SIGN OFF SHEET

NAME	DATE	SIGNATURE
PAN TRAN	2022-02-01	
ANNE MYERS	Feb 7, 2022	
Jennifer Butuk	07FEB2022	
Veronica Levin	2022-02-08	
Olga Nash	2022-02-09	
Chris Lo	2022-02-10	C.L
Fatemeh Nazari	2022-02-10	F.N
Nathan Grossi	2022-02-12	N.G
Elham Shahabi	2022-02-13	1.
Maral Almasi	2022-02-14	M.A
Meghan Kennedy	2022-02-14	M.K
Natalie Kurasz	2022-09-16	N.K
Mara Ivankovic	2022-09-17	M.I
Dave Nelson	2022-11-30	D.N
Bahareh Pourian	2022-11-30	B.P
Anne Myers	2023-01-09	A.M
2024	**2024**	**2024**
Reviewed and Revised Marlene McCarthy	August 15, 2024	
Dr. Peter Zia	August 19, 2024	
Dr. Phil Mok	August 19, 2024	

X-RAY ASSOCIATES INC.

RADIOGRAPHY 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
Revised and Reviewed	April 2016	Marlene McCarthy
Revised and Reviewed	October 2017	Marlene McCarthy
Revised and Reviewed	March 2018	Marlene McCarthy
Revised and Reviewed	January & July 2019	Marlene McCarthy
Revised and Reviewed	January 2020	Marlene McCarthy
Revised and Reviewed	February 2021	Marlene McCarthy
Revised and Reviewed	January 2022	Marlene McCarthy

Table of Contents

- Interesting Case Log
- QC Notes
- Training List (see Main P & P)
- PACS/ RIS Quick tips

6. **CAR Guidelines**
- General Radiography
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- Lumbar Spine

7. **HARP: Healing Arts Radiation Protection Act**

8. **CMRITO STANDARDS OF PRACTISE**

****It is important to always remember that we are a People Centered facility that includes patients families. We must respect the rights and responsibilities of patients and their essential care partners. Upon arrival we must identify and ideally remove all barriers that may limit access to our services.**

Dress Code

This is a Professional Medical Office. It is important that you represent X-Ray Associates Inc. 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
2. Hooded tops/Sweatshirts
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:

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”

MRT Duties and Responsibilities (see separate Job Descriptions in Main P&P))

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 judgment 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 judgment 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 physical markers are present in the x-ray field but not within the anatomy of interest (electronic markers are considered a last resort only)
• Ensure appropriate collimation is used. This can be verified by viewing the raw image
• 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
• Exposure factors must be taken from technique charts (either manually posted in the control booth or electronically programmed into the anatomical programming of the generator control). Pediatric technique charts are available by weight for infant, toddler and child.
• Ensure the door to the examination room is self-closing and therefore closed during radiation exposures
• Ensure film and or CR cassettes are stored appropriately and not left in the examination room
• 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).

CMRITO CODE OF ETHICS

Introduction

The Code of Ethics is a set of principles that delineates responsible conduct and the ethical and moral behaviour of registrants of the College of Medical Radiation and Imaging Technologists of Ontario (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 registrants of the College in the province of Ontario.

In the Code of Ethics, "registrants" refers to all registrants of the CMRITO; that is, registrants 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 registrants 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 registrants who provide clinical services, but also managers and educators who may be called upon to make judgements about ethical issues. It will also serve College Committees that may be called upon to make judgements about ethical issues in determining professional misconduct, incompetence or incapacity.

The Code of Ethics is intended to help registrants choose the right, fair, good and just action. Each registrant 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

Registrants 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

Registrants 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 registrant-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

3. Responsibility to the profession

Registrants 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

4. Responsibility to colleagues and other health professionals

Registrants 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 registrant's responsibility

c. educating colleagues and other health professionals about practices and procedures relating to the profession

5. Personal responsibility

Registrants 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

CMRITO

What you must know about ... preventing sexual abuse

The College of Medical Radiation and Imaging Technologists of Ontario (CMRITO) is responsible for responding to complaints and reports of sexual abuse by medical radiation and imaging technologists (MRITs). We investigate every allegation of sexual abuse in accordance with the *Regulated Health Professions Act, 1991* (RHPA), and are committed to supporting patients through this process.

Sexual abuse is never acceptable and will not be tolerated.

What is sexual abuse?

Sexual abuse is broadly defined in the RHPA and includes sexual intercourse or other forms of sexual relations, touching of a sexual nature, and behaviour or remarks of a sexual nature.

Sexual abuse of a patient occurs when an MRIT:

- has physical sexual relations with a patient
- touches a patient in a sexual manner (for example, touching a patient's genitals when it is not required as part of a procedure)
- behaves in a sexual manner towards a patient (for example, touching a patient's shoulder or hand unnecessarily and in a manner that implies a sexual interest in the patient)
- makes remarks of a sexual nature to a patient (for example, commenting on the appearance of a patient's breasts or genitals)

Any touching, behaviour, and/or remarks of a sexual nature are considered sexual abuse.

Contact and comments that are of a clinical nature and are appropriate to the care provided are not considered sexual abuse.

The mandatory penalties for sexual abuse include suspension and/or revocation of a registrant's registration.

Zero tolerance

CMRITO has a zero tolerance policy for the sexual abuse of patients.

Medical radiation and imaging technology requires physical contact with patients when performing diagnostic procedures and delivering therapeutic treatments. MRITs should use professional and supportive behaviours in delivering these services and ensure that all physical contact is clinically appropriate and acceptable to the patient.

Zero tolerance means that:

- acts of sexual abuse are never acceptable and will not be tolerated
- any allegation of sexual abuse of patients will be investigated by CMRITO
- CMRITO recognizes the extent of injury that sexual abuse causes both the patient and others related to the patient
- MRITs deliver services to a wide range of individuals from different cultural backgrounds with a variety of viewpoints and perspectives, and must therefore accept that there may be broad definitions of what is considered sexual abuse and appreciate that what constitutes "sexual nature" may depend on the patient's experience
- MRITs must be sensitive to the needs of their patients and, if a patient is uncomfortable with the words or behaviour being used by an MRIT, change their words or behaviour

CMRITO provides funding for therapy and counselling for patients who allege that they have been sexually abused by a registrant, as outlined in the RHPA.

Principles of communication and touching

MRITs must communicate effectively and pay careful attention to the way they share information and the words they use when speaking with patients. They must also be active and compassionate listeners, observe body language, and be sensitive to their patient's concerns and needs. Awareness of cultural differences and physical barriers which may interfere with clear communication – and respect for these differences – will help MRITs practise the profession in a responsive and responsible manner.

CMRITO is committed to providing MRITs with information and resources to help them perform their duties responsibly and in a manner that reflects the profession's commitment to respecting the personal dignity of every individual who entrusts themselves to their care. CMRITO's *What you must know about … communicating with patients* provides helpful guidelines for effective communication.

MRITs must:

- communicate effectively and pay attention to the ways in which information is conveyed and the words they select when speaking with patients
- be active and compassionate listeners that are sensitive to their patient's concerns and needs
- be aware of and respect cultural and physical barriers which may interfere with clear communication

Following the principles outlined below will help MRITs achieve the high standards of integrity and effectiveness that should be part of their care for their patients.

Principles of communication and touching

Talk before touching	• explain to the patient why, when, and where you might touch them • ensure that the patient has provided consent before starting the procedure • only touch the patient where needed to conduct the procedure • respect the patient's personal space • respect the patient's right to change their mind, pause, or end the procedure at any time
Treat every patient with respect	• greet the patient and anyone accompanying them in a welcoming manner and with a positive attitude • introduce yourself to the patient, tell them your profession, and what procedure you are going to perform • show a respectful and caring attitude towards the patient by listening to and respecting their perspectives and choices • respect the dignity, privacy, and autonomy of the patient • provide individualized, comprehensive, and safe treatment during examinations or therapy sessions, considering the patient's particular physical and emotional needs, values, and cultural background

Reserve judgement and never make assumptions	• ask your patient how they wish to be addressed • clarify the role of anyone accompanying the patient • do not make assumptions or judge people, their families, or their abilities • be aware of your own body language, tone of voice, and non-verbal behaviour • actively listen to the patient to be aware of their concerns and anxieties, and respond appropriately throughout the procedure
Speak directly to the patient	• maintain eye contact when speaking to the patient • provide clear and understandable information to the patient or patient's substitute decision maker prior to, during, and after the procedure, using an interpreter if necessary
Maintain confidentiality	• preserve and protect the patient's information and confidentiality
Create a safe environment	• maintain clear and appropriate professional boundaries in the MRIT-patient relationship • avoid placing patients at unnecessary risk of harm, pain, or distress • treat 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

Mandatory reporting of sexual abuse

Under the RHPA, health professionals must file a written report if they have reasonable grounds obtained through the course of their practice to believe that a patient has been sexually abused by an MRIT or a registrant of any other regulated health College.

Failure to report sexual abuse of patients when there are reasonable grounds to believe the abuse has occurred is an offence under the RHPA and can lead to severe penalties on conviction including a fine of not more than $50,000.

Specifically, if an MRIT believes a patient has been sexually abused, they must:

- submit a written report to the Registrar of the College that regulates the profession of the person being reported within 30 days or, if there is reason to believe that the abuse will continue or that others will be abused, the report must be submitted immediately

Additional information about mandatory reporting under the RHPA:

- MRITs are required to report information obtained in the course of practising the profession
- MRITs must only submit a report if the name of the practitioner involved in the alleged abuse is known
- the patient's name must not be included in the report without their written consent
- the Act provides protection to a person who files a report of sexual abuse in good faith

Conclusion

Sexual abuse by health professionals is never acceptable. CMRITO will investigate all complaints and reports of sexual abuse by MRITs against patients in accordance with the RHPA. Any CMRITO registrant found guilty of sexual abuse will face significant consequences, up to and including suspension, loss of registration, and possible criminal prosecution through the legal system. CMRITO is committed to ensuring patient safety and supporting patients through the investigation process.

For more information about preventing sexual abuse, please contact the CMRITO Professional Conduct team at professionalconduct@cmrito.org.

AURORA-ADULT MANUAL TECHNIQUE CHART

CHEST/ABDOMEN

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Chest PA/AP Erect 180cm	120/2	120/3.5	120/5
Chest LAT Erect 180cm	120/6	120/13	120/22
Ribs Upper	75/7.4	75/15	75/27
Ribs Lower	80/13	80/25.6	80/32
Sternum AP	80/20	90/20	90/25.6
Sternum LAT	85/32	85/50	95/64
Abdomen	75/15	80/27	85/55

PELVIS

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Pelvis	80/12.8	85/20.8	90/40
Hips	70/8	75/12.5	80/20
Sacrum & Coccyx AP	80/12.8	85/22	90/38
Sacrum & Coccyx LAT	80/32	90/46	100/79.4
SI Joints	75/8	80/12.5	85/20

UPPER EXTREMITIES

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Fingers	60/3	60/3.2	50/3.4
Hand	60/3	60/3.2	60/3.4
Wrist	60/3	60/3.2	60/3.4
Forearm	64/3.8	64/4	64/4.2
Elbow	68/3.8	68/4	68/4.2
Clavicle	75/5	75/8	70/15
Shoulder	75/6	75/11	75/15
Scapula	75/6.4	75/10	75/15.4
Humerus	75/3.5	75/5.1	75/7.4

LOWER EXTREMITIES

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Toes	60/3.8	60/4	60/4.2
Foot	60/4.8	60/5	60/5.2
Calcaneus	65/3.5	65/4.2	65/5.1
Ankle	65/4.8	65/5	65/5.2
Tib Fib	70/4.2	70/6.4	65/7.4
Knee	75/4.2	75/12.5	75/7.4
Femur	75/7.4	75/12.8	75/18.4

SPINE

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
C Spine AP	70/4	80/6.4	80/10
C Spine LAT	90/10.6	90/20	90/31.9
T Spine AP	70/10.6	75/15.4	80/22.1
T Spine LAT	80/16	80/25	80/40
L Spine AP	80/32	85/40	90/64
L spine LAT	95/50	95/64	100/80

SKULL

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Skull PA	80/10	80/12.5	80/16
Skull LAT	70/4.2	75/6.1	80/10.6
Facial bones	70/10	75/12.5	80/16
Mandible	80/10	80/12.5	80/16
TMJs	75/20	80/20	85/32.5
Nasal bones (without grid)	70/2.4	70/3.5	70/4.2

HARDING-ADULT MANUAL TECHNIQUE CHART

CHEST/ABDOMEN

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Chest PA/AP Erect 180cm	120/2	120/3.5	120/5
Chest LAT Erect 180cm	120/6	120/13	120/22
Ribs Upper	70/7.4	70/15	70/27
Ribs Lower	80/15	80/27	80/38
Sternum AP	80/10.5	80/15.4	80/22
Sternum LAT	85/22	85/38	85/71
Abdomen	80/15	80/27	80/55

PELVIS

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Pelvis	80/22	80/32	80/46
Hips	80/10.5	80/15.4	80/32
Sacrum & Coccyx AP	70/12.8	70/22	70/38
Sacrum & Coccyx LAT	80/32	80/46	80/79.4
SI Joints	76/13	76/22	76/38

UPPER EXTREMITIES

Body Habitus	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Fingers	50/1.2	50/1.7	50/2.4
Hand	55/1.2	55/1.7	55/2.4
Wrist	55/1.2	55/2	55/3.5
Forearm	60/1.2	60/2	60/3.5
Elbow	60/1.2	60/2	60/3.5
Clavicle	70/5	70/7	70/12.8
Shoulder	70/6	70/11	70/15
Scapula	75/6.4	75/10	75/15.4
Humerus	70/3.5	70/5.1	70/7.4

LOWER EXTREMITIES

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Toes	60/1	60/1.7	60/2.4
Foot	60/1	60/1.7	60/2.4
Calcaneus	60/3.5	60/4.2	60/5.1
Ankle	60/1.7	60/2.4	60/3.5
Tib Fib	65/1.7	65/3.5	65/5.1
Knee	70/4.2	70/6.1	70/7.4
Femur	75/7.4	75/12.8	75/18.4

SPINE

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
C Spine AP	80/5.1	80/7.4	80/12.8
C Spine LAT	80/10.6	80/15.4	80/31.9
T Spine AP	75/10.6	75/15.4	75/22.1
T Spine LAT	70/26.6	70/36.3	70/66.2
L Spine AP	80/31.9	80/46	80/79.4
L spine LAT	85/46	85/79.4	85/95.3

SKULL

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Skull PA	80/5.1	80/7.4	80/12.8
Skull LAT	80/4.2	80/6.1	80/10.6
Facial bones	80/4.2	80/6.1	80/10.6
Mandible	75/5.1	75/7.4	75/12.8
TMJs	75/7.4	75/12.8	75/18.4
Nasal bones (without grid)	60/2.4	60/3.5	60/4.2

NEWMARKET-ADULT MANUAL TECHNIQUE CHART

CHEST/ABDOMEN

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Chest PA/AP Erect 180cm	120/2	120/3.5	120/5
Chest LAT Erect 180cm	120/6	120/13	120/22
Ribs Upper	75/25	75/37.5	75/50
Ribs Lower	80/25	80/37.5	80/50
Sternum AP	80/20	80/30	80/40
Sternum LAT	80/30	80/40	80/50
Abdomen	80/25	80/37.5	80/50

PELVIS

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Pelvis	80/25	80/37.5	80/50
Hips	80/20	80/30	80/40
Sacrum & Coccyx AP	70/12.8	70/22	70/38
Sacrum & Coccyx LAT	80/32	80/46	80/79.4
SI Joints	76/13	76/22	76/38

UPPER EXTREMITIES

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Fingers	60/3.8	60/4	60/4.2
Hand	60/3.8	60/4	60/4.2
Wrist	60/3.8	60/4	60/4.2
Forearm	64/3.8	60/6.4	64/4.2
Elbow	64/3.8	60/6.4	64/4.2
Clavicle	70/10	70/12.5	70/14
Shoulder	80/12.5	80/14	80/16
Scapula	80/12.5	80/14	80/16
Humerus	70/10	70/12.5	70/16

LOWER EXTREMITIES

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Toes	60/3.8	60/4	60/4.2
Foot	60/4.8	60/5	60/5.2
Calcaneus	70/10	70/12.5	70/15
Ankle	60/4.8	60/5	60/5.2
Tib Fib	70/6	70/8	70/10
Knee	75/10	75/12.5	75/15
Femur	80/16	80/20	80/24

SPINE

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
C Spine AP	80/16	80/18	80/20
C Spine LAT	80/20	80/26	80/32
T Spine AP	80/20	80/26	80/31
T Spine LAT	85/32	85/41	85/50
L Spine AP	80/26	80/38	80/50
L spine LAT	85/64	85/82	85/100

SKULL

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Skull PA	80/25	80/28.5	80/32
Skull LAT	75/20	75/22.5	75/25
Facial bones	80/25	80/28.5	80/32
Mandible	75/5.1	75/7.4	75/12.8
TMJs	75/7.4	75/12.8	75/18.4
Nasal bones	80/25	80/28.5	80/32

VAUGHAN-ADULT MANUAL TECHNIQUE CHART

CHEST/ABDOMEN

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Chest PA/AP Erect 180cm	120/2	120/2.5	120/4
Chest LAT Erect 180cm	120/6	120/6.3	120/12.4
Ribs Upper	80/10	80/12.5	80/25
Ribs Lower	80/15	80/27	80/38
Sternum AP	80/8	80/20	80/40
Sternum LAT	85/22	80/38	85/71
Abdomen	80/15	80/27	80/55

PELVIS

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Pelvis	80/10	80/16	80/25
Hips	80/10	80/16	80/25
Sacrum & Coccyx AP	80/8	80/12.5	80/20
Sacrum & Coccyx LAT	80/20	90/50	90/80
SI Joints	75/10	80/16	85/25

UPPER EXTREMITIES

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Fingers	55/1.22	55/1.25	55/1.28
Hand	55/1.25	55/2	55/1.6
Wrist	55/1.8	55/2	55/2.2
Forearm	60/1.6	60/2.0	60/2.4
Elbow	60/1.25	60/1.6	68/1.8
Clavicle	70/3	70/5	70/10
Shoulder	78/3	78/5	78/12.5
Scapula	70/6.3	70/8	70/12.5
Humerus	70/6.3	70/8	70/10

LOWER EXTREMITIES

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Toes	50/1	50/1.6	50/1.8
Foot	55/2.5	60/2.5	65/2.5
Calcaneus	65/4	65/5	65/6.5
Ankle	60/2.5	60/3.2	65/3.2
Tib Fib	65/1.8	65/2.5	65/3.2
Knee	70/3.2	70/6.3	70/5.0
Femur	70/10	75/16	80/25

SPINE

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
C Spine AP	75/3.2	75/4.0	75/6.3
C Spine LAT	75/10.6	75/15.4	75/31.9
T Spine AP	80/16	80/20	80/32
T Spine LAT	80/20	80/32	80/50
L Spine AP	80/16	80/25	80/32
L spine LAT	90/20	90/40	90/63

SKULL

	Small kVp/mAs	Medium kVp/mAs	Large kVp/mAs
Skull PA	80/12.5	80/16	80/20
Skull LAT	70/4	70/5	75/6.3
Facial bones	75/12.5	75/16	80/20
Mandible	80/7	80/10	80/13
TMJs	80/6	80/6.3	80/6.5
Nasal bones	65/3.2	65/4.0	65/5

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE ALARA Principle Additional Views	ISSUING AUTHORITY Quality Advisor
LAST REVISION DATE: February 12, 2015 Mar 23, 2024	REFERENCE AIUM –	EFFECTIVE DATE February 12, 2015

ALARA Principle

A. The potential benefits and risks of each examination should be considered. The ALARA principle (as low as reasonably achievable) principle must be applied when performing radiography exams, the minimum number of views to produce the best examination is required.

