x A x F Where:
N = total count rate in counts per minute (cpm)
NB = normal background count rate in cpm obtained from a blank wipe
E = instrument counting efficiency expressed as a decimal, for the radioisotope being measured on Ludlum Model 44-17 Scintillator, the counting efficiencies are as follow: Tc99m 0.15 (15%), Tl-201 0.45 (45%), Ga-67 0.29 (29%) - values calculated by CNSC Specialist.
A = area wiped (not to exceed 300cm2)
F=collection factor for the wipe (for indirect method approx. 10% or 0.1)

Formula for direct method:

Activity in Bq/cm2=N-NB/E x 60 x A Where:
N = total count rate in cpm
NB = normal background count rate in cpm
E = instrument counting efficiency
A = area of the detector in cm2 for direct measurements. (17.8 cm2 provided by manufacturer)

Note: MDA for Ludlum Model 44-17 Scintillator is 1.17 Bq/cm2. Please see below for full calculation of MDA.

$$\text{MDA [Bq/cm2]} = \frac{4.65 \times \text{Sqrt (Bkgd[cpm]/Response Time[min])}}{\text{Area[cm2]} \times \text{Efficiency[c/d in decimal]} \times 60\text{[sec/min]}}$$

Where:
Bkgd is background in cpm (600 cpm from Ludlum-44-17 datasheet)
Response Time in min (22 s for Slow Position on Ludlum Model 3 data sheet) (22s x 1s/60min= 0.367 min)
Area of probe in cm2 (17.8 cm2) from Ludlum 44-17 datasheet)
Efficiency in counts/disintegration expressed as a decimal (Tc-99m 0.15, Tl-201 0.45, Ga-67 0.29 – values calculated by CNSC Specialist)

$$= \frac{4.65 \times \text{Sqrt (600/0.367)}}{17.8 \times 0.15 \times 60}$$
= 1.17 Bq/cm2 (Tc99m)

$$= \frac{4.65 \times \text{Sqrt (600/0.367)}}{17.8 \times 0.45 \times 60}$$
= 0.39 Bq/cm2 (Tl-201)

$$= \frac{4.65 \times \text{Sqrt (600/0.367)}}{17.8 \times 0.29 \times 60}$$
= 0.61 Bq/cm2 (Ga-67)

Revised: Sep 17, 2018

Procedure for decontamination of equipment and areas (Sep 2018)

If contamination is detected, the following procedure must be followed:

1. Wear protective clothing during decontamination. At minimum, the staff must wear a lab coat, and two pairs of gloves.

2. Within hot lab, locate spill kit inside cabinet.

3. Find radioactivity absorber (Radiacwash) inside spill kit. For small area, use the spray bottle. For large area, use the big jug and follow instructions on the product for diluting the solution.

4. Use absorbent blue pads and paper towels for picking up contamination

5. Methods used for decontamination include washing, and scrubbing. Minimize the spread of contamination during decontamination operations. Avoid wiping a highly contaminated cleaning towel over a less contaminated surface. Generally, the best technique is to start at the edge of a contaminated area and work toward the area of highest contamination. The exception to this, however, would be to clean highly contaminated areas first if those areas were creating unacceptably high radiation exposure levels.

6. After decontamination, monitor surfaces with survery meter and wipe test to determine presence of loose contamination. Repeat procedure until no loose contamination is detected.

7. Items and surfaces which cannot be decontaminated must be identified and controlled as radioactive material. Contaminated items may be put into shielded storage until the radioactivity has decayed.

8. Ensure all radioactive waste from decontamination is properly collected and bagged for storage in shielded waste containers.

9. Follow section 2.8.5 of RSM for proper storage and disposal of waste.

10. Once decontamination is complete, remove gloves and wash hands thoroughly. Monitor hands, body, lab coat, clothing for contamination.

Revised: Sep 17, 2018

Example MDA Calculations

RADIATION MEASUREMENT SYSTEMS
81 Romeo Crescent, Woodbridge, Ontario L4L 7A2
Phone (905) 856-5950 Fax (905) 851-7473
e-mail: rmsys@rogers.com

November 03, 2008

Ludlum Model 44-17 Scintillator/Model 3 Ratemeter

MDA for Tc-99m

$$\text{MDA [Bq/cm}^2\text{]} = \frac{4.65 \times \text{Sqrt (Bkgd [cpm] / Response Time [min])}}{\text{Area [cm}^2\text{]} \times \text{Efficiency [c/d in decimal]} \times 60 \text{ [sec/min]}}$$

$$= \frac{4.65 \times \text{Sqrt (600/0.367)}}{17.8 \times 0.221 \times 60}$$

$$= 0.80 \text{ Bq/cm}^2$$

Where:

Bkgd is background in cpm (600 cpm from Ludlum 44-17 datasheet)

Response Time in min (22 s for Slow Position on Ludlum Model 3 data sheet) (22 s x 1s/60 min = 0.367 min)

Area of probe in cm^2 (17.8 cm^2) from Ludlum 44-17 datasheet)

Efficiency in counts/disintegration expressed as a decimal (0.221 from calculations below)

Calculation of Efficiency for Tc-99m

1.0 The efficiency for Tc-99m (140 keV gamma) was estimated from the Co-57 (122 keV gamma) response.

2.0 No data was available for the Model 44-17 probe (2" x 2 mm NaI). It was assumed the Co-57 response would be the same as for the Model 44-10 probe (2" x 2" NaI). See attached table of efficiencies for various Ludlum probes.

3.0 A correction was made for the relative yields (Co-57 122 keV 87% + 136 keV 11% = 98%, Tc-99m 90%).

4.0 Calculation is 0.2403 % Eff x (90% Tc-99m yield/98% Co-57 yield) = 0.221 % Eff

GE MILLENIUM MG QUALITY CONTROL SCHEDULE

DAILY FLOODS – EXTRINSIC	To be performed **daily** before beginning any studies. Check flood for any visual non-uniformity and compare with previous flood. Use QC preset on camera and label according to month, which day of the week, and year. Uses Co-57 sheet source.
SYSTEM RESOLUTION AND LINEARITY	To be performed **weekly** for each head Uses bar phantom and Co-57 sheet source. Uses same QC preset as DAILY FLOODS Ensure the lines in the four quadrants are visible and straight. Compare with previous and ensure there is no drastic change.
CAMERA UNIFORMITY ANALYSIS (CUA)	To be performed **weekly** for each head Test is done on both heads with collimators attached Use Co-57 sheet source Check results are satisfactory and that the integral and differential graph stays within the acceptable limit as determined by the red line If results are unacceptable, do not save and repeat CUA. If the 2nd CUA is unacceptable, perform Uniformity Correction and again repeat CUA. If 3rd CUA is unacceptable, call GE service.
CENTRE OF ROTATION (COR)	To be performed **monthly** for each head Suspend Tc99m point source (approx 1mCi) off the end of the bed using a paper tube Verify for each head that the XCOR value is < 5 mm, and X/Y COR variation < 4 mm
UNIFORMITY CORRECTION	To be performed **monthly** for each head Uses Co-57 sheet source. Each flood image acquired for 120 Million counts Save collimator uniformity correction flood to LEHR If defect is found repeat flood again before placing service call to GE.
PREVENTATIVE MEASURE	To be performed **annually** or when service order indicates as per GE healthcare service contract.
QUALITY ADVISOR (QA)	To be informed of any unresolved quality control issues immediately. Discuss and follow-up with quality assurance committee.

XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND** **PROCEDURE** **Manual**	PROCEDURE	**MISCELLANEOUS**
	ISSUING AUTHORITY Medical Director Manager	
	SIGNATURE	EFFECTIVE DATE
LAST REVISION DATE _____ LAST REVIEW DATE _____	REFERENCE	

POLICY: MISADMINISTRATION OF RADIOPHARMACEUTICAL

Misadministration of radiopharmaceutical is defined as:

1. Incorrect route of radiopharmaceutical administration (IV, oral, inhalation)
2. Incorrect dosage administered (i.e. greater than 10% of what is required for test)
3. Incorrect radiopharmaceutical and/or isotope.

Steps to prevent misadministration of radiopharmaceutical

1. Check label on syringe holder for correct A)radiopharmaceutical B)dosage
2. Assay syringe in dose calibrator checking again that dosage matches label
3. Check that the correct patient is identified for the test
4. Check that the correct radiopharmaceutical is used for the test being performed before administration.
5. Administer radiopharmaceutical according to the Policies and Procedures (IV, oral, inhalation) put in place for the test being performed.

In the event a radiopharmaceutical is administered incorrectly, the following steps shall be taken. Procedure:

1. Upon discovery of a misadministration, the patient shall be informed of the incident and a new appointment will scheduled for him/her.
2. The Nuclear Medicine Technologist shall promptly notify the Radiation Safety Officer and Medical Director within 24 hours.
3. The Radiation Safety Officer and Medical Director will be available to discuss the incident.
4. The Nuclear Medicine Technologist shall submit an incidence report to the Radiation Safety Officer and Medical Director within 48 hours. The incidence report will include: the patient's name, technologist's name, a brief description of the event, why the event occurred, the effect on the patient, what actions/improvements are needed to prevent recurrence, what actions were taken as a result of the incident.
5. The incidence report shall be kept on file for five years

XRAY ASSOCIATES **Nuclear Medicine** **Medical Directive: Delegated Act** **IV Insertion** **(radiopharmaceuticals/medicine)**	PROCEDURE	**MISCELLANEOUS**
	ISSUING AUTHORITY Medical Director: Dr. Siow Manager	
	SIGNATURE	EFFECTIVE DATE
LAST REVISION DATE February 2019 LAST REVIEW DATE _____	REFERENCE	

Medical Directive: To insert IV catheters and the Intravenous administration of radiopharmaceuticals and/or medications as deemed appropriate by the Medical Director of Nuclear Medicine for routine NM procedures.

Background: All pharmaceuticals to be injected based on individual protocols. Medications are to be administered as directed by physicians on site.

Directive To: MRTs Nuclear Medicine Technologists

Clinical conditions required: Patient is to meet all the clinical requirements set out in the specific NM procedure guidelines.

Additional conditions required: Patient consent-Verbal. Must check if breast feeding or pregnancy and follow weight-based dosage for pediatric patients. Follow guidelines regarding misadministration of radiopharmaceuticals, radioactive source leak

Contraindications: No patient consent

Competency: All staff must be reviewed annually by the Medical Director or GM.

