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Accreditation Standards 2014 For Initial Assessment

Diagnostic Imaging

Enhancing public safety through excellence in diagnostic medicine accreditation

ACCREDITATION STANDARDS

HOW TO USE THIS DOCUMENT

A new facility, new services provided by an accredited facility, or services that have implemented significant change ***must*** proceed through the Initial Assessment process and receive a Provisional Accreditation award ***PRIOR*** to service delivery and testing of equipment on people.

The Initial Assessment process includes:

- the facility/service completing and submitting documentation that outlines the service profile, equipment, key individuals and their related qualifications, and other information as requested.
- a DAP Officer reviewing the submitted documentation and conducting an on-site visit of the facility/service.

During the Initial Assessment process, the facility/service is assessed to a partial selection of the Diagnostic Accreditation Program (DAP) Accreditation Standards. This document, "*ACCREDITATION STANDARDS For Initial Assessment*" identifies those standards that will be utilized by the DAP Officer for conducting the Initial Assessment. A facility preparing for an Initial Assessment is strongly encouraged to review this document in their preparation, and to ensure all mandatory requirements have been fulfilled prior to contacting the DAP to schedule the on-site Initial Assessment. It is also suggested that the facility/service reviews the complete, comprehensive set of DAP Accreditation Standards as these documents provide additional guidance and explanations that the facility may find useful.

Evidence of compliance with mandatory requirements is required for the facility to be eligible to receive a Provisional Accreditation award. Mandatory requirements are identified by a bold type "**M**".

Example:

DSA 1.0 Potential hazards and risks to staff, patients and visitors are minimized.

DSA 1.3 Safety issues are discussed and monitored.

DSA1.3.1 **M** ☐ The imaging service has a safety committee or health and safety representative.
Guidance: If there are 20 or more employees, a joint occupational health and safety committee (JOHSC) must be functioning. If the imaging service is part of a larger facility, a member of the committee must have the responsibility to represent the imaging service. If the facility has between 10 and 19 staff, the workers must select a person to be their Health and Safety Representative. This person, in effect, carries out the same functions as the committee in a larger facility. For organizations with less than 10 employees, the employer is required to hold regular meetings with the staff to discuss matters relating to maintaining a healthy and safe workplace. Records of these meetings must be kept. Sections 125 to 140 of the Workers Compensation Act provide all the details about committee requirements and function.

Accreditation Award

All mandatory requirements must be fully implemented for a facility to be eligible for a Provisional Accreditation award.

A new facility/service that is granted Provisional Accreditation status is permitted to commence service delivery to patients subject to satisfactory performance in fulfilling continuous accreditation requirements. If a facility/service is not awarded Provisional Accreditation, they are not permitted to commence service delivery.

Facilities are encouraged to contact an Accreditation Specialist at the DAP for more information on proceeding through the Initial Assessment process, and to arrange for a DAP Officer to conduct an Initial Assessment.

Quality Category Codes

Governance and Leadership	DGL
Medical Staff	DMS
Human Resources	DHR
Patient and Client Focus	DPC
General Safety	DSA
Patient Safety	DPS
Infection Prevention and Control	DIPC
Quality Improvement	DQI
Information Management	DIM
Imaging Informatics	II
Equipment and Supplies	DES
Global Modality	GM
Radiation Safety	RS
Radiology	RA
Mammography	MA
Ultrasound	US
Echocardiography	EC
Computed Tomography	CT
Magnetic Resonance Imaging	MR
Magnetic Safety	MRS
Nuclear Medicine	NM
Nuclear Medicine Radiation Safety	NMRS
Bone Densitometry	BD

GOVERNANCE AND LEADERSHIP STANDARDS

Introduction:
Each organization has a corporate governance structure that is ultimately responsible for the quality and safety of services provided. For large organizations, such as health authorities and some privately owned facilities, this governance structure is the Board of Directors. For other privately owned facilities the governance structure may be a partnership group or an individual as the sole proprietor. The term "governing body/ownership" is used in these standards to refer to those individuals who provide corporate governance to the organization.

Each organization, regardless of its complexity, also has a leadership structure. Many leadership responsibilities directly affect the provision of diagnostic services as well as the day to day operations of the diagnostic department. In some cases, these responsibilities will be shared amongst leaders; in other cases, a particular leader may have primary responsibility. Regardless of the organization's structure, it is important that leaders carry out all of their responsibilities.

GOVERNANCE

DGL 1.0 The governing body/ownership is committed to, and actively engaged in, quality and safety.

DGL 1.1 The governing body/ownership is accountable for the quality and safety of care delivered by the diagnostic service.
Intent: The governing body/ownership defines their expectations for the diagnostic service management and senior leaders to create and maintain a safety and quality focused culture.

DGL1.1.1 **M** ☐ The governing body/ownership ensures effective internal structures and resources are in place to support quality and safety within the diagnostic service.

LEADERSHIP

DGL 2.0 Accountability and responsibility for key leadership functions is assigned.
Guidance: Functions may be assigned to an individual, leadership group or committee. An individual may be assigned to more than one key function.

DGL 2.2 Responsibility for the clinical oversight of diagnostic service quality and safety is assigned and supported by the organization.
Guidance: Clinical oversight describes a system through which an organization continually improves the quality of their services and safeguards high standards of care through an environment that promotes clinical excellence.

DGL2.2.1 **M** ☐ A senior medical leader is appointed with responsibility for the quality and safety of the medical practice within the diagnostic service.

DGL2.2.2 **M** ☐ Medical leaders are appointed for specific sections/departments/programs within the imaging service with responsibility for the quality and safety of medical practice within the section/department/ program.

DGL2.2.3 **M** ☐ Medical leaders are actively involved in the monitoring of the clinical caseload.

DGL2.2.4 **M** ☐ Administrative and technical leaders are appointed with responsibility for the quality and safety of operational processes and technical operations within the diagnostic service.

DGL2.2.5 **M** ☐ There is a defined structure and process through which the medical, administrative and technical leaders are held accountable.

DGL 2.3 There is a documented and dated organizational chart.

Guidance: The organizational chart includes medical, technical and administrative staff.

DGL2.3.1 **M** ☐ The management structure of the diagnostic service is clearly delineated.

DGL2.3.2 **M** ☐ Lines of accountability, responsibility and authority as well as the interrelationships of all staff are clear.

DGL2.3.3 **M** ☐ Relationships to other organizations are identified (e.g. remotely located medical leadership).

MEDICAL STAFF STANDARDS

Introduction:
The medical staff of the organization is comprised of those medical practitioners who hold a valid license to practice medicine in British Columbia, and who have been appointed to the medical staff by the governing body/ownership of the organization. The governing body/ownership has a responsibility to ensure that only qualified and competent medical practitioners are appointed to the medical staff. The medical staff is accountable to the governing body/ownership.

MEDICAL STAFF LEADERSHIP

For health authority/hospital based diagnostic services, the medical leader may have the title of Chief, Department Head, Medical Director, or an alternate title. The medical leader and medical staff of health authority/hospital based diagnostic services operate within the provisions set out in the Medical Staff Bylaws, and are accountable to the governing body through the established medical staff structure of the health authority/hospital.

In partnership groups, one or more partners may take responsibility for the activities of medical leadership and there may or may not exist written documents that outline the medical staff structure and rules for self governance.

If a physician is the owner in solo practice, they are responsible for ensuring the activities of medical leadership take place, inclusive of ensuring that they are qualified and competent themselves to undertake the scope of medical service provided within their organization through a peer review process.

REMOTELY SUPERVISED FACILITIES

Intent: Remotely supervised facilities provide services without medical leadership regularly on site. These facilities are typically small and located in remote communities where examination interpretation is performed off-site at a larger facility or hospital.

DMS 1.2 Medical leaders must attend the diagnostic service to assess the quality and safety of service.

At a minimum, for radiology:

DMS1.2.1 **M** ☐ The medical leader visits the facility prior to assuming responsibility for medical leadership of a new service.

At a minimum, for mammography:

DMS1.2.3 **M** ☐ The medical leader visits the facility prior to assuming responsibility for medical leadership of a new service.

At a minimum, for ultrasound:

DMS1.2.5 **M** ☐ The medical leader visits the facility prior to assuming responsibility for medical leadership of a new service.

At a minimum, for echocardiography:

DMS1.2.7 **M** ☐ The medical leader visits the facility prior to assuming responsibility for medical leadership of a new service.

At a minimum, for computed tomography:

DMS1.2.9 **M** ☐ The medical leader visits the facility prior to assuming responsibility for medical leadership of a new service.

At a minimum, for magnetic resonance imaging:

DMS1.2.11 **M** ☐ The medical leader visits the facility prior to assuming responsibility for medical leadership of a new service.

At a minimum, for nuclear medicine:

DMS1.2.13 **M** ☐ The medical leader, or a delegated nuclear medicine physician, visits the facility prior to assuming responsibility for medical leadership of a new service.

At a minimum, for bone densitometry:

DMS1.2.15 **M** ☐ The medical leader visits the facility prior to assuming responsibility for medical leadership of a new service.

DMS 1.4 Logs to record medical leader visits are maintained.

DMS1.4.1 **M** ☐ A log is kept to record the visit of the medical leader or delegate to the diagnostic service.

DMS1.4.2 **M** ☐ Recommendations for improvement or required follow-up are recorded in the log.

DMS1.4.3 **M** ☐ The log is signed by the person conducting the visit.

DMS 1.5 Roles of authority, responsibility and accountability are clearly defined and maintained at remotely supervised facilities.

DMS1.5.1 **M** ☐ The medical leader or designated interpreting physician maintains ongoing communication with the technical staff and examination requestors.

DMS1.5.2 **M** ☐ Processes are in place to ensure the prompt availability of the interpreting physician for consultation and image review, whenever required.

DMS1.5.4 **M** ☐ The medical leader documents those examinations that may be performed at remotely supervised facilities.

CREDENTIALING AND PRIVILEGING

Introduction:

Credentialing is a process that involves the collection, verification and assessment of information regarding the education, training, experience and ability of an individual physician to perform a requested privilege. In British Columbia physicians must have the requisite credentials as outlined in the Provincial Privileging Dictionaries. Refer to http://bcmqi.ca/privileging-dictionaries.

Credentialing for physicians who hold privileges at any Health Authority facility is performed by the Health Authority, and includes assessing eligibility for MSP billings for restricted services. Many medical offices are owner operated solo practices and the physician may not hold privileges with a Health Authority; therefore, the physician would not have proceeded through a credentialing process. In these instances the physician is licensed to their scope of practice through the College of Physicians and Surgeons of BC. For MSP billing purposes for a restricted diagnostic service, the College will review the associated credentials required to be eligible to bill for these services and will notify MSP of the eligibility. For further information please contact credentialing@cpsbc.ca.

For community-based multi-physician facilities the medical director and ownership are responsible to ensure the physicians that practice in their facilities are appropriately credentialed, either through the Health Authority or by reviewing the credentials of the physician and ensuring that the physician has been deemed eligible to bill MSP for the services. There must be a formal process used for credentialing and privileging, and it is the expectation of these accreditation standards that the medical director and ownership can demonstrate these processes.

DMS 2.0 Appropriately qualified and competent medical practitioners practice within the diagnostic service.

DMS 2.3 Diagnostic radiology services are provided by qualified physicians.

DMS2.3.1 **M** ☐ Physicians providing diagnostic radiology services have the requisite credentials for privileges as outlined in the Provincial Privileging Dictionaries.
Guidance: Diagnostic radiology services are considered core and non-core privileges depending on the relevant specialty and therefore may require further training, experience and demonstrated skill. Refer to http://bcmqi.ca/privileging-dictionaries/ for the requirements to perform diagnostic radiology.

DMS 2.4 Diagnostic mammography services are provided by qualified physicians.

DMS2.4.1 **M** ☐ Physicians providing diagnostic mammography services have the requisite credentials for privileges as outlined in the Provincial Privileging Dictionaries.
Guidance: Diagnostic mammography services are considered core and non-core privileges depending on the relevant specialty and therefore may require further training, experience and demonstrated skill. Refer to http://bcmqi.ca/privileging-dictionaries/ for the requirements to perform diagnostic mammography.

DMS 2.5 Diagnostic ultrasound services are provided by qualified physicians.

DMS2.5.1 **M** ☐ Physicians providing diagnostic ultrasound services have the requisite credentials for privileges as outlined in the Provincial Privileging Dictionaries.
Guidance: Diagnostic ultrasound services are considered core and non-core privileges depending on the relevant specialty and therefore may require further training, experience and demonstrated skill. Refer to http://bcmqi.ca/privileging-dictionaries/ for the requirements to perform diagnostic ultrasound.

DMS 2.8 **Diagnostic echocardiography services are provided by qualified physicians.**

DMS2.8.1 **M** ☐ Physicians providing diagnostic echocardiography services have the requisite credentials for privileges as outlined in the Provincial Privileging Dictionaries.
Guidance: Diagnostic echocardiography services are considered core and non-core privileges depending on the relevant specialty and therefore may require further training, experience and demonstrated skill. Refer to http://bcmqi.ca/privileging-dictionaries/ for the requirements to perform diagnostic echocardiography.

DMS 2.9 **Diagnostic computed tomography (CT) services are provided by qualified physicians.**

DMS2.9.1 **M** ☐ Physicians providing diagnostic CT services have the requisite credentials for privileges as outlined in the Provincial Privileging Dictionaries.
Guidance: Diagnostic CT services are considered core and non-core privileges depending on the relevant specialty and therefore may require further training, experience and demonstrated skill. Refer to http://bcmqi.ca/privileging-dictionaries/ for the requirements to perform diagnostic CT.

DMS 2.10 **Diagnostic magnetic resonance imaging (MRI) services are provided by qualified physicians.**

DMS2.10.1 **M** ☐ Physicians providing diagnostic MRI services have the requisite credentials for privileges as outlined in the Provincial Privileging Dictionaries.
Guidance: Diagnostic MRI services are considered core and non-core privileges depending on the relevant specialty and therefore may require further training, experience and demonstrated skill. Refer to http://bcmqi.ca/privileging-dictionaries/ for the requirements to perform diagnostic MRI.

DMS 2.11 **Diagnostic Nuclear medicine services are provided by physicians:**

DMS2.11.1 **M** ☐ Physicians providing diagnostic nuclear medicine services have the requisite credentials for privileges as outlined in the Provincial Privileging Dictionaries.
Guidance: Diagnostic nuclear medicine services are considered core and non-core privileges depending on the relevant specialty and therefore may require further training, experience and demonstrated skill. Refer to http://bcmqi.ca/privileging-dictionaries/ for the requirements to perform diagnostic nuclear medicine.

DMS 2.14 **Diagnostic Bone Densitometry services are provided by qualified physicians.**

DMS2.14.1 **M** ☐ Physicians providing diagnostic bone densitometry services have the requisite credentials for privileges as outlined in the Provincial Privileging Dictionaries.
Guidance: Diagnostic bone densitometry services are considered core and non-core privileges depending on the relevant specialty and therefore may require further training, experience and demonstrated skill. Refer to http://bcmqi.ca/privileging-dictionaries/ for the requirements to perform diagnostic bone densitometry.

DMS 3.0 **Physicians who operate radiographic and/or radioscopic equipment have the necessary education, knowledge and skills to do so safely and effectively.[1]**
Intent: *To ensure patient and operator safety, it is essential that physicians who choose to operate radiographic and/or radioscopic equipment are appropriately trained on the use of the equipment, and are knowledgeable about the unique radiation safety issues associated with this equipment. As most radiologists receive training in radioscopy (fluoroscopy) during their residency training programs, radiologists are exempt from DMS 3.5 as it relates to radioscopy.*

DMS 3.1 **Operators of radiographic and/or radioscopic equipment have documented training in:**

DMS3.1.1 **M** ☐ the safe operation of radiographic and/or radioscopic equipment and accessories being used in the facility.

DMS3.1.2 **M** ☐ all manufacturer-specified quality assurance procedures.

DMS3.1.3 **M** ☐ radiation protection procedures and measures.
Guidance: Physicians performing fluoroscopy are encouraged to complete the OSHA Program.

DMS3.1.4 **M** ☐ techniques to optimize image quality.

for radiography:

DMS3.1.5 **M** ☐ the radiological procedure being performed.

DMS3.1.6 **M** ☐ patient positioning for accurate localization of regions of interest.

DMS 3.2 Operators of radiographic and/or radioscopic equipment have knowledge of radiation protection and safety that includes:

DMS3.2.1 **M** ☐ radiation protection practices and the ALARA principle.
DMS3.2.2 **M** ☐ minimizing radiation exposures to patients, staff and visitors.
DMS3.2.3 **M** ☐ appropriate reduction of radiation exposures to lowest practical levels.
DMS3.2.4 **M** ☐ appropriate use of personal protective equipment.

DMS 3.3 The competency of the operator is assessed prior to independent work on patients and at regular intervals.

DMS3.5.1 **M** ☐ The competency of the operator is assessed by a CAMRT certified medical radiation technologist.
Guidance: At a minimum, the operator is assessed to the requirements in DMS 3.1 and DMS 3.2
DMS3.5.2 **M** ☐ A record of the competency assessment is maintained.

DELEGATED MEDICAL ACTS

Refer to the College of Physicians and Surgeons of British Columbia for additional information, accessible at https://www.cpsbc.ca/files/pdf/PSG-Delegation-of-a-Medical-Act.pdf.

DMS 4.0 The delegation of medical acts does not compromise patient safety or quality.

DMS 4.1 Delegated medical acts are clearly defined.

DMS4.1.1 **M** ☐ Each delegated medical act is clearly defined and circumscribed.
DMS4.1.2 **M** ☐ The degree of medical supervision required is identified.
Guidance: Medical supervision may be direct, with the physician in attendance, or through technology (video link, digital imaging, telephone), or according to a written protocol.
DMS4.1.3 **M** ☐ Competency requirements to perform the delegated medical act are clearly identified.

DMS 4.2 The delegation of medical acts has been approved and accepted.

DMS4.2.1 **M** ☐ Approval from the governing body/ownership of the organization has been obtained prior to the delegated medical act being carried out in the organization.
DMS4.2.2 **M** ☐ The delegation of the medical act has been accepted by the individual(s) who will perform the delegated medical act.
DMS4.2.3 **M** ☐ The diagnostic service maintains a list of approved medical acts and the individuals authorized to conduct each delegated medical act.

DMS 4.3 Delegated medical acts are performed by competent individuals.

DMS4.3.1 **M** ☐ Additional training is provided to individuals performing the delegated medical act.

DMS4.3.2 **M** ☐ Competency assessment to perform a specific delegated medical act is conducted by a physician or technical delegate.
Guidance: Competency assessment of the technical delegate is conducted by a physician with relevant expertise in the medical act.

There is a competency assessment record for each individual performing delegated medical acts. The competency assessment record includes:

DMS4.3.3 **M** ☐ the date of the assessment.
DMS4.3.4 **M** ☐ the specific act(s) being assessed.
DMS4.3.5 **M** ☐ the name of the physician or technical delegate conducting the assessment.
DMS4.3.6 **M** ☐ the signature of the individual attesting to the competence of the individual performing the specific act(s).

HUMAN RESOURCES STANDARDS

Introduction:
The management of human resources encompasses the policies, procedures and systems that influence the behavior and performance of staff. The diagnostic service must have methods in place to ensure that staff are managed as effectively as possible, since the quality of care and services provided within the diagnostic service will be greatly affected by the quality of the staff working in the department.