B. **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.

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE **INFECTION CONTROL** **Hand washing/PPE**	ISSUING AUTHORITY General Manager
LAST REVISION DATE: Nov 2015, Jan 2016, Feb 2018, Oct 2021,Sep 16, 2022, Mar 23, 2024	REFERENCE	EFFECTIVE DATE January, 2016

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 the 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:

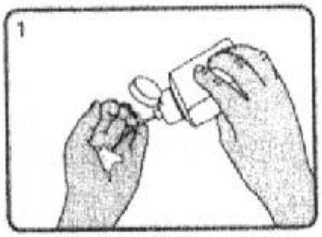
- Perform Hand Hygiene
- Put on gown
- Put on Mask or N95 Respirator
- Put on eye protection
- Put on gloves

Sequence for Removal of PPE:

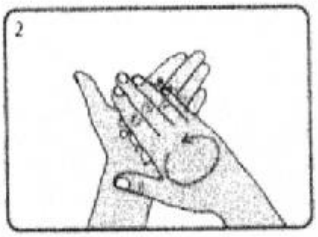
- Remove gloves
- Remove gown
- Perform hand hygiene
- Remove eye protection
- Remove mask or N95 Respirator
- Perform hand hygiene

NHS

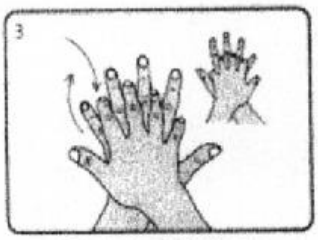
Alcohol handrub hand hygiene technique – for visibly clean hands



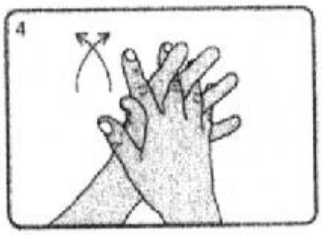
Apply a small amount (about 3 ml) of the product in a cupped hand



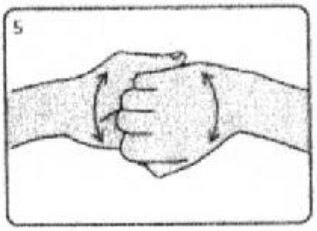
Rub hands together palm to palm, spreading the handrub over the hands



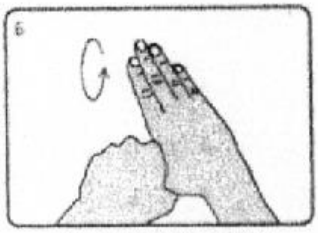
Rub back of each hand with palm of other hand with fingers interlaced



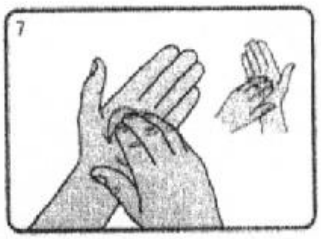
Rub palm to palm with fingers interlaced



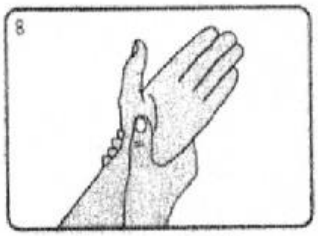
Rub back of fingers to opposing palms with fingers interlocked



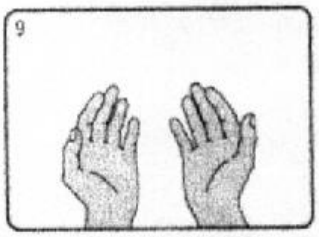
Rub each thumb clasped in opposite hand using a rotational movement



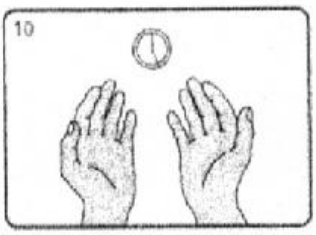
Rub tips of fingers in opposite palm in a circular motion



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

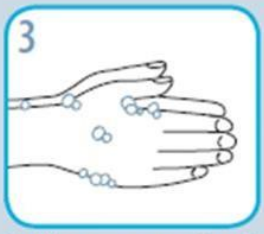
Adapted from World Health Organization *Guidelines on Hand Hygiene in Health Care*

How to handwash

Lather hands for 15 seconds

Wet hands with warm water.

Apply soap.



Lather soap and rub hands palm to palm.

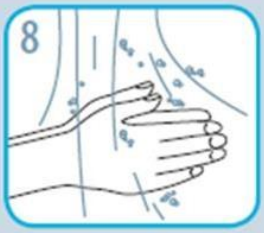
Rub in between and around fingers.

Lather hands for 15 seconds

Rub back of each hand with palm of other hand.

Rub fingertips of each hand in opposite palm.

Rub each thumb clasped in opposite hand.



Rinse thoroughly under running water.

Pat hands dry with paper towel.

Turn off water using paper towel.

Your hands are now safe.

JUST CLEAN YOUR HANDS

Catalogue No. 011875 13M March 2009 © Queen's Printer for Ontario

For more information, please contact handhygiene@oahpp.ca or visit publichealthontario.ca/JCYH

Ontario

Recommended Steps:

Putting On Personal Protective Equipment (PPE)

Public Health Ontario | Santé publique Ontario

1. Perform Hand Hygiene

2. Put on Gown

- Tie neck and waist ties securely

3. Put on Mask/N95 Respirator

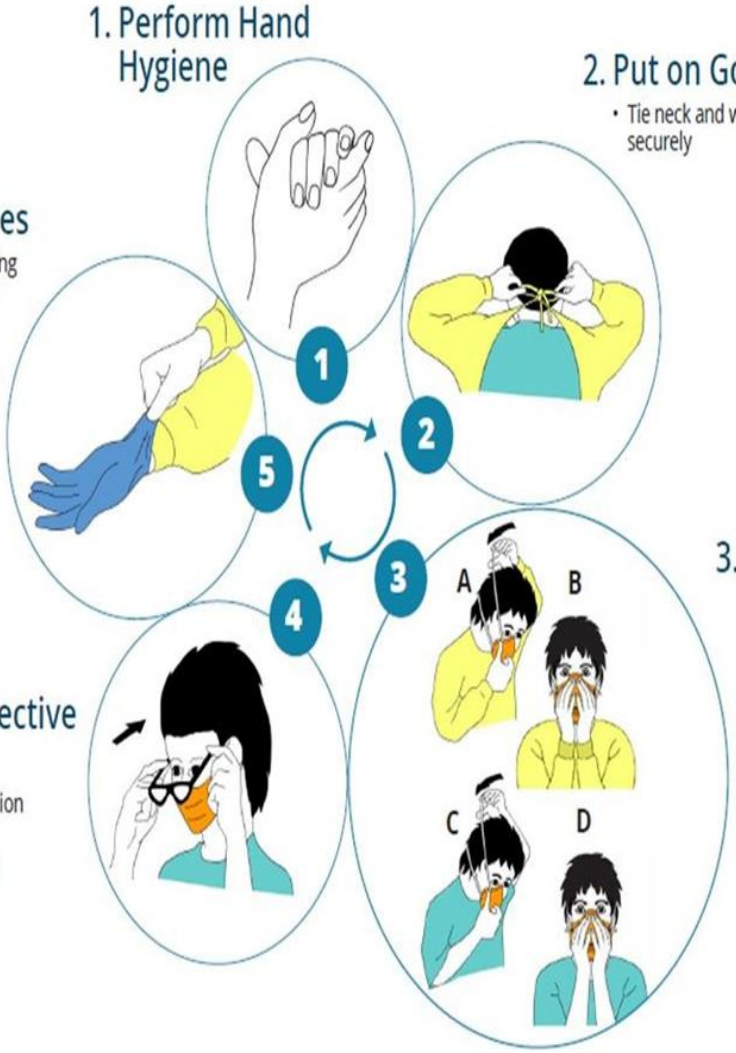
- Place mask over nose and under chin
- Secure ties, loops or straps
- Mould metal piece to your nose bridge
- For respirators, perform a seal-check

4. Put on Protective Eyewear

- Put on eye protection and adjust to fit
- Face shield should fit over brow

5. Put on Gloves

- Put on gloves, taking care not to tear or puncture glove
- If a gown is worn, the glove fits over the gown's cuff



For more information, please contact Public Health Ontario's Infection Prevention and Control Department at ipac@oahpp.ca or visit www.publichealthontario.ca.

Ontario

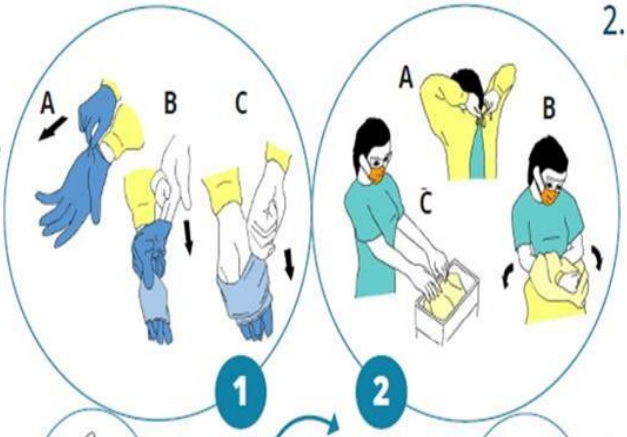
Recommended Steps:

Taking Off Personal Protective Equipment (PPE)

Public Health Ontario | Santé publique Ontario

1. Remove Gloves

- Remove gloves using a glove-to-glove / skin-to-skin technique
- Grasp outside edge near the wrist and peel away, rolling the glove inside-out
- Reach under the second glove and peel away
- Discard immediately into waste receptacle



2. Remove Gown

- Remove gown in a manner that prevents contamination of clothing or skin
- Starting with waist ties, then neck ties, pull the gown forward from the neck ties and roll it so that the contaminated outside of the gown is to the inside. Roll off the arms into a bundle, then discarded immediately in a manner that minimizes air disturbance.

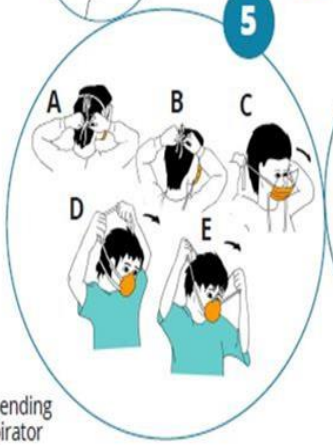
3. Perform Hand Hygiene

4. Remove Eye Protection

- Arms of goggles and headband of face shields are considered to be 'clean' and may be touched with the hands
- The front of goggles/face shield is considered to be contaminated
- Remove eye protection by handling ear loops, sides or back only
- Discard into waste receptacle or into appropriate container to be sent for reprocessing
- Personally-owned eyewear may be cleaned by the individual after each use

5. Remove Mask/ N95 Respirator

- Ties/ear loops/straps are considered 'clean' and may be touched with hands
- The front of the mask/ respirator is considered to be contaminated
- Untie bottom tie then top tie, or grasp straps or ear loops
- Pull forward off the head, bending forward to allow mask/respirator to fall away from the face
- Discard immediately into waste receptacle



6. Perform Hand Hygiene

This is an excerpt from Routine Practices and Additional Precautions In All Health Care Settings (Appendix L) and was reformatted for ease of use.

Ontario

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE **PATIENT CARE/CONTACT**	ISSUING AUTHORITY General Manager
LAST REVISION DATE: Nov 2020, Oct 18, 2021,Sep 16, 2022, Mar23, 2024	REFERENCE	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. (e.g. 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 not 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. Ultrasound probes must be cleaned according to manufacturer guidelines before use. TV probes must be reprocessed 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, 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

Ultrasound Reprocessing Areas:

Eating, drinking, storage of food, smoking, application of cosmetics or lip balm and handling contact lenses is NOT permitted in these areas.

Reprocessing Area Cleanliness:

The Reprocessing area is cleaned nightly by the professional cleaning staff. During the day the area must be kept clean and dry. ALL spills must be cleaned up immediately. NOTHING should be placed in this area that doesn't belong i.e. extra towels. No Supplies are stored on the counter top. **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.

PERMISSION 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 ULTRASOUNDS & 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.

ACCESS TO EXAM ROOMS:

Patient exam room doors must remain open when there is NO patient in the room. This will make you available to staff for assistance. The exception are any electronic doors i.e. Vaughan X-Ray.
IF an exam room door is closed, assume a patient is in there! DO NOT enter without knocking and getting verbal permission to enter!

ULTRASOUND FOR FETAL GENDER ONLY:

Exam requests for fetal ultrasound for non-medical reasons (e.g. gender identification) must not be performed. Fetal ultrasound should only be performed for diagnostic purposes on the order of a physician or other authorized health care professional.

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE **Infection Control Radiography**	ISSUING AUTHORITY General Manager
LAST REVISION DATE: Nov 2020, Oct 18, 2021, Sep 16, 2022, March 23, 2024	REFERENCE	EFFECTIVE DATE February, 2016

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 visible 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 the examination.
- After each examination, the table, upright bucky or detector is to be wiped with a cloth sprayed with 70% alcohol. Spray the cloth and not the surface as per the OHSA as back spray can be harmful. When filling the spray bottles wear protective goggles.
- Mr. Clean eraser can be used to remove sticky tape residue.
- Wipe any surface the patient has touched including the C arm if used for balance.
- Door, door knobs and door jambs should all be wiped throughout the day.
- Wipe the lead aprons, lead strips and gonadal shielding at least monthly.
- If you use the thyroid collar, wipe it between uses with the alcohol cloth.
- The chair / stool should be wiped clean after each shift and as required.
- Clean the mouse, keyboard and phone each shift.
- Floors must be kept clean and dry. Watch for mud or water from the soles of shoes.

General Radiography Shielding Protocols

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE **SHIELDING X-RAY**	ISSUING AUTHORITY General Manager
LAST REVISION DATE: July 2022, March 2024	REFERENCE	EFFECTIVE DATE February, 2016

Lead shielding must be used where possible and if a patient requests it and it is possible, then please provide it to the patient.

SKULL	Half Apron
EYE FOR FOREIGN BODY	Half Apron/ Thyroid Collar
FACIAL BONES	Half Apron/ Thyroid Collar
NASAL BONES	Half Apron/ Thyroid Collar
SINUSES	Half Apron/ Thyroid Collar
MANDIBLE	Half Apron
TEMPORO-MANDIBULAR JOINTS	Half Apron
ORBITS (PRE-MRI) OR F.B.	Half Apron/ Thyroid Collar

CERVICAL	Half Apron
SOFT TISSUE NECK	Half Apron
ADENOIDS	Half Apron
THORACIC	Half Apron
LUMBO-SACRAL	Thyroid Collar
SACROILIAC JOINTS	Thyroid Collar
SACRUM	Thyroid Collar
COCCYX	Thyroid Collar
SCOLIOSIS SERIES	Half Apron T spine Gonadal protection (taped to gown) & Thyroid on L spine

CHEST	Half Apron
LORDOTIC CHEST	Half Apron
PNEUMOTHORAX RECHECK	Half Apron
RIBS	Half Apron

STERNUM	Half Apron
STERNO-CLAVICULAR JOINTS	Half Apron
CLAVICLE	Half Apron
COSTAL JOINTS	Half Apron

ABDOMEN (2 VIEWS)	Thyroid Collar
ABDOMEN (KUB)	Thyroid Collar
CHEST & ABDOMEN F.B. (CHILD)	Lead wherever possible

METASTATIC (SKELETAL) SURVEY	Half Apron / thyroid Collar on Applicable Views
MYELOMA (SKELETAL) SURVEY	Half Apron / thyroid Collar on Applicable Views
ARTHRITIC SURVEY	Half Apron / Thyroid Collar on Applicable Views
BONE AGE (Up to 18 years old)	Thyroid Collar
BABYGRAM	N/A

Body Part	**Views**
FINGER	Half Apron / Thyroid Collar
THUMB	Half Apron / Thyroid Collar
HAND	Half Apron / Thyroid Collar
WRIST	Half Apron / Thyroid Collar
HAND & WRIST	Half Apron / Thyroid Collar
SCAPHOID	Half Apron / Thyroid Collar
SCAPHOID & WRIST	Half Apron / Thyroid Collar
7 PACK VIEWS OF WRIST	Half Apron / Thyroid Collar

FOREARM	Half Apron / Thyroid Collar
ELBOW	Half Apron / Thyroid Collar
HUMERUS	Half Apron / Thyroid Collar
SHOULDER	Half Apron / Thyroid Collar
SCAPULA	Half Apron / Thyroid Collar
CLAVICLE	Half Apron
AC JOINTS	Half Apron

BODY PART	VIEWS
PELVIS	Thyroid collar, Gonadal protection where possible to not obscure anatomy especially on youth patients.
ACETABULUM (JUDET VIEWS)	Gonadal protection / Thyroid collar.
ANDREN-VON ROSEN (for congenital hip dislocation)	Gonadal protection / Thyroid collar.
HIP	Gonadal protection / Thyroid collar.
FEMUR	Gonadal protection / Thyroid collar.
KNEE	Half Apron / Thyroid Collar
TIBIA & FIBULA	Half Apron / Thyroid Collar
ANKLE	Half Apron / Thyroid Collar
CALCANEOUS	Half Apron / Thyroid Collar
FOOT	Half Apron / Thyroid Collar
TOES	Half Apron / Thyroid Collar

Lead used on the exam must be recorded in PACS

X-Ray Associates Inc. POLICY AND PROCEDURE	PROCEDURE EMERGENCY CASES Radiologist Contact	ISSUING AUTHORITY QUALITY ADVISOR
LAST REVIEW DATE March 31, 2015, Feb 2016, Nov 2020, May 2021, June 2023, July 2024	REFERENCE	EFFECTIVE DATE October 2015

Regular Business Hours: (Monday-Friday 8-4 PM)
Our Radiologists are available for consultation on patient studies during regular business hours in the clinics.
If a pathology is suspected, (example fracture, pneumothorax)- US: See list. The technologist can direct the
patient to a hospital with a CD of images after consulting with a radiologist.

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.

Finding Radiologist Contact Number

1. CELL PHONE:

Please log on to the Qgenda which should be located on the Bookmarks Bar on all computers
email: xrayassociates@qgenda.com
password: Abcd1234
Daytime, click "Clinics". The Radiologist for Vaughan and Harding (R4) usually takes all STAT cases. Hover over their name and a cell # will appear which you can use to call them to explain your case. Use the Mobile phone
located in the front desk area of each clinic. Take the phone to your room to discuss the case and review your
images with the radiologist and then return once completed.

For weeknights after 4:00 pm and Saturdays refer to the "Call schedule". Follow the appropriate times for on-call
radiologist and hover over their name as above for their cell #.
If they do not answer immediately, leave a message and be patient for a return call as they may be doing a procedure in the hospital. You may also text them from your personal phone and ask them to return a call to you. Be sure to leave your name and reason for the text.