X-RAY ASSOCIATES

RE: Delegated Act, IV insertion for the administration of radiopharmaceuticals and medication

Nuclear Medicine Technologists performing IV insertion must have an active CMRITO registration in Nuclear Medicine and have the skills and knowledge to perform IV insertion. They also understand the indications and contraindications as outlined by X-Ray Associates. They have been assessed by Dr. Siow, Medical Director of Nuclear Medicine.

As Medical Director, the technologists listed below meet all of the requirements to Perform IV insertion:

Dr. Yin-Hui Siow MD, FRCP(C) _____

Technologist Name:	Signature:	Date:
Eric Kwan		

X-Ray Associates **Ultrasound** **Medical Directives**	PROCEDURE **Injection Procedure**	CODE/NUMBER
	ISSUING AUTHORITY Medical Director NM: Dr. Siow	PAGE
LAST REVISION DATE Feb 2019	SIGNATURE	EFFECTIVE DATE April 23, 2014
	REFERENCE CPSO-Delegation of Controlled Acts-February 2007	

Medical Directive: To insert IV catheter and the Intravenous administration of radiopharmaceuticals and/or medications as deemed appropriate by the Medical Director of Nuclear Medicine for routine NM procedures.

Background: All pharmaceuticals to be injected based on individual protocols. Medications are to be administered as directed by physicians on site.

Directive To: MRT Nuclear Medicine

Clinical Conditions Required: Must be a signed order for the NM exam or direct physician order to inject medication/s.

Contraindications:
1) No Patient Consent.
2) Pregnancy
3) If Breastfeeding: Discuss and get written consent if proceeding with the exam

Obtaining a Verbal consent:
Make sure the patient is informed about the procedures ask if they have any questions
The following must be part of obtaining verbal consent:

ASK the question, "May I proceed??" They must say **YES** for you to proceed.

Procedure:

The procedure will be explained to the patient and **consent** must be obtained verbally or written from the patient.

- A new tourniquet is used for each patient

- Palpate the area and find the best site to inject

- Wipe the area with an alcohol wipe
- Allow to air dry
- Insert catheter and secure
- Inject as per exam order

XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND** **PROCEDURE** **Manual**	PROCEDURE	**MISCELLANEOUS**
	ISSUING AUTHORITY Medical Director Manager	
	SIGNATURE	EFFECTIVE DATE
LAST REVISION DATE _____ LAST REVIEW DATE _____	REFERENCE	

BREAST FEEDING POLICY

PURPOSE:

To provide direction to the mother on breast feeding pre and post Nuclear Medicine

procedures PREPARATION:

Before appointment day:
The mother may pump and store/freeze breast milk for use following the Nuclear Medicine

procedures. GENERAL GUIDELINES:

For Tc99m and or Thallium 201 procedures:

Tc-99m-The mother will be asked to continue pumping milk manually for 12 hours following the Nuclear Medicine procedure and discard.

Thallium-201-The mother will be asked to continue pumping milk manually 7 days following the Nuclear Medicine procedure and discard.

XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND** **PROCEDURE** **Manual**	PROCEDURE	**MISCELLANEOUS**
	ISSUING AUTHORITY Medical Director Manager	
	SIGNATURE	EFFECTIVE DATE
LAST REVISION DATE _____ LAST REVIEW DATE _____	REFERENCE	

POLICY: TO PROVIDE DISCHARGE INSTRUCTIONS TO ALL NUCLEAR MEDICINE PATIENTS:

PURPOSE:

Follow ALARA. To provide direction to patients following nuclear medicine procedures to help reduce radiation exposure.

PROCEDURE:

Tc-99m Procedures: direct the patient to drink at least 4 glasses of water over the next 12 hours and void frequently.

Thallium 201 Procedures: direct the patient to drink at least 4 glasses of water over the 12 hour and void frequently.

XRAY ASSOCIATES **Nuclear Medicine** **POLICY** **AND** **PROCEDURE** **Manual**	PROCEDURE	**MISCELLANEOUS**
	ISSUING AUTHORITY Medical Director Manager	
	SIGNATURE	EFFECTIVE DATE
LAST REVISION DATE _____ LAST REVIEW DATE _____	REFERENCE	

Sealed radioactive source leak test sampling procedures

1. Prior to collecting a leak test sample, complete all the information required by the leak test sampling certificate and leak test kit.
2. Confirm that the information on your inventory record agrees with the information included with the device.
3. Take one of the two Q-Tips supplied with the leak test kit and moisten it with water or cleaning solvent and wipe the source holder on any seams.
4. Repeat step 3 with a dry Q-Tip.
5. Return the completed leak test kits and a signed copy of the leak test sampling certificate to designated service provider. The time span between sampling and analysis should be kept as short as practical but shall not exceed 10 working days.

Canada posts prohibits sending potential radioactive material; by mail. Use a courier of your choice.

Caution: After a leak test sample has been collected, treat the sample as being contaminated with radioactive material until proven otherwise.

Frequency: Every 6 Months!

X-RAY Associates

955 Major Mackenzie Drive, Suite 102
Vaughan, ON L6A 4P9
Phone: 289-553-6336 Fax: 289-553-6339

September 06, 2018

Policy on Radiation Deliveries by ISOLogic Innovative Radiopharmaceuticals

1. All ISOLogic couriers must have a valid TDG certificate authorized by ISOLogic Innovative Radiopharmaceuticals. A confirmation letter to this commitment is made available to X-Ray Associates.

2. ISOLogic couriers will be provided with 3 access keys: 1 to main clinic door, 1 to Nuclear Medicine Main door and 1 to Hot Lab.

3. Radioactive packages and documentation should be delivered directly into the Nuclear Medicine Hot lab, which is located within the Nuclear Medicine Suite. All doors should be locked when leaving.

4. Courier staff should be familiar with X-Ray Associates Emergency Procedures below. A staff list with signatures of training on these procedures should be made available to X-Ray Associates when requested.

5. If there is any concern, call **RSO, Eric Kwan**
   i. Home: 647-794-7124
   ii. Cell: 647-688-2561
   iii. Clinic main: 905-751-1500

ISOLOGIC
Innovative Radiopharmaceuticals

ISOLogic Innovative Radiopharmaceuticals
5450 Harvester Road, Burlington ON L7L 5N5
905-333-1789 (T) 905-333-5923 (F)

Di-Med Services LTD. Aurora **125 PEDERSEN DR** **UNITS 3, 4, & 5** **AURORA, ON.** **L4G 0E3**	**Di-Med Services LTD. Vaughan** **955 MAJOR MACKENZIE DR W, STE 102** **VAUGHAN, ON.** **L6A 4P9**

06-SEP-2018

To whom it may concern,

The purpose of this letter is to confirm Isologic Innovative Radiopharmaceuticals' commitment to transporting radiopharmaceuticals safely, legally, and in compliance with all prescribed regulation.

All Isologic couriers have been subject to formal job interviews and background verification checks prior to hire. Isologic couriers are properly trained and tested in accordance with company policy and most current versions of Transport Canada's Transport of Dangerous Goods Regulations, as well as CNSC Packaging & Transport of Nuclear Substances Regulations. In addition, refresher training is conducted on an annual basis as part of our extensive training program. Certificates of training are issued and carried by Isologic couriers at all times while ensuring a complete and proper chain of custody for delivery.

Isologic Type A approved packaging is transported by couriers, and test documentation certifying that the packaging meets Type A package design requirements is on file. Type A Packages containing radioactive material are constantly under the control of Isologic courier personnel and are delivered to a secure, access-controlled location designated by the customer.

As a leading manufacturer of radiopharmaceuticals, we are committed to following all applicable rules and regulations ensuring the safe and legal transport of hazardous materials.

If you have any questions on regulatory compliance or require additional information, please don't hesitate to contact me or our Radiation Safety Officer David Ritthaler at 905-333-1789.

Kind regards,

Carlos Fachada
Facility Manager
Isologic Innovative Radiopharmaceuticals
Burlington, ON

X-RAY Associates
Emergency Procedure for Nuclear Medicine

1. **<u>Damage or spill of Radioactive Materials packages.</u>**

   a.) **If a package containing Radioactive Materials is suspected to be damaged in the transport vehicle, the package should not be delivered into the clinic.**

   b.) **If a package is delivered into the Hot lab and damage or leakage is suspected:**

   - **Every attempt should be made to contain and isolate the damaged packages.**
   - **Obtain spill kit located in the lab for supplies**
   - **The area should be barricaded from other persons having access to the area. Block area with a caution tape.**
   - **Contact the RSO listed on page one ASAP.**

2. **<u>Theft of Radioactive Materials:</u> If theft of Radioactive Materials is suspected contact the RSO ASAP.**

3. **<u>Fire policy: REACT</u>**

   R-Remove any occupants from area.

   E-Ensure containment of fire.

   A-Activate Alarm.

   C-Call 911 for Fire Dept.

   T-Try fire extinguisher or evacuate.

   - **Notify the fire dept on arrival as to the type and amount of radioactive materials involved.**
   - **Contact the RSO listed ASAP.**

This is a federal publication which is of broader scope than the HARP Act. It includes installation requirements, machine specifications and recommendations of how x-ray procedures should be carried out. This must be printed and kept on site.

IHFA

This act regulates Independent Health Facilities in Ontario. It focuses on the overall function of a facility including office and imaging procedures and the employees and polices regarding the employees.

RHPA

The Regulated Health Professions Act defines and regulates various medical professions. The College of medical radiation Technologist of Ontario is the governing body for Medical Radiation technologists.

RED Act (Radiation Emitting Devices)

This mainly outlines the manufacture of imaging equipment.

HARP COMPLIANCE TESTING:

This testing was legislated in 1980 and must be completed every 6 months and following any major repairs or relocation of equipment. Several tests are done to evaluate the safety and consistency of all Ionizing radiation in Ontario. It defines who may prescript and perform examination, how machines should perform and how this is to be assured. PMs will be done on at least an annual basis. All HARP testing must be signed off by the Quality Advisor. All deficiencies must be followed up immediately and documentation must be recorded and maintained on site.

QUALIFIED PERSONNEL

The Quality Advisor shall be ultimately responsible for maintaining all policies. The Radiation Protection officer shall ensure that the control of radiation is in accordance with the standards as outlined by Federal and Provincial legislation. (Dr. Zia) The President (Dr. Yeung) and General Manager of Diagnostic Imaging Services shall administer a program of quality assurance that will enable the aforementioned standards to be met.