There is a strategy to ensure that qualified and competent staff are recruited and retained and that they are motivated and engaged in the work that they perform. This will help ensure that the needs and requirements of the diagnostic service and the population served are effectively met.

STAFF SELECTION AND RETENTION

DHR 2.1 The diagnostic service has qualified and competent staff to deliver services.

DHR2.1.1 **M** ☐ The diagnostic service selects and recruits staff based on qualifications and experience (e.g. certification, academic preparation, knowledge, skills, and reference checks).

For Radiology

DHR2.1.2 **M** ☐ Technologists providing radiology services are certified with the Canadian Association of Medical Radiation Technologists (CAMRT) or, are graduates of an accredited training school of radiology and are eligible to write the CAMRT certification examinations, or are certified Combined Laboratory X-ray Technologists (CLXT).

DHR2.1.3 **M** ☐ The diagnostic service defines the scope of practice for CLXT staff that is in alignment with their certification and training.
Intent: CLXTs receive training in radiological examinations as part of their certification. As there is no College for Combined Laboratory X-Ray Technologists established in BC, competency profiles from other provincial colleges (e.g. The Alberta College of Combined Laboratory X-Ray Technologists) can be used to define the radiological examinations that CLXTs are able to perform.

For Mammography

DHR2.1.4 **M** ☐ Technologists providing mammography services are certified with the Canadian Association of Medical Radiation Technologists (CAMRT) and have specialized training in mammography, either through a training curriculum or special courses.

DHR2.1.5 **M** ☐ Mammography technologists responsible for equipment QC are specifically trained to perform routine QC tests and record results.

DHR2.1.8 **M** ☐ Medical Physicists providing mammography services are accredited in mammography by the Canadian College of Physicists in Medicine (CCPM), the American Board of Radiology (ABR), or the American Board of Medical Physics (ABMP).

For Ultrasound

DHR2.1.9 **M** ☐ Sonographer providing ultrasound services are certified with Sonography Canada or the American Registry of Diagnostic Medical Sonographers (ARDMS), or are graduates of an accredited training school of ultrasound and are eligible to write the Sonography Canada or ARDMS certification examinations.

DHR2.1.10 **M** ☐ Sonographers performing breast ultrasound are certified with the ARDMS in Breast Ultrasound [RDMS(BR)].
Intent: Technologists that exclusively perform breast ultrasound (e.g. cross-trained mammography technologists) must either be certified with ARDMS or are graduates of an accredited training school of ultrasound and are in the process of writing their ARDMS certification.

DHR2.1.11 **M** ☐ Sonographers performing vascular imaging (e.g. carotids, peripheral vascular, abdominal vascular imaging, etc.) are certified with ARDMS in Vascular Imaging [Registered Vascular Technologist (RVT)].
Guidance: Technologists that exclusively perform vascular ultrasound (e.g. technologists working within a vascular laboratory) must either be certified with ARDMS or are graduates of an accredited training school of ultrasound and are in the process of writing their ARDMS certification.

For Echocardiography

DHR2.1.12 **M** ☐ Cardiac sonographers providing TTE and/or TEE services have obtained certification in Adult and/or Pediatric Echocardiography from the Sonography Canada or the American Registry of Diagnostic Medical Sonographers (ARDMS).

For Computed Tomography (CT)

DHR2.1.13 **M** ☐ Technologists providing CT services are certified with the Canadian Association of Medical Radiation Technologists (CAMRT) and have either completed an advanced specialty program in Computed Tomography or an equivalent combination of education, training and experience.

DHR2.1.16 **M** ☐ CT technologists performing CT colonography have completed continuing education courses or an equivalent combination of in-house education and training on the equipment and techniques used to perform the examination.

DHR2.1.17 **M** ☐ Medical physicists providing CT services are certified in Diagnostic Radiological Physics by the Canadian College of Physicists in Medicine (CCPM), or the American Board of Radiology (ABR), or the American Board of Medical Physics (ABMP).

For Magnetic Resonance Imaging (MRI)

DHR2.1.19 **M** ☐ Technologists providing MRI services are certified with the Canadian Association of Medical Radiation Technologists (CAMRT) in MRI (RTMR).

DHR2.1.21 **M** ☐ Medical physicists providing MRI services are certified in MRI by the Canadian College of Physicists in Medicine (CCPM), or the American Board of Radiology (ABR), or the American Board of Medical Physics (ABMP), or are MRI scientists with a graduate degree in a physical science involving nuclear MR (NMR) or MRI and possess a minimum of 3 years of documented experience in a clinical MRI environment

For Nuclear Medicine

DHR2.1.22 **M** ☐ Technologists providing Nuclear Medicine services are certified with the Canadian Association of Medical Radiation Technologists (CAMRT), or are graduates of an accredited training school of nuclear medicine and are eligible to write their CAMRT certification examinations.

DHR2.1.24 **M** ☐ Medical Physicists providing Nuclear Medicine services are certified in Nuclear Medicine Physics by the Canadian College of Physicists in Medicine (CCPM), or the American Board of Radiology (ABR), or the American Board of Medical Physics (ABMP).
Guidance: Specific training and experience in CT physics and CT equipment is obtained when SPECT/CT hybrid systems are used.

For Bone Densitometry

DHR2.1.25 **M** ☐ Technologists providing Bone Densitometry services are certified with the Canadian Association of Medical Radiation Technologists (CAMRT), or are graduates of an accredited training school of Radiology or Nuclear Medicine and are eligible to write their CAMRT certification examinations.

DHR2.1.26 **M** ☐ Bone Densitometry Technologists have obtained 12 CME/CE Category 1/A credits in bone densitometry or have current or previous CBDT or CDT certification with International Society for Clinical Densitometry (ISCD).

DHR2.1.29 **M** ☐ Nurses assisting with complex interventional procedures are registered with the College of Registered Nurses of British Columbia (CRNBC).

For information systems management

DHR2.1.34 **M** ☐ Information system specialists have defined responsibilities (e.g. *performing network connectivity and system checks, inspecting the physical environment of the servers, verifying the functionality of the system monitoring tools, conducting workstation and peripheral equipment checks and reviewing audit logs).*

For service and maintenance personnel

DHR2.1.35 **M** ☐ Service and maintenance personnel have specific knowledge and training in the repair and maintenance of imaging equipment.

DHR2.1.36 **M** ☐ Service and maintenance personnel have knowledge and training in radiation protection principles and procedures for equipment that uses ionizing radiation.

STAFF ORIENTATION AND TRAINING

DHR 5.0 Orientation, training and continuing education for the safe provision of quality diagnostic services is provided.

DHR 5.1 Orientation and training is provided to all new staff.

New staff receive orientation and training that includes:

DHR5.1.1		☐	mission, vision, and values of the organization.
DHR5.1.2		☐	sensitivity to cultural and religious diversity.
DHR5.1.3	**M**	☐	relevant policies and procedures related to performing the duties of the position.
DHR5.1.4	**M**	☐	roles and responsibilities of the individual and key staff.
DHR5.1.5		☐	patient rights and patient consent.
DHR5.1.6	**M**	☐	patient safety (e.g. adverse events and critical incident reporting).
DHR5.1.7	**M**	☐	patient identification. *Guidance: Staff must also be oriented to their responsibilities during the universal protocol, if appropriate.*
DHR5.1.8	**M**	☐	patient confidentiality.
DHR5.1.9	**M**	☐	information management processes and systems.
DHR5.1.10	**M**	☐	management of infectious materials including routine precautions, needle stick injury protocol, personal protective equipment.
DHR5.1.11	**M**	☐	sharps handling and disposal.
DHR5.1.12	**M**	☐	WHMIS and other local, provincial and federal requirements.
DHR5.1.13	**M**	☐	injury prevention and reporting staff injuries (e.g. use of patient lifts and transfer devices).
DHR5.1.14	**M**	☐	management of aggressive behaviour.
DHR5.1.15	**M**	☐	violence and harassment in the workplace.
DHR5.1.16	**M**	☐	emergency response/codes.
DHR5.1.17	**M**	☐	fire safety.
DHR5.1.18	**M**	☐	disaster response.

PATIENT AND CLIENT FOCUS STANDARDS

Introduction:
Engaging and involving patients and clients in their healthcare ensures their needs are met in a safe and effective manner. A patient and client focused culture enables the diagnostic service to be more responsive and enhances the quality and safety of the care and services provided to patients and clients.

The Patient and Client Focus Standards examine patient and client-centered services including how the diagnostic service determines the requirements, expectations and preferences of patients and clients. Examples of clients may include referring physicians, WorkSafeBC, and insurance companies.

MANAGEMENT OF PATIENT AND CLIENT RELATIONSHIPS

DPC 1.0 The imaging service seeks to understand and be responsive to the requirements of patients and clients.

DPC 1.2 Service standards of the diagnostic service are defined and made available to patients and clients.

DPC1.2.2 **M** ☐ There is a process for patient prioritization.

PATIENT RIGHTS

DPC 3.0 The diagnostic service respects the rights of patients.
Refer to the Government of Canada's Patient's Bill of Rights for additional information, accessible at http://dsp-psd.pwgsc.gc.ca/Collection-R/LoPBdP/BP/prb0131-e.htm.

DPC 3.3 The diagnostic service ensures that patients are provided with the information necessary to give or withhold informed consent.
Intent: Obtaining informed consent is a process of communication that establishes a mutual understanding between the patient and healthcare provider(s) involved in the imaging procedure. It provides patients with the information they need to make informed decisions and ultimately results in the patient's authorization or agreement to undergo the procedure for which informed consent is being obtained. Informed consent is a process that encompasses patient needs and preferences, patient education and compliance with the Health Care (Consent) and Care Facility (Admission) Act – see associated link: www.qp.gov.bc.ca/statreg/stat/H/96181_01.htm.

DPC3.3.1 **M** ☐ The diagnostic service identifies the specific examinations or procedures that require informed consent as well as the circumstances that would allow for exceptions to it.

DPC3.3.2 **M** ☐ The diagnostic service clearly identifies the healthcare providers who are authorized and responsible for obtaining informed consent.
Guidance: Refer to the Health Care (Consent) and Care Facility (Admission) Act for the definition of a healthcare provider.

GENERAL SAFETY STANDARDS

MANAGEMENT RESPONSIBILITIES

DSA 1.0 Potential hazards and risks to staff, patients and visitors are minimized.

DSA 1.2 A safety manual is readily available to staff that includes:

DSA1.2.1 **M** ☐ how to access first aid services and/or medical assistance for staff related injuries.
Guidance: If the diagnostic service is part of a larger facility (over 50 staff), there must be immediate access to an Occupational First Aid Attendant (OFAA) with a minimum of a level 2 occupational first aid certificate. If the facility is self-contained, a level 1 OFAA is sufficient until the total staff surpasses 50. Detailed tables specifying the first aid requirements are found in the Occupational Health and Safety Regulation at the end of Part 3. It must be noted that medical facilities are NOT exempt from these requirements. Medical facilities may have staff take the appropriate OFA course but some leeway is provided to allow for existing qualification to be considered equivalent.

DSA1.2.2 **M** ☐ the policy and procedure for investigating and reporting staff safety incidents including near misses.

DSA1.2.3 **M** ☐ exposure control plans, based on existing occupational hazards.

DSA1.2.4 **M** ☐ requirements for use of personal protective and other safety equipment.

DSA1.2.5 **M** ☐ Workplace Hazardous Materials Information System (WHMIS) program information.

DSA1.2.6 **M** ☐ emergency evacuation plans.

DSA1.2.7 **M** ☐ procedures to protect staff “working alone” or in “isolation”.
Guidance: "Working alone or in isolation" is defined as working in circumstances where assistance would not be readily available to the worker in case of emergency or if the worker is injured or becomes unwell.

DSA1.2.8 **M** ☐ procedures to manage violent and aggressive behaviour.
Guidance: The procedure for dealing with the prevention of, and response to, incidents of violence must distinguish between incidents involving two workers ("Improper Conduct") and incidents of aggressive behaviour from a patient or member of the public ("Violence"). WorkSafeBC has publications providing guidance on assessing and mitigating hazards. All incidents of improper conduct and violence must be formally investigated, whether any injury occurred or not.

DSA 1.3 Safety issues are discussed and monitored.

DSA1.3.1 **M** ☐ The diagnostic service has a safety committee or health and safety representative.
Guidance: If there are 20 or more employees, a joint occupational health and safety committee (JOHSC) must be functioning. If the diagnostic service is part of a larger facility, a member of the committee must have the responsibility to represent the diagnostic service. If the facility has between 10 and 19 staff, the workers must select a person to be their Health and Safety Representative. This person, in effect, carries out the same functions as the committee in a larger facility. For organizations with less than 10 employees, the employer is required to hold regular meetings with staff to discuss matters relating to maintaining a healthy and safe

workplace. Records of these meetings must be kept. Sections 125 to 140 of the Workers Compensation Act provide all the details about committee requirements and function.

SAFETY PRACTICES AND EQUIPMENT

DSA 1.4 Chemicals are used, stored and disposed of safely.

DSA1.4.1 **M** ☐ Hazardous liquids such as corrosives are stored below eye level.

DSA1.4.2 **M** ☐ The amount of hazardous liquids in a work area must not exceed the quantity reasonably needed for routine tasks.[2]

DSA1.4.3 **M** ☐ Containers for flammable liquids are kept closed when not in use.

DSA1.4.4 **M** ☐ Flammable liquids are stored in approved cabinets.
Guidance: Refer to the product Material Safety Data Sheets (MSDS) for handling and storage.

DSA1.4.5 **M** ☐ MSDS are available and current for controlled substances subject to WHMIS regulations.

DSA1.4.6 **M** ☐ Controlled substances are labeled appropriately.
Guidance: This applies to both the original supplier issued container and any secondary containers that have a workplace label indicating: product name; safe handling procedures; and reference to MSDS.

DSA1.4.7 **M** ☐ Chemicals are disposed of in accordance with WHMIS requirements.

DSA1.4.8 **M** ☐ Waste produced from X-ray film processing is not disposed of directly into the sewer system. X-ray film processing generates silver containing wastes which must be collected and disposed of appropriately.
Guidance: Refer to BC Hazardous Waste Regulations, 2009.

DSA 1.5 Spills are responded to in an effective and safe manner.
Guidance: Based upon the chemicals used (e.g. gluteraldehyde) the diagnostic service should consult with WorkSafe BC to determine if spill kits and/or spill control teams are required.

DSA1.5.1 **M** ☐ Chemical and biological spill kits are readily available.
Guidance: The type and number of spill kits will depend on the variety of chemicals in the diagnostic service and the quantities that are typically in use.

DSA1.5.2 **M** ☐ The procedures to control and clean up spills are documented and readily available to staff.
Guidance: As with any emergency situation, staff must have prior training in the procedures and the required personal protective equipment (e.g. P100 or cartridge respirators).

DSA 1.6 Centrifuges are used safely.

Intent: The use of centrifuges is limited in most diagnostic imaging services. They are however still used as part of the white and red blood cell labeling processes in nuclear medicine.

DSA1.6.1 **M** ☐ Centrifuges have safety-capped cups or rotor enclosures that provide aerosol containment.

DSA1.6.2 **M** ☐ Centrifuge lids or doors are locked when the motor is energized and remain locked until the centrifuge stops.

DSA1.6.3 **M** ☐ Centrifuge loads are balanced by distributing samples evenly.

DSA1.6.4 **M** ☐ Centrifuges are cleaned and properly maintained as per manufacturer's recommendations. This maintenance is documented.

DSA1.6.5 **M** ☐ Procedures for centrifugation are expressed in relative centrifugal force units (RCF/g).

DSA 1.7 Compressed gas is maintained and stored safely.

Guidance: An example of a compressed gas would be portable oxygen.

DSA1.7.1 **M** ☐ Gas cylinders are clearly labeled with the cylinder's contents.

DSA1.7.2 **M** ☐ A pressure-reducing regulator or device is used for all compressed gas cylinders.

DSA1.7.3 **M** ☐ Any gauge whose pointer (or needle) does not go back to the zero point when pressure is removed is replaced.

DSA1.7.4 **M** ☐ Adapters between cylinders and pressure reducing regulators are NOT used.

DSA1.7.5 **M** ☐ Cylinders not in use are shut off and capped.

DSA1.7.6 **M** ☐ Cylinders are secured to prevent falling during storage, transportation and use.

DSA1.7.7 **M** ☐ Cylinder carts are used to move large cylinders and specifically designed cylinder holders are used to carry small cylinders.

DSA 1.8 Fume hoods are operated in a manner that protects staff.

Intent: The use of fume hoods in diagnostic imaging may be limited to nuclear medicine radiopharmacies.

DSA1.8.1 **M** ☐ There is a marking on the sash to indicate the maximum height to which the face can be opened and still maintain the required flow rate.

DSA1.8.2 **M** ☐ Fume hood face velocity is checked at least annually, after installation, after movement of the unit, and after any repair or maintenance that could affect the airflow of the hood.

DSA1.8.3 **M** ☐ Fume hood operation ensures optimal conditions are maintained (e.g. proper sash height, free of obstructions).

DSA1.8.4 **M** ☐ All new fume hood installations have an alarm capable of indicating when the average face velocity falls below the minimum average face velocity.

DSA 1.9 Biological safety cabinets (BSC) are operated in a manner that protects staff.

Intent: The use of biological safety cabinets in diagnostic imaging may be limited to white cell labeling in nuclear medicine.

BSCs are certified to ensure filters are functioning properly and that airflow meets specifications:

DSA1.9.1 **M** ☐ on installation.

DSA1.9.2 **M** ☐ annually.

DSA1.9.3 **M** ☐ after change of the HEPA filter.

DSA1.9.4 **M** ☐ after movement of the unit.

DSA1.9.5 **M** ☐ after any repair or maintenance that could affect the seal of the HEPA filter.

DSA1.9.6 **M** ☐ Certification of BSCs is conducted by an individual with knowledge, training and experience.
Guidance: Consult with WorkSafeBC for guidance on confirming that an individual has the knowledge, training and experience as acceptable to WorkSafeBC.

DSA1.9.7 **M** ☐ Records of certification are retained.

DSA1.9.8 **M** ☐ BSCs are operated in a manner that ensures optimal conditions are maintained (e.g. proper sash height, clutter-free, free of grill obstructions).

DSA1.9.9 **M** ☐ The airflow at the face of the BSC is monitored and recorded daily.
Guidance: Refer to the WorkSafeBC Laboratory Health and Safety Handbook for acceptable face velocities for different designs of biological safety cabinets.

DSA 1.10 Fire safety measures are implemented.

DSA1.10.1 **M** ☐ Appropriate fire extinguishing equipment and procedures are in place.

DSA 1.11 Electrical safety measures are implemented.

DSA1.11.1 **M** ☐ Equipment and supplies are clearly labelled and comply with electrical safety regulatory requirements (e.g. Canadian Standards Association [CSA] or equivalent).

DSA 1.12 Transportation of patient samples complies with federal regulations[3].

Intent: Refer to Nuclear Medicine Radiation Safety Standards, NMRS3.3 for the transport of radioactive materials.

DSA1.12.1 **M** ☐ Staff preparing patient samples for transport to another facility are certified in accordance with *Transport of Dangerous Goods (TDG) Regulations.*

DSA1.12.2 **M** ☐ Staff transporting patient samples are certified in accordance with *Transport of Dangerous Goods (TDG) Regulations.*

DSA 1.13 Personal protective equipment is available for staff.
See also Radiation Safety Accreditation Standards and Infection Prevention and Control Accreditation Standards.