Any concerns contact Vicki 647-466-1500, Marlene 647-221-7766 or Rosalba 647-981-5040

X-Ray Associates Inc. POLICY AND PROCEDURE	PROCEDURE EMERGENCY CASES Radiologist Contact	ISSUING AUTHORITY QUALITY ADVISOR
LAST REVIEW DATE March 31, 2015, Nov 2015, August 2016, April 2016, July 2024	REFERENCE	EFFECTIVE DATE October 2015

Please follow the Guidelines for Emergency Cases:

- ***Positive Appendix***
- ***Ectopic Pregnancy***
- ***Obstructive Stone in Common Bile Duct or Kidney***
- ***Positive Deep Vein Thrombosis, DVT.***
- ***Testicular Torsion***
- ***BPP: anything less than 8 out of 8***

- ***Fracture***
- ***Pneumothorax***
- ***Free Air***

Procedure:

1. Keep the patient and process as a verbal
2. Speak to a Radiologist and confirm the next step for the patient, i.e. send to the ER
3. If after hours, the radiologist on call should be notified as per Emergency protocol

Technologists **MUST write a message in the ENCOUNTER NOTES in Velox, stating the steps given to the patient. i.e. sent to Emergency MH

X-Ray Associates Inc. POLICY AND PROCEDURE	PROCEDURE **EMERGENCY CASES** **Patient sent to ER**	ISSUING AUTHORITY QUALITY ADVISOR
LAST REVIEW DATE July 2024	REFERENCE	EFFECTIVE DATE June 2017

Patients Directed To Emergency: (ultrasound or x-ray)

Send the patient to the closest Emergency with their portal access as directed by the radiologist.

1) If the STAT report is available, insert it into an envelope for them to take.
2) If the report is not available before the patient leaves it will be available in the patient's portal along with the images and within HDIRS for the hospital to retrieve.
3) If a report needs to be expedited, then fax the report to the Emergency Department

.

- Southlake ER Fax #: 905-830-5805
- Mackenzie ER Fax #: 905-883-2138
- Cortellucci ER Fax #: 905-417-3216

****Always record what direction the patient was given in the Encounter notes**

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE **Pigg O Stat**	ISSUING AUTHORITY General Manager
LAST REVISION DATE: Sept 16, 2022, March 2024	REFERENCE	EFFECTIVE DATE May 11, 2016

The Pigg O Stat is currently at all locations. Staff are available during the day if additional training/assistance is required. The following guidelines must be followed when using the Pigg O Stat:
***** the child must be watched and held closely**

Guidelines:

- Wipe the plastic holder between use
- Infants under 10 pounds or exceptionally frail: DO NOT use
- Before placing the child in the holder, set your technique, have the room ready, and an apron for one parent.
- There are 2 sizes of holders. If unsure, aim on the side of smaller rather than larger
- Ensure that the seat is adjusted to the correct height. The smaller the child, the higher
  the seat
- Older children can be placed in the unit as long as their legs fit in the holes. Just ask
  them if they will sit on the bicycle seat. It helps ensure that they are not rotated for the exam.
- Make sure footwear has been removed (for ease in placing in holes)
- Tell the parents the following: If you are clear about the following they will be
  able to assist and will understand why this device is being used.
    - Tell them it is called a Pigg O Stat (and we are not sure why)
    - It will keep your baby safe, straight and in the best position for the exam
    - We want your baby to cry, it will make them take a big breath and will show
      their lungs for a more diagnostic image
    - This will be very quick and you will be touching your baby the entire time
    - Let them know how many images you are taking
    - Ask if they have any questions?

- **Placing child in the holder**
  - Make sure correct size holders are secured to unit (silver button should be up)
  - Take the child from the parent, get the parent to put their apron on
  - Have the parent face you on the opposite side of the holder
  - Place the baby in the holder away from you, making sure the baby's legs go in completely. The parent may need to grab them and pull.
  - Ask the parent to take the child's hands and pull the arms straight up
  - While ALWAYS keeping a hand on the child, close the sides and lock
  - Place the upper and lower straps securely around
  - Ask the parent to keep holding the child's hands as it is comforting

- **Imaging**
  - Place the child PA to upright screen.
  - Make sure that you are listening to the crying….the child will gasp between cries so wait, do not expose during the cry as that is usually expiration
  - Twist the unit so the child is in a lateral position and expose

- **Removing the child from the Pigg O Stat**
  - Tell the parent you are taking the child out and to please hold the child's arms
  - Undo both straps
  - Undo one side of the holder, while always having a hand on the infant
  - While holding the infant, undo the other side and grab the infant under the arms and lift out.

GENERAL RADIOGRAPHY

The procedures in this section are the radiographic routines of X-Ray Associates Inc.. In this manual, a “view” is taken to mean a specific projection of a body part (i.e. PA projection of the hand). A “routine” is taken to mean a set of views, which demonstrate a specific body part
(i.e. a Hand). This page details the form of the routines, and lists some general policies, which should be followed for all examinations.

For the purposes of this manual, a child is defined as being 17 years of age or less.

Changing the referring order or Additional views can only be done with the consultation of a radiologist or referring physician. Notation must be on the requisition of any changes to the original order.

Female patients 10 years and older must be asked if they are menstruating. The 10 day rule
must be observed where applicable.

The technologist must confirm with the patient and the history that the correct imaging has been requested. If unsure, ask the referring physician or consult a radiologist.

ANNOTATION:

ALL images that have been done upright or weight bearing should be annotated on the image before sending to PACS!

All thoracic and lumbar spines need to be annotated as upright or supine.

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE **CRANIUM**	ISSUING AUTHORITY General Manager/QA
LAST REVISION DATE: March 31, 2016 April 26, 2017, Jan 2019, Nov 2020, Oct 2021,Sep 16, 2022, Mar 23, 2024	REFERENCE	EFFECTIVE DATE May, 2010

Prep: No prep
Equipment: DIGITAL
Technique: A.E.C. or FIXED.

SKULL	Towne's, Caldwell, Lateral (do one only), Basal *Note: if patient cannot extend neck, omit basal view*
ORBITS	PRE-MRI(OR F.B.) PA axial with 30 degree caudad angle (position as a Caldwell) with eyes looking up and eyes looking down. Lateral with eyes looking straight ahead. LESION AND TRAUMA Caldwell, Waters, lateral affected side down AND PA oblique of affected side (3 point landing)
FACIAL BONES	Water's, Towne's, Caldwell, lateral (include tip of nose) Children 12 and under – omit Towne's
NASAL BONES	Water's (coned tight), lateral (soft tissue) of the affected side
SINUSES	Self-Paid Only Upright Water's (must clear petrous ridges to see maxillary sinuses) Caldwell, Lateral.
MANDIBLE	Towne's (for condyles) Lateral oblique of both sides PA Caldwell
TEMPORO-MANDIBULAR JOINTS	Towne's Bilateral Schuller's views with Open Mouth and Closed Mouth.
LATERAL FACE FOR DENTAL ASSESSMENT	Lateral: Important that the mandible is perfectly aligned including the skull! Caldwell (occasional) 20 degrees, include skull.

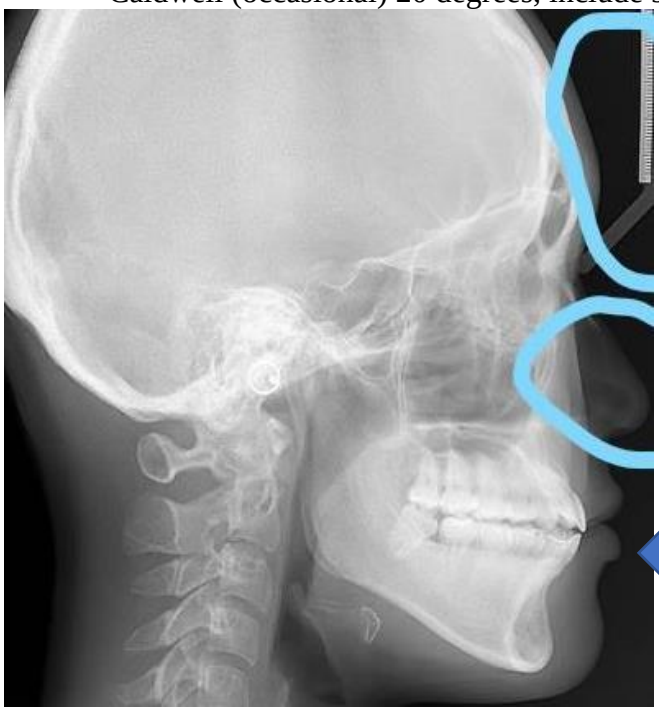
X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE LATERAL FACE FOR DENTAL ASSESSMENT	ISSUING AUTHORITY General Manager/QA
LAST REVISION DATE: Nov 2020, Oct 2021, Sep 16, 2022, Mar 23, 2024	REFERENCE	EFFECTIVE DATE October, 2020

Prep: No prep Equipment: Digital
Technique: A.E.C. AND FIXED

This is a self-pay exam ordered by a dentist: $28 in Aurora and $35 all other IHFs

VIEWS:
Lateral: Important that the mandible is perfectly aligned, include skull!

Caldwell (occasional) 20 degrees, include skull.



NOTE lateral nasal bones

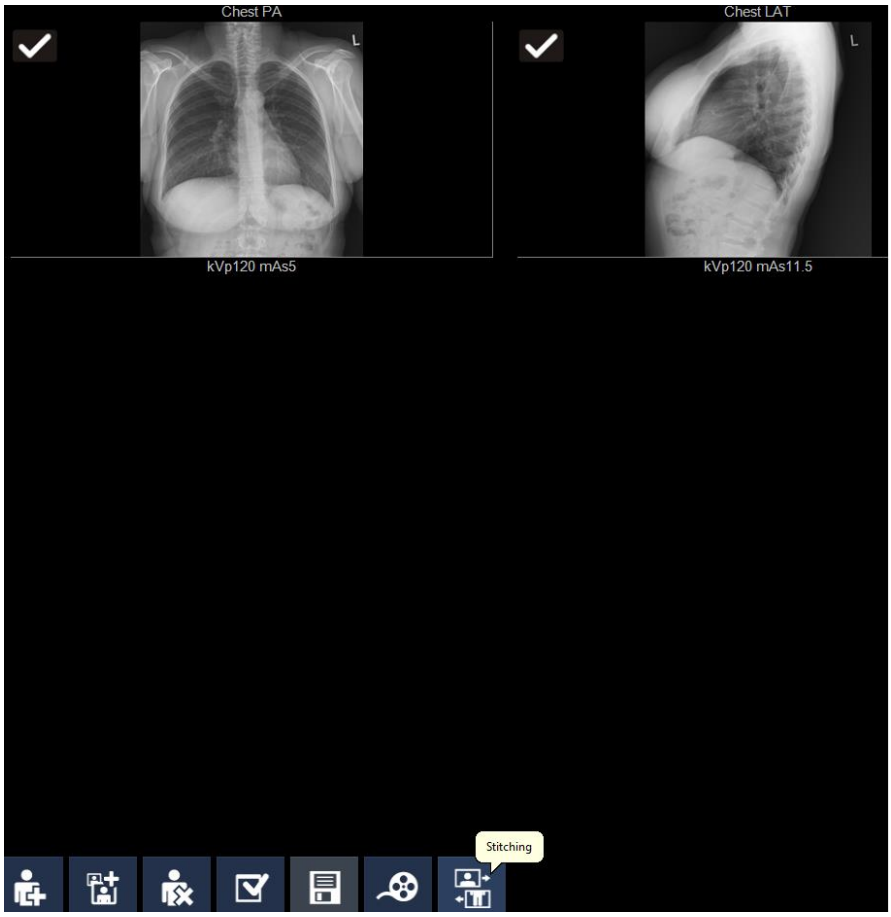
NOTE mandible perfectly aligned

X-Ray Associates Inc. **RADIOGRAPHY** **POLICY AND PROCEDURE**	PROCEDURE **SPINE**	ISSUING AUTHORITY General Manager/QA
Last Revised: Sep 16, 2022, March 31, 2016, Jan 2017, Mar 2017, Jan 2019, Nov 2020, Nov 2021, Mar 23, 2024	REFERENCE	EFFECTIVE DATE November 18, 2009

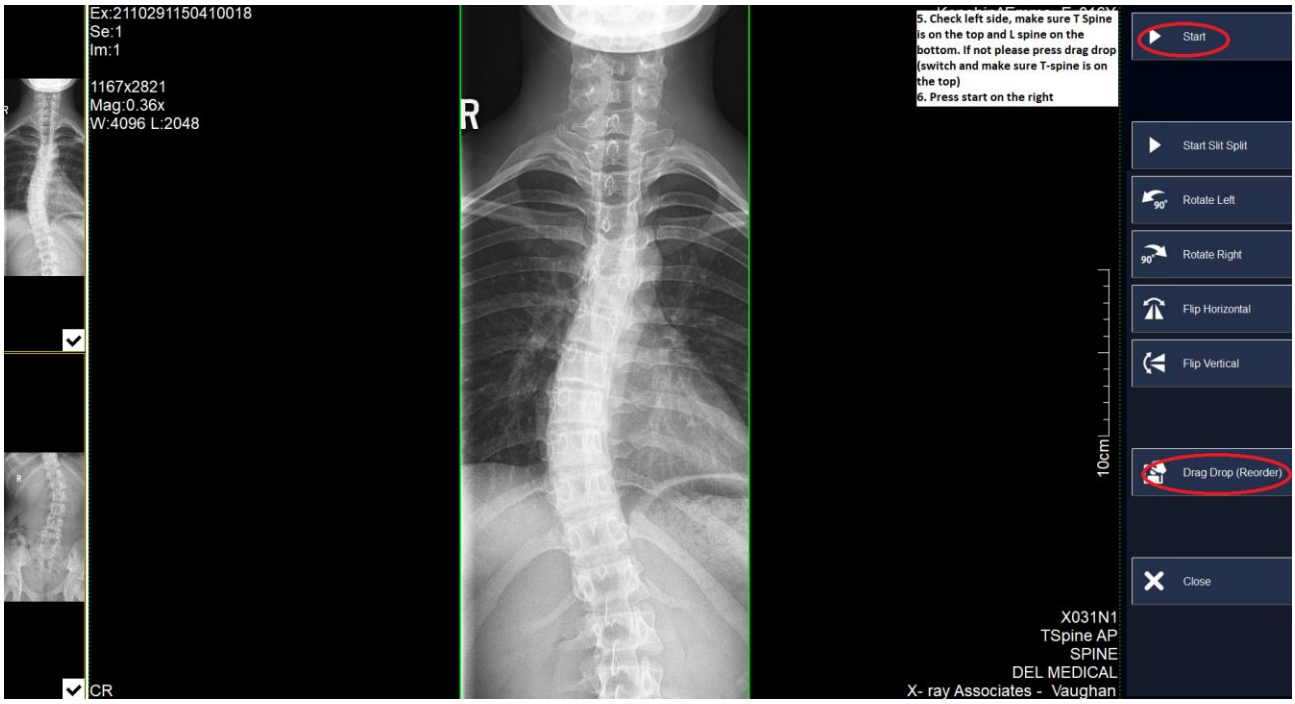
Prep: No prep Equipment: Digital
Technique: A.E.C. AND FIXED

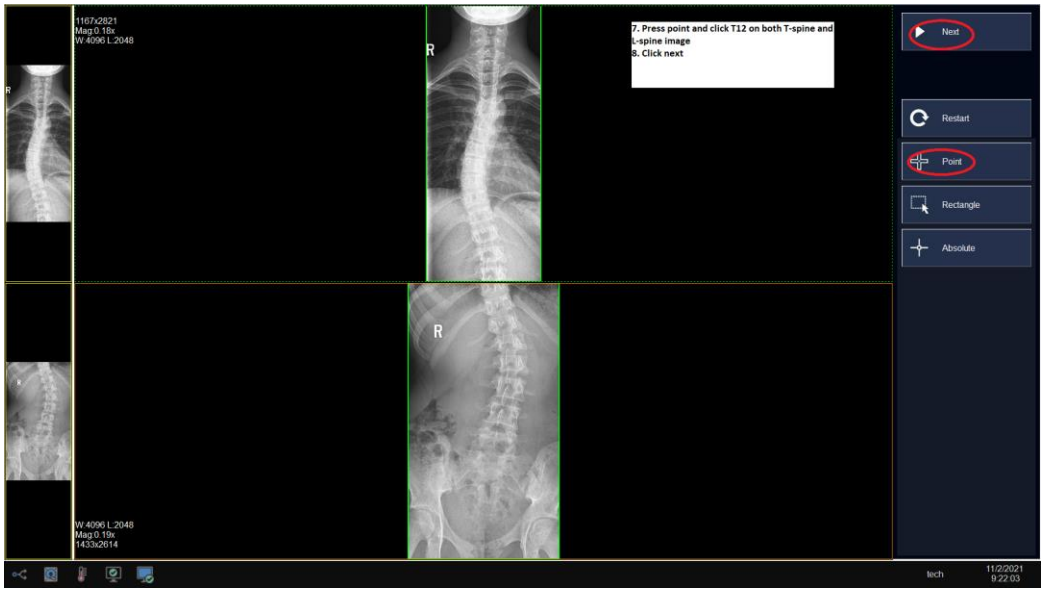
CERVICAL	AP, AP open mouth, Lateral, both obliques *Note: do flexion and extension laterals as required,* CHILDREN 18 and under as above but omit obliques TRAUMA CASES as above but omit the obliques.
SOFT TISSUE NECK	Lateral (expose during inspiration to fill pharynx with air) AP to show pharynx
ADENOIDS	Lateral to include pharynx using soft tissue tech.
THORACIC	AP, Lateral and Swimmers view ****Record if supine or upright in PACS***
LUMBO-SACRAL	>40 AP, Lateral, Both Obliques, Lateral <40 AP Lateral *Note: For obliques patient is rotated 45 degrees, tube is straight, and all 5 vertebrae visualized* *SPOT only if not open & penetrated showing all of S1 and the start of the median sacral crest* ****Record if supine or upright in PACS*** Patients 40 and under – omit obliques
Thoraco-Lumbar	AP and Lateral T9 – L3 ****Record if supine or upright in PACS***
Thoraco-Lumbar + Thoracic	AP, Lateral & swimmers Thoracic spine AP, Lateral of Lumbar spine ****Record if supine or upright in PACS***
Thoraco-Lumbar + Lumbar	AP, Lateral Thoracic spine AP, Lateral, both obliques & spot if needed of Lumbar spine (if <40 no obliques) ****Record if supine or upright in PACS***
SACROILIAC JOINTS	AP with 15 degree cephalad tube angle Bilateral obliques, patient rotated 15-20 degrees, 15 degree cephalad tube tilt, imaging SI joint that is raised.
SACRUM & COCCYX	AP with 15 degree cephalad angle, AP with 10 degree caudad angle, Lateral
SCOLIOSIS SERIES	AP only unless Lateral has been requested Note: AP area of interest: C3-L4, 72"ffd to be used in all cases so as to fit complete exam on 1 (14-17) image where possible. If not 2(24-17) overlapping by at least 3-4 vertebrae is acceptable. ****Vaughan must complete a stitched view whenever possible.**