A) Registered Technologist:

This person will be the responsible use of the equipment and will a fully qualified registered technologist in good standing with the CMRITO. A record of their current CMRITO (My Info page) must be on site. All technologists must have a current CPR/First Aid and the record must be on site. They must maintain education as per their modalities and this must be kept on site.

B) Radiation Protection Officer/Quality Advisor

Dr. Zia is the QA and RPO for all sites. There must be a signed letter confirming this kept at each site. This delegate accepts the responsibilities as detailed in the HARP Act Regulation Section 7.

METHODS-SAFETY

Inlight Nova Dosmieter (TLDs)

1. All staff of Diagnostic Imaging Services must be monitored with a thermo-luminescent dosimeter as provided by Health and Welfare Canada Radiation Protection Bureau. All x-ray workers shall wear these dosimeters throughout the working day. When not in use, badges shall remain on the premises and be kept at a central storage point. Staff will keep a monitor at each clinic that they work. DO NOT transfer monitors clinic to clinic.
2. X-ray workers shall be advised of the results of the monitoring program. The Radiation Safety Officer shall investigate any over exposure.
3. IND results must be signed by all staff and the most recent must be posted on site.
4. IND cannot be shared amongst workers.
5. IND are sent to a Monitoring Program every 3 months.
6. An x-ray worker should report confirmed pregnancy to the Radiation Safety Officer, who will then 'determine her future.
7. The maximum permissible dose levels should be tabulated in the code.

RPB
Health and Welfare
Radiation Protection Bureau
775 Brookfield Road
Ottawa, Ontario
K1A 1C1 Phone Number: 1 800 268-0902

Protective aprons and gloves must be of a thickness appropriate to the work done. Regular annual testing by radiological methods as shall be performed to ensure the integrity of the protective apparel. Lead will also have a visual inspection and any deficiencies must be reported to the General Manager and the Lead Radiographer.

Gonadal and thyroid protection shall be employed with children and adults in reproductive age range and ALL ages, in respect of both primary and scattered radiation, provided there will be no interference with the diagnostic image.

Minimum number of views should be taken and great care must be given to avoid a repeat examination. High kV techniques should be used.

Chest, Abdomen, Lumbar spine etc. should be measured in consideration given to the subject type and pathology prior to the selection of factors in order to minimize repeat exposure due to incorrect techniques. i.e. Plan of breathing.

Daily calibration of x-ray and BMD equipment must be done.

Monthly repeat/reject rate is done for x-ray. A rate over 4% must be reviewed.

Technique charts must be available including pediatric which must be include infant age and weight. All routine views and special views must be available at each site.

Exposure factors if they do not appear on the PACS image overlay must be manually included in the patient documentation, along with lead shielding, not pregnant verification and technologist initials.

A) WARNING SIGNS

Warning signs to alert pregnant females are essential. The entrance door of the x-ray room has a warning signs displayed to alert people to the presence of x-ray equipment. Pregnancy warning signs must also be in the waiting areas and change rooms.

B) ENTRANCE DOORS

The entrance doors to the x-ray room, including patient's cubicles, should be kept closed while a patient is in the room. All x-ray room doors, shall be closed during x-ray exposure.

C) THE CONTROL AREA

In the x-ray room, the control switch of the radiographic machine shall be located so that the operator must remain in the protected area when making an exposure. While remaining in the control area, the technologist must have a clear view of the patient and be able to communicate with him/herThe control area should be free of objects that significantly reduce the protected area available to the operator.

D) USAGE OF X-RAY ROOM

The x-ray room is not to be used for more than one radiological investigation simultaneously.When examining patients, please take the following precautions:

1. Keep the doors closed.
1. Use sponges and sandbags for immobilization.
2. Shield all patients, especially children.
3. Technologists cannot hold patients.
4. All persons holding patients during exposure are to wear aprons, gloves etc.

E) PRECAUTIONS FOR ELECTRICAL AND RADIATION HAZARDS

- Dry hands before handling any electrical equipment.
- Protect electrical cords from damage. Do not run stretcher or wheelchairs across foot switches, cords, etc.
- Turn off (or as instructed by the manufacturer) at the end of the day.
- Ensure a safe environment when working with electrical or radiation equipment
- Report all broken twisted, frayed wires to service
- Report all equipment malfunctions to service
- Remove patients to a safe area if a malfunction occurs i.e. burning smell, sparking, circuit breaker activation, overheating, minor shock or unusual noise.
- In the event of any electrical emergency, turn off the main power switch before handling any part of the equipment.
- Contact RPO, RSO and General Manager

F) ESSENTIAL PERSONS

Only those persons whose presence is essential shall be in the x-ray room when an exposure is carried out. Children should have only one parent to assist. Assistance may be required from a family member or friend of the patient. These assistants can stand away from exposure unless holding a patient. i.e translator, elderly, infirm, emotionally disturbed patient. OB patients see ultrasound.

G) PATIENT SAFETY Be aware of where your patient is at all times. The tube head or other objects must not be in the way of the patient before or after the exam. Never leave a young child unattended

IMAGING/CONSENT/PROTECTIVE DEVICES

A. **PATIENT IDENTIFICATION:** Patient identification must be verified by date of birth. Confirm the examination order is correct before proceeding. Confirm order in RIS. Right or Left markers in anatomical position must be present on all images. Adding markers post processing is not an acceptable practice. It should only be used on occasion that the original was not seen. The following are mandatory to be recorded on all exams.
   a. **LAU: lead apron used**
   b. **TPU: thyroid protectin used**
   c. **Pb used: lead protection used**
   d. **NCP: no chance pregnancy (also a box on the requisition to confirm)**
   e. **Markers**
   f. **Technologist initials**
   g. **History: technologist supplement if necessary**
   h. **Technique: Kvp and mAs**

B. **BREATHING:**The technologists should instruct all patients before the x-ray is taken, what to expect and what is expected during the examination, e.g. they should be instructed on how to breathe or instructed to cease breathing entirely during the x-ray exposure. This reduces movement and eliminates the need for repeat exposures.

C. **COLLIMATION:** Proper collimation is extremely important in protection and must be used to ensure minimum field sized for all radiographic examinations. Evidence of collimation should appear whenever possible but non-compliance with this requirement is not cause for repeating the radiograph. Restricting the X-ray beam by collimating reduces not only the volume of tissue radiation but also the dose at any point of the scatter radiation. Reducing scatter also increases image quality by increasing radiographic contrast.

D. **PROTECTIV E SHIELDING:** Protective shielding must be used on all patients; especially those of child bearing age. Either a' /z or full apron must be used when it does not interfere with diagnostic procedure. Gonad shielding shall be used with children and adults in reproductive age range, provided there will be no interference with the diagnostic image. A thyroid collar protection should be used whenever possible (see shielding policy and procedure)

E. **SUPPORTIVE DEVICES:** Personnel should use supportive devices whenever necessary- i.e.- sandbags, sponges and any other immobilizing device provided to prevent movement and to minimize holding of patients.

F. **SMALL CHILDREN**: Special devices shall be used whenever possible for immobilization of small children. Any shielding methods possible are to be used. Never leave a young child unattended.

G. **CONSENT** must be obtained for all exams. It may be verbal or if the patient is pregnant then written consent must be obtained. Patients must be made aware that they will be touched and positioned. If possible the patient should move themselves to prevent injury to the technologist.

H. **PATIENT MOBILITY:** Always be beside the patient when getting off or on a table. Patient chairs must not have wheels, unless they are can be locked. Before leaving a patient alone in a

room, make sure the patient will remain safe. Restraining devices must be used where warranted.

I. **LANGUAGE:** Patients who cannot speak your language, should have a family member assist or find someone in the clinic to translate where possible.

J. **The control area** of x-ray rooms shall be kept free from objects that would significantly reduce the protected area available to operators. The exposure cord cannot extend outside of the lead protected control panel. From the control panel you must have a clear view of the patient and be able to communicate with the patient.

K. **ALARA**: The minimum number of views to produce the best examination is required.

L. **Additional views** are to be taken only if the radiologist or referring physician is consulted. The reason and who was consulted must be recorded on the requisition.

M. **RADIATION OVEREXPOSURE**: In the event of equipment failure or suspected unusual radiation exposures, turn the equipment off, inform the radiologist immediately, and advise the Radiation Safety Officer. The Ministry of Health must be notified within 5 working days.

N. **NON PHOTOTIMING:** Chest, abdomen and lumbar spine must be measured if phototiming is not used. Technical factors must be recorded on the requisition.

PREGNANT PERSONS:

A: Patients who are pregnant or may be, should not be x-rayed, especially during the first (4) months.

A: Although, as stated previously in this manual, warning signs are displayed for all potentially pregnant women to see. The technologist should ask women of childbearing age if there is any chance that she could be pregnant. The 10 day rule must be followed.

C. A pregnant woman that must NEVER hold or assist and be present during an exposure.

D: Before an x-ray examination of a pregnant woman is undertaken the technologist should have the approval of the referring physician and the radiologist. Views must be reduced if possible. This should be noted on the requisition. A pregnancy release form must be signed and scanned into PACS. If the x-ray examination is still considered essential, exposure should be kept to an absolute minimum And full use of gondola protection without interfering with the diagnostic area, extra shielding should be used over the abdominal and pelvic area Also, a well-collimated beam must be used.

NOTE: Radiography of the pelvis area should be undertaken on the tenth day following the onset of menstruation, if possible, since the risk of the pregnancy is minimal during this period of time ("TEN DAY RULES")

***where possible ultrasound should be the go to exam and not radiographic methods

WORKERS:

A female technologist should be encouraged to notify her employer if she believes herself to be Pregnant in order that appropriate steps be taken to ensure that her work during the remainder of the pregnancies are compatible with accepted maximum radiation exposure. A dosimeter must be worn at all times by a technologist at all time. Special limits apply to confirmed pregnant workers. They may request more frequent dosimeter readings.

DI-MED SERVICES LIMITED o/a X-RAY ASSOCIATES
955 Major Mackenzie Drive, Suite 216
Vaughan, Ontario, L6A 4P9 Phone:289.553.5040 Fax:289.553.5042

To Whom it May Concern: This is to advise that I

_____

Date of Birth_____am_____weeks pregnant with

an expected date of delivery _____

I wish to have a_____X-Ray exam. I am fully aware of the

possible risks to my pregnancy and absolve the radiologists and staff of Di-Med services Ltd of all

Responsibility for any resulting X-Ray related problem.