DSA1.13.1 **M** ☐ Adequate and appropriate personal protective equipment is available to protect staff from chemical or biological hazards.
Guidance: Personal protective equipment may include gloves, lab coats/gowns and masks.

DSA1.13.2 **M** ☐ Latex-free gloves are available to staff with latex sensitivities.

DSA 1.14 There are mechanisms in place to prevent staff from assuming postures that could result in musculoskeletal injuries.

DSA1.14.4 **M** ☐ Adequate assistance and transfer/lift devices are available when moving or lifting patients.
Guidance: Transfer/lift devices include 'transavers', slider boards and ceiling or mobile patient lifts.

DSA1.14.5 **M** ☐ The weight limit of lifting equipment is clearly marked.

APPROPRIATE PHYSICAL ENVIRONMENT

DSA 2.0 The design and layout of the physical space allows service delivery to be safe, efficient and accessible for patients, visitors and staff.

DSA 2.1 The design and layout of the physical space meets laws, regulations and codes.

DSA2.1.1 **M** ☐ A professional engineer, responsible for the build, has attested that the new construction or structural changes meet the minimum CSA Standards.

DSA2.1.3 **M** ☐ Emergency exit routes are marked and provide unimpeded exit.

DSA 2.3 The physical environment ensures patient safety and privacy.

DSA2.3.1 **M** ☐ Patient areas are safe, clean and private.

DSA2.3.2 **M** ☐ A secure and private location for changing clothing and for the temporary storage of personal items is available.

DSA2.3.3 **M** ☐ Furniture is safe for patient use.

DSA2.3.5 **M** ☐ Patient information cannot be viewed by other patients or visitors.

DSA 2.4 The design and layout of the space supports safe and appropriate service delivery.

DSA2.4.3 **M** ☐ Activity, workspace and equipment is designed or positioned to reduce the risks of ergonomic distress disorders and accidents (e.g. musculoskeletal injuries, repetitive stress injuries, etc.).
Guidance: If workers experience symptoms indicating a musculoskeletal injury, the employer must investigate and make appropriate changes to the work area. This might be ergonomically designed chairs, anti-fatigue mats for staff that must stand for most of the work day. The employer must have conducted a risk assessment for the potential for musculoskeletal injury that will include handling of patients who

are heavy or have restricted ability to move or the use of awkwardly placed controls on equipment. Controls, including equipment and training, must have been put in place to address all the identified moderate or high risk situations. WorkSafe BC has two worksheets ("A" and "B") in the publications section of the website, which provide a template for conducting the risk identification and assessment. These worksheets can be found at http://www2.worksafebc.com/pdfs/ergonomics/MSI_worksheet_A_fillable.pdf?_ga=1.245774660.1138311406.1379014432 and http://www2.worksafebc.com/pdfs/ergonomics/MSI_worksheet_B_fillable.pdf?_ga=1.149796342.1138311406.1379014432 .

DSA2.4.4 **M** ☐ Security measures are in place relative to the threat of theft and tampering with patient samples, drugs, chemicals and confidential information.
Guidance: The threat of theft or tampering is assessed, and based upon that assessment appropriate security measures are implemented.

DSA 2.5 The physical environment meets the needs of staff.

DSA2.5.1 **M** ☐ A secure and private location for changing clothing and for storage of personal belongings is available to staff.

DSA2.5.4 **M** ☐ Storage and consumption of food and beverages is permitted in designated areas only.

DSA 2.6 Sinks and eyewashes are available to staff.

DSA2.6.1 **M** ☐ There are clearly labeled hand washing sinks in areas where biological materials are handled.
Intent: Sinks used for soiled equipment are deemed "dirty" and not used for Hand washing.

DSA2.6.2 **M** ☐ Hand washing sinks have unimpeded drainage (e.g. not stoppers).

DSA2.6.4 **M** ☐ Eyewash stations are conveniently located and regularly flushed, when appropriate.
Guidance: Consult with WorkSafeBC to determine the type of eyewash station required based upon the chemicals used in the diagnostic service.

DSA 2.7 Lighting, temperature and ventilation is appropriate.

DSA2.7.1 **M** ☐ Lighting provides sufficient illumination for safe working.

DSA2.7.2 **M** ☐ Emergency lighting is available in the event of power failure and tested regularly for effective function.
Guidance: For facilities with back-up power (e.g. emergency generators), an additional emergency lighting system is made available to staff (e.g. flashlight).

PATIENT SAFETY STANDARDS

Introduction:
Patient safety is fundamental to the delivery of quality diagnostic services and optimal patient outcomes. A priority for all diagnostic services is to ensure that procedures are safe and a continuous effort is made to improve patient safety. Appropriate and sufficient resources should be allocated to support the diagnostic service's implementation of patient safety priorities and goals.

CREATING A CULTURE OF PATIENT SAFETY

DPS 1.0 The imaging service creates a culture of patient safety and makes patient safety a priority.

DPS 1.1 The activities of the diagnostic service ensure patient safety.

DPS1.1.2 **M** ☐ There is a process for patients and their advocates to report concerns related to patient safety.

DPS1.1.3 **M** ☐ There are systems in place to ensure patient safety notices, alerts and other information is communicated.

DPS1.1.4 **M** ☐ Mechanisms are in place to address patient sensitivities and allergies.
Guidance: At a minimum, latex-free products are made available for both patients and staff (e.g. tourniquets, gloves, bandages).

THE UNIVERSAL PROTOCOL

Introduction:
The universal protocol applies to invasive procedures that expose patients to harm, including procedures done in settings other than the operating room. Certain routine minor procedures such as venipuncture, peripheral (intravenous catheter) placement, insertion of nasogastric tube or foley catheter insertion are not within the scope of the universal protocol.
The universal protocol consists of a series of three steps undertaken to protect patient safety and reduce the occurrence of errors, adverse events and critical incidents. The universal protocol consists of the following steps:

1) A pre-procedure verification process.
2) Marking the procedural site.
3) A final "time out" verification process immediately before the procedure.

Invasive procedures, especially those requiring general anesthesia or deep sedation, place patients at risk. Patient safety for patients undergoing these procedures can be enhanced by conducting the universal protocol to verify patient identity, procedure and site prior to commencing the procedure.[2 3 4]

DPS 3.0 The universal protocol is conducted for all patients undergoing invasive procedures. [2 3 4]

DPS 3.1 The imaging service has a policy and procedure in place for conducting the universal protocol.

DPS3.1.1 **M** ☐ The imaging service assesses the risks associated with each invasive procedure performed to identify those that fall within the universal protocol.
Guidance: At a minimum, those procedures that require general anesthesia, deep sedation or consist of more than one possible procedural site (e.g. breast, kidneys, etc.) fall within the universal protocol.

DPS3.1.2 **M** ☐ There is a policy that outlines the process for conducting the universal protocol.

DPS3.1.3 **M** ☐ The policy clearly specifies the procedures that fall within the universal protocol.

MEDICAL EMERGENCY MANAGEMENT

DPS 6.0 The imaging service has procedures in place to handle medical emergencies.

DPS 6.1 There are procedures to handle medical emergencies in a timely and effective manner.

DPS6.1.1 **M** ☐ There is a medical emergency response protocol in place.

DPS6.1.2 **M** ☐ Staff are familiar with the procedure(s) for responding to medical emergencies.

DPS6.1.3 **M** ☐ Emergency call systems are available in patient care areas.
Guidance: Facilities should conduct a risk assessment to determine what emergency call systems are required (e.g. patient washrooms, changing rooms, etc.).

Staff know how to access:

DPS6.1.4 **M** ☐ emergency medical services.

DPS6.1.5 **M** ☐ emergency equipment and supplies.

DPS6.1.6 **M** ☐ The facility identifies staff who respond to medical emergencies and provides training in the use of emergency equipment.

DPS 7.0 Emergency procedures, equipment and supplies are available to address medical emergencies resulting from high risk procedures.
Intent: High risk procedures include complex interventional procedures, TEE, stress examinations, and the administration of moderate sedation or general anesthesia. Having attending personnel trained and experienced in the use of emergency equipment and supplies is required to deal with a variety of complications that can arise during imaging procedures. Examples of patient complications include cardiac arrest, life-threatening hemorrhage, anaphylactic contrast reaction, vasovagal reactions, pneumothorax, and sedation-related respiratory compromise.

DPS 7.1 Emergency procedures, equipment and supplies are available to respond to a medical emergency resulting from a high risk procedure.

DPS7.1.1 **M** ☐ A minimum of one medical and/or technical staff member has current CPR certification.
Guidance: Individuals with CPR certification are present during the procedure as defined by the service or facility protocol.

DPS7.1.2 **M** ☐ Oxygen and suction equipment with appropriate delivery devices and attachments are readily available.

Emergency equipment and supplies are:

DPS7.1.4 **M** ☐ appropriate for the patient population (e.g. adults and pediatrics).

DPS7.1.5 **M** ☐ regularly inspected and maintained.

DPS7.1.6 **M** ☐ available.

Emergency drugs are:

DPS7.1.7 **M** ☐ available.

DPS7.1.8 **M** ☐ within expiry date.

DPS7.1.9 **M** ☐ secure.

INFECTION PREVENTION AND CONTROL STANDARDS

Introduction:
Facilities establish infection prevention and control activities and precautions to help reduce the possibility of acquiring and transmitting an infection. The type and scope of the activities and precautions are influenced by the size of the facility, the resources available, the services provided, and the patients served.

PLANNING

DIPC 1.0 Planning for infection prevention and control is effective, integrated, and coordinated.

DIPC 1.1 An infection prevention and control plan is developed and implemented.

DIPC1.1.1 **M** ☐ There are documented policies and procedures for infection prevention and control (e.g. an infection control manual).

ROUTINE PRACTICES

DIPC 2.0 Routine practices for preventing the transmission of infection are implemented.
Guidance: The term 'routine practices' (or 'standard precautions') is used to describe a system to prevent transmission of infections in health care settings. These practices are to be used at all times, with all patients regardless of diagnosis or infectious status.

DIPC 2.1 Hand hygiene activities and practices are used to prevent and control the spread of infection.
Intent: Hand hygiene is the single most important activity for preventing the transmission of infections.

DIPC2.1.1 **M** ☐ There are readily-accessible designated hand hygiene sinks or other forms of hand hygiene products.

DIPC 3.0 Personal Protective Equipment (PPE) is worn by staff as a barrier against blood and body fluid exposure.

DIPC 3.2 Gloves are worn by staff for protection against infection.

DIPC3.2.7 **M** ☐ Gloves for latex sensitive workers are available.

DIPC 3.4 The imaging service has a process for the assessment and use of a N95 respirator/mask.

DIPC3.4.1 **M** ☐ A risk assessment is conducted to determine if and when the use of N95 respirators/masks for staff is necessary.

Intent: An N95 respirator/mask helps protect staff from respiratory pathogens that are transmitted via the airborne route. Staff must use N95 respirators/masks if they may be exposed to an airborne infection that is listed in the WorkSafe BC Regulations and a risk assessment has indicated that this infection poses a potential hazard. It is recommended that the imaging service consults with Occupational Health and Safety (OH&S) and infection control resources regarding conducting the risk assessment.

ADDITIONAL PRECAUTIONS

DIPC 4.0 Patients, staff and visitors are protected from potential or known communicable diseases.

DIPC 4.1 Additional precautions are used for patients with known or suspected communicable diseases.

Intent: Additional infection prevention and control precautions are necessary for specific certain pathogens or clinical presentations. Professional knowledge, skill and judgment are used to assess the potential routes of transmission and the appropriate additional precautions to be taken e.g. contact, droplet, droplet/contact, or airborne precautions.

DIPC4.1.1 **M** ☐ Processes are in place to identify patients with known or potential communicable diseases.

Guidance: Known or suspected communicable diseases may be identified in many ways for example asking the patient, notation on the requisition, or noted in the RIS. It is not necessary to wait for a specific diagnosis or microbiologic confirmation before initiating appropriate precautions when patient assessment clearly indicates a clinical syndrome or risk factors related to a potentially communicable disease. For the patient who has, or is suspected of, having a disease requiring additional precautions it is important to institute these precautions immediately. They may be instituted by any health care provider as soon as the communicable disease, clinical presentation, or risk factors are suspected or identified.

DIPC 4.2 Mechanisms are in place to ensure staff have current up to date immunizations or are aware of their previous infectious disease medical history.

DIPC4.2.1 **M** ☐ All staff are aware of or have access to their vaccination history, medical history, or serologic test results.

DIPC4.2.2 **M** ☐ Staff that have the potential to be exposed to blood and body fluids are offered the Hepatitis B vaccination.

Guidance: WorkSafeBC requires the Hepatitis B vaccination series be offered to employees with "occupational exposure to blood borne pathogens". Occupational exposure is defined as reasonably anticipated contact.

CLEANING OF SURFACES AND ANCILLARY MEDICAL EQUIPMENT

DIPC 6.0 The physical environment of the imaging service is clean.

DIPC 6.1 Safe and effective cleaning of the physical environment is ensured.

DIPC6.1.1 **M** ☐ Policies and procedures are in place indicating the frequency and method of environmental cleaning and disinfection.

DECONTAMINATION OF REUSABLE SEMI-CRITICAL DEVICES

DIPC 7.0 Standardized reprocessing practices for the decontamination of reusable semi-critical medical devices are implemented.

Introduction:
A risk classification is given to medical devices that present a high risk of infection if contaminated by any microorganism. For purposes of these standards the risk classification of semi-critical devices will be addressed and for the imaging service this specifically covers trans-esophageal and endocavity probes.

DIPC 7.1 The imaging service provides staff education for the decontamination of reusable semi-critical medical devices.

DIPC7.1.5 **M** ☐ There is documentation of the initial and ongoing training staff receives.

DIPC 7.2 All areas for decontamination, preparation, and storage of medical devices are designed to minimize contamination and infection.

DIPC7.2.1 **M** ☐ There is a designated reprocessing area that is separated into distinct areas to ensure one-way work flow.

DIPC7.2.2 **M** ☐ Cleaning of the medical device is performed in a distinctly separate area from where disinfected/sterile medical devices are handled or stored.[4]

DIPC 7.3 Medical devices are cleaned to minimize contamination and infection.

DIPC7.3.1 **M** ☐ Medical devices are thoroughly cleaned and rinsed prior to high level disinfection.

DIPC 7.4 Effective high level disinfectants are used to achieve decontamination of the medical device.

DIPC7.4.2 **M** ☐ High level disinfectants have a Drug Identification Number (DIN) from Health Canada.

DIPC7.4.5 **M** ☐ Chemical test strips or chemical indicators are used within the expiry date and are stored as per manufacturer's recommendations.

DIPC7.4.6 **M** ☐ The temperature of the high level disinfectant is monitored prior to reprocessing a semi-critical medical device to ensure that the manufacturer's recommended temperature range is maintained.
Guidance: If the temperature of the high level disinfectant is not within the recommended range, there is a procedure for performing corrective action.

DIPC 7.5 **There is a safe and effective process for high level disinfection.**

DIPC7.5.1 **M** ☐ There are implemented procedures for reprocessing each different type of medical device.

DIPC 7.6 **Documentation for all aspects of the decontamination of contaminated reusable semi-critical medical devices is available.**

DIPC7.6.1 **M** ☐ Detailed written policies and procedures for high-level disinfection (HLD) of medical devices are readily available for staff.

DIPC 8.0 **Standardized sterilization practices for the decontamination of reusable medical devices are implemented.**

DIPC 8.1 **There is a safe and effective process for sterilization of medical devices.**

DIPC8.1.1 **M** ☐ Sterilization of medical devices by imaging service staff is performed following manufacturer's instructions.

INFORMATION MANAGEMENT STANDARDS

Introduction:
Information management processes may be basic or complex, depending on the information system used Information systems can be paper-based; fully electronic or a combination of the two. Operational and clinical information must be accurately generated by the laboratory to ensure staff and clients have access to necessary and appropriate information.

PLANNING

DIM 3.0 There are processes to ensure the availability of information.

DIM 3.1 The diagnostic service is prepared for events that could impact the availability of information.

DIM3.1.3 **M** ☐ For information systems, database and diagnostic image back-up is performed daily and the backup is securely located in a separate physical location.

DIM3.1.4 **M** ☐ Data stored on-site and off-site is accessible, but protected from unauthorized access and safeguarded against harm (e.g. water, fire, etc.).

DIM 3.2 Downtime procedures are available and communicated to staff.
Intent: Downtime procedures are required for both scheduled and unscheduled system downtime.

DIM3.2.1 **M** ☐ Downtime procedures are communicated to staff.

CONFIDENTIALITY

DIM 4.0 Patient confidentiality and information is protected through policies and procedures.

DIM 4.1 Data access is restricted, controlled and monitored.

DIM4.1.1 **M** ☐ Policies are in place that specify the level of access that is permitted for each category of staff, including information recorded in patient files from other service areas in the organization.
Intent: Personal information is accessed only by those who are engaged in the primary purpose for which the information was captured.

DIM4.1.2 **M** ☐ Authorized staff maintain user access and restriction controls.

DIM4.1.3 **M** ☐ User access is monitored.

DIM4.1.4 **M** ☐ There is a policy that addresses how to handle unauthorized access.

DIM4.1.5 **M** ☐ For computer-based systems there is a policy for password confidentiality and use.

DIM 4.2 The service has policies for the release or destruction of data.

DIM4.2.1 **M** ☐ There is a policy for the use and disclosure of personal information.
Intent: The policy must include the release of information to patients, family, other service areas, other organizations, for research or education purposes or legal reasons.

DIM4.2.2 **M** ☐ There is a policy that identifies how personal information is distributed (e.g. email, facsimile, web-based technology).

MEDICAL RECORDS

DIM 5.0 The diagnostic service maintains complete and accurate medical records.
See also Global Modality Accreditation Standard, GM 7.0 and modality-specific accreditation standards.

DIM 5.1 The medical record includes accurate patient identification information.

DIM5.1.1 **M** ☐ The facility uniquely identifies the patient and examinations performed.
Guidance: There is a system for uniquely identifying patients and records used from the time the patient presents through all stages of the examination. The facility ensures that correct patient identification is maintained on all records, including reports. Every patient has a unique facility-issued patient identifying number and each examination is uniquely associated to that patient.

DIM5.1.2 **M** ☐ The patient name, patient identifying number and facility name are clearly identified on the master file/patient medical record.
Guidance: The master patient file is appropriately identified for film-based systems and the medical record for electronic systems.

DIM 5.2 Data integrity is monitored and maintained.

DIM5.2.1 **M** ☐ There are policies and procedures for reporting and reconciliation of data entry errors and patient identification issues.

DIM5.2.4 **M** ☐ For PACS systems, there is a policy that addresses data deletion and correction procedures.
Intent: All images captured, whether on film or using digital image data management systems, must remain with the medical record unless they are rejected by the operator for valid pre-defined quality issues. For digital image data management systems this is critical as once images are sent to PACS they may have been viewed by information users and clinical decisions made based on those images.

IMAGING INFORMATICS STANDARDS

Introduction:
The Imaging Informatics Accreditation Standards address electronic information systems and digital image data management systems. Digital image data management systems cover the spectrum of a single-modality or single-use system to a complete Picture Archiving and Communication System (PACS). Most teleradiology systems are now PACS systems with network connections with only a few remaining point-to-point systems. These standards address concepts touching every aspect of the imaging chain from image acquisition, communication, distribution and archiving to image processing, analysis and display.