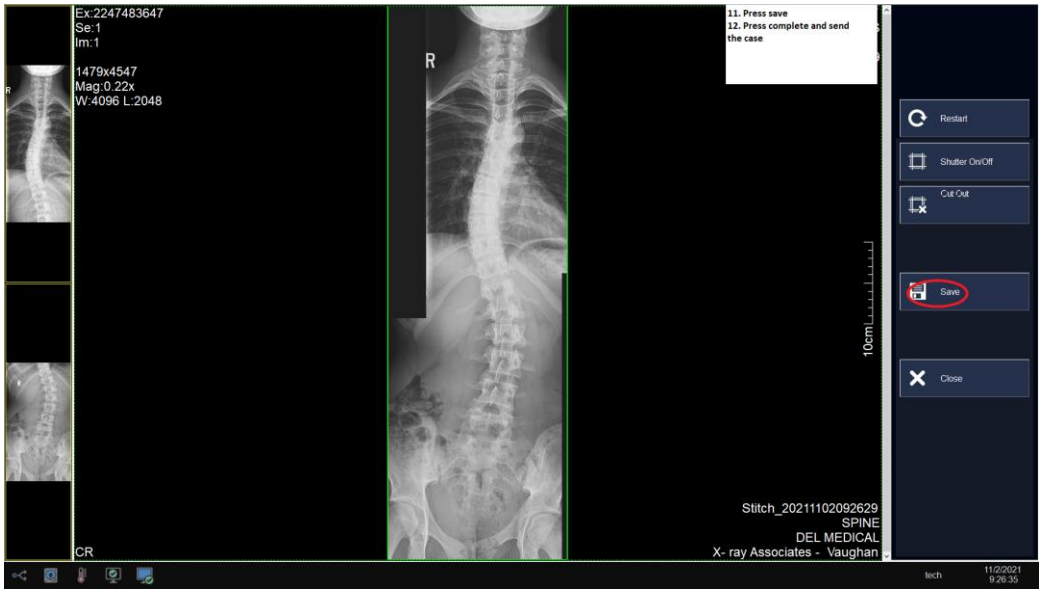
Instruction for Vaughan's DEL MEDICAL Scoliosis

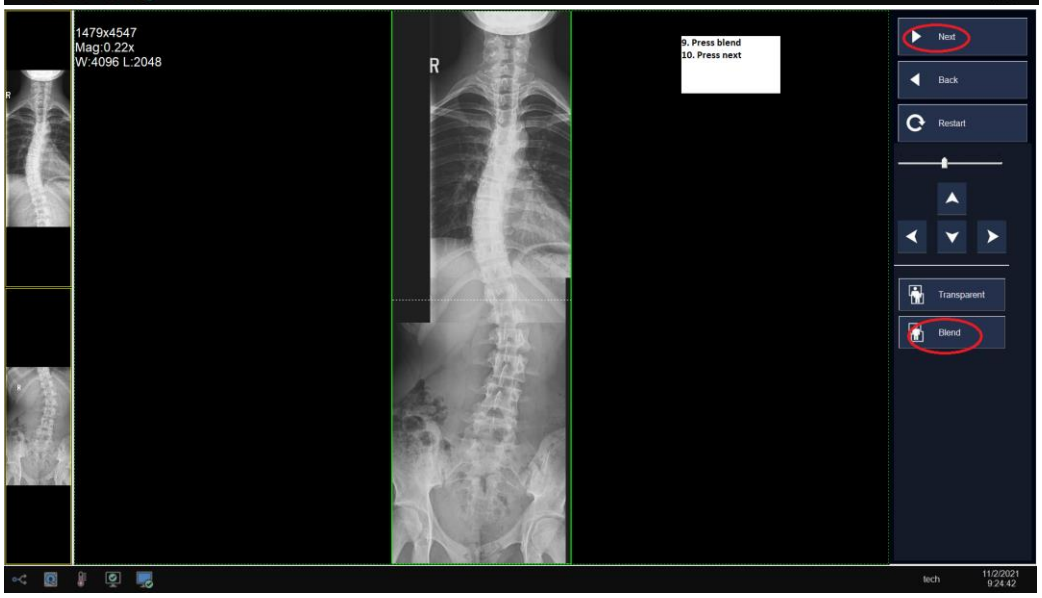


Scoliosis Protocol
(DEl MEDICAL)
1. Set SID 180 vertical
2. Obtain T-Spine AP
3. Obtain L-Spine AP
(Include C3-L4)
4. Press stitching on the bottom left (see image on the left)


Ex:2110291150410018
Se:1
Im:1
1167x2821
Mag:0.36x
W:4096 L:2048
R
5. Check left side, make sure T Spine is on the top and L spine on the bottom. If not please press drag drop (switch and make sure T-spine is on the top)
6. Press start on the right
Start
Start Slit Split
Rotate Left
Rotate Right
Flip Horizontal
Flip Vertical
Drag Drop (Reorder)
Close
10cm
X031N1
TSpine AP
SPINE
DEL MEDICAL
X- ray Associates - Vaughan
CR


1167x2821
Mag:0.18x
W:4096 L:2048
R
7. Press point and click T12 on both T-spine and L-spine image
8. Click next
Next
Restart
Point
Rectangle
Absolute
W:4096 L:2048
Mag:0.19x
1433x2614
tech
11/2/2021
9:22:03





Chiropractor Notes

- Chiropractors are not allowed to order the following:
    - Any cranium x-rays
    - Abdomen x-rays
    - Chest x-rays (Ordered rib x-rays are to be completed without PA chest)
- Chiropractors' orders generally start with billing code 8
- Chiropractors can choose to order x-rays with or without reports
    - With reports-complete as normal, assign to correct location for rads' to report
    - Without reports-assign to chiro chiro and archive the case

CHIROPRACTOR WORKFLOW

NO REPORT NEEDED

CLERICAL: REGISTER PATIENT 1 TIME TO OHIP. AT TIME OF REGISTRATION ASSIGN CASE TO **CHIRO CHIRO**.

DO NOT ARCHIVE!

TECHNOLOGIST: ONCE IMAGES HAVE BEEN SENT TO VELOX IMMEDIATELY ARCHIVE THE CASE. MAKE SURE THE CASE IS ASSIGNED TO CHIRO CHIRO. (Rads do not want to see it on the worklist)

REPORT NEEDED

AT TIME OF

CLERICAL: REGISTER THE PATIENT TWICE IN VELOX.

FIRST REGISTRATION: GOES TO OHIP AND ARCHIVE IMMEDIATELY TO CHIRO CHIRO

Give lamented report needed sign to the patient and instruct them to give to the MRT.

THE CHIRO DOCTOR WILL BE INVOICED BY XRA.

TECHNOLOGIST: IMAGES WILL GO UNDER THE ENCOUNTER ASSIGNED TO

"VAUGHAN & HARDING ULTRASOUND & BMD"

"AURORA & NEWMARKET

REPORT NEEDED

AT A LATER DATE

CLERICAL: IF A CHIRO PHONES FOR A REPORT TO BE ISSUED, FILL OUT THE CHIRPRACTOR FORM AND FAX TO HEAD OFFICE ATTENTION LORI. IF YOU GET A FAX FROM A CHIROPRACTOR FAX THE FORM TO HEAD OFFICE ATTENTION: LORI

PACS ADMIN WILL: REGISTER PATIENT AND MOVE IMAGES TO THE NEW ENCOUNTER SO RADIOLOGIST CAN REPORT IN VELOX.

BILL THE CHIROPRACTOR TO **"CASH CHIROPRACTOR CHIROPRACTOR NAME**

FOLLOW THIRD PARTY BILLING PROCESS

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE THORAX	ISSUING AUTHORITY General Manager/QA
Last Revised: March 31, 2011, Nov 2020, Oct 2021, Nov 29, 2022, Mar 23, 2024	REFERENCE	EFFECTIVE DATE November 18, 2009

Prep: No prep Equipment: Digital
Technique: A.E.C. AND FIXED

CHEST: Routine Adults kVp @ 120 or >	PA, Left Lateral All routine chest examinations should include a PA and lateral View, regardless what is checked on the requisition with the exception of:
DECUBITUS:	Perform decubitus views with the affected side down i.e. Right lateral decubitus- deep inspiration with the patient lying on the right side, mark with a right arrow down
Immigration **Emigration**	**PA Only**-for Emigration, Immigration. Refugee status for immigration, students for college entrance, employment. (These are all private billings, not OHIP.) **Recent previous CXR**-If done internally and PA only is checked, do a PA and Lateral unless previous report indicates PA only for follow up. If the previous was external and PA only is requested, obtain the report, scan into PACS. If previous images or reports are not available do PA and Lateral.
Chest for TB **Pediatric for TB**	Adult PA and Lat PA only ***A child with a history of Croup or R/O pneumonia, 2 views of the chest must be done, even if only a PA is ordered**
LORDOTIC CHEST	Have patient stand 1 foot in front of the upright bucky AP, lean them back until shoulders are resting on bucky, image with a straight tube Note: If no recent chest x-ray, include PA & Lat views
? PNEUMOTHORAX	PA Expiration, PA Inspiration and Lateral
PNEUMOTHORAX RECHECK Post Chest Tube Removal 2nd visit same day	PA Expiration, if previous imaging on site, if no previous available, perform PA Inspiration and Expiration Enter pt. as a new visit. RIS will deny the request, continue with entry & add: post chest tube removal. HO will take care of billing. Label image POST CHEST TUBE REMOVAL. Check with the patient to see if they must return to the physician office.
RIBS	AP upper (1-10), AP lower (8-12), AP 45 degree oblique (LPO or RPO, away from affected side) Note: If no recent chest x-ray , include a PA chest Note: do posterior obliques for posterior rib injury and anterior obliques for anterior rib injury
STERNUM	Lateral (180cm SID), RAO or LPO (100cm SID) Note: use low mA and long exposure time with shallow breathing for oblique to obliterate pulmonary markings.
STERNO-CLAVICULAR JTS	PA PA Obliques (RAO, LAO)
CLAVICLE	AP, 15 degree upshot

X-Ray Associates Inc. **RADIOGRAPHY** **POLICY AND PROCEDURE**	PROCEDURE **ABDOMEN**	ISSUING AUTHORITY General Manager/QA
Last Revised: March 31, 2016 Sept 2017, Jan 2019, Nov 2020, Oct 2021, Sep 16, 2022, Mar 23, 2024	REFERENCE	EFFECTIVE DATE November 18, 2009

Prep: No prep Equipment: DIGITAL

Technique : A.E.C

ABDOMEN (2 VIEWS)	AP Upright (must include diaphragms),Supine abdomen. Must also include a PA OR AP Chest. Mark as erect in PACS *Note: For pediatrics you may do the Chest and Abdomen in one image.*
ABDOMEN (KUB)	AP-SUPINE **(must be supine do not perform upright)**
CHEST & KUB F.B. (CHILD)	AP to include esophagus, pharynx, chest, abdomen to SP. If the patient is large, do the upper image first to check for the foreign body.

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE SURVEYS	ISSUING AUTHORITY General Manager/QA
Last Revised: March 31, 2015, Jan 2019, Nov 2020, Nov 2021, Sep 16, 2022, Mar 23, 2024	REFERENCE	EFFECTIVE DATE May 5, 2010

Prep: No prep
Equipment: DIGITAL Technique: A.E.C. AND FIXED

METASTATIC (SKELETAL) SURVEY	Skull – Caldwell, Lateral Cervical Spine – AP, Lateral Thoracic Spine – AP, Lateral Lumbar Spine – AP, Lateral Ribs – AP Pelvis – AP Humeri – bilateral AP Femora – bilateral AP
MYELOMA (SKELETAL) SURVEY	Skull – Caldwell, Lateral Cervical Spine – AP, Lateral Thoracic Spine – AP, Lateral Lumbar Spine – AP, Lateral Ribs – AP Pelvis – AP Humeri – Bilateral AP Femora – Bilateral AP
ARTHRITIC SURVEY	Cervical Spine – AP, Lateral Shoulders – bilateral AP Hands – bilateral PA, Norgaard's (ball catchers) Pelvis – AP Knees – Bilateral AP Ankles – Bilateral AP Feet – Bilateral AP
BONE AGE (Up to 18 years old)	bilateral PA of hands and wrists (**Please annotate Male/Female**)

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE EXTREMITIES	ISSUING AUTHORITY General Manager/QA
Last Revised: March 31, 2016 Sept 2017, Jan 2019, Nov 2020, Oct 2021, Sep 16, 2022, Mar 23, 2024	REFERENCE	EFFECTIVE DATE May 5, 2010

Prep: No prep Equipment: DIGITAL Exposure: FIXED and A.E.C.

Body Part	Views	Orientation for PACS
FINGER	PA, Oblique, Lateral If 2 or more digits are ordered: do full hand Mag the AP, window level & width to improve image. If the distal phalanx still not seen clearly, perform a coned AP of the digits True Coned lateral of the digits (may be individually if not seen clearly)	
THUMB	AP, Oblique, Lateral	
HAND	PA, Fan Oblique, Lateral *Note: If patient is unable to separate phalanges, do straight lateral* For Rheumatoid or Osteo Arthritis: OMIT PA oblique and do Norgaard's View/Ball Catchers (bilateral AP 45 degree obliques)	
WRIST	PA, PA Oblique, Lateral *Note: for pisiform or triquetrum do AP oblique*	
HAND & WRIST	PA, PA Oblique (include finger tips to distal radius and ulna) Lateral	
SCAPHOID & WRIST	PA, PA with ulnar deviation, oblique with ulnar deviation, lateral, Stecher View (PA wrist with ulnar deviation and a 20 degree angled tube towards the elbow)	
7 PACK VIEWS OF WRIST	PA neutral, PA ulnar deviation, PA radial deviation, AP with clenched fists, AP Medial Oblique 30 degrees, lateral neutral (unclenched fist), lateral neutral (clenched fist) Both wrists, all 7 views	

******If foot and toe or hand and digit, ensure billing is 4+ and separate views of the digit are done if required. The AP image can be copied and magnified. A separate lateral and oblique may be required**

X-Ray Associates Inc. **RADIOGRAPHY** **POLICY AND PROCEDURE**	PROCEDURE **UPPER EXTREMITIES**	ISSUING AUTHORITY General Manager/QA
Last Revised: March 31, 2016 Sept 2017, Jan 2019, Nov 2020, Oct 2021, Sep 16, 2022, Mar 23, 2024	REFERENCE	EFFECTIVE DATE May 5, 2010

Prep: No prep

Equipment: DIGITAL

Technique: A.E.C. and FIXED

FOREARM	AP, Lateral *Images must include both joints*	
ELBOW	AP, AP Medial Oblique, AP External Oblique, True lateral (with humerus and forearm level and wrist in true lateral position) *Note: If radial head fracture is suspected do an additional lateral view with the hand internally rotated* Children under 12 – AP, lateral *Note: if a patient is unable to straighten arm for AP do 2 AP views, one for proximal forearm and one for distal humerus.*	
HUMERUS	AP, Lateral *Note: When arm cannot be abducted, do transthoracic lateral*	
SHOULDER	AP with internal rotation (patient rotated 30 towards affected side, 15 degree caudad tube angle), AP with external rotation, Axial (Superoinferior projection) *Note: If patient is unable to abduct arm for axial image do trans-scapular view* Children 12 years and younger do one AP & axial view or trans-scapular	
SCAPULA	AP AND LATERAL	
CLAVICLE	AP, AP WITH TUBE ANGLED CEPHALIC 15 DEGREES	
ACROMIO-CLAVICULR JOINTS	AP without weights (bilateral), AP with weights (bilateral) *Note: Do AC joints individually, center on the joint and cone tight*	

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE **PELVIS & LOWER EXTREMITIES**	ISSUING AUTHORITY General Manager/QA
Last Revised: Oct 2021, Mar 2024	REFERENCE	EFFECTIVE DATE May 5, 2010

Prep: No prep
Equipment: DIGITAL
Technique: A.E.C. AND FIXED

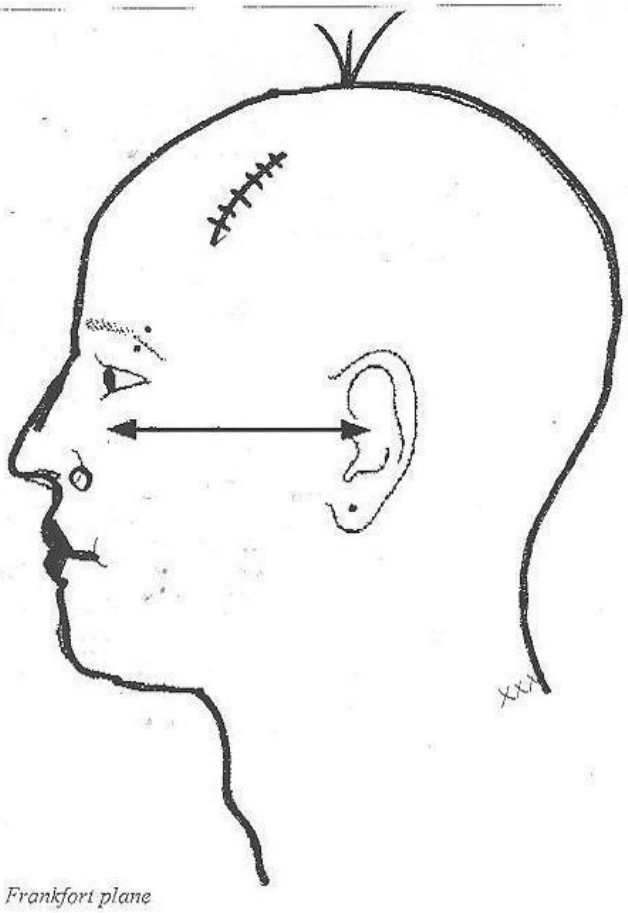
BODY PART	VIEWS	
PELVIS	*AP only routinely.* *INLET & OUTLET VIEWS OF PELVIS* *AP with 40 degree cephalad angle* *AP with 40 degree caudad angle*	
ACETABULUM (JUDET VIEWS)	45 degree posterior oblique (affected side down), 45 degree posterior oblique (affected side up) CR remains perpendicular for both images. *Note: If the patient is unable to lie on the affected side, do cross-table iliac oblique.*	
ANDREN-VON ROSEN (for congenital hip dislocation)	AP bilateral hips, AP bilateral hips with both hips abducted at least 45 degrees with appreciable inward rotation of the femora. *Note: the second view is to be positioned by an orthopedic surgeon or radiologist*	
HIP	AP pelvis, frog-leg lateral *Exception: **post-surgery and/or hip replacement check** only a coned down AP and a lateral view of the entire prosthesis (not full pelvis) are required.	
FEMUR	AP, Lateral (Hip and knee joint to be included)	
KNEE	**Routine** (if under 18 omit the tunnel view) AP or PA standing unilateral unless ordered as bilateral Lateral, Tunnel, Skyline **Trauma** - AP, Lateral, skyline and both obliques **Post Op (Children under 12)** AP and Lateral *NOTE: Osgood Shlatters, AP and Lateral BOTH knees* *NOTE: any special views for specific physicians are to be followed*	
TIBIA & FIBULA	AP, Lateral (must include both joints on both images)	
ANKLE	AP, Medial Oblique (angle toes 15 degrees medially), Lateral (maximum dorsiflexion for all views where possible) *NOTE: any special views for specific physicians are to be followed*	

Prep: No prep

Equipment: DIGITAL

Technique: A.E.C. and FIXED

CALCANEUS	Axial (40 degree cephalad angle with maximum flexion of ankle), Lateral *Note: For Talus or Subtalar joint use BRODEN method: foot rotated 45 degrees medially. Four projections with CR 3 cm below lateral malleolus with cephalad tube angles of 10, 20, 30, and 40.*	
FOOT	AP, Medial Oblique, Lateral	
FEET FOR BUNIONS	Any clinical history of bunions: True weight-bearing, Standing AP Laterals on table Dr. Rogakou: Standing AP & Laterals! **patients who cannot stand and are done sitting must be noted on the requisition	
TOE(s)	AP, AP Oblique, Lateral Include distal ends of metatarsals If 2 or more digits are ordered: do full foot views Mag the AP, window level & width to improve image. If the distal phalange still not seen clearly, perform a coned AP of the digits True Coned lateral of the digits (may be individually if not seen clearly)	



Frankfort plane

A line used in anthropometry, which passes from the highest point of the ear canal through to the lowest point of the eye socket.