Patient Name:_____

Sigture:_____

Date: _____

Witness name:

_____

Witness Signature:

_____

HOLDING PATIENTS:

A. REGISTERED TECHNOLOGISTS:

Registered technologists should not hold a patient during a radiation exposure. Since the technologist is working alone at the clinic, she/ he is required to take the exposure.

B. PREGNANT PERSONS:

At no time, under any condition, is a pregnant staff member, patient, or other pregnant person to hold a patient.

C. **OTHER STAFF OR PERSONNEL:** If other staff from the building, parents or escorts are asked to hold a patient or to assist with a procedure, they must be provided with protective aprons, thyroid collar and gloves and be positioned as to avoid the useful beam. No one person should regularly perform these duties. When this cannot be avoided, personnel who routinely participate in radiological procedures, and others likely to receive excessive doses of radiation, must also wear personal monitors.

MAINTENANCE OF RECORDS

A) The following records must be organized by room and available on site for 6 years:

HARP testing/ PMs/ Service

Apron testing/ Screen and Cassette QC

CMRITO current registrations, education

CPR/First Aid

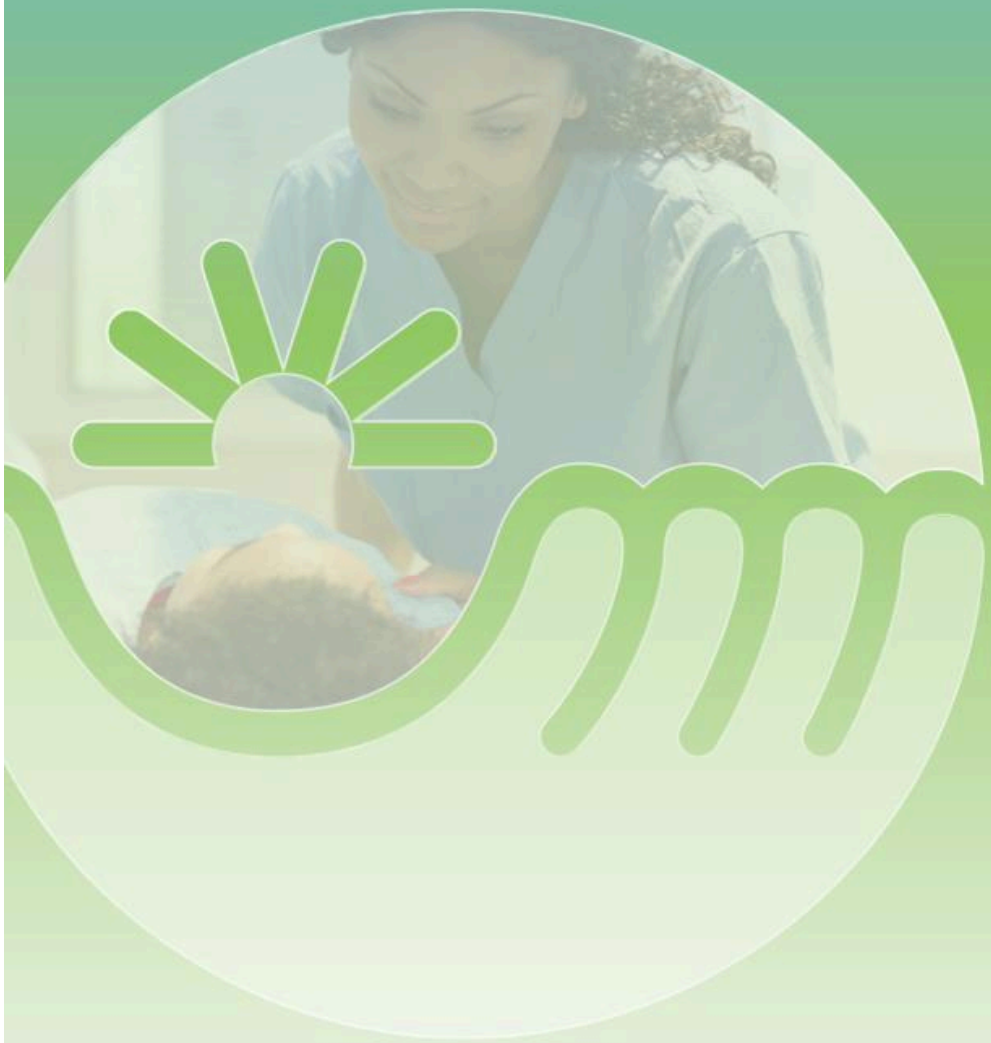
RPO/Quality Advisor signed Letter

Reference Books/HARP Act/

IHFA

Safety code 35 (old 20-A) posted on Intranet

Policy and Procedure Manual: Signed Annually



CMRITO
Regulator of medical radiation and imaging technologists in Ontario

CMRITO STANDARDS OF PRACTISE

Introduction

The Standards of Practice have been developed by the College of Medical Radiation and Imaging Technologists of Ontario[1] (CMRITO or the "College") to describe the expectations for professional practice of members of the College. The Standards of Practice describe what each member is accountable and responsible for in practice. They represent performance criteria for members and can be used to interpret the scope of practice to the public and other health care professionals.

In the Standards of Practice, "members" refers to all members of the CMRITO; that is, members in all of the five specialties: radiography, radiation therapy, nuclear medicine, magnetic resonance and diagnostic medical sonography. In the Standards of Practice, "profession" refers to the profession of medical radiation and imaging technology, which includes all of the five specialties: radiography, radiation therapy, nuclear medicine, magnetic resonance and diagnostic medical sonography.

The Standards of Practice reflect the knowledge, skills and judgement that members need in order to perform the services and procedures that fall within the scope of practice of the profession.

The *Regulated Health Professions Act* and the companion health profession Acts govern the practice of regulated health professions in Ontario. For this profession, the companion Act is the *Medical Radiation and Imaging Technology Act* (MRIT Act). The *Medical Radiation and Imaging Technology Act* sets out the scope of practice statement for the profession, as follows:

" The practice of medical radiation and imaging technology is the use of ionizing radiation, electromagnetism, soundwaves and other prescribed forms of energy for the purposes of diagnostic or therapeutic procedures, the evaluation of images and data relating to the procedures and the assessment of an individual before, during and after the procedures."

The *Medical Radiation and Imaging Technology Act* also sets out which of the controlled acts as set out in the *Regulated Health Professions Act*, members are authorized to perform. These are known as authorized acts. The *Medical Radiation and Imaging Technology Act* states:

[1] On January 1, 2020, the *Medical Radiation and Imaging Technology Act, 2017* (MRIT Act) came into force. The MRIT Act changed the name of the College of Medical Radiation Technologists of Ontario to the College of Medical Radiation and Imaging Technologists of Ontario, and the name of the profession to the medical radiation and imaging technology profession.

" In the course of engaging in the practice of medical radiation and imaging technology, a member is authorized, subject to the terms, conditions and limitations imposed on their certificate of registration, to perform the following:

1. Administering substances by injection or inhalation.

2. Tracheal suctioning of a tracheostomy.

3. Administering contrast media, or putting an instrument, hand or finger,

• Beyond the opening of the urethra,
• Beyond the labia majora,
• Beyond the anal verge, or
• Into an artificial opening of the body.

4. Performing a procedure on tissue below the dermis.

5. Applying a prescribed form of energy."

The Standards of Practice are intended to be generic. The indicators that follow each Practice Standard indicate the application of the Practice Standard in a specific dimension of practice. Most indicators refer to tasks that are common to all members. Indicators that refer to tasks generally performed only by members in one of the specialties are listed under separate headings. The methods for implementing each task may be determined by departmental policies and procedures.

In the event that the Standards of Practice set a standard that is higher than departmental policy or procedure, the member must comply with the standard set by the Standards of Practice. In the Standards of Practice, the term "legislation" refers to both statutes and regulations.

Under the College's Standards of Practice, members of the College are expected to be:

Competent: meaning to have the necessary knowledge, skills and judgement to perform safely, effectively and ethically and to apply that knowledge, skill and judgement to ensure safe, effective and ethical outcomes for the patient. This means that members must maintain competence in their current area of practice, must refrain from acting if not competent, and must take appropriate action to address the situation.

Accountable: meaning to take responsibility for decisions and actions, including those undertaken independently and those undertaken as a member of a team. This means that members must accept the consequences of their decisions and actions and act on the basis of what they, in their clinical judgement, believe is in the best interests of the patient. **3**

Collaborative: meaning to work with other members of the health care team to achieve the best possible outcomes for the patient. This means members are responsible for communicating and coordinating care provision with other members of the health care team, and taking appropriate action to address gaps and differences in judgement about care provision.

Members must take appropriate action if they feel these interests are being unnecessarily and unacceptably compromised. This includes not implementing ordered procedures or treatment plans that, from their perspective, appear to be contraindicated, and in this event, taking appropriate action to address the situation.

1. Legislation, standards and ethics

In order to be registered as a member of the College of Medical Radiation and Imaging Technologists of Ontario, members must meet the professional education and other registration requirements set by the College. They must continue to educate themselves about practical, legal, ethical and other matters pertaining to the profession. Members must be competent, accountable and collaborative in their practice.

Practice Standard: Members must understand, and adhere to, the legislation governing the practice of the profession, the Standards of Practice set by the College, the Code of Ethics and the by-laws of the College.

Indicators

Members must:

a. have the knowledge, skills and judgement to perform procedures undertaken in the course of the practice of the profession

b. take responsibility for decisions and actions, including those undertaken independently and those undertaken as a member of the team

c. work with other members of the health care team to achieve the best possible outcomes for the patient

d. adhere to all relevant provincial and federal legislation and guidelines governing the practice of the profession

e. adhere to the Standards of Practice set by the College

f. adhere to the Code of Ethics and the by-laws of the College[4]

g. adhere to all regulations made under the *Medical Radiation and Imaging Technology Act* including:

• Quality Assurance
• Registration
• Professional Misconduct
• Advertising

2. Equipment and materials

The practice of members entails the use of a wide range of equipment and materials. Members must know and understand the functions, capabilities, specifications and hazards of the equipment and materials they use in the course o f their practice.

Practice Standard: Members must have the knowledge, skills and judgement to select the appropriate equipment and materials for procedures ordered by a physician or other authorized health professional, to make determinations as to the quality, serviceability and operability of the equipment and materials, and to take any corrective actions required to meet standards set by legislation, facility policies and manufacturers' guidelines. Members must be skilled in making safe, efficient and effective use of resources to produce the desired examination information or deliver safe, effective treatment.