The implementation of informatics concepts will enable a patient-centric, evidence-based healthcare delivery environment that promotes and enhances patient safety and the quality and efficiency of care, while reducing medical errors.

EQUIPMENT AND INTEGRATION

II 1.0 Information systems are monitored and maintained to ensure reliable and timely information.

II 1.1 Hardware and software meets established standards and ensures reliable and timely delivery of information.

II1.1.1 **M** ☐ High availability servers exist to provide the maximum possible access to the applications.

II 1.2 Processes are in place to monitor system performance.

II1.2.1 **M** ☐ A designated individual, or team, is responsible for regularly monitoring and evaluating the effective management of the information system(s).

II 1.4 Compliance to established standards ensures reliable and timely delivery of information.

II1.4.1 **M** ☐ There is HL7 integration with HIS/RIS or RIS and PACS.

II1.4.2 **M** ☐ There is compliance with the DICOM standard for all new digital imaging equipment.

For PACS and digital imaging equipment, the following confirm to the current DICOM 3.0 network standard:

II1.4.3 **M** ☐ communications protocols.

II1.4.4 **M** ☐ file formats.

II1.4.5 **M** ☐ compression methods.

II1.4.6 **M** ☐ Network and software security protocols are in place to protect the confidentiality of images, diagnostic reports and other data.
Intent: Systems provide network and/or software protocols to protect the confidentiality of the patient's record(s), image(s), interpretation(s) and other data and ensure that the system is secure and used only on an as needed basis by those

authorized by the patient in accordance with provincial privacy of information legislation and CMA guidelines.

II 2.0 Appropriate equipment is used for acquisition, communication, display, and storage of images.

Introduction: For all digital image data, the initial data set provides full resolution data for processing, manipulation, and subsequent display.

II 2.1 Digitization equipment is capable of a digital resolution acceptable for rendering the official interpretation.

Intent: In occasional circumstances, the digital conversion of hard copy or analogue images may be necessary. The laser scanning digitizer used does not reduce the digital resolution below that considered an acceptable threshold.

II2.1.1 **M** ☐ For systems with a pixel matrix up to 512 x 512, the individual image is digitized to a matrix size as large as or larger than that of the original image and a minimum of 8 bits pixel depth.

II2.1.2 **M** ☐ For systems with a pixel matrix up to 2000 x 2000, images are digitized to a matrix size corresponding to 2.5lp/mm (200micron) or greater, measured in the original detector plane and a minimum of 10 bits pixel depth.

For mammography services:

II2.1.3 **M** ☐ Images are digitized to a matrix size corresponding to 5.0 lp/mm (100 micron wide detector elements) or greater, measured in the original detector plane and a minimum of 10 bits pixel depth.

II2.1.4 **M** ☐ Digitizers used for mammography have been certified for mammography by the equipment manufacturer and conform to the IHE Mammography Image Profile.

II 2.2 Acquisition equipment is capable of capturing demographic as well as imaging information that includes, but is not limited to:

Intent: The initial image acquisition information is associated with the images when transmitted and is formatted in the appropriate DICOM fields.

II2.2.1 **M** ☐ patient name.

II2.2.2 **M** ☐ unique patient identifier.

II2.2.3 **M** ☐ date and time of acquisition.

II2.2.4 **M** ☐ name of acquisition facility (site or origin).

II2.2.5 **M** ☐ modality.

II2.2.6 **M** ☐ examination.

II2.2.7 **M** ☐ patient or anatomic part orientation (e.g. right, left, superior, inferior etc.).

II2.2.8 **M** ☐ amount and method of data compression.

II 2.4 Primary display systems used for interpretation of diagnostic images have at a minimum:

Guidance: Primary display systems commonly allow the viewing of multi-modality examinations of images of various matrix sizes on one system. It is possible to have less stringent contrast requirements for certain modalities or diagnostic tasks (e.g. display of only ultrasound and nuclear medicine images). If so, however, it should be taken into consideration that a display that is originally intended for a certain modality might be used to view images from another modality in the future, so it should meet the more stringent set of requirements for that display system.

II2.4.1 **M** ☐ 1600 x 1200 (1.9 mega pixel) monitor or better.

II2.4.2 **M** ☐ a luminance ratio of at least 250:1 under normal reading conditions.

II2.4.3 **M** ☐ a luminance of 170 cd/m^2 under normal reading conditions.

For digital mammography:

II2.4.4 **M** ☐ Display workstations conform to the IHE Mammography Image Profile including the display actor.

II2.4.5 **M** ☐ A minimum of two portrait set-up monitors or equivalent are used and the resolution of each monitor is at a minimum 5 megapixels.[5]

II2.4.6 **M** ☐ Luminance ratio is between 250 and 650 (including ambient light). [6]

II2.4.7 **M** ☐ A minimum luminance of 250 cd/m^2 is maintained.[7]

Guidance: A luminance of 450 cd/m^2 is strongly recommended for digital mammography primary displays.

II 2.5 Primary display systems accurately reproduce the original examination.

Primary display systems have the ability to:

II2.5.1 **M** ☐ select the image sequence.

II2.5.2 **M** ☐ accurately associate the patient and study demographic data with the images.

II2.5.3 **M** ☐ adjust the brightness and contrast or interactive window and level function.

II2.5.4 **M** ☐ invert the gray-scale values of the displayed image.

II2.5.5 **M** ☐ zoom (magnification) the image.

II2.5.6 **M** ☐ reproduce digital mammography images at 1:1 or 100% size (e.g. full resolution).[8]

II2.5.7 **M** ☐ rotate and flip the displayed images while preserving the orientation of the patient label.

II2.5.8 **M** ☐ calculate and display accurate linear measurements and determine pixel values appropriate for the modality (e.g. Hounsfield values for CT images).

II2.5.9 **M** ☐ display prior image compression ratio, processing, or cropping.

II2.5.10 **M** ☐ display image acquisition characteristics (e.g. matrix size and bit depth).

II2.5.11 **M** ☐ display the total number of images acquired in the series and clinically relevant technical parameters.

II 2.6 Primary display system reporting environments are established considering patient confidentiality, ergonomics and environmental issues.

II2.6.2 **M** ☐ Ambient light is low and consistent.[9]

Guidance: Ambient light is maintained between 20-40 lux.

II2.6.3 **M** ☐ Lighting controls are used, where appropriate.

Guidance: In hybrid reading environments (where soft and hard copy images are read) lighting controls are required

II2.6.6 **M** ☐ Display workstations are in locations that do not compromise patient confidentiality.

II2.6.8 **M** ☐ Patient information applications are configured to automatically log-off when inactive for a predetermined length of time.

II 2.7 The primary display system specifications, reporting environments and network and software security protocols for non-hospital (e.g. clinic or home reporting) settings meet the requirements as listed in II1.4.4, II 2.3, II2.4, II2.5, II2.6, and II2.7.
Note: See also Equipment and Supplies Accreditation Standards, DES 3.5 and DES 3.6 for QC procedures.

II2.7.1 **M** ☐ The primary display system specifications, reporting environments and network and software security protocols for non-hospital (e.g. clinic or home reporting) settings meet the requirements as listed in II1.4.4, II 2.3, II2.4, II2.5, II2.6, and II2.7.

II 2.8 Secondary display systems meet the needs of their intended user.
Secondary display systems used for clinical decision making by a physician have at a minimum:

II2.8.1 **M** ☐ a 1024 x 1280 monitor or better.
Guidance: A pixel matrix of 1600 x 1200 is strongly recommended.

II2.8.2 **M** ☐ a luminance ratio of at least 250:1 under normal viewing conditions.

II2.8.3 **M** ☐ a luminance of 170 cd/m^2 under normal viewing conditions.

Secondary display systems used for image review have at a minimum:
Guidance: Secondary displays systems used for image review also include image acquisition displays. Typically, these secondary monitors are viewed by technologists to ensure images sent to PACS are available for interpretation and appropriately displayed (e.g. correct markers, orientation, annotations).

II2.8.4 ☐ a 1024 x 1280 monitor or better.

II2.8.5 **M** ☐ a luminance ratio of at least 100:1 under normal viewing conditions.

II2.8.6 **M** ☐ a luminance of 100 cd/m^2 under normal viewing conditions.

For digital mammography:

II2.8.7 **M** ☐ Secondary monitors used for clinical decisions have a minimum resolution of 3 mega pixels.
Guidance: Clinical decisions in mammography include review prior to stereotactic biopsy, fine wire localization and specialized views (e.g. coned compression).

II2.8.8 ☐ In order to meet the technologist's needs, the acquisition and/or technologist review workstation display monitor(s) has resolution and luminance characteristics similar to that of the primary display workstation (e.g. radiologist's mammography reporting workstation).

II 2.9 Secondary display system reporting environments are established considering patient confidentiality, ergonomics and environmental issues.

II2.9.2 **M** ☐ Display workstations are in locations that do not compromise patient confidentiality.
Guidance: Display workstations should be located far enough from casual observance so that confidential patient information cannot be seen by patients, visitors and other non-responsible staff.
See also II2.9.3.

II2.9.4 **M** ☐ Display workstations are configured to automatically log-off when inactive for a predetermined length of time.

II 2.11 Portable media used in the exchange of diagnostic information allows reliable and secure viewing of diagnostic information.

II2.11.2 **M** ☐ Proprietary formatted images are not used for image sharing on portable media.

II2.11.3 **M** ☐ CD's are appropriately labeled and include user viewing instructions as part of the CD package.

II2.11.4 **M** ☐ CD packaging includes, labels directly printed on the media, external CD package labels, and a statement that the contents are confidential medical records, with instructions on what to do if located.

II2.11.6 **M** ☐ Portable media used as a temporary backup is encrypted and password protected.
Intent: In rare circumstances, the imaging service may not have immediate access to a secured database server (through a PACS system). If image data is temporarily stored to portable media (USB media, DVD, CD), the facility has implemented strict measures to maintain the security of the data.

QUALITY ASSURANCE

II 3.0 Quality Assurance programs are established to ensure the attainment of intended quality.
Note: Digital imaging devices and display system performance is monitored at intervals consistent with proper quality control.

II 3.1 Diagnostic image quality is monitored and maintained.

II3.1.1 **M** ☐ There are documented policies and procedures for monitoring and evaluating the effective management, safety, proper performance of imaging, transmitting, receiving and display equipment.

II3.1.2 **M** ☐ Procedures are systematically monitored and evaluated as part of the overall quality improvement program of the facility.

II3.1.3 **M** ☐ Facilities have access to medical physicists, bioengineers and image informatics specialists on-site or as consultants.

EQUIPMENT AND SUPPLIES STANDARDS

Introduction:
Equipment used to perform imaging examinations can be divided into categories that include: equipment used in the imaging chain such as the medical imaging devices and film processors, etc.; and ancillary equipment used for specific examinations such as power injectors, biopsy devices, etc. The range and variety of consumable supplies required is directly proportional to the complexity of the examinations performed.

EQUIPMENT OPERATION

DES 1.0 Equipment is safely operated, and maintained and monitored in a manner that ensures performance specifications are met.

DES 1.2 Imaging systems and ancillary equipment are appropriately operated.

DES1.2.1 **M** ☐ An orientation and training program is provided to those who use the equipment to ensure safe, consistent, and accurate operation.

DES1.2.4 **M** ☐ Equipment operators have access to the manufacturer's operator manual for the specific equipment used in the facility.[10]

DES1.2.5 **M** ☐ All equipment is located and stored in a safe and secure location.

DES1.2.6 **M** ☐ Staff are made aware of table weight limits.
Guidance: Weight limits are labeled directly on the table whenever possible.

DES1.2.9 **M** ☐ All personal protective equipment, (lead aprons, etc.) when not in use, are stored in accordance to the manufacturers' recommendations.[11]

DES1.2.10 **M** ☐ Power injectors are capable of varying injection volumes and rates and have appropriate safety mechanisms to prevent over injection and to detect the presence of air.

DES1.2.11 **M** ☐ Insufflators are equipped with a filter and reservoir to prevent the reflux of colonic effluent into the insufflation device.

DES 1.3 The diagnostic service investigates and resolves problems involving all equipment.

DES1.3.2 **M** ☐ There is a list of service staff and their contact information.

EQUIPMENT TESTING AND QUALITY ASSURANCE

DES 2.0 Equipment testing is performed prior to clinical use.

DES 2.1 Acceptance testing is performed after purchase and prior to clinical use of equipment.

DES2.1.1 **M** ☐ New, replaced, or relocated equipment has acceptance testing performed prior to clinical use.
Guidance: Relocated imaging equipment does not refer to imaging devices commonly used for mobile imaging (e.g. ultrasound units, mobile X-ray units, etc.).

DES2.1.2 **M** ☐ The tester is independent of the manufacturer.[12]

DES2.1.3 ☐ Results from the acceptance testing are used to establish baseline values of operational performance.

Acceptance testing of imaging equipment includes:

DES2.1.4 **M** ☐ an initial inspection of the system and any ancillary equipment.

DES2.1.5 **M** ☐ an inspection of documentation.

DES2.1.7 **M** ☐ Acceptance testing reports are submitted to the DAP.

DES 3.0 Quality Assurance programs are established to ensure the attainment of intended quality.

Intent: A quality assurance program means the planned and organized actions necessary to provide adequate confidence that the equipment and its related components will reliably produce quality images providing the necessary information for accurate clinical assessment. A quality assurance program includes quality control procedures for the monitoring and testing of medical imaging equipment and related components, and administrative methodologies to ensure that monitoring, evaluation and corrective actions are properly performed. Quality Control procedures are an essential component of a quality assurance program which clearly specify the technical procedures necessary for the monitoring and testing of the imaging equipment and related components.

DES 3.1 Quality Control procedures are performed by staff knowledgeable in the testing procedures.

Guidance: QC test procedures and frequency of testing are defined in the modality-specific Accreditation Standards.

DES3.1.1 **M** ☐ There is a designated person(s) responsible for monitoring and reviewing QC on a regular basis.

Intent: The facility determines who is trained and knowledgeable to perform and monitor QC procedures. Some QC procedures may be designated to individuals. For example, technologists may perform some frequently scheduled QC procedures, QC coordinators, equipment service providers, consultants, and biomedical service engineers may perform more specialized procedures and Medical Physicists may perform or provide consultation for all or some of the QC procedures.

DES3.1.2 **M** ☐ Staff have the necessary training, reference and education materials available to ensure QC is performed according to manufacturer's recommendations or recognized best practices.

COMMON EQUIPMENT QUALITY CONTROL

DES 3.5 **Quality Control procedures are established and used to monitor performance of electronic display devices (monitors/image display systems).**
Guidance: The conditions for the testing are to be similar to those under normal use of the equipment.

DES3.5.1 **M** ☐ The performance of all new electronic display devices used for the interpretation of diagnostic images and guidance during interventional procedures is tested to verify performance prior to clinical use.
Guidance: At a minimum, primary display systems are verified for compliance with the DICOM Grayscale Standard Display Function (GSDF) and recalibrated if necessary.

DES 3.6 **The quality control procedures for primary display systems at non-hospital (e.g. clinic or home reporting) settings meet the requirements as listed in Equipment and Supplies Accreditation Standards, DES 3.5.**

DES3.6.1 **M** ☐ The quality control procedures for primary display systems at non-hospital (e.g. clinic or home reporting) settings meet the requirements as listed in Equipment and Supplies Accreditation Standards, DES 3.5.

GLOBAL MODALITY STANDARDS

The Global Modality Accreditation Standards are applicable to all modalities and are to be used in conjunction with the modality-specific accreditation standards.

Introduction:
The Global Modality Accreditation Standards examine those practices related to pre-examination, examination, and post-examination processes in the performance of diagnostic imaging.

EXAMINATION REQUEST

GM 1.0 Examination requests are standardized and ensure that accurate, comprehensive and appropriate information is relayed.
Guidance: Requests for imaging referrals are to be completed for all imaging examinations. Requests may be verbal, written (requisitions) or electronic.

GM 1.3 Examination requests include accurate information that is received prior to an examination being undertaken.
Information recorded on the requisition includes:

GM1.3.1 **M** ☐ the patient's first and last name.
GM1.3.2 **M** ☐ a unique personal identifier number such as Provincial Health Number (PHN) or facility–issued identifier number.
GM1.3.3 **M** ☐ date of birth.
GM1.3.4 **M** ☐ gender.
GM1.3.5 **M** ☐ name and contact information of authorized individual.
Intent: If an urgent/stat report is required the authorized individual's contact information is provided.
GM1.3.6 **M** ☐ clear indication of the authorized individual.
GM1.3.7 **M** ☐ names of any other individual who is to receive a copy of the report.
GM1.3.8 **M** ☐ examination type(s) and any specific instructions.
GM1.3.9 **M** ☐ pertinent clinical information including indications, history, and provisional diagnosis.
Intent: The clinical information is sufficient to ensure the appropriate examination is performed. Provisional diagnosis is provided when applicable to assist in determining the most appropriate imaging examination.
GM1.3.10 **M** ☐ the date the request is received.
GM1.3.11 **M** ☐ indication of urgency.
Intent: There is an effective system in place to ensure patient prioritization. For emergent patient prioritization cases the urgency is indicated on the request either by the authorized individual and/or by the imaging physician or delegate.

INTRAVASCULAR CONTRAST AGENTS

GM 4.0 Intravascular contrast agents are managed and administered safely and effectively.

GM 4.1 Emergency equipment and supplies are available for a response to a medical emergency.
Guidance: See also Patient Safety Accreditation Standard DPS 6.0; Medical Emergency Management.

GM4.1.1 **M** ☐ When IV contrast is administered there is either an emergency crash cart or a modified emergency cart immediately accessible.
Guidance: In this context "immediately accessible" refers to the cart reaching the patient within thirty (30) seconds.

GM4.1.2 **M** ☐ If there is no emergency crash cart, a modified emergency cart is available.

The modified emergency crash cart contains, at a minimum, the following:

Airway

GM4.1.3 **M** ☐ oral airway set
GM4.1.4 **M** ☐ suction equipment with tubing and catheter

Breathing

GM4.1.5 **M** ☐ O2 face mask (non-rebreather)
GM4.1.6 **M** ☐ bag-valve-mask device (e.g. Ambu-bag with mask)
GM4.1.7 **M** ☐ oxygen tank ("D" Cylinder) with flow valve and tubing
GM4.1.8 **M** ☐ pulse oximeter

Circulation

GM4.1.9 **M** ☐ cardiac defibrillator
GM4.1.10 **M** ☐ stethoscope
GM4.1.11 **M** ☐ blood pressure cuff
GM4.1.12 **M** ☐ intravenous supplies
GM4.1.13 **M** ☐ tourniquet, 4 X 4 gauze and tape
GM4.1.14 **M** ☐ IV catheters (18 gauge or larger)
GM4.1.15 **M** ☐ IV pole and tubing
GM4.1.16 **M** ☐ normal saline (2 X 500 cc bags)

Other

GM4.1.17 **M** ☐ flashlight
GM4.1.18 **M** ☐ an emergency drug tray is available in the room.

The emergency drug tray includes the following:

GM4.1.19 **M** ☐ nitroglycerine, in tablet or aerosol spray
GM4.1.20 **M** ☐ epinephrine
GM4.1.21 **M** ☐ atropine
GM4.1.22 **M** ☐ intravenous supplies
GM4.1.23 **M** ☐ parenteral antihistamine
GM4.1.24 **M** ☐ parenteral antiemetic

GM4.1.25 **M** ☐ short-acting bronchodilator (e.g. salbutamol) either in a metered-dose inhaler with a spacer device or as a solution with a nebulizer administration unit, ventolin nebules or as a discus device.