CEPH:
Right Lateral skull upright, criteria:
1. Frankfort Plane Parallel to floor
2. Teeth Biting down
3. Lips in relaxed position
4. No swallowing
5. No overshadowing teeth

Dental Assessment: D112

EQUIPMENT/BREAKDOWN:

AGE OF EQUIPMENT:
CPSO guidelines state that radiography equipment can become outdated. This is only one factor in maintaining equipment. Equipment must be reviewed annually and as troubles occur to ensure that all equipment is meeting all guidelines and producing quality images with as low dose as possible. ALL equipment is reviewed at least biannually with the Quality Advisor.

HARP:
An x-ray machine must be HARP tested every six months. At that time, any deficiency found must be followed up. All HARP testing must be signed off by the Quality Advisor.
The General Manager is responsible to ensure all testing is done and all corrective actions are done. Equipment older than 15 years will have a physicist acceptance test done and repeated every 3 years. At least annual review of image quality is done by GM and QA on aging equipment or when image quality has changed.

PREVENTATIVE MAINTENANCE:
Annual preventative maintenance is done on all Radiography rooms.

SERVICE:
i) At any other time, the technologist may correct minor breakdowns (light bulbs, fuses, etc.) Qualified service personnel should look after major breakdowns. It is the responsibility of the technologist working

- **Weekday:** Call service directly (X Tron for all) Rosalba and/or General Manager must be notified if down completely..
- **Weekend:** Must call Rosalba or Marlene for directions and leave a note for day staff with issues. You may be directed to call service to arrange for service early Monday.

ii) The name and telephone number of the Services Company servicing the x-ray equipment should be readily accessible.
iii) Any corrective action taken should be documented, as well as the Quality Assurance testing which may be necessary after servicing.
Documentation must be maintained on site in the service manuals.

AGING EQUIPMENT:
Equipment 15 years of age require an image review by Quality Advisor and General Manager. A physicist acceptance test must be done and the equipment must pass for use and the image quality approved by the QA. Annual image reviews are required until replacement. The physicist review must be done every 3 years, until replacement.

REFERENCE MATERIALS:

A. Reference books (Merrill's) are available in the clinic so that those technologists are able to refer to them for assistance. This may lessen the chances for the necessity of repeats.
B. A copy of the IHFA and HARP Act must be kept in the clinic and are located in the Policy and Procedure Manual.

X-Ray Associates Inc. RADIATION SAFETY POLICY AND PROCEDURE	PROCEDURE **X-Ray Radiation Safety**	ISSUING AUTHORITY General Manager/QA
Last Revised: Nov 2020, Oct 2021,Sep 16, 2022, Mar 23, 2024	REFERENCE	EFFECTIVE DATE July 29, 2015

POLICY

It is the policy of X-Ray Associates Inc. to operate all facilities under the guidance of a Radiation Protection Officer as required by the HARP Act. He / she will meet all qualifications outlined in the Act. The Radiation Protection Officer is responsible for ensuring the safe operation of all x-ray equipment in each facility and also will ensure that each patient receiving x-rays are adequately protected and not subjected to any risk of overexposure to radiation.

The Radiation Protection Officer is responsible for the radiation safety of all workers, the licensing compliance with all applicable legislation and shall oversee that all internal inspections are completed and the results satisfactory. The RPO will take responsibility for ensuring that each x-ray unit is operated in a safe manner, is in safe working condition and is only operated by those who meet the qualifications to use the equipment. The RPO and the JHSC will liaison regarding issues pertaining to radiation safety and compliance. The RPO will ensure the following protocols and procedures are adhered to.

PROTOCOLS

- Each location shall post the name of the Radiation Protection Officer. In the event of an over exposure, the RPO and the JHSC must be notified.
- Any extreme overexposure must be reported to the RPO, the JHSC and The Ministry of Labour for investigation
- HARP and preventative maintenance servicing will be done on all equipment at the required times and all reports shall be available for review by the RPO and /or inspectors.
- Each facility shall operate under the guidelines outlined in the Occupational Health and Safety Act regarding Radiation Safety for **X-RAY** as required in Regulation 861 and Appendix C.
- Each facility shall operate under the guidelines given in Health Canada's Technical Reports and publications.
- Each employee shall adhere to all department policies and relevant provincial and federal guidelines pertaining to health and safety while administering ionizing radiation.
- No radiation will be administered without a clear indication of the body part or parts to be examined and the order must be signed by the physician requesting the examination. Clinical information provided will be read and the technologist will be attentive to these details in support of the current signed order.
- Any malfunctioning radiation unit (i.e.: equipment failure, unusual exposure readings etc.) must be shut down until it can be deemed safe after maintenance protocol has been followed.

- Each radiation unit room entrance must have a warning sign on the entry door prohibiting unauthorized entry. During exposures, the door must be closed.
- Only authorized medical professionals may order an x- ray examination and specifically those with limited ordering authority will be monitored as such. (Chiropractors Nurse Practitioners)

PROCEDURES

- Every patient shall be checked before the commencement of any procedure to be certain that the patient in question is in fact the correct patient that was called for and will verify his/her birth date, name and be in agreement to the ordered procedure.
- Women between the ages of 10 – 55 shall be questioned as to the possibility of a pregnancy and no woman who answers positively shall be radiographed without consultation with a radiologist. The patient will be informed of the risks involved with proceeding and should they agree to proceed, a pregnancy consent form will be completed before the procedure begins. The consent is to be scanned into the PACS records for the patient. Patients who are unsure of their status regarding pregnancy should be encouraged to return at the onset of their next menstrual cycle and or have a pregnancy test before x-ray to ensure full disclosure and understanding of the choice to continue. Any x-ray examination that must be done while a patient is pregnant should be discussed with the attending radiologist to achieve the required order with the least number of exposures.
- Notices shall be posted in prominent locations requesting patients to notify the staff if they think they may be or are pregnant.
- Providing that there is not any interference with imaging, all patients should be provided with gonadal shielding, and where possible with thyroid protection as well.
- The ALARA principle will be adhered to in all imaging.
- Any person who is in the room during an x-ray exposure to restrain a patient or position a patient (in the case of a specialist) shall be given a lead apron, thyroid protection and lead gloves if required.
- No child shall be left unsupervised in any x-ray room and must have a guardian to aid in position restraint as advised by the technologist to safeguard against injury.
- Achieving the best imaging with the least number of exposures for each examination is a requirement for all technologists. Minimum field sizes must be used and collimation should be evident wherever possible.
- All x-ray technologists and any staff working directly in the examination rooms shall be provided with a dosimeter and reports of dosimeter readings shall be posted so staff can see the reported doses.
- All x-ray technologists shall maintain their membership in their college and complete their ongoing education hours as required by the college.
- All technologists will receive proper training on all x- ray equipment that they are operating.

POLICY REGARDING RADIATION OVER-EXPOSURE OR ACCIDENT

In case of a radiation accident, one or two regulatory bodies must be immediately notified, depending on individual circumstances.

PROVINCIAL MINISTRY OF HEALTH — X-RAY INSPECTION SERVICES:

This agency is primarily concerned with the public and patients, whether it is from radiation or injury that should occur from the x-ray equipment. X-ray safety is carried out by enforcement of the Healing Arts Radiation Protection Act and Regulation.

PROVINCIAL MINISTRY OF LABOUR—X-RAY SAFETY

This agency is responsible for occupational x-ray safety. It administers the x-ray safety regulation under the Occupational Health and Safety Act. Procedures set up by this office will be followed to ensure the public, patients, and staff that an investigation will be done according to provincial regulations

PROCEDURE "A."

An accident involving an x-ray machine (ex. Collimator falling on a patient) An over exposure of radiation involving patient or public

1- X-ray Inspection Services (MOH) must be notified
2- Director of x-ray safety (MOH) shall be notified forthwith (HARP Act Section 14, page 23)
3- The Radiation Protection Officer shall ensure that the Director of safety receives a written report no later than 5 days after the occurrence (HARP Act section 14, page 23)

The regulatory bodies will give any further direction

17.4 **PROCEDURE "B."**

Excessive dose to staff that is deemed unusual (I REM to 10 msv) during a 3 months time period

1. Review x-ray safety measures with staff regarding use of protective apparatus and ensures that exposure was not a result of carelessness on the part of the technologist.
   - a- If there is a possibility of the technologist not following safety procedures then follow subsection (V)
   - b- If relatively certain that exposures were not due to the technologist's carelessness, follows subsection (ii) and so on.
   - c-

2. Review the last x-ray inspection done for HARP regulation and reassure that: all standards were met.

3. Test all protective barriers for radiation leaks (ex. Aprons, lead window at control booth)

4. Visually inspect equipment for fault or breakage

1. Contact the x-ray Inspection Services (MOH) and give details of the radiation incident and subsequent follow-up. They will advise and arrange for an x-ray inspection if it is deemed necessary.

PROCEDURE "C" — DEFINITE EXPOSURE

Where x-ray workers received a dose, more than the annuals limit (50-tnsv whole body) in a period of three months.

1-The employer will immediately investigate the cause of the exposure (follow Procedure B)
2-And provide a report in writing of the findings and of the corrective action taken to the director of safety (Read regulation 632/86 section 13) The regulatory body will give any further direction.

PROCEDURE "D" — POSSIBLE EXPOSURE

Where an accident or failure of any equipment occurs that may have resulted in a worker receiving a dose more than the annual limits.

1. The employer will notify immediately by telephone, fax, or other direct means the director of safety.

2. And within forty-eight hours after the accident or failure, send to the director a written report (read 0 regulation 632/86 section 14)

3. The employer will immediately investigate the cause of the exposure

NOTE: The director of x-ray safety will advise the clinic regarding staff placement/job activity after the radiation incident, but this depends on each particular situation. In care of an emergency regarding radiation exposure or accident, refer to the following addresses:

Provincial Ministry of Health
X-ray Inspection Services
7 Overleaf Blvd, 6th floor
Toronto, Ontario M4H 1A8
416-327-7940

Provincial Ministry of Labor
Radiation Protection Services
400 University Ave.
Toronto, Ontario M7A 1T7
416-965-8175

QUALITY ASSURANCE AND DOSE MEASUREMENT

INTRODUCTION:

Diagnostic x-rays are an essential part of the present day medical practice. In North America, over 60% of the population with access to modern medical care undergoes radiological procedures each year. Over half of all important decisions for the welfare of patients are based on radiological procedures. The diagnostic x-ray is thus one of the most valuable tools used in modern health care.

Although individual doses are usually small, in total diagnostic x-rays account for the major portion of exposure to the general population. However, with well-designed, installed and maintained x-ray equipment,, and with the proper procedure by trained operators, unnecessary exposure to patients can be reduced significantly, with no decrease in value of medical information derived. To the extent, that patient exposure for machine operators and other health care personnel.

The need for radiation protection exists because exposure to ionizing radiation may result in effects that manifest themselves not only in exposed individuals but in his/her descendants as well. These effects are called: somatic and genetic effects, respectively.

Somatic effects are characterized by observable changes occurring in the body organs of the individual exposed. These changes may appear in a time within a year's frame of a few hours to many years, depending on the amount and duration of exposure of the individual. Genetic effects are of equal case of concern at the lower doses used in diagnostic radiology. Although the radiation dose may be small and appear to cause no observable damage, the probability of chromosomal damage in the germ cell, with the consequences of mutation giving rise to genetic defects, can make such doses significant when considered for a very large population.

There are four main aspects of the problem to be considered.

Firstly, radiological procedures are required and it is essential that patients be protected from excessive radiation during the exposure. It is necessary that personnel in radiology clinics be protected from excessive exposure to radiation in the course of their work.

Finally, personnel, especially radiology facilities and the public require adequate protection.

While for radiation workers and the general public, maximum permissible levels of exposure have been defined, no specific level has been recommended for patients undergoing diagnostic x-ray procedures. For patients, the risk involved in the exposure must always be weighed against the medical requirement for accurate diagnosis. However there must always be conscious efforts to reduce patient exposures to the lowest practical levels and to eliminate "unnecessary" exposure.

This program has been developed in order to ensure that we are meeting our commitment to provide excellence in the delivery of imaging services to our patients and referring physicians.

Each aspect of the program has to comply with both Provincial and Federal Government

Standards outlined in the Healing Arts of Radiation Protection Act (HARP), the Radiation Emitting Devices Act (RED) and the Independent Health Facility Act (Bill 147) are closely monitored by the clinic's supervisory staff. The program's focus includes not only standards and guidelines for the daily testing of equipment but also comprehensive quality assurance components to ensure the consistent achievement of quality examinations. Our technologists operate within controls and monitoring systems which meet and in some instances, surpass government guidelines and are firmly committed to the ALARA principle which states that a radiological facility must reduce radiation levels to AS LOW AS REASONABLY ACHIEVABLE.

To monitor and record the performance and effectiveness of the equipment used by Diagnostic Imaging Services, X-Ray Associates Inc. ensure that the diagnostic information produced will be consistent with high quality radiographs, using minimum radiation dose to both the patient and the technological personnel.

SAFETY CODE 20-A now called Safety code 35

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 policies 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 prescribe and perform examinations, 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. The President 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 be 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 as per CMRITO guidelines. A radiation worker acknowledgement form is signed upon hire.

B) Radiation Protection Officer/Quality Advisor

Dr. Phil Mok 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

METHODS-SAFETY

Inlight Nova Dosimeter (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/General Manager 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/General Manager, 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 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 the 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 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.

Physical markers must be exposed in the image. Electronic markers are used only when the physical marker cannot be seen.

THE X-RAY ROOM

A) WARNING SIGNS

Warning signs to alert pregnant females are essential. The entrance door of the x-ray room has 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 the 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/her. The 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:

2. Keep the doors closed.
3. Use sponges and sandbags for immobilization.
4. Shield all patients, especially children.
5. Technologists cannot hold patients.
6. 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 stretchers 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 protection 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 size 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. **PROTECTIVE 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 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 pregnancy is compatible with accepted maximum radiation exposure. A dosimeter must be worn at all times by a technologist at all times. Special limits apply to confirmed pregnant workers. They may request more frequent dosimeter readings.

X-RAY ASSOCIATES INC.
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 X-Ray Associates Inc. of all

responsibility for any resulting X-Ray related problem.

Patient Name: _____

Signature: _____

Date: _____

Witness name: _____

Witness Signature: _____

Date _____

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
CPR/First Aid
RPO/Quality Advisor signed Letter
Reference Books/HARP Act/ IHFA
Safety code 35 (old 20-A)
Policy and Procedure Manual: Signed Annually

RADIOGRAPHY QUALITY CONTROL:

EXPOSURE INDEX:

ALARA principle must always be followed: Radiographic techniques must be as low as possible to obtain a diagnostic image and keep patient exposure at a minimum.
The programmed AEC values provide optimal imaging for each body part. When a manual setting is used (ma/ms), the EI or DEI value is important as a guide to ensure each image has been obtained using the correct exposure factors for image quality and lowest dose.

*****It is expected that every image is examined to ensure it has the correct exposure index. If any AEC programmed is not in the correct range, then the lead radiographer should be notified.** From these values we can alter our exposures accordingly.

Vaughan and Aurora **USE DEI**
The GE units give a machine-determined DEI for each image. If the exposed image is in the acceptable determined DEI range, a green indicator is shown. These units also show if the image is under or over exposed should the image not be optimal and in the "green" zone.

Newmarket and Harding DR **USE f**
These IDC units have a determined "f" value. A perfect image would be an f 0 value. The unit gives every image an "f: number. The majority of exposures should be between f-1 and f 1 however, + or - 2 is acceptable.
Underexposed is more negative
Overexposed is more positive.

HARP: every 6 months

PMs: annually

Lead: X-Ray all lead at 100 cm and a technical factor to produce an optical density of 1.0. Check for cracks and holes. Circle the area with a black marker. Check all ties to ensure they have not frayed and can be tied. Analyze and record data. All aprons damaged, should be repaired and if necessary removed from use depending on location of damage. Should be done twice a year. Contact GM once completed.

Repeat/Reject Rate: This must be done monthly and a % calculated based on total exams for the month. (reminder to NOT include blank or service exposures)

Film Audit: All staff will have an annual film audit and periodic live exam audits.

Warm Up: Each unit must be warmed up before use. An image is to be sent to PACS as confirmation that the unit is exposing and ready for patient use.

Obtaining Reject Percentage by Clinic

All totals for each month are to be entered onto your monthly total recap sheet found in your binder in each clinic.

Aurora - DR

1. The percentage rejected for each month is compiled by taking the number of exams from x-ray and chiro and adding these together for a total sum. These numbers are supplied by the Head Office each month as it is not possible to obtain these from the x-ray unit. Take the total sum and multiply by three as an average number of exposures per exam. This is the total of exposures for the month. Using the reject sheet supplied by the technologists, calculate the total number of rejects. Now you can calculate the percentage of rejects for the month. Do add each number of rejects for each given reason to determine if there is a trend in reject reasons. Eg- Motion, Artifact, Exposure

$$\frac{\text{Total \# of Rejects}}{\text{Total \# of Exams}} = \frac{X}{100}$$

cross multiply and divide where X = the total % rejected that month

Newmarket & Harding- DR

1. The reject analysis can be run directly from the x-ray unit under the **Super User** capabilities. Sign in as a super user. Go to the Camera Ready icon. Go to Reports. On the report summary select Rejection Summary Report on the drop down menu. Number of copies =1. Select the correct start and end date. Print and gathering Data will begin. This will take some time. When the data is gathered, put it in your USB. On the top select where you wish the Data to go- removable disk F drive. Save as a PDF. Highlight your choice to save by double clicking and hit Save. The report should appear on the screen when this is complete. Close by the X on the top right. Restart Magellan if it is not running. Print your month from the USB and put a hard copy into your files and enter the percentage on the monthly total sheet in your binder.

Vaughan

1. These totals may be gathered from the x-ray unit directly and should be done at each month's end. Click onto Tools. Click onto System. Next to RRA reporting tool click on Start. Select the time and date. Press export to USB. Print a hard copy and file in the clinic and enter the percentage total on your monthly total sheet in your binder.

REPEAT REJECT ANALYSIS:

2024

MONTH	RATE %
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

2025

MONTH	RATE %
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

2026

MONTH	RATE %
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

2027

MONTH	RATE %
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	T
November	
December	

2028

MONTH	RATE %
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

2029

MONTH	RATE %
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

REPEAT REJECT ANALYSIS FORM

Type of exam/view	overexposed	underexposed	positioning	Motion	Other reason, please explain	Initials

X-Ray Associates Inc. **RADIOGRAPHY** **POLICY AND PROCEDURE**	PROCEDURE **LEAD APRON SCREENING**	ISSUING AUTHORITY General Manager/QA
Last Revised: Sept 2017, Nov 2020, Oct 2021, Sep 16, 2022, Mar 23, 2024	REFERENCE	EFFECTIVE DATE February, 2016

Preamble:

Lead apron screening testing is performed twice per year. All images and results must be maintained for 6 years.

- The lead apron testing is to be done bi-annually in May and November.
- Use the master list of aprons in your clinic binder. Each lead piece must be numbered or labeled so that it is distinguishable.
- Make sure the master list is updated and any aprons that have been removed from use noted.
- Add any newly acquired aprons, thyroid collars etc. to the master list and number accordingly
- Each apron is to be exposed and the image evaluated for any imperfections that would indicate the lead has been compromised.
- If an apron is larger than your exposure area, do the number of test shots needed to verify the apron.
- Check for apron cleanliness and hoop or Velcro fastener security. Check the stitching on the apron. Any imperfections should be reported and repaired.
- Lead gloves and thyroid collars must be imaged.
- If possible depending on your x-ray unit, overtype the apron identification number onto the image for ease of evaluation.
- All images from each test time are to be accepted into PACS and sent to the PACS administrator. Notify the PACS administrator that you have sent these images. He /she will label according to the clinic and date them for future reference for six years.
- Do not put any apron back into service if you are unsure of safety. Contact the Lead Technologist and ask for a further evaluation of the lead.
- Date, accept each lead protection unit by ticking the appropriate box and sign the apron test sheet once you are finished.