Indicators

Members must:

a. ensure the room is prepared for the procedure specified in the order

b. select and set up the equipment and materials needed for the procedure specified in the order

c. select the correct substances to be administered orally, by injection or inhalation, or into the body through an orifice

d. prepare diagnostic or therapeutic substances as required

e. conduct the required quality control tests, or ensure that the required quality control tests have been conducted, on each piece of equipment and any materials used in the ordered procedure, according to the applicable legislation and the facility policies and manufacturers' guidelines

f. ensure that the results of quality control tests are acceptable

g. if quality control tests are not within acceptable limits, take corrective action to ensure that the standards set by legislation, facility policies and manufacturers' guidelines are met

h. determine the quality, serviceability, and operability of the equipment and materials to be used in the procedure in accordance with the standards se t by legislation, facility policies and manufacturers' guidelines, and if the standards are not met, take corrective action

i. determine, set and verify the technique and protocol to be used in the procedure

j. verify all required immobilization and/or beam modification devices

k. make use of appropriate shielding devices

In addition, members in the specialty of radiation therapy must:

l. prepare or construct immobilization or personalized devices and/or beam modification devices as required

In addition, members in the specialty of magnetic resonance must:

m. administer and follow the necessary safety precautions for entry to the magnet room

In addition, members in the specialty of nuclear medicine and radiation therapy must:

n. dispose of expired, unused or contaminated eluate, radioactive materials and all administrative devices in accordance with legislation and established safety protocols

o. store radiopharmaceuticals and radioactive materials according to manufacturers' specifications

In addition, members in the specialty of diagnostic medical sonography must:

p. clean and/or reprocess transducers, or ensure that transducers are cleaned and/or reprocessed after each patient use in accordance with the manufacturers' guidelines, other applicable guidelines and the facility policies

q. use, store and dispose of ultrasound gel and gel containers in accordance with applicable guidelines and the facility policies

3. Diagnostic and therapeutic procedures

Members employ ionizing radiation, radiopharmaceuticals, electromagnetism and soundwaves to create images and data that are part of diagnostic imaging examinations or that are used for defining and recording treatment parameters. These images may be dynamic, on film, digital displays, three-dimensional models or templates. Members in the specialties of radiation therapy and nuclear medicine administer ionizing radiation to treat cancer and other diseases.

Members who apply ionizing radiation do so under the authority of and in accordance with the *Healing Arts Radiation Protection Act* and, where applicable, the *Nuclear Safety and Control Act* and their respective regulations. Members are permitted to apply electromagnetism for magnetic resonance imaging under an exemption set out in the Controlled Acts regulation made under the *Regulated Health Professions Act*. Members are also permitted to apply soundwaves for diagnostic ultrasound under an exemption set out in the Controlled Acts regulation made under the *Regulated Health Professions Act*.

Members perform five controlled acts, which they are authorized to perform under the *Medical Radiation and Imaging Technology Act*. These are:

1. administering substances by injection or inhalation;
2. tracheal suctioning of a tracheostomy;
3. administering contrast media or putting an instrument, hand or finger,
• beyond the opening of the urethra,
• beyond the labia majora,
• beyond the anal verge, or
• into an artificial opening of the body;
4. performing a procedure on tissue below the dermis; and
5. applying a prescribed form of energy.

Practice Standard: Members must be able to create images and data that are sufficiently accurate and clear for the diagnostic or therapeutic procedures that are ordered by a physician or other authorized health professional. In the case of procedures that use ionizing radiation, members use only the minimum amount of radiation necessary during the course of the procedure. Members performing procedures using soundwaves for diagnostic ultrasound use the minimum acoustic power output and minimum exposure time. Members must be proficient in evaluating the images, data and tests relating to the procedures to ensure that the images, data and tests are satisfactory.[7]

Members must be able to administer ionizing radiation, radiopharmaceuticals, electromagnetism for magnetic resonance imaging and soundwaves for diagnostic ultrasound accurately and in accordance with the order of the physician or other authorized health professional for the diagnostic or therapeutic procedure and the applicable legislation. Members must not apply or administer ionizing radiation or radiopharmaceuticals unless the conditions under the applicable legislation (including without limitation, the *Healing Arts Radiation Protection Act* and its regulations and the *Nuclear Safety and Control Act*, its regulations and licences issued thereunder) have been met.

Under the *Medical Radiation and Imaging Technology Act*, members are authorized to perform five controlled acts ("authorized acts") as required in the course of engaging in the practice of the profession. They must not perform the authorized acts or any exempted controlled act unless the conditions under the *Regulated Health Professions Act*, the *Medical Radiation and Imaging Technology Act* and their respective regulations, and the Standards of Practice have been met.

Indicators

Members must:

a. perform procedures involving the application or administration of ionizing radiation only when the conditions under the applicable legislation have been met (This includes, without limitation, the *Healing Arts Radiation Protection Act* and its regulations and the *Nuclear Safety and Control Act*, its regulations and licences issued thereunder.)

b. perform only those controlled acts that have been authorized or exempted or excepted under the legislation or delegated in accordance with the legislation and the Standards of Practice[2]

c. perform authorized acts or delegated or exempted controlled acts only when the conditions under the legislation and the Standards of Practice have been met

d. ensure that the appropriate order authorizing the performance of the procedure is in place:

1. for application of ionizing radiation: the order must be from a physician or other authorized health professional listed in the *Healing Arts Radiation Protection Act* or regulations

[2] Members may accept delegation of other procedures that are controlled acts under the *Regulated Health Professions Act* and not authorized to members under the *Medical Radiation and Imaging Technology Act* provided they comply with the *Regulated Health Professions Act* and the Standards of Practice as set out in Practice Standard 6, Professional relationships.

2. for nuclear medicine procedures: the order must be from a person authorized under the regulations made under the *Public Hospitals Act* or in accordance with the generally accepted professional standards established under the *Independent Health Facilities Act*

3. for application of electromagnetism for magnetic resonance imaging procedures: the order must be from a physician or another authorized health professional listed in the Controlled Acts regulation made under the *Regulated Health Professions Act*, and in accordance with that regulation

4. for application of soundwaves for diagnostic ultrasound procedures: the order must be from a physician or another authorized health professional listed in the Controlled Acts regulation made under the *Regulated Health Professions Act*, and in accordance with that regulation

5. for authorized acts (other than the application of electromagnetism for magnetic resonance imaging procedures or the application of soundwaves for diagnostic ultrasound procedures): the order must be from a physician

e. perform procedures, including authorized acts, only in the course of engaging in the practice of the profession

f. not perform procedures contrary to any terms, conditions or limitations placed upon the member's certificate of registration

g. have and apply the necessary knowledge, skills and judgement to perform and manage the outcomes of performing the procedure safely, effectively and ethically

h. ensure that patient consent has been obtained

i. be responsible and accountable for performing the procedure and managing the outcomes having considered:

1. the known risks to the patient in performing the procedure

2. the predictability of the outcomes in performing the procedure

3. whether the management of the possible outcomes is within the member's knowledge, skill and judgement given the situation

4. any other factors specific to the situation to ensure the procedure is implemented safely, effectively and ethically[9]

j. not perform any procedure or provide any advice which may result in serious bodily harm unless that procedure or advice is within the scope of practice of the profession or the member is authorized or permitted to do so by legislation

k. position the patient as required for the diagnostic or therapeutic procedure

l. ensure the area to be diagnosed or treated will be displayed on the resultant image or captured electronically

m. use radiation protection devices and other patient protection devices as required

n. instruct the patient on breathing and movement procedures

o. ensure that the orientation of the body and other pertinent parameters are marked correctly on the images and data

p. ensure the exposure provides optimum image quality while using minimal radiation

q. ensure examination results (images and data) provide all the information requested in the order

r. carry out the procedures ordered

s. assess the patient's condition before, during and after the procedure or course of treatment

t. respond to any change in the patient's condition during or after the procedure or course of treatment

u. complete the procedure, advise the patient of any post-procedural care, and transfer the care of, or release, the patient

In addition, members in the specialty of radiography, nuclear medicine, magnetic resonance and diagnostic medical sonography must:

v. determine if the images and/or data are of sufficient diagnostic quality or if additional or repeat images are necessary

In addition, members in the specialty of magnetic resonance must:

w. perform procedures involving the application of electromagnetism for magnetic resonance imaging only when the conditions under the *Regulated Health Professions Act*, the *Medical Radiation and Imaging Technology Act* and their respective regulations have been met

In addition, members in the specialty of diagnostic medical sonography must:

x. perform procedures involving the application of soundwaves for diagnostic ultrasound only when the conditions under the *Regulated Health Professions Act*, the *Medical Radiation and Imaging Technology Act* and their respective regulations have been met

y. use the minimum acoustic power output and minimum exposure time to obtain the optimum image quality and the necessary clinical information

In addition, members in the specialty of radiation therapy must:

z. develop and/or interpret a treatment plan for each

patient aa. calculate treatment doses and duration of

administration bb. ensure use of record and verification

systems

cc. identify the treatment field and treatment volumes

dd. determine if the image verifies treatment parameters or if a repeat image is necessary

ee. assess and match the treatment verification image with the reference image and make required adjustments to patient position

ff. select and/or verify treatment parameters

gg. administer treatment

4. Safe practice

Members operate equipment, apply ionizing radiation, electromagnetism for magnetic resonance imaging and soundwaves for diagnostic ultrasound, and administer radiopharmaceuticals. All of these could be dangerous if used incorrectly. Members endeavour, at all times and in every aspect of their practice, to reduce the risk of harm to their patients, to themselves, to their colleagues and to any other individuals who may be present in the practice environment.