GM 4.2 Policies and procedures are in place for the administration of intravenous contrast agents.

GM4.2.1 **M** ☐ Policies and procedures are in place for technologists who perform venipuncture and administer intravenous contrast.

GM4.2.4 **M** ☐ There are dose protocols for adults and pediatrics.

GM4.2.6 **M** ☐ Documented procedures are in place for treating patients with adverse contrast events.
Guidance: After a reaction there is documentation of the effect and treatment, reporting to the appropriate healthcare personnel, counseling about future contrast administration, and flagging of the patient's medical record.

SEDATION AND ANESTHESIA

GM 5.0 Appropriate patient monitoring is provided for procedures involving moderate sedation or general anesthesia.
Intent: Moderate sedation is commonly referred to as conscious sedation.

GM 5.1 Policies and procedures are in place for the use of moderate sedation and general anesthesia.

GM5.1.1 **M** ☐ There are policies and procedures for obtaining informed consent prior to administering sedation.

GM5.1.2 **M** ☐ There are policies and procedures for administering sedation.

GM5.1.3 **M** ☐ There are policies and procedures for monitoring patients who have been sedated.

GM5.1.4 **M** ☐ There are procedures for discharging patients who have been sedated.

MEDICAL RECORD

GM 7.0 The medical record is current, accurate and contains quality diagnostic images and relevant examination details.

GM 7.1 Images/examinations are labeled in a standardized way that allows for proper patient identification and annotation that includes:

GM7.1.1 **M** ☐ patient first and last name.

GM7.1.2 **M** ☐ second patient identifier (e.g. identifying number and/or date of birth).

GM7.1.3 **M** ☐ facility name.

GM7.1.4 **M** ☐ date and time of examination.
Guidance: Time of examination is displayed for digital image acquisitions. The time of examination is included on any film-based images, if relevant (e.g. patients likely to have more than one of a given examination per day).

GM7.1.5 **M** ☐ identifying annotation (e.g. appropriate image location and orientation).

GM 7.2 Comprehensive examination details are recorded in the medical record that includes:
Intent: Examination details may be recorded electronically or on written requisitions/worksheets. All details are made available to the interpreting imaging physician.

GM7.2.1 **M** ☐ the paper or electronic patient requisition.

INTERPRETATION AND REPORTS

GM 8.0 Diagnostic reports are in a standardized format that provides comprehensive and necessary information for clinical decision-making.

GM 8.1 Reports are comprehensive and include appropriate patient and relevant clinical information.

Reports include the following information:

GM8.1.1 **M** ☐ the patient's first and last name.[13]
GM8.1.2 **M** ☐ a unique personal identifier number such as PHN or facility-issued identifier number.[4]
GM8.1.3 **M** ☐ date of birth.[4]
GM8.1.4 **M** ☐ gender.[4]
GM8.1.5 **M** ☐ facility name.[4]
GM8.1.6 **M** ☐ examination performed.[4]
GM8.1.7 ☐ clinical indication for the examination.
GM8.1.8 **M** ☐ name of authorized individual requesting examination.[4]
GM8.1.9 **M** ☐ report recipient(s).[4]
GM8.1.10 **M** ☐ date of the examination.[4]
GM8.1.11 **M** ☐ the time of examination, if relevant (e.g. patients likely to have more than one of a given examination per day).[4]
GM8.1.12 **M** ☐ date of interpretation (e.g. dictation and/or transcription).[4]
Intent: Having both dates may be useful to some facilities when determining report turnaround times. This information may be available in the RIS.
GM8.1.13 **M** ☐ Multiple page reports include patient identifiers on each sequentially numbered page.

GM 9.0 Effective communication minimizes the risks of both reporting and patient management errors.
Intent: An effective method of communication is tailored to satisfy the need for timeliness, support the role of an imaging physician as a physician consultant by encouraging physician to physician communication and minimize the risk of communication errors. Communication of information is only as effective as the system that conveys the information. There is a reciprocal duty of information exchange. The

authorized individual or relevant healthcare provider shares in the responsibility for obtaining results of imaging examinations he or she has requested.

GM 9.2 Urgent and other non-routine examination findings are effectively communicated.
Intent: Routine reporting of imaging findings is communicated through the usual channels established by the hospital or the imaging service. However, in urgent or other non-routine clinical situations, the imaging physician expedites the delivery of a diagnostic imaging report (preliminary or final) in a manner that reasonably ensures timely receipt of the findings. Documentation of this communication is extremely important because clinical care errors involving diagnostic imaging may relate to flaws in the chain of communication.

GM9.2.1 **M** ☐ There is a written policy and procedures on communication of urgent and other non-routine examination findings (e.g. critical findings/results).
Intent: An imaging service's policy on communication can be an effective tool to promote patient care. The policy can provide guidance on the types of communications that are most critical, the individuals responsible for receiving communications and the methods of communication that are most appropriate.

RADIATION SAFETY STANDARDS

Introduction:
When using imaging equipment involving ionizing radiation there are four main aspects of radiation protection and safety to be considered. First, patients are not to be subjected to unnecessary procedures. This means that the procedures are requested with justification, including clinical examination, and when the diagnostic information cannot be obtained otherwise. Second, when a procedure is required, it is essential that the patient be protected from excessive radiation exposure during the examination. Third, it is necessary that personnel within the facility be protected from excessive exposure to radiation during the course of their work. Finally, personnel and the general public in the vicinity of such facilities require adequate protection. In all facilities and for all equipment types, procedures are in place in order to ensure that exposures to patients, staff and the public are kept as low as reasonably achievable (the ALARA principle).

A conscious effort must always be made to reduce patient doses to the lowest practical level consistent with optimal quality of diagnostic information. Through close cooperation between medical professionals, technologists, medical physicists, and other support staff it is possible to achieve an effective radiation protection program and maintain a high quality diagnostic service.

MINIMIZING RADIATION EXPOSURE TO STAFF AND VISITORS

RS 1.0 Appropriate measures are in place to prevent unnecessary radiation exposure to staff and visitors.

Intent: To achieve optimal safety, responsible users, radiation safety officers, and equipment operators are to make every reasonable effort to keep exposures to themselves and to other personnel as far below the limits for Occupational Ionizing Radiation Exposures (Reference: Health Canada Safety Code 35, Appendix I, Dose Limits for Occupational Ionizing Radiation Exposures) as reasonably achievable. The activities outlined in this section are primarily directed toward occupational health protection. However, adherence to these activities will also, in many instances, provide radiation protection to visitors and other individuals in the vicinity of the facility.

RS 1.1 Imaging staff is aware of the risks of ionizing radiation and manage the risks appropriately.

Intent: Staff is to be knowledgeable of the hazards of ionizing radiation. The ALARA principle is understood and followed by all imaging staff.

RS1.1.1 **M** ☐ An X-ray room is not used for more than one radiological investigation simultaneously.

RS1.1.5 **M** ☐ The operator has a clear view of the patient during every X-ray examination and is able to communicate with the patient and/or attendants without leaving the control booth.

RS1.1.7 **M** ☐ Policies and procedures are in place to protect pregnant staff.[14]
Guidance: Refer to Occupational Health and Safety Regulation (WorkSafeBC) section 7.21 Reproductive hazards and HCSC 35 and 36, procedures for minimizing radiation exposure to personnel.

RS1.1.8 **M** ☐ Written guidelines are in place for individuals assisting the patient (e.g. holding or assisting during examinations).
Intent: If parents, attendants or other personnel are called to assist, they are provided with personal protective equipment, and positioned so as to avoid the X-ray beam. No person is to regularly perform these duties.

RS 1.2 Radiation exposure to staff is monitored through the use of personal dosimeters.

RS1.2.1 **M** ☐ All operators of X-ray equipment and others likely to receive a radiation dose in excess of 1/20th the dose limit to radiation workers, are declared radiation workers and their radiation exposures is monitored with the use of a personal dosimeter.

RS1.2.2 **M** ☐ Personal dosimeters are worn and stored according to the recommendations of the dosimetry service provider.

RS 1.3 Radiation warning signage is clearly visible to alert patients, staff and visitors of the risks associated with radiation.
See also Radiation Safety Accreditation Standard RS 6.3 for the requirements for room design and layout.

RS1.3.1 **M** ☐ Rooms with stationary X-ray equipment are identified with warning signs incorporating the X-ray warning symbol.
Guidance: Refer to Health Canada Safety Code 35 Appendix VI for acceptable X-ray warning symbols: http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/safety-code_35-securite/index-eng.php#app6.
The X-ray warning symbol:

RS1.3.2 **M** ☐ is displayed in two contrasting colors.

RS1.3.3 **M** ☐ is legible from a distance.

RS1.3.4 **M** ☐ bears the words “CAUTION: X-RAYS—ATTENTION: RAYONS X”.
Intent: Room warning signage may reflect the requirements in place at the time of equipment installation (e.g. rooms with equipment installed prior to September 2011 do not require bilingual signage); however, facilities are strongly encouraged to update their warning signage to meet the new requirements.

RS1.3.5 **M** ☐ Rooms with stationary X-ray equipment, which can be accessed from public areas, are identified with signage stating “Unauthorized Entry Prohibited”.
Intent: Signage must be affixed on or adjacent to the X-ray room door to ensure no individual inadvertently enters the room during exposure.

MINIMIZING RADIATION EXPOSURE TO PATIENTS

RS 2.0 Appropriate measures are in place to prevent unnecessary radiation exposure to patients.
Intent: Procedures to minimize radiation exposure to patients are the responsibility of the physician/practitioner, radiologist and technologist. These standards provide guidance for the elimination of unnecessary examinations and for minimizing doses to patients when examinations are necessary.

RS 2.1 Mechanisms are in place to prevent unnecessary radiation to patients.

RS2.1.1 **M** ☐ There is signage posted, at a minimum, in the reception and patient changing/waiting areas that is clearly visible to alert women who may be pregnant to notify the technologist.

RS2.1.6 **M** ☐ Infant immobilizers are available for pediatric imaging.

RS 2.2 Procedures are in place to protect female patients of childbearing age.

Intent: Only essential investigations are taken in the case of pregnant or suspected pregnant women. Care is taken to protect the fetus from radiation when the X-ray examination of a pregnant woman is unavoidable. This includes keeping the exposure to the absolute minimum, the use of shielding of the abdominal area and the use of a well-collimated X-ray beam.

RS2.2.2 **M** ☐ If an examination is requested on a pregnant or potentially pregnant patient, there are documented procedures on how to proceed with the examination request.

RS 4.0 Equipment is maintained and monitored in a manner that ensures performance specifications and radiation safety are met.

RS 4.1 All new, used, and refurbished medical X-ray equipment conforms to Health Canada regulatory requirements.

Intent: Whenever possible, existing medical X-ray equipment is upgraded to incorporate as many as possible of the safety and performance features required of new medical X-ray equipment, as specified in the Radiation Emitting Devices (RED) Regulations in effect at that time. It is noted that it is a requirement of the Radiation Emitting Devices Act that replacements for any component or subassembly of an X-ray machine, for which a construction or performance standard has been specified in the regulations applicable to the class of X-ray equipment, comply with the standards in effect at the time of replacement.

RS4.1.1 **M** ☐ At time of purchase, all new, used and refurbished medical X-ray equipment conforms to the Radiation Emitting Devices Regulations.[1]
Guidance: As part of acceptance testing procedures there is verification of compliance to RED regulations for diagnostic X-ray equipment, Part XII.
Note: Only a few of many important regulations are listed below.

Radiographic systems have:

RS4.1.2 **M** ☐ an irradiation switch that requires continuous pressure by the operator to emit X-rays.

Radioscopic systems have:

RS4.1.3 **M** ☐ an irradiation switch that requires continuous pressure by the operator for the entire period of any irradiation and enables the operator to terminate the recording of serial radioscopic images at any time.

RS4.1.4 **M** ☐ visual indicators that continuously display the X-ray tube voltage and the X-ray tube current.

RS4.1.5 **M** ☐ an X-ray image intensifier that includes protective shielding such that for any focal spot to image receptor distance, the entire cross section of the X-ray beam is intercepted within the primary protective shielding. Also, the radioscopic X-ray tube is not capable of emitting X-rays unless the protective shielding is in place to intercept the X-ray beam.

RS4.1.6 **M** ☐ a high-level irradiation control is activated by a separate means that requires continuous pressure by the operator to emit X-rays. An audible signal is emitted when the high-level irradiation control is in use.

RS4.1.7 **M** ☐ a device that limits the focal spot to skin distance.
Guidance: The focal spot to skin distance is not less than 30 cm for mobile equipment, 38 cm for stationary equipment, 20 cm for radioscopic equipment designed for special applications that would be impossible at 30 cm or 38 cm. In the case of small-format, low-intensity radioscopic equipment, the minimum focal spot to skin distance is the distance at which the equipment is capable of delivering an air kerma rate of 50 mGy/min.

RS4.1.8 **M** ☐ a last image hold system which keeps on display the last radioscopic image obtained.

CT systems ensure:

RS4.1.9 **M** ☐ initiation or continuation of irradiation is possible only from the control panel.

RS4.1.10 **M** ☐ an emergency stop switch is in place on or near the patient support and/or gantry to immediately terminate the motion of the equipment and the emission of X-rays.

RS4.1.11 **M** ☐ a minimum focal spot to skin distance of at least 15 cm.

Mammography systems ensure:

RS4.1.12 **M** ☐ an irradiation switch that requires continuous pressure by the operator to emit X-rays.

Intent: The following requirements must be met for all retrofitted X-ray and Mammography Systems.

RS4.1.12 **M** ☐ At time of purchase, all new, used and refurbished medical X-ray equipment conforms to the Medical Devices Regulations.[15]
Guidance: All equipment has an active Health Canada medical device licensing number.

RS4.1.13 **M** ☐ When purchasing a Computed Radiography (CR) system for a new or existing X-ray system or an after market DR detector to be installed on an existing system, both CR and Digital Radiography (DR) systems meet the requirements of the Radiation Emitting Devices Act and Regulations, as well as the Food and Drug Act and the Medical Devices Regulations.

RS4.1.14 **M** ☐ The existing X-ray system, onto which a CR or DR system is retrofitted, meets the current requirements of Part XII of the Radiation Emitting Devices Regulations.

RS4.1.15 **M** ☐ CR and DR image receptors are only installed on used or refurbished X-ray systems which have an automatic means of controlling exposures, such as an automatic exposure control.

RS4.1.16 **M** ☐ The digital system is calibrated to correctly reflect the sensitivity of the digital receptor.

RS 4.2 New and replaced medical X-ray equipment is registered with the Diagnostic Accreditation Program of BC and includes the following information:
Guidance: The registration of X-ray equipment is limited to radiographic, radioscopic and computed tomography systems. Registration forms are available at http://www.dap.org/Default.aspx?p=165.

RS4.2.1 **M** ☐ facility name and address.
RS4.2.2 **M** ☐ name of owner.
RS4.2.3 **M** ☐ name of Radiation Safety Officer/individual responsible for radiation safety.
RS4.2.4 **M** ☐ room name or number.
RS4.2.5 **M** ☐ type of equipment.
RS4.2.6 **M** ☐ manufacturer.
RS4.2.7 **M** ☐ year of manufacture.
RS4.2.8 **M** ☐ model.
RS4.2.9 **M** ☐ device master serial number.
RS4.2.10 **M** ☐ tube 1 insert number.
RS4.2.11 **M** ☐ tube 2 insert number (if applicable).
RS4.2.12 **M** ☐ date of installation.

RS 4.3 Personal protective equipment provides protection to patients, staff and visitors.
Protective lead aprons provide attenuation equivalent to at least:

RS4.3.1 **M** ☐ 0.25 mm of lead, for examinations where the peak X-ray tube voltage is 100 kVp or less.
RS4.3.2 **M** ☐ 0.35 mm of lead, for examinations where the peak X-ray tube voltage is greater than 100 kV and less than 150 kV.
RS4.3.3 **M** ☐ 0.50 mm of lead, for examinations where the peak X-ray tube voltages is 150 kV or greater.
RS4.3.4 ☐ 0.50 mm Pb in the front panels and 0.25 mm Pb in the back are recommended for full wrap around type aprons used for interventional procedures.

RS4.3.5 **M** ☐ Protective gonad shields for patients have a lead equivalent of at least 0.25 mm Pb.
Guidance: At a higher kilovoltage (e.g. 150 kV) it is recommended that gonad shields for patients have a lead equivalent thickness of 0.50 mm.
RS4.3.6 **M** ☐ Protective gloves possess at least a 0.25 mm Pb equivalency.
Guidance: These protections are provided throughout the glove, including fingers and wrist.
RS4.3.7 **M** ☐ The lead equivalent thickness of the protective material used is permanently and clearly marked on all protective equipment and apparel.
RS4.3.8 **M** ☐ The attenuation value is marked on all protective screens and shields.
Guidance: Refer to RS6.3.6 for control booth glass requirements.
RS4.3.10 **M** ☐ Protective equipment is stored and maintained according to manufacturers' recommendations.

RADIATION PROTECTION SURVEYS – RADIOLOGY, MAMMOGRAPHY and CT

RS 5.0 An evaluation of the radiation safety of the facility is conducted at appropriate frequencies.

RS 5.1 Radiation protection surveys are conducted to assess safety when:

RS5.1.1 **M** ☐ there is a new installation.
Intent: For a new facility, it is particularly advantageous to make visual inspections during construction, to ensure compliance with specifications and to identify faulty material or workmanship, since deficiencies can be resolved more economically at this stage than later. Such inspections include determination of thickness of lead and/or concrete thickness and density, degree of overlap between lead sheets or between lead and other barriers, as well as thickness and density of leaded glass used in viewing windows.

RS 5.2 The radiation protection survey report provides results and recommendations based on the surveyors findings.
Guidance: The survey report presents in a clear systematic way the details and results of the measurements carried out, as well as the conclusions drawn and recommendations made by the surveyor. Any unusual findings about the equipment itself, the facility or operating procedures, which could affect the safety of operators or other persons in the vicinity of the X-ray facility, are clearly identified.

RS5.2.1 **M** ☐ Surveyors are qualified by education and experience to perform advanced or complex procedures in radiation protection.

The survey report includes:

RS5.2.2 **M** ☐ a sketch of the facility, showing the location of the X-ray equipment and control booth/panel within the facility as well as identifying the nature and occupancy of the areas adjoining the facility.

RS5.2.3 **M** ☐ identification of the X-ray equipment (e.g. the name of the manufacturer, model designation and serial number of the generator, console, X-ray tube assembly, X-ray table, etc.) and the date, or at least approximate date manufactured.

RS5.2.4 **M** ☐ an indication of the method of support of the X-ray tube assembly (i.e., floor-to-ceiling tube stand, ceiling suspended over-table tube, etc.).

RS5.2.5 **M** ☐ observations made of the operational conditions (both electrical and mechanical) of the X-ray equipment at the time of the survey.

RS5.2.6 **M** ☐ the actual or estimated total workload of the facility, as well as the workload apportioned into various X-ray beam directions and procedures used, etc.

RS5.2.7 **M** ☐ results of radiation measurements carried out both inside and outside the controlled area under “typical” operating conditions and the locations at which the measurements are made.
Guidance: For a mammography facility with shielding design/calculations requiring only standard construction materials, a visual survey of the integrity of the standard construction materials provides an adequate assessment for the radiation protection survey. Construction materials for radiation shielding are based on the shielding calculations required in RS6.1.