Vaughan Lead Apron Screening – 2 Times per Year Please (55kVp, 3mAs)

Room 1

Apron Style	May Pass or Fail	November Pass or Fail	Pass or Fail Visual Inspection	Pass or Fail Irradiation
Pediatric royal blue #6A				
Ultra ray true lead royal blue #6B				
Full lead apron red #7				
Thyroid royal blue #9				
Thyroid LTD #10				
Gonadal shield small #11				
Gonadal shield medium #12				
Gonadal shield large #13				
Gonadal shield x-large #14				
Gonadal boys #15				
Full lead pediatric #18				
Ultra ray lead royal blue YM1				

Dark blue LTD YM10				
Lead gloves				
Lead stand YM6				

Room 2

Apron Style	May	November	Pass or Fail Visual Inspection	Pass or Fail Irradiation
Cook innoray royal blue #1				
Lead stand LTD large #4				
Full lead apron blue YMB2/4				
Green LTD true lite YM2				
Blue medium YM7				

Aurora Clinic

Lead Apron Screening

Apron Description	May Pass or Fail	November Pass or Fail	Visual Inspection Pass or Fail	Irradiation Pass or Fail
Cook innoray med wrap royal blue				
LTD navy pattern extra-large wrap				
Cook small royal blue hoop #5				
Ultraray royal blue small hoop #6				
Ultraray true lead royal blue hoop #7 (stand)				
Ultraray large royal blue hoop #8				
Pediatric hoop #9				
Full apron green #11				
Gloves – One pair (dark green)				

Gonadal lead #13				
Gonadal lead #14				
Infant gonadal #15				
Infant gonadal #16				
Blue thyroid #9				

Newmarket Clinic (1)

Lead Apron Screening

Apron Description	May Pass or Fail	November Pass or Fail	Visual Inspection Pass or Fail	Irradiation Pass or Fail
Small Lead Apron (Green)				
Medium Lead Apron (Blue)				
Large Lead Apron (Black)				
Medium Lead Apron (Black)				
Small Thyroid Collar				
Large Thyroid Collar				
Small Lead Apron (Blue)				
Large Lead Apron (Blue)				
Large Lead Apron (Blue)				

Newmarket Clinic (2)

Lead Apron Screening

Apron Description	May Pass or Fail	November Pass or Fail	Visual Inspection Pass or Fail	Irradiation Pass or Fail
Medium Lead Apron (Green)				
Medium Lead Apron (Green)				
Lead Apron (Blue)				
Full Lead Apron				
Full Lead Apron				

Harding Clinic

Lead Apron Screening

Apron Description	May Pass or Fail	November Pass or Fail	Visual Inspection Pass or Fail	Irradiation Pass or Fail
Royale Blue Lead Apron, small, #1				
Royale Blue Lead Apron, Medium, #2				
Royal Blue Lead Apron, Large, #3				
Thyroid Collar Black/Blue				
Black/Blue Gonadal Shield, Small				
Royal Blue Gonadal Shield, Small				
Kids Brown Gonadal Shield, Large				
Thyroid Collar				
Vest				

Blue Apron On Stand				
Green Apron				
Blue Flat Apron				

THE COLLEGE OF PHYSICIANS AND SURGEONS OF ONTARIO

RADIOGRAPHY

MEDICAL RADIATION TECHNOLOGIST OBSERVATION FORM

Please complete one form for each examination observed

MRT OBSERVED:	
CMRTO #:	

PATIENT IDENTIFIER:	
PATIENT WRITTEN CONSENT OBTAINED:	

TYPE OF EXAMINATION OBSERVED?	

	C	NC	NA
1.8.1 DUTIES AND RESPONSIBILITIES OF MRTs			
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.	○	○	○
Ensure female patients are confirmed and documented – "Not Pregnant"?	○	○	○
Inquire about and record any contraindications before starting the exam	○	○	○
Ensure that the worklist contains the correct patient information (if applicable).	○	○	○

	C	NC	NA
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 PPE (personal protection equipment masks/gloves/gown etc.) as required for the procedure and as indicated by personal risk assessment.	○	○	○
Make sure physical markers are present in the x-ray field but not within the anatomy of interest (electronic markers are considered as a last resort).	○	○	○
Ensure appropriate collimation is used. This can be verified by viewing the raw image.	○	○	○
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.	○	○	○
Exposure factors must be taken from technique charts (either manually posted in the control booth or electronically programmed into the anatomical programming of the generator control). Pediatric technique charts are available by weight for infant, toddler and child.	○	○	○
A Pigg o Stat is available for infant/toddler chest exams if done at the facility.	○	○	○
Ensure the door to the examination room is self-closing, marked with a radiation warning symbol and therefore closed during radiation exposures.	○	○	○
Ensure film and or CR cassettes are stored appropriately and not left in the examination room (if applicable).	○	○	○

	C	NC	NA
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.	○	○	○
Record exposure factors? (for mobile x-ray and if non-digital equipment is used).	○	○	○
Were infection control procedures followed? (e.g. Cassette cleaned before or after exam, hand washing/sanitizer used before and after touching patient, chest stand cleaned etc.).	○	○	○
Perform quality control procedures as per facility policies?	○	○	○
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?	○	○	○
Did each image include collimation and markers?	○	○	○
For chest radiography does the examination include the following?			
Is chest imaging done as per CAR guidelines?	○	○	○
Are the technical factors within the appropriate kVp range (120-150) If not, is the examination of diagnostic quality with adequate penetration.	○	○	○

General Comments: *(Please use this section to provide overall comments regarding the technologist's performance, attitude, competency, what infection control measures were taken etc.). Document products used?*

X-RAY IMAGE AUDIT	DATE

Technologist **Exam Date:** **Exam Type:** **Accession #:**		**Auditor's Name:** **Comments:** **Score:** **/25**
Documentation (Procedure Record)	5	
Proper exam & referring Dr.registered correctly in RIS		
Does exam match the clinical info		
Was clinical info supplemented if not provided?Tech annotated		
Was there a verbal/Stat request? Handled correctly?		
Was a positive finding seen and dealt with correctly?		
Positioning	3	
Proper views obtained (canned note made if not and why)		
AP		
Oblique		
Lateral		
Other		
Image Appearance	4	
Exposure index		
Motion		
Markers present: Yes (2), Electronic (1), no markers (0)		
Artifacts (i.e. jewelry, teeth, etc)		
Post Processing	6	
Density/contrast		
Orientation and correct order of images		
# of images taken vs # images sent to PACS		
Missing images without document comment		
Verified in PACS, initialed, screened and shielding used		
Proper documentation scanned into PACS		
Radiation Protection	2	
Proper collimation used		
Evidence of documentation of shielding		
Comments		

X-RAY ASSOCIATES INC. INTERESTING CASES	PROCEDURE	
	ISSUING AUTHORITY QA	PAGE
LAST REVISION DATE: October 2017 LAST REVIEWED DATE: Nov 2020, Oct 2021, Sep 16, 2022, Mar 23, 2024, Aug 2024	SIGNATURE	EFFECTIVE DATE September, 2015
	REFERENCE	

PREAMBLE:

Interesting cases can be logged by all staff and radiologists.

The RPO is required to send at least two interesting cases annually to be shared with all staff. Interesting cases will be reviewed at two QA meetings to ensure compliance.

See Next Page for Directions on how to log interesting cases in PACS

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE LOGGING INTERESTING CASES IN PACS	ISSUING AUTHORITY General Manager
Last Revised: Nov 2020, Oct 2021, Sep 16, 2022, Mar 23, 2024	REFERENCE	EFFECTIVE DATE October, 2017

LOGGING INTERESTING CASES IN PACS

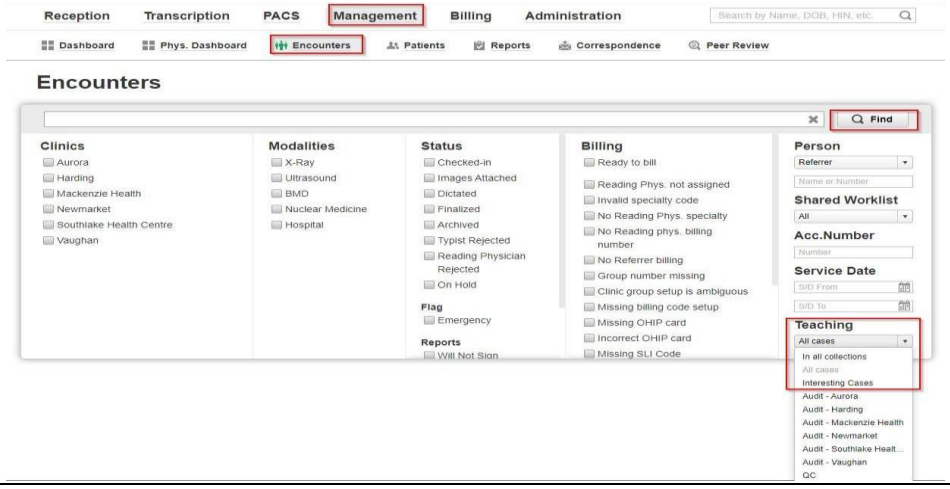
All technologists can log interesting cases in PACS for educational purposes.

How to Add studies to interesting cases folder

- Go to the encounter click on the  to edit the encounter.
- Click on Interesting cases and then save by clicking on the checkmark.

How to Lookup Interesting Cases in Velox

- Go to Management
- Encounter
- Under Teaching click on Interesting cases
- Find a list of all the interesting cases will appear


Reception
Transcription
PACS
Management
Billing
Administration
Search by Name, DOB, HIN, etc.
Dashboard
Phys. Dashboard
Encounters
Patients
Reports
Correspondence
Peer Review
Encounters
Find
Clinics
Aurora
Harding
Mackenzie Health
Newmarket
Southlake Health Centre
Vaughan
Modalities
X-Ray
Ultrasound
BMD
Nuclear Medicine
Hospital
Status
Checked-in
Images Attached
Dictated
Finalized
Archived
Typist Rejected
Reading Physician Rejected
On Hold
Flag
Emergency
Reports
Will Not Sign
Billing
Ready to bill
Reading Phys. not assigned
Invalid specialty code
No Reading Phys. specialty
No Reading phys. billing number
No Referrer billing
Group number missing
Clinic group setup is ambiguous
Missing billing code setup
Missing OHIP card
Incorrect OHIP card
Missing SLI Code
Person
Referrer
Name or Number
Shared Worklist
All
Acc.Number
Number
Service Date
S/D From
S/D To
Teaching
All cases
In all collections
All cases
Interesting Cases
Audit - Aurora
Audit - Harding
Audit - Mackenzie Health
Audit - Newmarket
Audit - Southlake Healt...
Audit - Vaughan
QC

X-Ray Associates Inc. RADIOGRAPHY POLICY AND PROCEDURE	PROCEDURE QC NOTES WORKFLOW	ISSUING AUTHORITY General Manager
Last Revised: November 12,2015 Sept 2017, Sep 16, 2022	REFERENCE	EFFECTIVE DATE October, 2009

Please follow the process for QC notes:

1) The PACS admin will review the QC notes. If the exam has NOT been reported, they will put the exam in the "unverified" or "arrived" status. This should be addressed ASAP by the individual clinic, ideally, by the technologist who performed the exam. If the technologist is not present, and the technologist on duty cannot answer the question, please notify the lead sonographer.
2) If the question cannot be answered by phone, it is expected that the technologist will return within 24 hours to answer the question so that the exam can be reported.
3) The technologist will not respond in the QC note unless the exam has NOT been reported.
4) The PACS admin will enter "technologist notified" in response to the radiologist question. He will then print the QC note and send it to the technologist in question, with a copy to the General Manager.
5) The technologist will review the exam, and respond to the question via on the sheet. If there is something missing from the exam i.e. images were not sent, or a tech worksheet needs updating, markers to be added or deleted etc. please make sure this is done and communicated.
6) **DO NOT** respond to the radiologist unless it has NOT been reported.
7) The modality lead will review the response and the original QC note and send a copy with the response to the general manager to file.
8) Please do not be defensive in your responses, they are not meant to be punitive. If we see errors being repeated we can update all staff. This is for teaching purposes and feedback only.

RADIOGRAPHY TRAINING CHECK LIST: SEE MAIN P&P

CAR Standards for General (Plain) Radiography

First adopted: June 2000 These standards were prepared by the Expert Advisory Panel of the CAR: Dr. Barry B. Hobbs, Dr. Erik Juriaans, Valerie Palm RT(R), ACR, Janet Scherer RT(R), ACR, Dr. Harald O. Stolberg, Chair

The standards of the Canadian Association of Radiologists (CAR) are not rules, but are guidelines that attempt to define principles of practice that should generally produce radiological care. The physician and medical high-quality physicist may modify an existing standard as determined by the individual patient and available resources. Adherence to CAR standards will not assure a successful outcome in every situation. The standards should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed to obtaining the same results. The standards are not intended to establish a legal standard of care or conduct, and deviation from a standard does not, in and of itself, indicate or imply that such medical practice is below an acceptable level of care. The ultimate judgment regarding the propriety of any specific procedure or course of conduct must be made by the physician and medical physicist in light of all circumstances presented by the individual situation.

I. INTRODUCTION

Radiography is a proven and useful procedure for evaluation of most areas of human anatomy. It utilizes differences in x-ray attenuation to demonstrate that anatomy and pathology. The goal of radiography is to establish the presence or absence and nature of disease by demonstration of the disease process itself or the effects of the disease process on normal anatomy. The study should be done with the minimal radiation dose necessary to achieve an optimal study. For this purpose, the ALARA principle ("as low as reasonably achievable") has been accepted by the federal and provincial regulatory agencies. If a CAR standard exists for the specific type of radiographic examination being performed, that standard would apply.

II. INDICATIONS AND CONTRAINDICATIONS

A. There are many indications for radiography, and these are dependent on the patient's clinical history and the disease processes that affect the anatomic area to be studied. There should be a sufficient clinical indication to warrant performance of a study, and a reasonable anticipation that the results of the radiograph, normal or abnormal, will influence the treatment course of the patient. Requests for general radiographs should be done according to the principles for "Request for Diagnostic Imaging Examinations" of the CAR.

B. All imaging facilities should have policies and procedures to reasonably attempt to identify pregnant patients prior to the performance of any diagnostic examination involving ionizing radiation. If the patient is known to be pregnant the potential radiation risk to the fetus and clinical benefits of the procedure should be considered before proceeding with the study. If the study is deemed essential, adequate shielding of the fetus should be applied.

III. QUALIFICATIONS AND RESPONSIBILITIES

A. Physician

Physicians involved in the performance, supervision and interpretation of standard radiographs should be Diagnostic Radiologists and must have a Fellowship or Certification in Diagnostic Radiology with the Royal College of Physicians and Surgeons of Canada and/or the Collège des médecins du Quebec. Also acceptable are foreign specialist qualifications if the Radiologist so qualified holds an appointment in Radiology with a Canadian University.

As new imaging modalities and interventional techniques are developed additional clinical training, under supervision and with proper documentation, should be obtained before radiologists interpret or perform such examinations or procedures independently. Such additional training must meet with pertinent provincial/regional regulations. Continuing professional development must meet with the

requirements of the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada.

B. Technologist Qualifications

The medical radiation technologist must have Canadian Association of Medical Radiation Technologist Certification or be certified by an equivalent licensing body recognized by the C.A.M.R.T.

Under the overall supervision of the radiologists, the technologist will have the responsibility for patient comfort and safety for examination preparation and performance and for image technical evaluation and quality and applicable quality assurance.

The training of technologists engaged in specialty activities shall meet with applicable and valid national and provincial specialty qualifications.

Continued education of technologists is encouraged by the C.A.M.R.T. and should meet pertinent provincial regulations.

The technologist should have training in fluoroscopy either in his/her training curriculum or through special courses and must perform fluoroscopy on a regular basis.

IV. SPECIFICATIONS OF THE EXAMINATION

Technique

1. All radiographic studies should be permanently labeled with patient identification and date of the examination. The time of the examination should be included, if relevant. The side (right or left) of the anatomic site radiographed should be permanently labeled.

2. All facilities performing radiography should have protocols for standard views of each anatomic area that will be radiographed. These should be designed to optimize diagnostic information while minimizing radiation exposure.

3. Appropriate collimation should be used to limit exposure to the anatomic area of interest.

4. All facilities performing radiography should have technique charts listing exposure factors which will reliably produce diagnostic radiographs of anatomic parts of patients of different sizes to minimize the need for repeat exposures. Repeat rates should be part of the routine quality control process.

5. All radiographs should be reviewed for positioning and diagnostic quality at the facility before the patient is released. Repeat radiographs should be performed when necessary for diagnostic quality.

6. All facilities producing radiographs should have policies and procedures for appropriate shielding of patients.

7. For pediatric or uncooperative patients, immobilization procedures should be available to enable diagnostic quality images to be obtained.

V. EQUIPMENT SPECIFICATIONS

A. The diagnostic radiographic equipment and facility should meet all applicable federal and provincial radiation regulations.

B. Where an analog film system is used, appropriate film-screen and grid combinations should be available to obtain diagnostic radiographs of all anatomic areas to be imaged.

C. Where digital radiography is used, the equipment should meet the specifications described in currently valid standards.

D. Automated processing is preferred. Carefully controlled temperature and regular processor maintenance should be included in a quality control program. A constant time and temperature shall be maintained for manual processing.

VI. QUALITY CONTROL AND IMPROVEMENT, SAFETY, INFECTION CONTROL AND PATIENT EDUCATION CONCERNS

The quality control program should be designed to minimize patient, personnel, and public radiation risks and maximize the quality of the diagnostic information.

Radiographic techniques, filtration, scatter reduction and the choice of optimal screen combinations and film processing performance are amongst the factors that must be assessed in order to provide appropriate image quality. By far the greatest number of technical errors are related to mismatched or poor choice of film-screen combinations or the use of deteriorated screens and cassettes, inadequately calibrated low power x-ray generators, inadequate attention to control of secondary radiation, and improper film development. With automated film processing the final stages of image production is often ignored. The improper processing, particularly the use of partially exhausted or over-diluted developers is a common cause for poor image contrast. Sensitometry must be used to monitor processor performance. Simple quality assurance procedures similar to those now used in mammography also can be used to monitor chemical processing and to assure consistent results. Technologists must look for the same detail in radiographs that radiologists look for, and there must be self-education and constant feedback of information.

Each imaging facility should have documented policies and procedures for monitoring and evaluating the safety and operation of imaging equipment. Equipment performance should be monitored at least annually and a quantitative dose determination should be conducted by a qualified medical radiation physicist.

The following quality control procedures should be applied to all radiographic examinations: 1. When the examination is completed the radiographs should be checked either by a radiologist or a qualified technologist. 2. Films not of diagnostic quality should be repeated as necessary. A repeat rate program should be part of the quality control process.

Procedures and policies should be systematically monitored and evaluated as part of the overall quality improvement program of the facility. Monitoring should include the evaluation of accuracy of radiological interpretation as well as the appropriateness of the examination. The data should be collected in a manner which complies with statutory and regulatory peer review procedures in order to protect the confidentiality of the peer review data.

Policies and procedures related to quality, patient education, infection control, and safety should be developed and implemented.

The findings on the radiograph should be reported in a timely fashion in compliance with the CAR Standards on Communication. Unusual, unexpected, or urgent findings should be communicated directly to the referring physician or his or her representative.