Practice Standard: Members must have and maintain the knowledge, skills and judgement to practise safely by adhering to all relevant provincial and federal legislation and guidelines, departmental protocols and policies and manufacturers' directions pertaining to health and safety. In the event of any unexpected problems or emergencies, members must be competent and prepared to handle or to assist in the management of the situation.[11]

Indicators

Members must:

a. observe all departmental and facility policies and relevant provincial and federal legislation and guidelines pertaining to health and safety, such as:

1. *Regulated Health Professions Act* and its regulations

2. *Medical Radiation and Imaging Technology Act* and its regulations

3. *Public Hospitals Act* and its regulations

4. *Independent Health Facilities Act* and its regulations

5. *Healing Arts Radiation Protection Act* and its regulations

6. *Occupational Health and Safety Act* and its regulations

7. *Nuclear Safety and Control Act* and its regulations and licences issued thereunder

8. *Radiation Emitting Devices Act* and its regulations

9. *Transportation of Dangerous Goods Act* and its regulations

10. *Health Protection and Promotion Act* and its regulations

11. Health Canada's Technical Reports and Publications, including:

- Safety Code 20A – X-Ray Equipment in Medical Diagnosis Part A: Recommended Safety Procedures for Installation and Use, 1980

- Safety Code 26 – Guidelines on Exposure to Electromagnetic Fields from Magnetic Resonance Clinical Systems, 1987

- Safety Code 30 – Radiation Protection in Dentistry, 1999

- Safety Code 35 – Safety Procedures for the Installation, Use and Control of X-ray Equipment in Large Medical Radiological Facilities, 2008

- Safety Code 36 – Radiation Protection and Quality Standards in Mammography - Safety Procedures for the Installation, Use and Control of Mammographic X-ray Equipment, 2013

12. As Low As Reasonably Achievable (ALARA) principle

b. conduct the appropriate quality control tests, or ensure that the appropriate quality control tests have been conducted, for all equipment and substances to be used in the diagnostic or therapeutic procedure

c. take corrective action if quality control tests are not within acceptable limits

d. use substances only before their expiry time or date

e. verify the patient's identity for all diagnostic or therapeutic procedures

f. prior to performing the procedure, ascertain whether there are any contraindications to the procedure, including pregnancy for procedures involving ionizing radiation, and notify the patient's physician, authorized health professional, radiologist, nuclear medicine physician, cardiologist or radiation oncologist of any contraindications and obtain direction to proceed, modify or halt the procedure

g. prior to administering a substance orally, by injection or inhalation, or into the body through an orifice, ascertain whether there are any contraindications to administering the substance to the patient and make necessary explanations, or referrals or implement necessary restrictions

h. assess the patient's physical and emotional limitations and ensure that the patient will not be expected to perform any task or movement that would cause physical harm

i. take all reasonable precautions to ensure that no equipment can injure a patient

j. use the ALARA principle to minimize patient exposure to radiation and soundwaves for the procedure

k. use shielding/protective devices where indicated

l. initiate emergency response procedures, notify a physician (if possible) and assist in, or carry out, emergency treatment as required if a patient suffers any adverse reaction to treatment or to administered substances

m. use appropriate aseptic techniques and infection control procedures in the course of the diagnostic or therapeutic procedure

n. protect themselves, their colleagues, other members of the health care team, any other individuals who may be present as well as any patient from any unnecessary exposure to radiation

o. ensure all positioning aids and immobilization devices maintain the patient's position appropriate to the diagnostic or therapeutic procedure according to departmental or facility policy

p. assess the patient's condition before, during and after the course of treatment or procedure

q. where appropriate, remove markers and accessory equipment/devices before the patient is released

In addition, members in the specialty of magnetic resonance must:

r. ensure that there are no contraindications present that could harm the patient or would exclude the patient from having the examination

s. ensure that all equipment and devices, both patient-specific and accessory, are MR compatible before being brought into the MR area

t. administer and follow the necessary safety precautions for entry to the magnet room to protect themselves, the patient, their colleagues, other members of the health care team and any other individuals who may be present

In addition, members in the specialty of nuclear medicine must:

u. conduct personal and area contamination monitoring

v. decontaminate where necessary in accordance with any licence(s) issued under the *Nuclear Safety and Control Act*

w. use appropriate personal protection equipment when handling radioactive materials in accordance with any licence(s) issued under the *Nuclear Safety and Control Act*

In addition, members in the specialty of radiation therapy must:

x. label and orient all patient-specific ancillary equipment **14**

5. Relationships with patients

Members have patient care as their main concern.

Practice Standard: Members must maintain clear and professional boundaries in relationships with patients and treat all patients with dignity and respect. Members must have the knowledge, skills and judgement to avoid placing patients at unnecessary risk of harm, pain or distress. Members must be able to provide appropriate responses to patient inquiries about procedures and related issues, and accept the patient's autonomy and the right of the patient or the patient's substitute decision maker to consent to or refuse service. Members must understand how and act to protect the confidentiality of all professionally acquired information about patients and the privacy of patients with respect to that information, while facilitating the effective delivery of health care.

Indicators

Members must:

a. provide clear and understandable information to the patient or patient's substitute decision maker prior to, during and after the diagnostic or therapeutic procedure, using an interpreter if necessary

b. give the patient or patient's substitute decision maker an opportunity to ask questions

c. provide the patient or patient's substitute decision maker with answers to their questions within the scope of the profession's responsibility

d. refer questions of the patient or patient's substitute decision maker that are outside the scope of the profession's responsibility to an appropriate health professional for answers

e. carry out diagnostic or therapeutic procedures only with the informed consent of the patient or the patient's substitute decision maker

f. treat the patient with dignity and respect and in accordance with the Code of Ethics of the College

g. make modifications to procedures based on the patient's physical, medical and/or emotional status and needs, based on the member 's assessment of the patient's physical, medical and/or emotional status and needs

h. instruct the patient to remove only the clothing and items that will interfere with the diagnostic or therapeutic procedures

i. provide the patient with a gown or sheet to cover areas where clothing was removed

j. explain to the patient when and where the member might touch them and why

k. touch the patient in only those areas needed to facilitate carrying out the procedure

l. keep all patient information confidential except when necessary to facilitate diagnosis or treatment of the patient, or when legally obliged or allowed to disclose such information

m. comply with any applicable privacy legislation such as the *Personal Health Information Protection Act* and its regulations

n. comply with all relevant legislation such as the *Health Care Consent Act*

o. comply with the *Regulated Health Professions Act* pertaining to the prevention of sexual abuse and the College's sexual abuse prevention program

6. Professional relationships

Professional relationships in health care settings are based on mutual trust and respect, and result in improved patient care.

Practice Standard: Members must be able to practise effectively within interprofessional care teams to achieve the best possible outcomes for the patient. Members are responsible for communicating about and coordinating care provision with other members of the team, and must be able to take the appropriate action to address gaps and differences in judgement about care provision.

Members may accept the delegation of controlled acts under the *Regulated Health Professions Act* not authorized to members under the *Medical Radiation and Imaging Technology Act*, provided they comply with the *Regulated Health Professions Act* and the Standards of Practice. Members cannot delegate to other individuals controlled acts authorized to members under the *Medical Radiation and Imaging Technology Act*.

Indicators

Members must:

a. use a wide range of communication and interpersonal skills to effectively establish and maintain professional relationships

b. demonstrate an understanding of and respect for the roles, knowledge, expertise and unique contribution by other members of the health care team for the provision of quality care

c. share knowledge with other members of the health care team to promote the best possible outcomes for patients

d. collaborate with other members of the health care team for the provision of quality care

e. participate effectively in interprofessional team meetings

f. resolve concerns about an order or treatment plan by:

1. discussing the concern directly with the responsible health professional

2. providing a rationale and best practice evidence in support of the concern

3. identifying outcomes desired for resolution

4. documenting the concern and steps taken to resolve it in the ap propriate record

g. perform controlled acts not authorized to members under the *Medical Radiation and Imaging Technology Act*, based on delegation, only when the following conditions have been met:

1. the health professional who is delegating the controlled act (the delegator) is a member of a regulated health profession authorized by their health profession Act to perform the controlled act

2. the delegator is acting in accordance with any applicable legislation and any guidelines and policies of their regulatory body governing delegation, and has not been restricted or prohibited from delegating the controlled act

3. the delegator has the knowledge, skills and judgement to perform and delegate the controlled act

4. the member has the knowledge, skills and judgement to perform the controlled act delegated to them safely, effectively and ethically given the circumstances of the situation

5. a written record of the transfer of authority (delegation) and certification of the member's competence is maintained

6. the member complies with any conditions established by the delegator in order for the member to maintain the authority to perform the controlled act

7. patient consent has been obtained[17]

8. the appropriate order authorizing the performance of the controlled act delegated to the member is in place

7. Records and reporting

Creating and maintaining records and reports are essential components of the professional practice of members. Members' records and reports provide information to other health care professionals about relevant aspects of patient care, treatment and assessment.

Practice Standard: Members must be proficient in creating records, charts, incident and other reports that attest to the diagnostic, treatment, quality assurance, workplace and patient safety procedures that have been carried out. Members must have the knowledge, skills and judgement to record information that will adequately identify the subjects of all the images and data they create and treatments they administer. Members must produce records and reports that are accurate, complete, legible and timely.

Indicators

Members must:

a. record results of quality control tests

b. record and report any equipment faults or problems

c. record and notify the patient's physician, authorized health professional, radiologist, nuclear medicine physician, cardiologist or radiation oncologist of any allergies, abnormal test results, pregnancy or other contraindications to the ordered procedure

d. mark all images and data with the patient's identity

e. ensure all images and data are archived according to principles and guidelines established by the employment facility

f. record the patient's reactions to the treatment or procedure or any administered substances

g. record all pertinent aspects of patient care and all procedures performed, including emergency treatments and descriptions of, and reasons for, any deviations from standard procedures on order forms, treatment prescriptions, patient health records or other relevant documentation

h. forward patients' records, images and pertinent data to appropriate recipients

i. record and inform the patient and/or members of the health care team of any follow-up care required

In addition, members in the specialty of nuclear medicine and radiation therapy must:

j. record results of radiopharmaceutical assays, quality control and other tests, radioactive preparations and disposal methods of radioactive materials

In addition, members in the specialty of nuclear medicine must:

k. record receipt and disposal of radiopharmaceuticals, generators and radioactive materials

l. label radiopharmaceutical preparations

m. maintain radiopharmaceutical and pharmaceutical dispensing records

In addition, members in the specialty of radiation therapy must:

n. record and communicate any concerns regarding the treatment or treatment prescription to the appropriate radiation oncology personnel

In addition, members in the specialty of diagnostic medical sonography must:

o. record and communicate their observations and technical impressions regarding the diagnostic ultrasound procedure to the reporting health professional

8. Continuing competence

Members must maintain competence in their current area of practice and continually improve their competence in order to respond to changes in practice environments, advances in technology and the changing health care environment.