RS5.2.8 **M** ☐ a review of the available personal protective equipment, mobile protective barriers and other protective devices.

RS5.2.9 **M** ☐ an indication of the estimate of potential exposures to personnel and general public in or around the facility.

RS5.2.10 **M** ☐ an evaluation of the X-ray performance and the imaging or diagnostic performance (this may include performing applicable acceptance testing or quality control tests, e.g. new and relocated equipment has acceptance testing performed.).

RS5.2.12 **M** ☐ an assessment of radiological techniques from the point of view of radiation safety.
Guidance: When possible, techniques and patient doses are reviewed and compared to established diagnostic reference levels.

RS5.2.13 **M** ☐ a review of the facility's quality assurance program to ensure it exists and is maintained, including quality control testing records.

RS5.2.14 **M** ☐ recommending when there is a need for a follow-up survey.

RS5.2.15 **M** ☐ The results of surveys including conclusions drawn by the surveyors are submitted to the owner, radiation safety officer or responsible user in a written report.

FACILITY REQUIREMENTS

Note: For Bone Densitometry installations, reference: Radiation Protection Services of BC, Radiation Issue Notes, RIN #11, Radiological Safety in the Design and Operation of DEXA Bone Densitometry facilities. Recommendations are available for room design, workstation position and considerations for shielding.[16]

RS 6.0 Planning activities ensure adequate shielding is in place to provide the necessary level of radiation protection.

Intent: In the planning of any medical X-ray facility the main priority is to ensure that persons in the vicinity of the facility are not exposed to levels of radiation which surpass the current regulatory exposure limits. In the early stages of designing and planning a medical X-ray facility, three steps are taken to ensure adequate shielding is in place to provide the necessary level of radiation protection:

- *Preparation of facility plans*
- *Considerations for room design and layout*
- *Determination of parameters governing shielding requirements*

RS 6.1 Appropriate steps are taken to ensure adequate shielding is present in controlled and uncontrolled areas.

RS6.1.1 **M** ☐ The radiation levels in controlled areas that are occupied routinely by radiation workers are such that no radiation worker is occupationally exposed to more than 20 mSv per year.

RS6.1.2 **M** ☐ The radiation levels in uncontrolled areas are such that no person receives more than 1 mSv per year.

RS6.1.3 ☐ The radiation levels in uncontrolled areas where radiosensitive populations are present, such as pediatric wards, are limited to 0.3 mSv per year.

RS6.1.4 **M** ☐ Film storage containers and CR cassettes are shielded to ensure excessive exposure does not occur.
Guidance: Film is stored in a place with a radiation level less than 0.1 mGy over the storage period. Given that CR cassettes are used more frequently and stored for shorter periods of time, a limit of 0.5µGy is acceptable.

RS6.1.5 **M** ☐ Shielding calculations are performed by trained individuals with current in-depth knowledge of structural shielding design (e.g. knowledge of radiation protection requirements and radiation shielding barriers) and using the acceptable methods of performing these calculations.

FACILITY REQUIRMENTS – RADIOLOGY, MAMMOGRAPHY and CT

RS 6.2 Preparation of facility plans includes preparing a facility floor plan.
The facility floor plan includes:

RS6.2.1 **M** ☐ The dimensions and shape of the room where the X-ray equipment is operated and the physical orientation of the room (e.g. a mark indicating North).

RS6.2.2 **M** ☐ The location where the X-ray equipment is planned to be placed and the range of movement of the X-ray tube(s).

RS6.2.3 **M** ☐ The location of the control booth or control panel.

RS6.2.4 **M** ☐ The location, use, occupancy level and accessibility of adjacent rooms, as well as rooms above and below the facility.

RS6.2.5 **M** ☐ The designation of the adjacent rooms, whether to be designated as a controlled or uncontrolled area.

RS6.2.6 **M** ☐ The location(s) where image processing is performed (e.g. location of darkrooms, film or CR cassette storage area, CR reader and computer workstations)

RS6.2.7 **M** ☐ The position of all windows, doors, louvers, etc., that may affect radiation protection requirements.

RS6.2.8 **M** ☐ The planned and existing materials used to construct the walls, floor, ceiling, and the control booth, and their thicknesses including additional materials currently being used, or planned for use, as radiation shielding barriers.

RS6.2.9 **M** ☐ The application of the protective barriers.
Guidance: In mammography, the image receptor assembly acts as the primary protective barrier, therefore floor plans must indicate that the intervening shielding between the equipment and occupied areas will act as secondary barriers to attenuate scattered and leakage radiation.

RS 6.3 Radiation safety planning includes considerations for room design and layout.
See also Radiation Safety Accreditation Standards RS1.3.1-RS1.3.2 for the requirements for radiation warning and restricted access signage.

RS6.3.1 **M** ☐ Mobile X-ray and mammography equipment used routinely in one location is considered as a fixed installation and the shielding needs for the equipment and room are determined accordingly.

RS6.3.2 ☐ The rooms containing the X-ray equipment are designed to provide adequate working space for the equipment operator and to allow for ease of patient movement.

RS6.3.3 ☐ The X-ray equipment is positioned in the room in such a way that during an irradiation, no one can enter the room without the knowledge of the equipment operator.

RS6.3.4 **M** ☐ The X-ray beam is always directed toward adequately shielded areas.
Guidance: Particular attention is to be paid to the adequacy of shielding for chest radiography using wall mounted image receptors.

RS6.3.5 **M** ☐ A control booth is provided for the protection of the operator, if applicable, for the type of equipment. The control booth, and the viewing window, has shielding properties such that no operator is occupationally exposed to more than 0.4mSv/week.
Guidance: The control booth is located in an area, whenever possible, such that the radiation is scattered at least twice before entering the booth. The ALARA principle requires that additional shielding be specified in the design to further reduce operator exposure, wherever this can reasonably be done. Mobile protective screens are not considered adequate as a control booth for radiological procedures.

RS6.3.6 **M** ☐ The lead equivalency of the control booth glass is documented and is readily available.
Guidance: This includes the transparent shield protecting the mammography console.

RS6.3.7 **M** ☐ Shielding is constructed to form an unbroken barrier and if lead is used, it is adequately supported to prevent "creeping".

RS6.3.8 ☐ The position of the exposure switch is at least one meter from the control booth entrance, when applicable.

RESPONSIBILITY OF PERSONNEL– RADIOLOGY, MAMMOGRAPHY and CT

Introduction:
It is the responsibility of the owner to ensure that the equipment and the facilities in which such equipment is installed and used meet all applicable radiation safety standards, and that a radiation safety program is developed, implemented and maintained for the facility. The owner may delegate this responsibility to competent staff. How this responsibility is delegated will depend upon the number of staff members, the nature of the operation, and on the number of X-ray equipment owned.

RS 7.0 Responsible staff ensures the optimum level of radiation safety and image quality.

RS 7.1 The radiation safety program is monitored and managed by competent staff.

RS7.1.1 **M** ☐ The governing body/ownership ensures that one or more competent individuals are designated to carry out the duties identified in RS 7.2 "responsible user" and RS 7.3 "medical physicist/radiation safety officer".

RS 7.2 Radiation safety activities are performed by competent staff.

RS7.2.1 **M** ☐ There is at least one individual designated to perform the duties of "responsible user".
Guidance: The responsible user can be an owner, licensed physician, technologist or administrator of a facility who is able to demonstrate competency in the duties of a responsible user as listed in RS7.2.2 - RS 7.2.11. The responsible user typically needs to be a person who is stationed on-site; for smaller facilities, an off-site responsible user may be acceptable if the duties are being adequately fulfilled with the assistance of on-site competent staff.

The responsible user:

RS7.2.2 **M** ☐ ensures that the X-ray equipment, image processing equipment, and ancillary/auxiliary equipment function correctly.

RS7.2.3 **M** ☐ ensures that the equipment is maintained properly by implementing and maintaining an effective imaging quality assurance program for the facility, including quality control testing, establishing diagnostic reference levels, and record keeping.

RS7.2.6 **M** ☐ establishes documented safe operating procedures for the equipment and ensures that operating staff are adequately instructed.

RS7.2.7 **M** ☐ promulgates documented rules of radiation safety and ensures that staff members are made aware of them through training.

RS7.2.9 **M** ☐ ensures that radiation levels in controlled and uncontrolled areas are below the maximum permissible limits such that the annual dose limits to radiation workers and the public will not be exceeded.

RS7.2.10 **M** ☐ ensures that an effective communication system is maintained between X-ray equipment operators, referring physicians, medical physicists/radiation safety officers and information systems specialists to discuss all matters related to radiation protection of patients and workers.

RS 7.3 Radiation protection specialists act as an advisor for all aspects of radiation protection.

RS7.3.1 **M** ☐ There is a medical physicist or radiation safety officer to act as an advisor on all radiation protection aspects during the initial stages of construction of the facility, installation of the equipment, and during subsequent operations.
Intent: This individual typically needs to be a person who is stationed on-site; some duties can be contracted as required, and some duties can be performed regionally or corporately. A responsible user can also be the RSO. Radiation protection specialists must have documented training in radiation safety which includes an understanding of the work, hazards and control measures associated with ionizing radiation.

The radiation protection specialist/medical physicist/radiation safety officer:

RS7.3.2 **M** ☐ assesses the radiation safety of an installation at the time of planning and/or construction of the facility, or when modifications are planned and/or are being made to an existing facility.
Guidance: For some facilities, this is an example of when a contracted service may be applicable.

RS7.3.3 **M** ☐ registers the equipment with the Diagnostic Accreditation Program when new equipment is purchased or equipment is replaced.
Note: See also Radiation Safety Accreditation Standard RS 4.2.

RADIOLOGY STANDARDS

Introduction:
In addition to the Global Modality Accreditation Standards, the modality specific Accreditation Standards for Radiology provide additional mandatory requirements and best practices for accreditation in the modality of Radiology.

EXAMINATION REQUEST

RA 1.0 Examination requests are standardized and ensure that accurate, comprehensive and appropriate information is relayed.

RA 1.2 Examination requests contain accurate information that is received prior to an examination being undertaken.

RA1.2.1 **M** ☐ Outpatient requisitions for intravascular contrast agent examinations indicate recent eGFR.
Guidance: For inpatients, either the requisition or information system indicates the recent eGFR results.

IMAGING PROCEDURES

RA 3.0 Standard protocols result in images appropriate for their intended use in clinical decision-making.

RA 3.2 Protocols contain all the information necessary to perform the examination.
Protocol information includes, but is not limited to:

RA3.2.1 **M** ☐ the radiation technique.
Intent: Loading factors and techniques (e.g. tube voltage, current and filtration) are documented for all examinations in a technique chart or separate imaging protocol. Techniques preprogrammed into the X-ray system are not an acceptable substitute.

RA3.2.2 **M** ☐ the equipment/supplies needed.

RA3.2.4 **M** ☐ a description of patient positioning.
Intent: At a minimum, a description of patient positioning for interventional and specialized procedures is provided.

RA3.2.5 **M** ☐ the type and dose of contrast agents administered.

RA 3.3 Examinations are performed following established protocols.

RA3.3.1 **M** ☐ Protocols are readily available to staff performing the examination.

RA3.3.3 **M** ☐ There are protocols for the pediatric population.
Intent: Examinations of infants and children are only performed using techniques and loading factors which have been modified for size and age.[17]

RA3.3.7 **M** ☐ Written procedures are in place for the use of electronic markers when errors/omissions are identified after exposure.

RA3.3.8 **M** ☐ Technique charts are available and reflective of the equipment used.

ACCEPTANCE TESTING AND QUALITY ASSURANCE

RA 12.0 Equipment testing is performed prior to clinical use.
See also Equipment and Supplies Accreditation Standards DES 2.0.

RA 12.1 Acceptance testing is performed after purchase and prior to clinical use of film-based systems.

Acceptance testing includes visual and functional testing of the:

RA12.1.1 **M** ☐ mechanical properties.
RA12.1.2 **M** ☐ safety systems.

Testing includes evaluation of the:

RA12.1.3 **M** ☐ accuracy of loading factors.
Guidance: Testing is performed of the kVp accuracy (e.g X-ray tube voltage), current time product (mAs) and timer accuracy (loading time).
RA12.1.4 **M** ☐ backup timer.
Intent: The back-up (or guard) timer terminates the radiographic exposure if all other systems such as the AEC or timer fail. Health Canada Safety Code 35 has not required testing of the backup timer however; this is a requirement in the RED Act and must be assessed at acceptance testing and is also strongly recommended to be assessed annually.
RA12.1.5 **M** ☐ radiation output reproducibility.
RA12.1.6 **M** ☐ radiation output linearity.
RA12.1.7 **M** ☐ (HVL) X-ray beam filtration.
RA12.1.8 **M** ☐ automatic exposure control (AEC).
RA12.1.9 **M** ☐ X-ray field and light field alignment.
RA12.1.10 **M** ☐ X-ray beam collimation.
RA12.1.11 **M** ☐ accuracy of the dose area product value.
RA12.1.12 **M** ☐ grid performance.
RA12.1.13 **M** ☐ dynamic range.
RA12.1.14 **M** ☐ high contrast resolution (spatial resolution).
RA12.1.15 **M** ☐ low contrast detectability (contrast detectability).
RA12.1.16 **M** ☐ artifacts.
Intent: This is a visual test of image uniformity.
RA12.1.17 **M** ☐ phantom dose measurements (phantom entrance dose rate).

RA 12.2 Acceptance testing is performed after purchase and prior to clinical use of CR/DR systems.

Acceptance testing includes visual and functional testing of the:

RA12.2.1 **M** ☐ mechanical properties.
RA12.2.2 **M** ☐ safety systems.

Testing includes evaluation of the:

RA12.2.3 **M** ☐ accuracy of loading factors.

Guidance: Testing is performed of the kVp accuracy (e.g X-ray tube voltage), current time product (mAs) and timer accuracy (loading time).

RA12.2.4 **M** ☐ backup timer.
Intent: The back-up (or guard) timer terminates the radiographic exposure if all other systems such as the AEC or timer fail. Health Canada Safety Code 35 has not required testing of the backup timer however; this is a requirement in the RED Act and must be assessed at acceptance testing and is therefore also strongly recommended to be assessed annually.

RA12.2.5 **M** ☐ radiation output reproducibility.
RA12.2.6 **M** ☐ radiation output linearity.
RA12.2.7 **M** ☐ (HVL) X-ray beam filtration.
RA12.2.8 **M** ☐ automatic exposure control (AEC).
RA12.2.9 **M** ☐ X-ray field and light field alignment.
RA12.2.10 **M** ☐ X-ray beam collimation.
RA12.2.11 **M** ☐ accuracy of the dose area product value.
RA12.2.12 **M** ☐ grid performance.
RA12.2.13 ☐ response function.
RA12.2.14 **M** ☐ exposure index or manufacturer's equivalent measure.
RA12.2.15 **M** ☐ dynamic range.
RA12.2.16 **M** ☐ noise, uniformity and image artifacts.
RA12.2.17 **M** ☐ high contrast resolution (spatial resolution).
RA12.2.18 **M** ☐ low contrast detectability (contrast detectability).
RA12.2.19 **M** ☐ digital detector residual image.
RA12.2.20 **M** ☐ phantom dose measurements (phantom entrance dose rate).
RA12.2.21 ☐ modulation transfer function (MTF).

RA 12.3 Acceptance testing is performed after purchase and prior to clinical use of <u>radioscopic systems</u>.

Acceptance testing includes visual and functional testing of the:

RA12.3.1 **M** ☐ mechanical properties.
RA12.3.2 **M** ☐ safety systems.

Testing includes evaluation of the:

RA12.3.3 **M** ☐ accuracy of loading factors.
Guidance: Testing is performed of the kVp accuracy (e.g X-ray tube voltage), current time product (mAs) and timer accuracy (loading time).

RA12.3.4 **M** ☐ radiation output reproducibility.
RA12.3.5 **M** ☐ radiation output linearity.
RA12.3.6 **M** ☐ (HVL) X-ray beam filtration.
RA12.3.7 **M** ☐ X-ray field and light field alignment.
RA12.3.8 **M** ☐ X-ray beam collimation.
RA12.3.9 **M** ☐ accuracy of the dose area product value.
RA12.3.10 **M** ☐ radioscopic timer and chronometer.
RA12.3.11 **M** ☐ grid performance.
RA12.3.12 **M** ☐ uniformity and artifacts.
RA12.3.13 **M** ☐ high contrast resolution (spatial resolution).

RA12.3.14	**M**	☐	low contrast detectability (contrast detectability).
RA12.3.15	**M**	☐	maximum air kerma rate.
RA12.3.16	**M**	☐	typical image receptor air kerma rate.
RA12.3.17	**M**	☐	automatic intensity control.
RA12.3.18	**M**	☐	phantom dose measurements (phantom entrance dose rate).
RA12.3.19		☐	automatic brightness control.

MAMMOGRAPHY STANDARDS

Introduction:
In addition to the Global Modality Accreditation Standards, the modality specific Accreditation Standards for Mammography provide additional mandatory requirements and best practices for accreditation in the modality of Mammography.

IMAGING PROCEDURES

MA 3.0 Standard protocols result in mammograms appropriate for their intended use in clinical decision-making.

MA 3.2 Protocols contain all the information necessary to perform the examination.
Protocol information includes, but is not limited to:

MA3.2.1 **M** ☐ the radiation technique.
Guidance : A set technique is not used during standard mammography but rather an OPDOSE or AEC function. The appropriate kVp is selected based on the thickness of the breast and the equipment chooses the appropriate mAs using the OPDOSE or AEC function.

MA3.2.2 **M** ☐ the equipment/supplies needed.

MA3.2.3 **M** ☐ a description of patient positioning.
Intent: At a minimum, a description of patient positioning for interventional and specialized procedures is provided.

MA 3.3 Examinations are performed following established protocols.

MA3.3.1 **M** ☐ Protocols are readily available to staff performing the examination.

EQUIPMENT

MA 11.0 Equipment is safely operated, maintained and monitored in a manner that ensures performance specifications are met.

MA 11.1 The imaging service ensures that equipment is capable of achieving the desired image quality and complies with the requirements of the examination.

MA11.1.1 **M** ☐ Dedicated mammography X-ray equipment is used.

MA11.1.2 **M** ☐ Specimen radiography is performed on a dedicated mammography unit or a specialized radiographic unit designed for specimen work.

For digital mammography facilities

MA11.1.3 **M** ☐ Mammography primary acquisition devices conform to the IHE Mammography Image Profile including the acquisition actor.

MA11.1.4 **M** ☐ The diagnostic service has access to a printer capable of printing images for review by another non-digital mammography facility in a timely fashion.
Intent: Some mammography facilities with film-based systems may not have the capability to display digital mammograms.

MA11.1.5 **M** ☐ The images are printed on a FDA/HC approved mammography printer, utilizing film specifically designed for mammography images.[18]

ACCEPTANCE TESTING

MA 12.0 Equipment testing is performed prior to clinical use.
See also Equipment and Supplies Accreditation Standards DES2.1.

MA 12.1 Acceptance testing of film-based systems is performed by a medical physicist after purchase and prior to clinical use.

Acceptance testing includes visual and functional testing of the:

MA12.1.1 **M** ☐ mechanical properties.
MA12.1.2 **M** ☐ safety systems.