VII. DOCUMENTATION

The result of the examination should be communicated to the referring physician in accordance with the CAR Standard on Communication: Diagnostic Radiology.

· Requisitions: The requisition is a legal document and must contain pertinent clinical information using precise and accurate terminology - not jargon - legibly recorded on the request form.

· Reports: Communication is the goal of radiological interpretation and reporting and the ability of the radiologist to communicate the results of the examination to the referring physician is often a neglected aspect of the radiologist's work. Ambiguous and confusing reports reduce the practical value of the imaging procedure leads to diminished confidence by the referring physician and the patient, and may result in inappropriate care and delay in diagnosis.

REFERENCES

1. Yaffe M, editor. The healing arts radiation protection guidelines. Toronto: Ontario Ministry of Health: 1987. 2. Stolberg HO, Hynes DM, Rainbow AJ, Moran LA. Requesting diagnostic imaging examinations: a position paper of the Canadian Association of Radiologists. CARJ 1997; 48(2):89-91 3. Dixon RL. On the primary barrier in diagnostic x-ray shielding. Med Phys 1994;21:1785-1793. 4. Havukainen R, Pirinen M. Patient dose and image quality in five standard x-ray examinations. Med. Phys 1993;20:813-817. 5. Hunter TB. Film labels: a new look. J Digital Imaging 1994;7:39-41. 6. Kreel L. Medical Imaging. Postgrad Med J 1991;67:334-346 7. Lam C, Martin CJ. Design of a database with graphical analysis for x-ray quality assurance and dose information to assist in a program for patient dose reduction. Br J Radiology 1991;64:831-835. 8. Pitcher EM, Wells PN. Quality assurance and radiologic audit. Curr Opin Radiol 1992;4:9-14.

Standards for Chest Radiography

First adopted in 1994 and revised in June 2000 These standards were prepared by the Chest Expert Advisory Panel of the CAR: Craig L. Coblentz, M.D., Chair, Frederick Matzinger, M.D., Louise M. Samson, M.D., Janet Scherer, RT(R), ACR, Harald O. Stolberg, M.D., Gordon Weisbrod, M.D.

The standards of the Canadian Association of Radiologists (CAR) are not rules, but are guidelines that attempt to define principles of practice that should generally produce radiological care. The physician and medical high-quality physicist may modify an existing standard as determined by the individual patient and available resources. Adherence to CAR standards will not assure a successful outcome in every situation. The standards should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed to obtaining the same results. The standards are not intended to establish a legal standard of care or conduct, and deviation from a standard does not, in and of itself, indicate or imply that such medical practice is below an acceptable level of care. The ultimate judgment regarding the propriety of any specific procedure or course of conduct must be made by the physician and medical physicist in light of all circumstances presented by the individual situation.

I. INTRODUCTION

Chest radiography with the use of screen film systems is the most frequently performed radiological study and also one of the most challenging. It remains one of the prime methods for investigation of diseases of the lungs and mediastinal structures and of the heart and the pulmonary circulation despite recent advances in other non invasive techniques. Since the discovery of x-rays more than a century ago advances in technology have yielded numerous improvements in thoracic imaging. The technical aspects of conventional chest radiographic examinations have been studied extensively and effects of various parameters on the quality of chest radiographs are part of the Canadian Association of Radiologists' Standards for Chest Radiography and the ACR Standards for Chest Radiography, but still insufficient attention is being directed towards technical factors concerned with improving the diagnostic content and diminishing patient exposure in chest radiography. This communication addresses issues involved in the production of the "optimal" chest radiographs by current standards.

All radiographic examinations should be done in accordance with the CAR Standards for General (Plain) Radiography.

II. INDICATIONS

The concept of heart and lung as a single cardiopulmonary system is encouraged in this context and rigid compartmentalization of the chest is to be avoided.

Chest radiography is performed to assess the presence and nature of respiratory and cardiac disease.

Indications for chest radiography include: · Signs and symptoms related to the respiratory and cardiac system, such as chest pain, dyspnea or cough. · Follow-up of patients with diagnosed respiratory or cardiac disease for the evaluation of improvement, resolution or progression. · Monitoring of patients in intensive care units, patients with life supporting devices, and patients who have undergone cardiac or thoracic surgery. · To rule out metastasis in patients with extrathoracic malignancies, to rule out bronchogenic carcinoma or mediastinal tumors in patients with paraneoplastic syndromes, in the investigation of fever of unknown origin, and in the assessment of patients with severe trauma. · Based on the clinical assessment and/or evaluation of the chest radiograph further examination of the chest with other imaging modalities may be indicated.

"Routine radiographs" for periodic health examinations; pre-employment health assessment; pre-admission and preoperative chest radiographs and x-rays for tuberculosis screening and screening for bronchogenic carcinoma are not warranted.

III. QUALIFICATIONS OF PERSONNEL

A. Physician Qualifications

Physicians involved in the performance, supervision and interpretation of standard radiographs should be Diagnostic Radiologists and must have a Fellowship or Certification in Diagnostic Radiology with the Royal College of Physicians and Surgeons of Canada and/or the Collège des médecins du Québec. Also acceptable are equivalent foreign Radiologist qualifications if the Radiologist is certified by a recognized certifying body and holds a valid provincial license.

As new imaging modalities and interventional techniques are developed additional clinical training, under supervision and with proper documentation, should be obtained before radiologists interpret or perform such examinations or procedures independently. Such additional training must meet with pertinent provincial/regional regulations. Continuing professional development must meet with the requirements of the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada.

B. Technologist Qualifications

The medical radiation technologist must have a Canadian Association of Medical Radiation Technologist Certification or be certified by an equivalent licensing body recognized by the C.A.M.R.T.

Under the overall supervision of the radiologists, the technologist will have the responsibility for patient comfort and safety for examination preparation and performance and for image technical evaluation and quality and applicable quality assurance.

The training of technologists engaged in specialty activities shall meet with applicable and valid national and provincial specialty qualifications.

Continued education of technologists is encouraged by the C.A.M.R.T. and should meet pertinent provincial regulations.

IV. TECHNICAL PROBLEMS OF CHEST RADIOGRAPHY

To appreciate the merits and limitations of various approaches one must understand certain basic concepts of image quality as applied to the thorax which is one of the most technically challenging regions to image radiographically due to large difference in tissue density present in the chest. Depending on beam quality (kilovolt peak) x-ray transmissions through the unobscurred lung can be 100 times greater than that in the mediastinum and subdiaphragmatic area. This disparity in regional radiopacity leads to a wide range of x-ray intensities reaching the image receptor. Unfortunately, this wide dynamic range can easily exceed the sensitivity of most screen film receptors and this problem makes it difficult to depict in a single film image all regions of the chest with good contrast. Given that as much as 40% of the lung area is obscured by the heart, mediastinum and diaphragm, it is difficult to visualize adequately all regions of the thorax.

* What is good chest radiography? In a good image of the chest it should be possible to see: · lung tissue · the vascular pattern of the lung including that behind the heart · areas along the chest wall · the trachea and main bronchi · bone detail of the thorax

The contrast provided by the alveolar air surrounding the heart, great vessels and pulmonary vessels allows us to identify and assess these structures. The lung structure as seen on the chest radiograph is composed almost entirely of vessels. In addition, it is necessary to penetrate the dense tissues of the thorax in order to observe abnormalities in the lung which may be superimposed on these structures. The optimal chest radiograph then must provide a combination of wide latitude at lower density and contrast at higher density in the same radiograph. More than in other areas of imaging there is an inherent conflict between the desire for high contrast (to facilitate recognition of subtle lung detail and abnormalities) and wide latitude to enable the full range of tissue opacities encountered in the thorax. The chest radiograph is therefore a technically challenging examination and must be made within relatively narrow technical parameters.

V. SPECIFICATIONS FOR THE PERFORMANCE OF THE EXAMINATION

The written request for the chest radiographic examination should contain appropriate clinical history and the reason for the examination. If at all possible, this request should be completed by the referring physician.

A. Standard Chest Radiography * Global image contrast and density: Factors determining the global (large area) contrast of chest radiographs include:

· the tube kV (the x-ray spectrum) · the efficiency of scatter rejection · the shape of the sensitometric curve of the film · exposure level · conditions of development

* Image fine detail: Depiction of fine detail is determined by:

· local image contrast · spatial resolution · noise

A standard chest examination should include an erect posterior-anterior (PA) and left lateral projection made in full inspiration (total lung capacity). The examination may be modified by the physician as dictated by the clinical circumstances or the condition of the patient.

The chest radiograph should include both lung apices and costophrenic angles. There should be appropriate definition of the vertebral bodies and the left retrocardiac vascular pattern should be visible. The scapulae should be positioned outside the lungs on the PA view and the arms elevated for the lateral view. The medial ends of the clavicles should be projected equidistant from the margins of the vertebral column.

* Films and Screens

· Conventional Chest Radiography: The screen film detector is by far the most commonly used image recorder, a fact that attests to its practical benefits including low cost, high spatial resolution, operational simplicity, and dependability. However, there are limitations in its ability to provide contrast in both lungs and mediastinum as well as overall image latitude. The exposure range (dynamic range) that a conventional chest film can record is

approximately 2 orders of magnitude. Standard radiographic films have a relatively narrow latitude and a low linear response as depicted by the Hurter & Driffield (H&D) characteristic curve. As a result contrast in a film varies with local background optical density and structures with inherent low subject contrast may not be detectable if they are in a region of low optical density on the "toe" of the H&D curve.

· New Screen Film Systems in Chest Radiography: The ideal image receptor for chest radiography should be highly sensitive to radiation and be able to respond to a wide range of exposures (wide latitude). In the past decade several innovations in screen film systems have been developed to address this problem and have established a new standard for radiographic image quality. These systems have raised the quality of chest radiography by further increasing the information that can be recorded and displayed. The use of asymmetric film screen systems is the current Canadian standard for conventional chest radiography.

* Grids: In a conventional radiograph acquired without an anti scatter grid more than 90% of all detected radiation in the mediastinal region is from scattered (non information containing) photons and in the lung approximately 50% of the detected radiation is scatter. Even when a 12 to 1 anti scatter grid is used, only half of the potential subject contrast in the retro cardiac and retro diaphragmatic regions is available to the image recorder, and this improvement is achieved only at the expense of higher patient radiation dose levels. The image degradation caused by scattered radiation almost always dictates the use of a grid. The best radiographic rule for the use of grids includes all structures where the anatomy is greater than 10 cm thick. If this rule is properly applied, then all chest imaging other than neonates should be done with a grid including portable radiographs. The grid ratio must be appropriate for the kVp range that is commonly used. Most grids in chest

* Technical Advances in Chest Radiography: New approaches to image acquisition and display have been introduced in the last decade to circumvent the limitation of conventional film screen studies. Digital radiography with its wide exposure latitude, low scatter images and flexible display capabilities can compensate for the limited spatial resolution in standard radiographic systems. Also with modern computer technology it is feasible to replace film screen systems with digital methodology to improve image acquisition. These advances include: · storage phosphor systems · selenium detector systems · silicon flat panel detectors

The diagnostic performance of these systems is equivalent or superior to that of the conventional screen film systems for clinical chest imaging and can replace conventional radiography systems. This new technology offers transmission and storage capabilities inherent to digital radiology.

B. Bedside (Portable) Chest Radiography

1. The technologist should seek and expect assistance of nursing personnel in positioning unstable patients and adjusting and removing support apparatus from the radiologic field.

2. In cooperative patients, erect radiographs at 180 cm target-film distance are preferred. In uncooperative or comatose patients, a semi-erect or supine radiograph may be necessary, and a 125 cm target-film distance is acceptable.

3. Radiographic exposure should be made during peak inspiration.

4. The kilovoltage should be between 80 and 90 kVp in order to optimize penetration and minimize the effects of scattered radiation. Grids should be used whenever possible. If grids are used, higher

radiography have either 8 to 1 or 10 to 1 ratios with 103 lines/cm and a focal range between 90 cm and 180 cm.

* Focal Spot Size: Focal spot size of the radiographic tube used for chest x-rays should not exceed 1.2 mm (numerous studies have concluded that a spatial resolution of 2.5 line pairs per mm is sufficient for most diagnostic tasks in chest imaging).

* kVp Range: Chest radiography is usually performed with moderately high kilovoltage technique (120-140 kVp) which allows for better penetration of the mediastinum and retrocardiac and subdiaphragmatic lung and a decrease in the range of transmitted radiation as well as shorter exposure times.

* mAs and mA and time: Whether the exposure is set in mAs-or mA time is not important as long as the essential criteria is recognized. When working with mAs a combination must be selected that will yield the shortest exposure time. When the operator can select mA and time, there is more control over the technical factors, and again the shortest possible exposure time is essential.

* Distance: The depiction of fine detail on chest radiographs is principally determined by the screen film system used as geometric effects are usually small because of the large distance between focal spot and film. Distance in chest imaging is also important to minimize magnification of the heart and mediastinal structures. A 180 cm SID is most commonly used.

* Equipment: all these principles apply to both automated chest units and standard radiographic units. While it is possible to obtain excellent chest radiographs with general purpose radiographic equipment, high quality images in a routine clinical practice are most easily obtained with dedicated chest radiographic systems. These systems typically include an automated film changer, an integrated docked

kilovoltage ranges of 100-120 kVp may be employed. To minimize patient motion, mobile equipment should have adequate capacity to make a radiographic exposure in less than 0.1 seconds.

5. Film with medium scale contrast should be used to maximize image contrast. Photostimulable phosphor plates are an acceptable alternative to film screen radiography but require careful quality control. An optimally exposed radiograph presents the lung at a mid-gray level (optical density approximately 1.4-1.7).

6. Exposure parameters (i.e. mAs, kVp, distance and patient position) should be recorded for each film, as they may be helpful in future radiographs taken at the bedside.

C. Chest Fluoroscopy

Chest fluoroscopy has been largely superseded by other noninvasive techniques.

VI. QUALITY CONTROL PROCEDURES

* Quality Management A wide range of radiographic techniques, processing conditions and film screen combinations and speeds are still being used in conventional chest radiography. Exposure monitoring is done quite consistently, but this is just part of quality management.

Quality management policies and procedures must be in keeping with quality management principles of Standards for General Radiography.

VII. REQUISITION AND REPORT

· Reports: Interpretation of chest radiographs requires assessment of the thoracic cage and soft tissues; diaphragms, pleura, mediastinum, heart, hila and lungs. Requisitions and reports must meet with the CAR Standards for General Radiography.

· It is of particular importance that the most recent radiograph be compared with prior chest radiographs and/or chest computed tomography, if those examinations are available.

REFERENCES

1. Soffer A. Editorial Don't Compartmentalize the Chest. Diseases of the Chest 1969;55:443-444

2. MacMahon H, Vyborny CJ. Technical Advances in Chest Radiography. AJR 1994;163:1049-1059.

3. Ravin CE, Chotas HG. State of the Art: Chest Radiography. Radiology 1997;204:593-600

4. Glazer HS, Muka E. Et al. New Techniques in Chest Radiography. Radiological Clinics of North America 1994;32:711-729.

5. Canadian Association of Radiologists National Standards on Chest Radiography. National Standards for Radiology in CAR 1994.

6. American College of Radiology ACR Standards for the Performance of Adult Chest Radiography. Reston, VA: American College of Radiology 1993.

7. Slone RM, VanMetter R, et al. Effects of Exposure Variations on Clinical Utility of Chest Radiography. Radiology 1996;199:497-504.

8. Routine Preadmission Chest X-ray developed by McMaster Diagnostic Imaging Practice Guidelines Initiative. March 1998.

9. Pre-Operative Chest X-ray developed by McMaster Diagnostic Imaging Practice Guidelines Initiative. March 1998.

10. Chest X-ray in Pre-employment Examinations developed by McMaster Diagnostic Imaging Practice Guidelines Initiative. March 1998.

11. Chest X-ray in Lung Cancer Screening developed by McMaster Diagnostic Imaging Practice Guidelines Initiative. March 1998.

12. Chest X-ray in Routine Health Examination developed by McMaster Diagnostic Imaging Practice Guidelines Initiative. March 1998.

13. MacMahon H, Vyborny CJ. Technical Advances in Chest Radiography. In Green R, Muhm Jr (Eds); Syullabus: Categorical Course in Diagnostic Chest, Radiology, Oak Brook, Il. RSNA Publication 1992;pp45-56

14. Gray JE, Stears JG, et al. Evaluation of Resolution and Sensitometric Characteristics of an Asymmetric Screen-Film Imaging system. Radiology 1993;188:537-539.

15. Swensen SJ, Gray JE, et al. A New Asymmetric Screen-Film Combination for Conventional Chest Radiography: Evaluation in 50 Patients. AJR 1993;21:1769-1775.

16. VanMetter R, Dickerson R. Objective Performance Characteristics of a New Asymmetric Screen-film System. Medical Physics 1994;21:1483-1490.

17. Yosiharu, Higashida, Yasunori, Murakami, et al. Basic Imaging Properties of a New Screen-film System for Chest Radiography. Medical Physics 1996;23:1351-1357.

18. Garmer M, Hennigs SP, Jager HJ, et al. Digital Radiography Versus Conventional Radiography in Chest Imaging. Diagnostic Performance of a Large-Area Silicon Flat-Panel Detector in a Clinical CT-Controlled Study. AMR 2000;174:75-80

CAR Standards for Performance of the Lumbosacral Spine

First adopted: June 2000

These standards were prepared by the Expert Advisory Panel of the CAR: Dr. Barry B. Hobbs, Dr. Erik Juriaans, Valerie Palm RT(R), ACR, Janet Scherer RT(R), ACR, Dr. Harald O. Stolberg, Chair

The standards of the Canadian Association of Radiologists (CAR) are not rules, but are guidelines that attempt to define principles of practice that should generally produce radiological care. The physician and medical highquality physicist may modify an existing standard as determined by the individual patient and available resources. Adherence to CAR standards will not assure a successful outcome in every situation. The standards should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed to obtaining the same results. The standards are not intended to establish a legal standard of care or conduct, and deviation from a standard does not, in and of itself, indicate or imply that such medical practice is below an acceptable level of care. The ultimate judgment regarding the propriety of any specific procedure or course of conduct must be made by the physician and medical physicist in light of all circumstances presented by the individual situation.

I. INTRODUCTION

Radiography of the lumbosacral (LS) spine is a proven and useful initial procedure for evaluation of the lumbosacral vertebral bodies, posterior elements, and disc spaces. This standard outlines the principles for the performance of high quality LS spine radiography.

All radiographic examinations should be performed in accordance with the CAR Standard for General (Plain) Radiography.

II. GOAL

The goal of the radiographic examination of the LS spine is to identify anatomic abnormalities or disease processes of the LS spine.

A. Indications for radiography of the LS spine include, but are not limited to:

1. Trauma to, or potentially involving, the LS spine.
2. Back pain in the lumbar region.
3. Pain radiating into legs.
4. In children, limping or refusal to bear weight, suspected congenital anomaly of the LS spine, and syndromes associated with spinal abnormalities.
5. Current or prior surgery to the LS spine.
6. Evaluation of a LS spine abnormality seen on another imaging study, e.g. bone scan.
7. Arthritis.
8. Osteoporosis; compression fractures.
9. Follow-up of previous LS spine abnormality.
10. Evaluation of primary and secondary malignancy.

III. SPECIFICATIONS OF THE EXAMINATION

A. Adult Lumbosacral Spine Examination

1. Anteroposterior and lateral views. The "breathing" technique described with Dorsal Spine examinations can also be used for the AP and lateral view of the Lumbosacral spine. These may be the initial and only views required, with the following views obtained when indicated:

· Both oblique views
· Coned down lateral view of the L5-S1 area
· Angled AP view of L5-S1
· Additional views, such as flexion and extension lateral views, may be helpful in completing the evaluation in selected cases.