Practice Standard: Members must have, maintain and apply the necessary knowledge, skills and judgement to ensure safe, effective and ethical outcomes for the patient. Members must maintain competence in their current area of practice and must refrain from acting if not competent. Members must obtain and maintain the necessary knowledge, skills and judgement to respond to changes in practice environments, advances in technology and other emerging issues. Members must participate in the College's Quality Assurance Program as part of maintaining and improving their competence.[19]

Indicators

Members must:

a. maintain competence and refrain from performing activities that the member is not competent to perform

b. maintain and apply current and relevant scientific and professional knowledge and skills in their practice

c. obtain and maintain the necessary knowledge, skills and judgement to respond to changes in practice environments, advances in technology and other emerging issues

d. assume responsibility for professional development and for sharing knowledge with others

e. invest time, effort and other resources to maintain and improve their knowledge, skills and judgement

f. engage in a learning process to enhance practice

g. participate in the College's Quality Assurance Program

h. collaborate with other members of the health care team to create quality practice settings

Ontario

Français

Healing Arts Radiation Protection Act

R.S.O. 1990, CHAPTER H.2

Consolidation Period: From April 1, 2018 to the e-Laws currency date.

Note: This Act is repealed on a day to be named by proclamation of the Lieutenant Governor. (See: 2017, c. 25, Sched. 9, s. 84 (2))

Last amendment: 2017, c. 25, Sched. 9, s. 84 (2).

Legislative History: [+]

CONTENTS [−]

Interpretation

1 (1) In this Act,

"Appeal Board" means the Health Services Appeal and Review Board under the *Ministry of Health and Long-Term Care Appeal and Review Boards Act, 1998*; ("Commission d'appel")

"Director" means the Director of X-ray Safety appointed under section 19; ("directeur")

"inspector" means an inspector appointed under section 20; ("inspecteur")

"Minister" means the Minister of Health and Long-Term Care; ("ministre")

"owner", when used with reference to an X-ray machine, means the owner or other person who has the management and control of the X-ray machine; ("propriétaire")

"regulations" means the regulations made under this Act; ("règlements")

"X-ray equipment" includes X-ray imaging systems, processing equipment and equipment directly related to the production of images for diagnosis or directly related to irradiation with X-rays for therapy; ("matériel de rayons X")

"X-ray machine" means an electrically powered device the purpose and function of which is the production of X-rays for the irradiation of a human being for a therapeutic or diagnostic purpose; ("appareil à rayons X")

"X-rays" means artificially produced electromagnetic radiation with peak energy greater than five kilovolts. ("rayons X") R.S.O. 1990, c. H.2, s. 1 (1); 1998, c. 18, Sched. G, s. 51 (1); 2006, c. 19, Sched. L, s. 11 (2); 2009, c. 33, Sched. 18, s. 17 (2); 2011, c. 9, Sched. 19, s. 1.

Shielding

(2) In this Act, a reference to the installation of an X-ray machine includes a reference to the shielding of the area in which the X-ray machine is installed. R.S.O. 1990, c. H.2, s. 1 (2).

Section Amendments with date in force (d/m/y) [+]

Administration of Act

2 The Minister is responsible for the administration of this Act. R.S.O. 1990, c. H.2, s. 2.

Approval of installation

3 (1) No person shall install an X-ray machine unless the Director has issued written approval for the installation. R.S.O. 1990, c. H.2, s. 3 (1).

Issuance of approval

(2) Subject to subsection (3), any person who applies in accordance with this Act and the regulations for written approval for the installation of an X-ray machine and,

(a) submits to the Director the plans, specifications and information prescribed by the regulations;

(b) who meets the requirements of this Act and the regulations; and

(c) pays the fee for the approval established by the Minister,

is entitled to be issued the written approval. R.S.O. 1990, c. H.2, s. 3 (2); 1997, c. 15, s. 4 (1).

Criteria

(3) The Director may refuse to approve a proposed installation of an X-ray machine where,

(a) the proposed installation will not comply with this Act or the regulations;

(b) the application therefor is incomplete;

(c) the plans, specifications and information required by this Act and the regulations in respect of the installation of the X-ray machine have not been submitted to the Director or are incomplete; or

(d) any fees due are unpaid. R.S.O. 1990, c. H.2, s. 3 (3).

Installation

(4) Where the Director has issued written approval for the installation of an X-ray machine, no person shall install the X-ray machine other than in accordance with the plans, specifications and information on the basis of which the Director issued the written approval. R.S.O. 1990, c. H.2, s. 3 (4).

Revocation of approval

(5) Subject to section 10, the Director may revoke an approval where it was issued on mistaken or false information. R.S.O. 1990, c. H.2, s. 3 (5).

Approval of change

(6) Where the Director has given written approval for the installation of an X-ray machine and the X-ray machine has been installed in accordance with the plans, specifications and other information on the basis of which the Director issued the approval, no person shall change the installation without the written approval of the Director for the change. R.S.O. 1990, c. H.2, s. 3 (6).

Application of subss. (1-5)

(7) Subsections (1) to (5) apply with necessary modifications in respect of a change in an installation of an X-ray machine and, for the purpose, changing an installation of an X-ray machine shall be deemed to be installing an X-ray machine. R.S.O. 1990, c. H.2, s. 3 (7).

Section Amendments with date in force (d/m/y) [+]

Registration

4 (1) The owner of an X-ray machine shall not operate the X-ray machine or cause or permit the X-ray machine to be operated for the irradiation of a human being unless the X-ray machine, the location of the X-ray machine and the name and business address of the owner of the X-ray machine are registered with the Director. R.S.O. 1990, c. H.2, s. 4 (1).

Application

(2) Upon the application of the owner of an X-ray machine and upon payment of the fee established by the Minister, the Director shall register the X-ray machine, its location and the name and business address of the owner thereof. R.S.O. 1990, c. H.2, s. 4 (2); 1997, c. 15, s. 4 (2).

Notice of change

(3) An owner of an X-ray machine registered with the Director who changes his, her or its business address shall give written notice of the change to the Director within fifteen days of the occurrence of the change. R.S.O. 1990, c. H.2, s. 4 (3).

(4), (5) REPEALED: 2011, c. 1, Sched. 6, s. 2 (1).

Section Amendments with date in force (d/m/y) [+]

Use of X-ray machine

5 (1) No person shall operate an X-ray machine for the irradiation of a human being unless the person meets the qualifications and requirements prescribed by the regulations. R.S.O. 1990, c. H.2, s. 5 (1).

Persons deemed to be qualified

(2) The following persons shall be deemed to meet the qualifications prescribed by the regulations:

1. A legally qualified medical practitioner.
2. A member of the Royal College of Dental Surgeons of Ontario.
3. A member of the College of Chiropodists of Ontario who has been continuously registered as a chiropodist under the *Chiropody Act* and the *Chiropody Act, 1991* since before November 1, 1980 or who is a graduate of a four-year course of instruction in chiropody.
4. A member of the College of Chiropractors of Ontario.
5. REPEALED: 1998, c. 18, Sched. G, s. 51 (2).
6. REPEALED: 2011, c. 1, Sched. 6, s. 2 (1).
7. A member of the College of Medical Radiation Technologists of Ontario.

Note: On a day to be named by proclamation of the Lieutenant Governor, paragraph 7 of subsection 5 (2) of the *Act* is amended by striking out "the College of Medical Radiation Technologists of Ontario" and substituting "the College of Medical Radiation and Imaging Technologists of Ontario". (See: 2017, c. 25, Sched. 6, s. 16)

8. A member of the College of Dental Hygienists of Ontario. R.S.O. 1990, c. H.2, s. 5 (2); 1998, c. 18, Sched. G, s. 51 (2, 3); 2011, c. 1, Sched. 6, s. 2 (1).

Section Amendments with date in force (d/m/y) [+]

Instructions required

6 (1) No person shall operate an X-ray machine for the irradiation of a human being unless the irradiation has been prescribed by,

(a) a legally qualified medical practitioner;

(b) a member of the Royal College of Dental Surgeons of Ontario;

(c) a member of the College of Chiropodists of Ontario who has been continuously registered as a chiropodist under the *Chiropody Act* and the *Chiropody Act, 1991* since before November 1, 1980 or who is a graduate of a four-year course of instruction in chiropody;

(d) a member of the College of Chiropractors of Ontario; or

(e) REPEALED: 1998, c. 18, Sched. G, s. 51 (4).

(f) REPEALED: 2011, c. 1, Sched. 6, s. 2 (2).

(g) a member of the College of Nurses of Ontario who holds an extended certificate of registration under the *Nursing Act, 1991*.

R.S.O. 1990, c. H.2, s. 6; 1998, c. 18, Sched. G, s. 51 (4); 2009, c. 26, s. 9 (1); 2011, c. 1, Sched. 6, s. 2 (2, 3).

Same

(2) Despite subsection (1), a person may operate an X-ray machine for the irradiation of a human being if the irradiation is prescribed in a manner permitted by the regulations by a member of the College of Physiotherapists of Ontario. 2009, c. 26, s. 9 (2).

(3) REPEALED: 2009, c. 26, s. 9 (2).

Section Amendments with date in force (d/m/y) [+]

Causing or permitting use of X-ray machine

7 No person shall cause or permit any other person to operate an X-ray machine for the irradiation of a human being unless the other person meets the qualifications and requirements prescribed by the regulations. R.S.O. 1990, c. H.2, s. 7.

X-ray machine standards

8 No person shall operate an X-ray machine for the irradiation of a human being, unless the X-ray machine meets the standards prescribed by the regulations. R.S.O. 1990, c. H.2, s. 8.

Radiation protection officer

9 (1) The owner of a portable X-ray machine or an installed X-ray machine shall designate a person as the radiation protection officer for the portable X-ray machine or the facility in which the X-ray machine is installed if he or she meets the qualifications prescribed by the regulations and is,

(a) a legally qualified medical practitioner;

(b) a member of the Royal College of Dental Surgeons of Ontario;

(c) a member of the College of Chiropodists of Ontario who has been continuously registered as a chiropodist under the *Chiropody Act* and the *Chiropody Act, 1991* since before November 1, 1980 or who is a graduate of a four-year course of instruction in chiropody; or

(d) a member of the College of Chiropractors of Ontario. 2011, c. 1, Sched. 6, s. 2 (5).

(2), (3) REPEALED: 2011, c. 1, Sched. 6, s. 2 (5).