Testing includes evaluation of the:

MA12.1.3 **M** ☐ X-ray beam filtration and radiation beam quality.
MA12.1.4 **M** ☐ X-ray tube voltage accuracy and reproducibility.
MA12.1.5 **M** ☐ irradiation timer accuracy and reproducibility.
MA12.1.6 **M** ☐ reproducibility of radiation output.
MA12.1.7 **M** ☐ focal spot size.
MA12.1.8 **M** ☐ proper radiation beam alignment.
MA12.1.9 **M** ☐ light field/x-ray image receptor congruence.

Testing includes evaluation of ancillary components for:

MA12.1.10 **M** ☐ source to image receptor distance indicators accuracy.
MA12.1.11 **M** ☐ compression device design and performance.
MA12.1.12 **M** ☐ bucky system and grid performance.

Testing includes evaluation of automatic exposure control (AEC) for:

MA12.1.13 **M** ☐ reproducibility.
MA12.1.14 **M** ☐ X-ray tube voltage compensation.
MA12.1.15 **M** ☐ minimum response time.
MA12.1.16 **M** ☐ thickness compensation response.
MA12.1.17 **M** ☐ optical density setting response.
MA12.1.18 **M** ☐ backup timer.

Testing includes evaluation of films, screens and cassettes for:

MA12.1.19 **M** ☐ adequacy of film-screen combination.
MA12.1.20 **M** ☐ film-screen speed uniformity.
MA12.1.21 **M** ☐ film-screen contact.
MA12.1.22 **M** ☐ screen condition.

Testing includes evaluation of viewboxes for:

MA12.1.23 **M** ☐ brightness.
MA12.1.24 **M** ☐ light output uniformity.
MA12.1.25 **M** ☐ light output.

MA12.1.26 **M** ☐ homogeneity.
MA12.1.27 **M** ☐ ambient light control.

Testing includes evaluation of image processing for:
MA12.1.28 **M** ☐ light tightness.
MA12.1.29 **M** ☐ safelight conditions.
MA12.1.30 **M** ☐ cleanliness.
MA12.1.31 **M** ☐ temperature control of water supply.
MA12.1.32 **M** ☐ ventilation system.
MA12.1.33 **M** ☐ fixer recovery system.

Testing includes evaluation of film processing for:
MA12.1.34 **M** ☐ condition of processing equipment.
MA12.1.35 **M** ☐ film speed and contrast.
MA12.1.36 **M** ☐ level of film base plus fog.
MA12.1.37 **M** ☐ solution temperature.
MA12.1.38 **M** ☐ replenishment rate.
MA12.1.39 **M** ☐ fixer retention analysis.

Testing includes evaluation of imaging characteristics for:
MA12.1.40 **M** ☐ representative breast surface dose with mean glandular dose calculations.
MA12.1.41 **M** ☐ dose calculations.
MA12.1.42 **M** ☐ image spatial resolution.
MA12.1.43 **M** ☐ image contrast.
MA12.1.44 **M** ☐ image quality.

MA 12.2 Acceptance testing of <u>CR/DR systems</u> is performed by a medical physicist after purchase and prior to clinical use of mammography X-ray equipment.
Guidance: Acceptance testing is required when upgrading from film-screen systems to CR systems.
Acceptance testing includes visual and functional testing of the:
MA12.2.1 **M** ☐ mechanical properties.
MA12.2.2 **M** ☐ safety systems.

Testing includes evaluation of the:
MA12.2.3 **M** ☐ X-ray beam filtration and radiation beam quality.
MA12.2.4 **M** ☐ X-ray tube voltage.
MA12.2.5 **M** ☐ reproducibility of radiation output and linearity.
MA12.2.6 **M** ☐ focal spot size(s).
MA12.2.7 **M** ☐ loading time and current time product.
MA12.2.8 **M** ☐ light field and x-ray field alignment.
MA12.2.9 **M** ☐ radiation leakage.

Testing includes evaluation of ancillary components for:
MA12.2.10 **M** ☐ source to image receptor distance indicators accuracy.
MA12.2.11 **M** ☐ compression force and thickness accuracy.

MA12.2.12 **M** ☐ bucky/detector and grid performance.

Testing includes evaluation of automatic exposure control (AEC) for:

MA12.2.13 **M** ☐ reproducibility.
MA12.2.14 **M** ☐ X-ray tube voltage compensation.
MA12.2.15 **M** ☐ minimum response time.
MA12.2.16 **M** ☐ thickness compensation response.
MA12.2.17 **M** ☐ optical density setting response, if applicable.
MA12.2.18 **M** ☐ backup timer.

Testing includes an assessment of:

MA12.2.19 **M** ☐ representative breast surface dose with mean glandular dose calculations.
MA12.2.20 **M** ☐ dose calculations, including verification of dose estimation.
MA12.2.21 **M** ☐ image spatial resolution.
MA12.2.22 **M** ☐ image contrast and noise.
MA12.2.23 **M** ☐ image quality.
MA12.2.24 **M** ☐ image ghosting and residual image.
MA12.2.25 **M** ☐ geometric distortion.
MA12.2.26 **M** ☐ dose response at the image receptor.

ULTRASOUND STANDARDS

Introduction:
In addition to the Global Modality Accreditation Standards, the modality specific Accreditation Standards for Ultrasound provide additional mandatory requirements and best practices for accreditation in the modality of Ultrasound.

IMAGING PROCEDURES

US 3.0 Standard protocols result in images appropriate for their intended use in clinical decision-making.

US 3.2 Protocols contain all the information necessary to perform the examination.
Protocol information includes, but is not limited to:

US3.2.1 **M** ☐ clearly specified measurements and imaging views.

US 3.3 Examinations are performed following established protocols.

US3.3.1 **M** ☐ Protocols are readily available to staff performing the examination.

US3.3.2 **M** ☐ Probes are cleaned and disinfected between patients.
Intent: Probes that only contact intact skin require cleaning and low level disinfection.[19] The activities associated with reprocessing endocavity probes are addressed in the Infection Prevention and Control Accreditation Standards DIPC6.2.3 and DIPC 7.0.

US3.3.3 **M** ☐ Probes are covered, whenever appropriate.
Intent: Probes are covered during sterile interventional procedures and for cases with a risk of infection.

US3.3.4 **M** ☐ Any endocavity probe, when in use, is protected by a single-use disposable cover or a commercially available probe cover.

US3.3.6 **M** ☐ There is an established protocol for the use of gel in the performance of the ultrasound examination that minimizes the transmission of pathogens.
Guidance: The protocol must include clear directions on the use, storage and warming of both sterile and non-sterile gels. Health Canada has published Safety Guidelines that should be used to develop the facility's protocol. The Health Canada guidelines can be assessed at: http://www.hc-sc.gc.ca/dhp-mps/medeff/advisories-avis/prof/_2004/ultrasound_nth-ah-eng.php.

INTERPRETATION AND REPORTS

US 8.0 Diagnostic reports are in a standardized format that provides comprehensive and necessary information for clinical decision-making.

US 8.4 Standardized reporting is used for first trimester ultrasound reports.
Guidance: In addition to the patient demographics and body requirements outlined in the Global Modality and Ultrasound Accreditation Standards, first trimester ultrasound reports should follow a standardized format to ensure that all information relevant to diagnosis is included.
Intent: First trimester is defined as up to 14 weeks.

The report includes a description of the following structures:

US8.4.1 **M** ☐ presence or absence of yolk sac or embryo.
US8.4.2 **M** ☐ fetal number.
Guidance: If there are multiple fetuses, the chorionicity and amnionicity needs to be documented.
US8.4.3 **M** ☐ location of the gestational sac.
US8.4.4 **M** ☐ presence or absence of cardiac activity.
US8.4.5 **M** ☐ fetal heart rate.
US8.4.6 **M** ☐ crown rump length (CRL).
US8.4.7 **M** ☐ placental location, after 9 weeks, 0 days gestation.
US8.4.8 **M** ☐ maternal pelvic anatomy (e.g. adnexa, ovaries, cervix).

For fetuses greater than 13 weeks, 0 days gestation, the report template also includes:

US8.4.9 **M** ☐ head circumference (HC).
US8.4.10 **M** ☐ CRL or biparietal diameter (BPD).
US8.4.11 **M** ☐ abdominal circumference (AC).
US8.4.12 **M** ☐ femur length (FL).
US8.4.13 **M** ☐ choroid plexus.
US8.4.14 **M** ☐ cardiac axis.
US8.4.15 **M** ☐ stomach.
US8.4.16 **M** ☐ fetal abdominal wall cord insertion.
US8.4.17 **M** ☐ presence of four limbs.
US8.4.18 **M** ☐ presence or absence of bladder.

If nuchal translucency (NT) measurements are made, the report template also includes:
Guidance: NT measurements are performed only when the CRL is between 45.0 and 84.0 mm.

US8.4.19 **M** ☐ NT measurement in mm to 1 decimal point.
US8.4.20 **M** ☐ Fetal Maternal Foundation (FMF) certification number of the individual performing the NT measurement.
US8.4.21 **M** ☐ standard comments established by the Prenatal Genetic Screening Program.

US 8.5 **Standardized reporting is used for second trimester ultrasound reports.**

Guidance: In addition to the patient demographics and body requirements outlined in the Global Modality and Ultrasound Accreditation Standards, second trimester ultrasound reports should follow a standardized format to ensure that all information relevant to diagnosis is included.

Intent: Second trimester is defined as 14 weeks, 1 day to 26 weeks, 6 days.

The report includes a description of the following structures:

US8.5.1 **M** ☐ fetal number.
Guidance: If there are multiple fetuses, the chorionicity and amnionicity needs to be documented.

US8.5.2 **M** ☐ fetal position (after 23 weeks, 0 days).

US8.5.3 **M** ☐ presence or absence of cardiac activity.

US8.5.4 **M** ☐ fetal heart rate.

US8.5.5 **M** ☐ cardiac axis.

US8.5.6 **M** ☐ head circumference (HC).

US8.5.7 **M** ☐ CRL or biparietal diameter (BPD).

US8.5.8 **M** ☐ abdominal circumference (AC).

US8.5.9 **M** ☐ femur length (FL).

US8.5.10 **M** ☐ choroid plexus.

US8.5.11 **M** ☐ stomach.

US8.5.12 **M** ☐ placental cord insertion.

US8.5.13 **M** ☐ presence of four limbs.

US8.5.14 **M** ☐ presence or absence of bladder.

US8.5.15 **M** ☐ a description of the amniotic fluid volume.
Guidance: The description should indicate one of the following: polyhydramnios, oligohydramnios, absent or normal.

US8.5.16 **M** ☐ a description of the placenta (e.g. number, if multiple; location; relationship to the internal cervical os).

US8.5.17 **M** ☐ a description of the cervix.

US8.5.18 **M** ☐ maternal pelvic anatomy (e.g. uterus).

US8.5.19 **M** ☐ an indication of whether fetal soft markers were performed and the markers assessed.

US8.5.20 **M** ☐ a comprehensive summary of the fetal anatomy assessment (if performed).

US 8.6 **Standardized reporting is used for detailed fetal anatomy assessments.**

Guidance: In addition to the report demographic and body requirements outlined in the Global Modality and Ultrasound Accreditation Standards, detailed fetal anatomy assessments should follow a standardized format to ensure that all information relevant to diagnosis is included.

Intent: A detailed fetal anatomy assessment should be performed between 18 weeks, 0 days and 22 weeks, 6 days and is typically performed during the 2nd trimester ultrasound examination.

The report includes:

US8.6.1 **M** ☐ a description of the head that includes the cerebellum, cisterna magna, cavum septi pellucidi, choroid plexus and cerebral lateral ventricles.

US8.6.2 **M** ☐ a description of the face and neck that includes the orbits, lips, and nuchal thickness (fold) or nuchal index.

US8.6.3 **M** ☐ a description of the chest that includes the heart (axis and position), cardiac outflow tracts (LVOT, RVOT) or short axis view and a four chamber view.

US8.6.4 **M** ☐ a description of the abdomen that includes the stomach, bladder, abdominal wall, abdominal cord insertion, bowel, number of umbilical cord vessels and kidneys.

US8.6.5 **M** ☐ a description of the spine that includes the cervical, thoracic, lumbar and sacral spine.

US8.6.6 **M** ☐ a description of the extremities that includes the presence or absence of the four limbs and the presence or absence of the hands and feet.

US8.6.7 **M** ☐ a description of the genitalia (e.g. male or female or not determined)
Intent: A reasonable attempt is made to assess fetal genitalia, but the examination time must not be extended for the sole purpose of determining fetal sex.

US 8.7 **Standardized reporting is used for third trimester ultrasound reports.**
Guidance: In addition to the patient demographics and body requirements outlined in the Global Modality and Ultrasound Accreditation Standards, third trimester ultrasound reports should follow a standardized format to ensure that all information relevant to diagnosis is included.
Intent: Third trimester is defined as after 27 weeks.

The report includes a description of the following structures:

US8.7.1 **M** ☐ fetal number.
Guidance: If there are multiple fetuses, the chorionicity and amnionicity needs to be documented.

US8.7.2 **M** ☐ fetal position (after 23 weeks, 0 days).

US8.7.3 **M** ☐ presence or absence of cardiac activity.

US8.7.4 **M** ☐ fetal heart rate.

US8.7.5 **M** ☐ cardiac outflow tracts or short axis.

A description of the following:

US8.7.6 **M** ☐ the four chambers of the heart.

US8.7.7 **M** ☐ the stomach.

US8.7.8 **M** ☐ the bladder.

US8.7.9 **M** ☐ the kidneys.

US8.7.10 **M** ☐ head circumference (HC).

US8.7.11 **M** ☐ CRL or biparietal diameter (BPD).

US8.7.12 **M** ☐ abdominal circumference (AC).

US8.7.13 **M** ☐ femur length (FL).

US8.7.14 **M** ☐ a description of the amniotic fluid volume.
Guidance: The description should indicate one of the following: polyhydramnios, oligohydramnios, absent or normal and include AFI and DVP.

US8.7.15 **M** ☐ a description of the placenta (e.g. number, if multiple; location; relationship to the internal cervical os).

US8.7.16 **M** ☐ a description of the cervix (if less than 32 weeks, 0 days).

US8.7.17 **M** ☐ an estimation of the appropriateness of interval growth.

US8.7.18 **M** ☐ a comprehensive summary of the fetal anatomy assessment (if performed).
Guidance: When performing an ultrasound examination in the third trimester and a complete 2nd trimester anatomic ultrasound assessment has not been performed, every effort should be made to assess and document those structures listed in US8.6.1-8.6.7.

ACCEPTANCE TESTING AND QUALITY ASSURANCE

US 12.0 Equipment testing is performed prior to clinical use.
See also Equipment and Supplies Accreditation Standards DES2.1.

US 12.1 Acceptance testing is performed after purchase and prior to clinical use of equipment that includes:

US12.1.1 **M** ☐ a physical and mechanical inspection of the system and probes.

US12.1.2 **M** ☐ electrical leakage current testing of probes.

US12.1.3 ☐ a uniformity assessment of the system and probes.
Guidance: Uniformity is assessed by scanning a homogenous region of a tissue-mimicking phantom (the region should have a texture similar to liver parenchyma and be free of targets). Each probe should be used to scan across the phantom assessing for image streaking. It is recommended that this assessment be performed by a sonographer to ensure proper imaging technique.

US12.1.4 ☐ an evaluation of geometric accuracy.
Guidance: Geometric accuracy is the comparison of a measured distance to a known distance. This evaluation requires a phantom with test targets (typically filament targets) measured along the vertical and horizontal axis.

US12.1.5 ☐ an assessment of system sensitivity.
Guidance: System sensitivity is the determination of the weakest echo signal detected and clearly displayed. Sensitivity can be expressed as a maximum visualization depth or a quantitative measure of signal-to-noise ratio (SNR). The assessment requires a phantom with test targets of known depths.

US12.1.6 ☐ verification of the spatial and contrast resolution of the system.
Guidance: Spatial and contrast resolution can be assessed using a phantom with targets of differing size and echogenic properties. At a minimum, lateral and axial resolution must be assessed using a phantom and filament targets distributed axially and laterally. To assess contrast resolution, targets with differing echogenic properties must be used.

US12.1.7 ☐ a quantitative assessment of each probe for lens delamination, element damage and cable integrity.
Intent: Research studies have shown that transducer arrays with dead elements can result in increased image noise and inaccurate Doppler flow velocity measurements. Qualitative system tests using tissue-mimicking phantoms may not fully reveal the extent of transducer and cable defects and system self-tests performed by the ultrasound machine do not test the transducer or cable performance. Quantitative assessment of the transducer's lens, matching layer, acoustic array, cable and connector can be performed using a commercially available computerized test device that measures element sensitivity (volts p-p), capacitance (pF), pulse width (ns), center frequency (MHz), and fractional bandwidth (%). The device is used to acceptance test new or recently repaired transducers and also aids in transducer repair or replacement decision making by differentiating between system problems and transducer problems. Identifying transducer defects early helps ensure clinical image quality is optimized and may significantly reduce repair costs.

US12.1.8 ☐ For systems with harmonic imaging, acceptance tests are repeated in both modes.

US12.1.9 ☐ For systems with color, pulsed or Doppler imaging, a qualitative evaluation of these capabilities is performed at acceptance.

ECHOCARDIOGRAPHY STANDARDS

Introduction:
In addition to the Global Modality Accreditation Standards, the modality specific Accreditation Standards for Echocardiography provide additional mandatory requirements and best practices for accreditation in the modality of Echocardiography.

IMAGING PROCEDURES

EC 3.0 Standard protocols result in echocardiograms appropriate for their intended use in clinical decision-making.

EC 3.2 Protocols contain all the information necessary to perform the examination.
Protocol information includes, but is not limited to:

EC3.2.1 **M** ☐ clearly specified measurements and imaging views.

EC 3.3 Examinations are performed following established protocols.

EC3.3.1 **M** ☐ Protocols are readily available to staff performing the examination.

EC3.3.2 **M** ☐ Probes are cleaned and disinfected between patients.
Intent: Probes that only contact intact skin require cleaning and low level disinfection.[20]

EC3.3.3 **M** ☐ TTE probes are covered, whenever appropriate.
Intent: Probes are covered during sterile interventional procedures and for cases with a risk of infection.

EC3.3.5 **M** ☐ There is an established protocol for the use of gel in the performance of the ultrasound examination that minimizes the transmission of pathogens.
Guidance: The protocol must include clear directions on the use, storage and warming of both sterile and non-sterile gels. Health Canada has published Safety Guidelines that should be used to develop the facility's protocol. The Health Canada guidelines can be assessed at: http://www.hc-sc.gc.ca/dhp-mps/medeff/advisories-avis/prof/_2004/ultrasound_nth-ah-eng.php.

EC3.3.7 **M** ☐ There are protocols for the pediatric population, where applicable.

INTRAVASCULAR CONTRAST AGENTS

EC 4.0 Intravascular contrast agents are managed and administered safely and effectively.

EC 4.2 Policies and procedures are in place for the administration of intravenous ultrasonic contrast agents.
Intent: Ultrasonic contrast agents include both agitated saline and commercial available contrast media (e.g. albumin shell microbubbles).

EC4.2.1 **M** ☐ Policies and procedures are in place for technologists who perform venipuncture.

EC4.2.4 **M** ☐ There are dose protocols for adults.

EC4.2.6 **M** ☐ Documented procedures are in place for treating patients with adverse contrast events.
Guidance: After a reaction there is documentation of the effect and treatment, reporting to the appropriate healthcare personnel, counseling about future contrast administration, and flagging of the patient's medical record.