If general radiography is not sufficient to resolve the questions, other studies should be performed to complete the evaluation, such as CT, MRI, or skeletal scintigraphy.

B. Pediatric Lumbosacral Spine Examination

In infants and children. AP and lateral views are usually sufficient. In older children and adolescents, oblique views and coned down lateral view of LS may be helpful. In children with back pain and inconclusive radiographs, skeletal scintigraphy may be helpful prior to CT or MRI.

IV. QUALITY CONTROL

1. The examination should completely demonstrate the entire lumbosacral spine, or the levels of clinical interest in a limited exam.
2. If prior lumbosacral spine films are available, they should be compared.

REFERENCES

1. Cohn EL, Maurer EJ, Keats TE, et al. Plain film evaluation of degenerative disc disease at the lumbosacral junction. Skeletal Radiol 1997;26:161-166.
2. Hall FM. Routine oblique projections of the lumbar spine in evaluation of low back pain. AJR 1983;141:209-210.
3. Penning L. Blickman JR. Instability in lumbar spondylolisthesis: a radiologic study of several concepts. AJR 1980;134:293-301.
4. Reinus WR, Strome G, Zweimer LF JR. Use of lumbosacral spine radiographs in a level II emergency dept. AJR 1998;170:443-447.
5. Simmons ED Jr., Guyer RD, Graham-Smith A, et al. Radiographic assessment for patients with low back pain. Spine 1995;20:1839-1841.
Torgerson WR, Dotter WE. Comparative roentgenographic study of the asymptomatic and symptomatic lumbar spine. J Bone Joint Surg Am 1976;58:850-853.

Healing Arts Radiation Protection Act

R.S.O. 1990, CHAPTER H.2

Consolidation Period: From July 24, 2023 to the e-Laws currency date.

Last amendment: 2023, c. 4, Sched. 2, s. 4.

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).

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).

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).

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 and Imaging Technologists of Ontario.

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); 2017, c. 25, Sched. 6, s. 16.

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 or another person prescribed by the regulations;

(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* or another person prescribed by the regulations. 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); 2023, c. 4, Sched. 2, s. 4.

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).

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).

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).

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).

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).

Notice requiring hearing

(3) A notice under subsection (2) shall inform the person that the person is entitled to a hearing by the Appeal Board if the person gives notice in writing to the Director and the Appeal Board, within fifteen days after the notice under subsection (2) is served on the person, requiring a hearing, and the person may so require such a hearing. R.S.O. 1990, c. H.2, s. 13 (3).

Power of Director or inspector where no hearing

(4) Where a person served with notice under subsection (2) does not require a hearing in accordance with subsection (3), the Director or inspector may carry out the proposal stated in his or her notice. R.S.O. 1990, c. H.2, s. 13 (4).

Powers of Appeal Board where hearing

(5) Where a hearing is required under subsection (3), the Appeal Board shall appoint a time for and hold the hearing and by order may direct the Director or the inspector 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 or the inspector 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 or the inspector. R.S.O. 1990, c. H.2, s. 13 (5).

Application of ss. 11, 12

(6) Sections 11 and 12 apply with necessary modifications to a proceeding under this section. R.S.O. 1990, c. H.2, s. 13 (6).

Emergency order

14 (1) Where the Director or an inspector is of the opinion, upon reasonable and probable grounds, that an emergency exists by reason of danger to the health or safety of any patient or member of the public in respect of an X-ray machine or the installation, operation or maintenance of an X-ray machine, the Director or inspector may make an oral or written order directed to any one or more of,

(a) the owner of the X-ray machine;

(b) any person who operates the X-ray machine;

(c) the radiation protection officer for the facility in which the X-ray machine is installed or, in the case of a portable X-ray machine, the radiation protection officer for the portable X-ray machine. R.S.O. 1990, c. H.2, s. 14 (1).

Contents of order

(2) An order under subsection (1) may require the person to whom it is directed to stop operating or stop the operation of the X-ray machine either permanently or for a specific period of time. R.S.O. 1990, c. H.2, s. 14 (2).

Immediate appeal

(3) A person affected by an order under subsection (1) may appeal therefrom in person or by an agent and by telephone or otherwise to the Director, and the Director, after receiving the submissions of the person and of the inspector, shall vary, rescind or confirm the order. R.S.O. 1990, c. H.2, s. 14 (3).

Written reasons for order

(4) Where the Director makes an order under subsection (1) or varies or confirms an order under subsection (3), the Director shall forthwith thereafter serve a written copy of the order or the order as varied or confirmed, together with written reasons therefor, upon the person to whom the order is directed. R.S.O. 1990, c. H.2, s. 14 (4).

Notice

(5) An order under subsection (1) or an order as varied or confirmed under subsection (3) shall inform the person to whom it is directed that the person is entitled to a hearing by the Appeal Board if the person gives to the Director and the Appeal Board, within fifteen days after a copy of the order or the order as varied or confirmed is served notice in writing requiring a hearing, and the person may so require such a hearing. R.S.O. 1990, c. H.2, s. 14 (5).

Effect of order

(6) Although an appeal is taken against an order under subsection (1) or an order as varied or confirmed under subsection (3), the order is effective at and from the time it is communicated to the person to whom it is directed until it is confirmed, varied or rescinded on appeal and the person shall comply with the order immediately. R.S.O. 1990, c. H.2, s. 14 (6).

Powers of Appeal Board

(7) Where a hearing is required under subsection (5), the Appeal Board shall appoint a time for and hold the hearing and the Appeal Board by order may confirm, alter or rescind the order of the Director and for such purposes the Appeal Board may substitute its opinion for that of the Director. R.S.O. 1990, c. H.2, s. 14 (7).

Application of ss. 11, 12

(8) Sections 11 and 12 apply with necessary modifications to proceedings under this section. R.S.O. 1990, c. H.2, s. 14 (8).

Where order rescinded by Director

(9) The Director by an order may rescind an order made under subsection (1) or an order as varied or confirmed and in such case shall serve a copy of the order upon the person to whom the order or the order as varied or confirmed was directed. R.S.O. 1990, c. H.2, s. 14 (9).

15 Repealed: 2011, c. 9, Sched. 19, s. 2.

16-18 Repealed: 2011, c. 9, Sched. 19, s. 2.

Director of X-ray Safety

19 The Minister shall appoint an employee of the Ministry of Health and Long-Term Care as Director of X-ray Safety for the purposes of this Act and the regulations. R.S.O. 1990, c. H.2, s. 19; 2006, c. 19, Sched. L, s. 11 (3).

Inspectors

20 (1) The Minister may appoint in writing one or more employees in the Ministry of Health and Long-Term Care or other persons as inspectors for the purposes of this Act and the regulations and in an appointment may limit the authority of an inspector in such manner as the Minister considers necessary or advisable. R.S.O. 1990, c. H.2, s. 20 (1); 2006, c. 19, Sched. L, s. 11 (3).

Certificate of appointment

(2) The Minister shall issue to every inspector appointed under subsection (1) a certificate of appointment. R.S.O. 1990, c. H.2, s. 20 (2).

Production of certificate

(3) Every inspector, in the execution of duties under this Act and the regulations, shall produce his or her certificate of appointment upon request. R.S.O. 1990, c. H.2, s. 20 (3).

Inspection

(4) An inspector at all reasonable times may enter and inspect the premises and may inspect the operations and all records and radiographs where an X-ray machine is installed or operated and may require the production of proof that any person who operates an X-ray machine meets the qualifications and requirements prescribed by the regulations to ensure that this Act and the regulations are complied with. R.S.O. 1990, c. H.2, s. 20 (4).

Powers of inspector

(5) Upon an inspection under this section, an inspector is entitled to make tests and examinations to determine whether or not X-ray machines are installed and used in compliance with this Act and the regulations. R.S.O. 1990, c. H.2, s. 20 (5).

Copies

(6) Upon an inspection under this Act, an inspector, upon giving a receipt therefor, may remove any material that relates to the purpose of the inspection in order to make a copy thereof, but the copying shall be carried out with reasonable dispatch and the material in question shall be promptly thereafter returned to the person being inspected. R.S.O. 1990, c. H.2, s. 20 (6).

Admissibility of copies

(7) Any copy made as provided in subsection (6) and purporting to be certified by an inspector is admissible in evidence in any action, proceeding or prosecution as proof, in the absence of evidence to the contrary, of the original. R.S.O. 1990, c. H.2, s. 20 (7).

Obstruction

(8) No person shall obstruct an inspector or withhold or destroy, conceal or refuse to furnish any information or thing required by the inspector for the purposes of an inspection. R.S.O. 1990, c. H.2, s. 20 (8).

Information confidential

21 (1) The Director, each inspector appointed under this Act and each person engaged in the administration of this Act and the regulations shall preserve secrecy with respect to all matters that come to his or her knowledge in the course of employment or duties pertaining to the health of any person and shall not communicate any such matter to any other person except as provided in this Act. R.S.O. 1990, c. H.2, s. 21 (1); 2011, c. 9, Sched. 19, s. 3.

Exceptions

(2) A person referred to in subsection (1) may furnish information pertaining to the health of a person,

(a) in connection with the administration of this Act or any Act of Ontario or of Canada related to the delivery of health services or to safety in relation to irradiation from X-rays or regulations made thereunder;

(b) in proceedings under this Act or the regulations;

(c) to the person who provided a service to which the information is related, the person's solicitor, other personal representative, executor, administrator, guardian of property, trustee in bankruptcy or other legal representative; or

(d) to the person who received the service to which the information is related, his or her solicitor, personal representative, another person who has lawful custody of or is guardian for the person or other legal representative of the person. R.S.O. 1990, c. H.2, s. 21 (2); 1992, c. 32, s. 14.

Exception for professional discipline

(3) The Director may communicate information of the kind referred to in subsection (2) and any other information related thereto to the statutory body governing the profession or to a professional association of which a person who provides a service referred to in subsection (2) is a member or governing the health practice practised by the person. R.S.O. 1990, c. H.2, s. 21 (3).

Regulations

22 The Lieutenant Governor in Council may make regulations,

(a) prescribing any matter required or authorized by this Act to be, or referred to in this Act as, prescribed by the regulations;

(b) prescribing classes of or in respect of any matter that is or may be prescribed under the regulations;

(c) limiting the application of any regulation to any one or more of the classes prescribed under clause (b);

(d) exempting any class of persons, X-ray machines or facilities from any provision of this Act or the regulations and attaching conditions to any such exemption;

(e) governing or limiting, or both, the purposes for which any class of persons may operate X-ray machines or any class of X-ray machines;

(f) prescribing an X-ray Safety Code including,

(i) prescribing standards for the installation of X-ray machines,

(ii) prescribing standards for darkrooms and darkroom procedures associated with the operation of X-ray machines or any class of X-ray machines,

(iii) prescribing standards and procedures for the operation of X-ray machines and X-ray equipment or any class of X-ray machines or X-ray equipment,

(iv) prescribing physical standards for persons who operate X-ray machines or X-ray equipment,

(v) prescribing standards and procedures for the purpose of minimizing exposure to X-rays of patients and members of the public,

(vi) governing the testing of X-ray machines and X-ray equipment including, but not limited to, prescribing tests in respect of X-ray machines and X-ray equipment and requiring persons operating X-ray machines and X-ray equipment and radiation protection officers to perform the tests,

(vii) prescribing programs for evaluation of performance of procedures and observance of standards,

(viii) prescribing additional duties of radiation protection officers and persons who own or operate X-ray machines,

(ix) prescribing standards of design, construction, operation and performance for X-ray machines and X-ray equipment operated in Ontario,

(x) requiring compliance with any matter prescribed or governed under subclauses (i) to (ix);

(g) governing the keeping of records by persons who own or operate X-ray machines and by radiation protection officers and requiring and governing returns by them to the Director;

(h) prescribing classes of radiation protection officers and restricting or limiting the types of facilities or X-ray machines or both for which any such class may be designated as radiation protection officers;

(i) prescribing subject-matters for courses of study in the operation of X-ray machines and X-ray equipment;

(j) prescribing additional duties and powers of the Director and inspectors;

(k) Repealed: 1997, c. 15, s. 4 (3).

(l) adopting by reference, in whole or in part, with such changes as the Lieutenant Governor in Council considers necessary, any code or standard and requiring compliance with any code or standard that is so adopted.

(m) Repealed: 1997, c. 15, s. 4 (3).

R.S.O. 1990, c. H.2, s. 22; 1997, c. 15, s. 4 (3); 2011, c. 9, Sched. 19, s. 4.

Fees

22.1 The Minister may establish and charge fees for registrations and approvals. 1997, c. 15, s. 4 (4).

C.A.T. scanners

23 (1) In this section,

"hospital" has the same meaning as in the *Public Hospitals Act*. R.S.O. 1990, c. H.2, s. 23 (1).

Designations by Minister

(2) The Minister may designate,

(a) a hospital or facility or a class of hospitals or facilities within which it is permitted to install or operate computerized axial tomography scanners; and

(b) the number of computerized axial tomography scanners that may be installed or operated in such hospitals or facilities. 1998, c. 18, Sched. G, s. 51 (8).

Prohibition

(3) No person shall install or operate or cause or permit the installation or operation of a computerized axial tomography scanner unless it is installed and operated in a hospital or facility that is designated under subsection (2) or in a hospital or facility that is part of a class of hospitals or facilities that is designated under subsection (2). 1998, c. 18, Sched. G, s. 51 (8).

Same

(3.1) No person shall install or operate or cause or permit the installation or operation of more computerized axial tomography scanners in a hospital or facility than the number designated under subsection (2). 1998, c. 18, Sched. G, s. 51 (8).

Application

(4) This section does not apply in respect of a computerized tomography scanner that was installed before the 1st day of May, 1984. R.S.O. 1990, c. H.2, s. 23 (4).

Offence

24 (1) Every person is guilty of an offence who,

(a) knowingly furnishes false information in an application under this Act or in any statement or return required to be furnished under this Act or the regulations;

(b) fails to comply with any order, direction or other requirement made under this Act; or

(c) contravenes any provision of this Act or the regulations. 2002, c. 18, Sched. I, s. 4.

Penalty, individual

(2) Every individual who is convicted of an offence under subsection (1) is liable,

(a) for a first offence, to a fine of not more than $25,000 or to imprisonment for a term of not more than 12 months, or to both;

(b) for a subsequent offence, to a fine of not more than $50,000 or to imprisonment for a term of not more than 12 months, or to both. 2002, c. 18, Sched. I, s. 4.

Same, corporation

(3) Every corporation that is convicted of an offence under subsection (1) is liable to a fine of not more than $50,000 for a first offence and to a fine of not more than $200,000 for a subsequent offence. 2002, c. 18, Sched. I, s. 4.

No limitation

(4) Section 76 of the *Provincial Offences Act* does not apply to a prosecution under this section. 2002, c. 18, Sched. I, s. 4.

Proceeding to prohibit continuation or repetition of contravention

25 Where any provision of this Act or the regulations or any order issued under this Act by the Director is contravened, despite any other remedy or any penalty imposed, the Director may apply to the Superior Court of Justice for an order prohibiting the continuation or repetition of the contravention or the carrying on of any activity specified in the order that, in the opinion of the court, will or is likely to result in the continuation or repetition of the contravention by the person committing the contravention, and the court may make the order and it may be enforced in the same manner as any other judgment of the Superior Court of Justice. R.S.O. 1990, c. H.2, s. 25; 2006, c. 19, Sched. C, s. 1 (1).

Protection from personal liability

26 (1) No action or other proceeding for damages shall be instituted against the Director or an inspector for any act done in good faith in the execution or intended execution of his or her duty or for any alleged neglect or default in the execution in good faith of his or her duty. R.S.O. 1990, c. H.2, s. 26 (1).

Crown not relieved of liability

(2) Subsection (1) does not, by reason of subsection 8 (3) of the *Crown Liability and Proceedings Act, 2019*, relieve the Crown of liability in respect of a tort committed by a person mentioned in subsection (1) to which it would otherwise be subject, and the Crown is liable under that Act for any such tort in a like manner as if subsection (1) had not been enacted. 2019, c. 7, Sched. 17, s. 83.

Service

27 (1) Any notice, order, decision or other document required to be given, served or delivered under this Act or the regulations is sufficiently given, served or delivered if delivered personally or sent by registered mail addressed to the person to whom it is required to be given, served or delivered at the latest address for service appearing on the records of the Ministry or, where there

is no address for service so appearing, at the address, if any, last known to the Director. R.S.O. 1990, c. H.2, s. 27 (1).

When service deemed made

(2) Where service is made by registered mail in accordance with subsection (1), the service shall be deemed to be made on the seventh day after the day of mailing unless the person on whom service is being made establishes that the person did not, acting in good faith, through absence, accident, illness or other cause beyond the person's control, receive the notice, order, decision or other document until a later date. R.S.O. 1990, c. H.2, s. 27 (2).

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CMRITO STANDARDS OF PRACTICE

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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 judgment 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. [2] ***" 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 judgment to perform safely, effectively and ethically and to apply that knowledge, skill and judgment 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 judgment, 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 judgment 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 judgment 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

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 of their practice.

Practice Standard: Members must have the knowledge, skills and judgment 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[5]

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. 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 licenses 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 licenses 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. 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*

2. 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

3. 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

4. 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 judgment 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 judgment given the situation

4. any other factors specific to the situation to ensure the procedure is implemented safely, effectively and ethically 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

j. position the patient as required for the diagnostic or therapeutic procedure

k. ensure the area to be diagnosed or treated will be displayed on the resultant image or captured electronically

l. use radiation protection devices and other patient protection devices as required

m. instruct the patient on breathing and movement procedures

n. ensure that the orientation of the body and other pertinent parameters are marked correctly on the images and data

o. ensure the exposure provides optimum image quality while using minimal radiation

p. ensure examination results (images and data) provide all the information requested in the order

q. carry out the procedures ordered

r. assess the patient's condition before, during and after the procedure or course of treatment

s. respond to any change in the patient's condition during or after the procedure or course of treatment

t. 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:

u. 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:

v. 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:

w. 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

x. 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:

y. 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 judgment 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 licenses 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

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[13]
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 license(s) issued under the *Nuclear*

Safety and Control Act

w. use appropriate personal protection equipment when handling radioactive materials in accordance with any license(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]

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 judgment 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:

y. 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

z. give the patient or patient's substitute decision maker an opportunity to ask questions

aa. provide the patient or patient's substitute decision maker with answers to their questions within the scope of the profession's responsibility

bb. 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

cc. carry out diagnostic or therapeutic procedures only with the informed consent of the patient or the patient's substitute decision maker

dd. treat the patient with dignity and respect and in accordance with the Code of Ethics of the College

ee. 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

ff. instruct the patient to remove only the clothing and items that will interfere with the diagnostic or therapeutic procedures

gg. provide the patient with a gown or sheet to cover areas where clothing was removed [15]

hh. explain to the patient when and where the member might touch them and why

ii. touch the patient in only those areas needed to facilitate carrying out the procedure

jj. 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

kk. comply with any applicable privacy legislation such as the *Personal Health Information Protection Act* and its regulations

ll. comply with all relevant legislation such as the *Health Care Consent Act*

mm. comply with the *Regulated Health Professions Act* pertaining to the prevention of sexual abuse and the College's sexual abuse prevention program

5. 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 practice 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 judgment 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[16]

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 judgment to perform and delegate the controlled act

4. the member has the knowledge, skills and judgment 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 judgment 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[18]

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 judgment 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 judgment 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]