Responsibilities

(4) A radiation protection officer for a facility is responsible,

(a) for ensuring that every X-ray machine operated in the facility is maintained in safe operating condition; and

(b) for such other matters related to the safe operation of each X-ray machine in the facility as are prescribed by the regulations. R.S.O. 1990, c. H.2, s. 9 (4).

Section Amendments with date in force (d/m/y) [+]

Proposal to refuse to issue or to revoke an approval

10 (1) Where the Director proposes to refuse to issue or to revoke an approval under section 3 for the installation or for a change in the installation of an X-ray machine, the Director shall serve notice of his or her proposal, together with written reasons therefor, on the applicant or the person to whom the approval was issued, as the case may be. R.S.O. 1990, c. H.2, s. 10 (1).

Notice

(2) A notice under subsection (1) shall inform the applicant or person to whom the approval was issued that he or she is entitled to a hearing by the Appeal Board if, within fifteen days after the notice under subsection (1) is served on him or her, the applicant or person gives written notice to the Director and the Appeal Board requiring a hearing by the Appeal Board and the applicant or person may so require such a hearing. R.S.O. 1990, c. H.2, s. 10 (2).

Powers of Appeal Board

(3) Where a hearing is required under subsection (2), the Appeal Board shall appoint a time for and hold the hearing and may direct the Director to carry out his or her proposal or refrain from carrying out his or her proposal and to take such action as the Appeal Board considers the Director ought to take in accordance with this Act and the regulations and, for such purposes, the Appeal Board may substitute its opinion for that of the Director. R.S.O. 1990, c. H.2, s. 10 (3).

Hearing

11 (1) The Director, the applicant or other person who has required the hearing and such other persons as the Appeal Board may specify are parties to proceedings before the Appeal Board under this Act. R.S.O. 1990, c. H.2, s. 11 (1).

Notice of hearing

(2) Notice of a hearing shall afford the applicant or other person who has required the hearing a reasonable opportunity to show or to achieve compliance before the hearing with all lawful requirements for the issue of the approval of the Director. R.S.O. 1990, c. H.2, s. 11 (2).

Examination of documentary evidence

(3) Any party to proceedings under section 10 shall be afforded an opportunity to examine before the hearing any written or documentary evidence that will be produced or any report the contents of which will be given in evidence at the hearing. R.S.O. 1990, c. H.2, s. 11 (3).

Members holding hearing not to have taken part in investigation, etc.
(4) Members of the Appeal Board holding a hearing shall not have taken part before the hearing in any investigation or consideration of the subject-matter of the hearing and shall not communicate directly or indirectly in relation to the subject-matter of the hearing with any person or with any party or the party's or person's representative except upon notice to and opportunity for all parties to participate, but the Appeal Board may seek legal advice from an adviser independent from the parties and in such case the nature of the advice shall be made known to the parties in order that they may make submissions as to the law. R.S.O. 1990, c. H.2, s. 11 (4).

Recording of evidence
(5) The oral evidence taken before the Appeal Board at a hearing shall be recorded and, if so required, copies of a transcript thereof shall be furnished upon the same terms as in the Superior Court of Justice. R.S.O. 1990, c. H.2, s. 11 (5); 2006, c. 19, Sched. C, s. 1 (1).

Findings of fact
(6) The findings of fact of the Appeal Board pursuant to a hearing shall be based exclusively on evidence admissible or matters that may be noticed under sections 15 and 16 of the *Statutory Powers Procedure Act*. R.S.O. 1990, c. H.2, s. 11 (6).

(7) REPEALED: 1998, c. 18, Sched. G, s. 51 (7).

Release of documentary evidence
(8) Documents and things put in evidence at a hearing shall, upon the request of the person who produced them, be released to the person by the Appeal Board within a reasonable time after the matter in issue has been finally determined. R.S.O. 1990, c. H.2, s. 11 (8).

Section Amendments with date in force (d/m/y) [+]

Appeal to court
12 (1) Any party to the proceedings before the Appeal Board under this Act may appeal from its decision or order to the Divisional Court in accordance with the rules of court. R.S.O. 1990, c. H.2, s. 12 (1).

Record to be filed in court
(2) Where any party appeals from a decision or order of the Appeal Board, the Appeal Board shall forthwith file in the Superior Court of Justice the record of the proceedings before it in which the decision was made, which, together with the transcript of evidence if it is not part of the Appeal Board's record, shall constitute the record in the appeal. R.S.O. 1990, c. H.2, s. 12 (2); 2006, c. 19, Sched. C, s. 1 (1).

Minister entitled to be heard
(3) The Minister is entitled to be heard, by counsel or otherwise, upon the argument of an appeal under this section. R.S.O. 1990, c. H.2, s. 12 (3).

Powers of court on appeal
(4) An appeal under this section may be made on questions of law or fact or both and the court may affirm, alter or rescind the decision of the Appeal Board and may exercise all powers of the Appeal Board to direct the Director to take any action which the Appeal Board may direct him or her to take and as the court considers proper and for such purposes the court may substitute its opinion for that of the Director or of the Appeal Board, or the court may refer the matter back to the Appeal Board for rehearing, in whole or in part, in accordance with such directions as the court considers proper. R.S.O. 1990, c. H.2, s. 12 (4).

Section Amendments with date in force (d/m/y) [+]

Order by Director or inspector
13 (1) The Director or an inspector may make a written order directed to any one or more of,

(a) the owner of an X-ray machine;

(b) any person who operates the X-ray machine; or

(c) the radiation protection officer for the facility in which the machine is installed or, in the case of a portable X-ray machine, the radiation protection officer for the portable X-ray machine,

requiring the taking of such action as, in the opinion of the Director or inspector, upon reasonable and probable grounds, is necessary in order to achieve compliance with this Act or the regulations, or both, or is necessary or advisable to protect the health or safety of any patient or member of the public in or near the premises where the X-ray machine is operated. R.S.O. 1990, c. H.2, s. 13 (1).

Notice of proposal to make order
(2) The Director or the inspector who proposes to make an order under subsection (1) shall serve notice of the proposal, together with written reasons therefor, on the person to whom he or she proposes to direct the order. R.S.O. 1990, c. H.2, s. 13 (2).

a. collaborate with other members of the health care team to create quality practice settings

THE COLLEGE OF PHYSICIANS AND SURGEONS OF ONTARIO

NUCLEAR MEDICINE

MEDICAL RADIATION TECHNOLOGIST OBSERVATION FORM

Please complete one form for each examination observed

MRT OBSERVED:	
CMRTO #:	

PATIENT IDENTIFIER:	
PATIENT WRITTEN CONSENT OBTAINED:	

	C	NC	NA
1.7.1 DUTIES AND RESPONSIBILITIES OF MRTs			
Ensure appropriate delegations (when required).	○	○	○
Follow facility policy regarding situations where the use of chaperones may be appropriate.	○	○	○
Ensure the room is prepared for the procedure specified in the order.	○	○	○
Select and set up the equipment and materials needed for the procedure specified in the order. (patient height and weight taken and documented)	○	○	○
Ensure correct patient identification (e.g. confirmation of patient name, date of birth, examination to be performed, and physician/authorized health professional authorization is present).	○	○	○
Confirm that the order is appropriate based on the patient history.	○	○	○
Ensure female patients are confirmed and documented (initialed) – "Not Pregnant"?	○	○	○
Inquire about and record any contraindications (e.g., pregnancy/breastfeeding, anaphylaxis) before starting the exam as well as obtain and record the direction of the physician/authorized health professional to proceed, modify, or halt the exam as per facility policy.	○	○	○
Ensure that the worklist contains the correct patient information (if applicable).	○	○	○
Obtain informed consent (oral or written as per facility policy) before each examination (after explaining the procedure and answering any questions).	○	○	○

	C	NC	NA
Ensure pertinent clinical history is available and supplement as necessary.	○	○	○
Follow the facility examination protocols.	○	○	○
Follow facility protocols when unexpected findings are found that would require immediate attention (e.g. STEMI)	○	○	○
Are proper injection techniques used? (e.g. aseptic)	○	○	○
THROUGHOUT THE EXAMINATION:			
Assess the patient's condition before, during and after the procedure or course of treatment and make modifications to procedures based on the patient's physical, medical and/or emotional status and needs.	○	○	○
Instruct the patient to remove only the clothing and items that will interfere with the procedure, providing the patient with a gown or sheet to cover areas where clothing was removed and explaining to the patient when and where the MRT may touch them and why.	○	○	○
Maintain patient comfort, privacy and dignity at all times.	○	○	○
Stop procedure if at any time the patient withdraws consent and record withdrawal of consent and reason as per site protocol.	○	○	○
Use PPE (personal protection equipment masks/gloves/gown etc.) as required for the procedure and as indicated by personal risk assessment.	○	○	○
Was the data from previous scans compared to the current exam? (if applicable). If so, was a "trend" demonstrated on the findings?	○	○	○
Ensure that the orientation of the body and other pertinent parameters are marked correctly on the image and data.	○	○	○
Ensure the processed image provides diagnostic image quality while using minimal radiation (ALARA – As Low As Reasonably Achievable).	○	○	○
Ensure that patient examination images and data contains patient name, ID number, date of examination and type of examination.	○	○	○
Ensure that each patient record has the MRT identifier to verify who performed the examination.	○	○	○
Were infection control procedures followed? (e.g. table covered with paper, hand washing/sanitizer used before and after touching patient etc.)	○	○	○
Comply with privacy and confidentiality legislation such as the Personal Health Information Protection Act (Ontario). Was patient privacy maintained at all times?	○	○	○
IMAGE REVIEW:			
Are the images diagnostic and all views acquired?	○	○	○
Ensure correct anatomy is displayed on image for accuracy of positioning o Ensure proper positioning of patient region of interest? o Ensure appropriate region placement?	○ ○	○ ○	○ ○

General Comments: *(Please use this section to provide overall comments regarding the technologist's performance, attitude, competency etc. What infection control measures were taken? Document products used?*

Recommendations: These recommendations must be documented in the Final Assessment Report

INJECTION Live Audit ***Auditor:*** ***MRT:***	Compliant	Non Compliant
Follow policy and procedures for loading injection		
prep are is clean		
patient arm pillow is clean and wiped after use		
explain procedure to patient and obtain consent		
perform hand hygiene		
gloves worn by MRT		
tourniquet is new or has been wiped clean with LLD		
skin has been prepped with alcohol		
IV has been secured		
needle is disposed of in sharps container		
sharps container is not overloaded		
needles are single use		

Comment on all non-compliant