APPROPRIATE PHYSICAL ENVIRONMENT

EC 6.0 The design and layout of the echocardiography service's physical space allows service delivery to be safe, respectful and efficient for patients and staff.

EC 6.1 Transesophageal echocardiography is performed in an environment designed to ensure patient safety.

EC6.1.2 **M** ☐ The room is large enough to accommodate emergency management monitoring equipment.

EC6.1.3 **M** ☐ There is an emergency crash cart immediately accessible. In this context "immediately accessible" refers to the cart reaching the patient within thirty (30) seconds.

EC6.1.4 **M** ☐ An emergency drug tray is available in the room.

The contents of the emergency drug tray include, but are not limited to:

EC6.1.5 **M** ☐ nitroglycerine, in tablet or aerosol spray
EC6.1.6 **M** ☐ epinephrine
EC6.1.7 **M** ☐ atropine
EC6.1.8 **M** ☐ intravenous supplies
EC6.1.9 **M** ☐ parenteral antihistamine
EC6.1.10 **M** ☐ parenteral antiemetic
EC6.1.11 **M** ☐ short-acting bronchodilator (e.g. salbutamol) either in a metered-dose inhaler with a spacer device or as a solution with a nebulizer administration unit, ventolin nebules or as a discus device.

EC 6.2 Stress echocardiography is performed in a safe environment and according to established protocols.

EC6.2.7 **M** ☐ There is an emergency crash cart immediately accessible.
EC6.2.8 **M** ☐ An emergency drug tray is available in the room.

The contents of the emergency drug tray include:

EC6.2.9 **M** ☐ nitroglycerine, in tablet or aerosol spray
EC6.2.10 **M** ☐ epinephrine
EC6.2.11 **M** ☐ atropine
EC6.2.12 **M** ☐ intravenous supplies
EC6.2.13 **M** ☐ parenteral antihistamine
EC6.2.14 **M** ☐ parenteral antiemetic.

EC6.2.15 **M** ☐ short-acting bronchodilator (e.g. salbutamol) either in a metered-dose inhaler with a spacer device or as a solution with a nebulizer administration unit, ventolin nebules or as a discus device.

EC6.12.16 **M** ☐ a beta-blocker (if performing pharmacological stress testing).

EQUIPMENT

EC 11.0 Equipment is safely operated, and maintained and monitored in a manner that ensures performance specifications are met.

EC 11.1 The imaging service ensures that equipment is capable of achieving the desired image quality and complies with the requirements of the examination.

Echocardiography systems are equipped with:

EC11.1.1 **M** ☐ real-time, 2D grey-scale imaging.

EC11.1.2 **M** ☐ M-mode imaging.

EC11.1.3 **M** ☐ color, pulsed, tissue, power and continuous wave Doppler.

EC11.1.4 **M** ☐ harmonic imaging.

EC11.1.5 **M** ☐ a range of transducer frequencies appropriate for the examinations performed.

EC11.1.6 **M** ☐ pediatric TEE transducers are small enough to be used in a safe and prudent manner in infants and children appropriate for their body weight.

EC11.1.7 **M** ☐ dedicated CW Doppler probe.

EC11.1.8 **M** ☐ ECG display capability.

EC 11.2 Echocardiography equipment used for contrast enhanced imaging has the following specifications to ensure diagnostic quality:

EC11.2.1 **M** ☐ the ability to adjust the mechanical index (MI).
Guidance: At a high MI, microbubble contrast agents are susceptible to destruction by insonation. Low MI imaging prolongs the effect of the contrast agent and optimizes the enhancement of the blood-myocardium interface.

ACCEPTANCE TESTING AND QUALITY ASSURANCE

EC 12.0 Equipment testing is performed prior to clinical use.
See also Equipment and Supplies Accreditation Standards DES 2.1.

EC 12.1 Acceptance testing is performed after purchase and prior to clinical use of equipment that includes:

EC12.1.1 **M** ☐ a physical and mechanical inspection of the system and probes.

EC12.1.2 **M** ☐ electrical leakage current testing of probes.

EC12.1.3 ☐ a uniformity assessment of the system and probes.
Guidance: Uniformity is assessed by scanning a homogenous region of a tissue-mimicking phantom (the region should have a texture similar to liver parenchyma and be free of targets). Each probe should be used to scan across the phantom assessing for image streaking. It is recommended that this assessment be performed by a sonographer to ensure proper imaging technique.

EC12.1.4 ☐ an evaluation of geometric accuracy.
Guidance: Geometric accuracy is the comparison of a measured distance to a known distance. This evaluation requires a phantom with test targets (typically filament targets) measured along the vertical and horizontal axis.

EC12.1.5 ☐ an assessment of system sensitivity.
Guidance: System sensitivity is the determination of the weakest echo signal detected and clearly displayed. Sensitivity can be expressed as a maximum visualization depth or a quantitative measure of signal-to-noise ratio (SNR). The assessment requires a phantom with test targets of known depths.

EC12.1.6 ☐ verification of the spatial and contrast resolution of the system.
Guidance: Spatial and contrast resolution can be assessed using a phantom with targets of differing size and echogenic properties. At a minimum, lateral and axial resolution must be assessed using a phantom and filament targets distributed axially and laterally. To assess contrast resolution, targets with differing echogenic properties must be used.

EC12.1.7 ☐ a quantitative assessment of each probe for lens delamination, probe element damage and cable integrity.
Intent: Research studies have shown that transducer arrays with dead elements can result in increased image noise and inaccurate Doppler flow velocity measurements. Qualitative system tests using tissue-mimicking phantoms may not fully reveal the extent of transducer and cable defects and system self-tests performed by the ultrasound machine do not test the transducer or cable performance. Quantitative assessment of the transducer's lens, matching layer, acoustic array, cable and connector can be performed using a commercially available computerized test device that measures element sensitivity (volts p-p), capacitance (pF), pulse width (ns), center frequency (MHz), and fractional bandwidth (%). The device is used to acceptance test new or recently repaired transducers and also aids in transducer repair or replacement decision making by differentiating between system problems and transducer problems. Identifying transducer defects early helps ensure clinical image quality is optimized and may significantly reduce repair costs.

EC12.1.8 ☐ For systems with harmonic imaging, acceptance tests are repeated in both modes.

EC12.1.9 ☐ For systems with color, pulsed or Doppler imaging, a qualitative evaluation of these capabilities is performed at acceptance.

COMPUTED TOMOGRAPHY STANDARDS

Introduction:
In addition to the Global Modality Accreditation Standards, the modality specific Accreditation Standards for Computed Tomography provide additional mandatory requirements and best practices for accreditation in the modality of Computed Tomography.

EXAMINATION REQUEST

CT 1.0 Examination requests are standardized and ensure that accurate, comprehensive and appropriate information is relayed.

CT 1.2 Examination requests contain accurate information that is received prior to an examination being undertaken.
See also Global Modality Accreditation Standards GM1.2.

CT1.2.1 **M** ☐ Outpatient requisitions for intravascular contrast agent examinations indicate recent eGFR for patients with significant renal disease or at least one risk factor.
Guidance: For inpatients, either the requisition or information system indicates the recent eGFR results.

IMAGING PROCEDURES

CT 3.0 Standard protocols result in images appropriate for their intended use in clinical decision-making.

CT 3.2 Protocols contain all the information necessary to perform the examination.
Protocol information includes:

CT3.2.1 **M** ☐ the equipment/supplies needed.
CT3.2.2 **M** ☐ a description of patient positioning.
CT3.2.3 **M** ☐ the technical parameters used.
CT3.2.4 **M** ☐ the type and dose of contrast agents administered.

CT 3.3 Examinations are performed following established protocols.

CT3.3.1 **M** ☐ Protocols are readily available to staff performing the examination.
CT3.3.2 **M** ☐ Protocols are equipment specific.
CT3.3.3 **M** ☐ Protocols are preprogrammed in the scanner with lowest clinically acceptable patient dose.
CT3.3.4 **M** ☐ There are protocols for the pediatric population.
Intent: CT examinations of infants and children are only performed using techniques and loading factors which have been modified for size and age.[21]

ACCEPTANCE TESTING AND QUALITY ASSURANCE

CT 12.0 Equipment testing is performed prior to clinical use.
Note: See also Equipment and Supplies Accreditation Standards DES2.1.

CT 12.1 Acceptance testing is performed after purchase and prior to clinical use of the equipment.

Acceptance testing includes visual and functional testing of the:

CT12.1.1 **M** ☐ mechanical properties.
CT12.1.2 **M** ☐ safety systems.

Testing includes evaluation of the:

CT12.1.3 **M** ☐ accuracy of loading factors.
Intent: Health Canada Safety Code 35 has not required testing of the KVP accuracy and current time product however; this must be assessed at acceptance testing and is also strongly recommended to be assessed annually.
CT12.1.4 **M** ☐ CT number accuracy.
CT12.1.5 **M** ☐ noise.
CT12.1.6 **M** ☐ uniformity.
CT12.1.7 **M** ☐ CT number calibration.
CT12.1.8 **M** ☐ CT number linearity.
CT12.1.9 **M** ☐ tomographic section thickness.
CT12.1.10 **M** ☐ patient support movement.
CT12.1.11 **M** ☐ laser light accuracy.
CT12.1.12 **M** ☐ accuracy of automatic positioning of tomographic plane.
CT12.1.13 **M** ☐ accuracy of gantry tilt.
CT12.1.14 **M** ☐ spatial resolution.
CT12.1.15 **M** ☐ low contrast detectability.
CT12.1.16 **M** ☐ number dependence on phantom position.
CT12.1.17 **M** ☐ radiation dose profile.
CT12.1.18 **M** ☐ radiation dose.
Guidance: The dose delivered from a scout localization image, which is a scanned projection radiograph.
CT12.1.19 **M** ☐ CT dose index.
Guidance: Establish a baseline Computed Tomography Dose Index (CTDI).

MAGNETIC RESONANCE IMAGING STANDARDS

Introduction:
In addition to the Global Modality Accreditation Standards, the modality specific Accreditation Standards for Magnetic Resonance Imaging provide additional mandatory requirements and best practices for accreditation in the modality of Magnetic Resonance Imaging.

IMAGING PROCEDURES

MR 3.0 Standard protocols result in images appropriate for their intended use in clinical decision-making.

MR 3.2 Protocols contain all the information necessary to perform the examination.
Protocol information includes, but is not limited to:

MR3.2.1 **M** ☐ the equipment/supplies needed.
MR3.2.2 **M** ☐ a description of patient positioning.
MR3.2.3 **M** ☐ the technical parameters used.
MR3.2.4 **M** ☐ the type and dose of contrast agents administered.
Intent: Gadolinium-containing contrast media selection should consider the relationship in respect to risk of nephrogenic systemic fibrosis. See also Global Modality Accreditation Standard GM 4.5.5.
MR3.2.5 **M** ☐ when guidance and/or review by a radiologist are required prior to patient discharge (e.g. suspected cord compression, cases involving moderate sedation or general anesthesia, etc.).
Intent: There is always the provision for the imaging protocol to require prompt MRI radiologist review of the images before patient discharge (e.g. where it is unclear from the initial request whether additional pulse sequences, or contrast administration will be required).

MR 3.3 Examinations are performed following established protocols.
MR3.3.1 **M** ☐ Protocols are readily available to staff performing the examination.
MR3.3.3 **M** ☐ Protocols are equipment specific.
Guidance: Due to differences in scanner design and functionality, imaging protocols are developed for each scanner.

ACCEPTANCE TESTING AND QUALITY ASSURANCE

MR 12.0 Equipment testing is performed prior to clinical use.

MR 12.1 Acceptance testing is performed by a medical physicist after purchase and prior to clinical use of the MRI system.

MR12.1.1 **M** ☐ Acceptance testing procedures include an assessment and identification of the fringe fields.
Intent: At a minimum the 5 gauss line is defined. Additional fringe fields may be required depending on the conditional equipment used by the imaging service.

MR12.1.2 **M** ☐ Acceptance testing procedures include an assessment of magnetic field homogeneity.

MR12.1.3 **M** ☐ Acceptance testing procedures include an assessment of RF shield integrity and ambient RF noise.

MR12.1.4 **M** ☐ Acceptance testing procedures include an assessment of MR spectroscopy using a Braino Phantom or equivalent.

MR12.1.5 **M** ☐ Acceptance testing procedures include an assessment of the system signal to noise ratio using the manufacturer's recommended settings.

MR12.1.6 **M** ☐ Acceptance testing procedures include an assessment of signal uniformity of the body coil.

MR12.1.7 **M** ☐ Acceptance testing procedures include an assessment of geometrical distortion.

MR12.1.8 **M** ☐ Acceptance testing procedures include an assessment of geometric and positioning accuracy and gradient performance in all dimensions.

MR12.1.9 ☐ Acceptance testing procedures include a measurement of high contrast spatial resolution.
Guidance: An ACR phantom is required to perform this measurement.

MR12.1.10 **M** ☐ Acceptance testing procedures include an assessment of image quality and image artifacts.

MR12.1.11 **M** ☐ Acceptance testing procedures include a check of table positioning accuracy.

MR12.1.12 **M** ☐ Acceptance testing procedures include an assessment of each coil and establishment of baseline performance.

MR12.1.13 **M** ☐ Acceptance testing procedures include an assessment of acoustic noise in and outside the magnet room.

MR12.1.14 **M** ☐ Acceptance testing procedures include an assessment of MRI signal stability.

MAGNETIC SAFETY STANDARDS

Introduction:
These standards have been adapted from the American College of Radiology, ACR Guidance Document for Safe MR Practices, 2013. These standards pertain to all types of scanners and all field strengths (low to high) approved for clinical practice by Health Canada.

The goal of magnetic safety is to prevent harm to patients. However, a MRI facility cannot simply adopt one or two interventions and hope to successfully attain this objective. According to safety and human factors engineering principles, multiple safety strategies must be adopted to be effective. As an example, policies that restrict access, specialized training and drills for MRI personnel, and warning labels for devices to be brought into Zone IV regions. Proper resources and professional discipline to never assume safety of an object in the MRI suite is crucial. Along with these people-oriented strategies of policies and training, facilities need also to adopt the strategies of safety-oriented architectural and interior design. These design elements can support the other safety strategies by making them easier or more obvious to follow.

FACILITY DESIGN AND ACCESS RESTRICTIONS

MRS 1.0 The design of the facility and access restrictions minimize the potential hazards and risks associated with the magnetic field.

MRS 1.1 Individuals knowledgeable in MRI safety are involved in planning and review of facility design plans for a new MRI installation.
Intent: There are many issues that impact MRI safety that are considered during facility planning for a given MRI installation including , but not limited to; cryogen emergency vent locations and pathways; 5-gauss lines; siting considerations; patient access pathways; etc. These issues and many others are reviewed with those individuals experienced in MRI facility planning and familiar with patient safety and patient flow considerations prior to committing to construction of a specific facility design. Enlisting the assistance of an architectural firm experienced in this area, and doing so early in the design stages of the planning process, may prove most valuable. Facility plans which incorporate the ACR 4 Zone Configuration with particular attention to all Zone III access restrictions will prevent harm to patients, staff and visitors.

MRS1.1.1 **M** ☐ Any **new facility** has incorporated the ACR 4 Zone Configuration into their design plans.
Intent: Of particular importance is ensuring Zone III regions are physically restricted from general public access by, for example; key locks, passkey locking systems or any other reliable, physically-restricting method.

MRS1.1.2 ☐ New facilities clearly mark Zone IV with a red lighted sign stating “The Magnet is On”.
Guidance: Except for resistive systems, the signage is illuminated at all times and includes a battery back-up energy source to continue illumination in the event of a loss of power to the facility.

MRS1.1.3 ☐ All magnet rooms/Zone IV regions include an emergency exhaust pathway in case of cryogen vent system failure or cryogen gas leak.

Guidance: The emergency exhaust grill should be positioned in the ceiling opposite the entrance to the magnet so that the exhaust fan draws the cryogenic gas away from the exit.

MRS 1.2 Access restrictions ensure the safety of patients and all individuals who enter the MRI facility.

MRS1.2.1 **M** ☐ All access to Zone III is restricted, including access to regions within it (including Zone IV) are controlled by, and entirely under the supervision of, MRI personnel.
Intent: Specifically identified MRI personnel are to be charged with ensuring that this MRI safe practice guideline is strictly adhered to for the safety of the patients and other non-MRI personnel, the health care personnel, and the equipment itself. Non-MRI personnel are not provided with independent Zone III access until such time as they undergo the proper education and training.

MRS1.2.2 **M** ☐ Zone III regions are physically restricted from general public access by, for example, key locks, passkey locking systems, or any other reliable, physically restricting method.

MRS1.2.3 **M** ☐ Access controls are in place for all non-MRI personnel (e.g. medical staff who occasionally work in MRI, housekeeping staff, facility maintenance, repair personnel, security staff, etc. and non-MRI personnel called to the facility in the event of an emergency).

MRS1.2.4 **M** ☐ Only MRI personnel shall be provided free access, such as the access keys or passkeys, to Zone III.

MRS1.2.5 **M** ☐ Zone III, or at the very least the area within it wherein the static magnetic field strength exceeds 5 gauss, is clearly demarcated and labeled with prominently displayed danger signs to make all individuals and patients aware of the risks associated with the MRI system.
Intent: Based on the design and layout of the facility, danger signs are visible prior to entering Zone IV. Because magnetic fields are three-dimensional volumes, Zone III controlled access areas may project through floors and ceilings of MRI facilities, imposing magnetic field hazards on persons on floors other than that of the MRI scanner. Zones of magnetic field hazard (above 5 gauss) are clearly delineated, even in typically non-occupied areas such as rooftops or storage rooms, and access to these Zone III areas are similarly restricted from non-MRI personnel as they would be inside any other Zone III region associated with the MRI facility.

MRS1.2.6 ☐ As part of the Zone IV site restriction, all MRI installations provide direct visual observation by level 2 personnel to access pathways into Zone IV.
Guidance: The MRI technologists are able to directly observe and control, via line of sight or via video monitors, the entrances or access corridors to Zone IV from their normal positions when stationed at their desks in the scan control room.

MRS1.2.7 **M** ☐ Fringe fields are established.
Intent: The 5 gauss line is used to define the margins for pacemaker safety.

MRS1.2.8 **M** ☐ There is a predetermined magnetically safe location where full resuscitative efforts are to be performed.
Intent: Because of risks associated with contrast agents, sedation, and anesthesia, each facility has the appropriate provisions for stabilization and resuscitation of

patients. This predetermined location is preferably outside of Zone III. If the resuscitation area is within Zone III, it is well separated from the entrance to Zone IV.

MRS1.2.9 **M** ☐ There is a separate storage area for ferromagnetic equipment and supplies (e.g. patient's wheelchairs, portable oxygen, etc.).
Guidance: Unsafe appliances brought by the patient are secured in a "ferrous quarantine" storage area, distinct from the storage areas for MR safe and MR conditional equipment and located as far from zone III as possible to ensure they are not inadvertently brought into the MRI room.

MRS1.2.10 **M** ☐ The MRI scan room door is locked during non-operational hours and is not left open except during patient entry and exit.

SAFETY-SCREENING

MRS 2.0 The establishment of thorough and effective safety-screening guards the safety of all those preparing to enter Zone III.

MRS 2.1 Screening procedures are strictly enforced to ensure safety to all individuals who enter the MRI facility.
Intent: The screening process and screening forms for patients, non-MRI personnel, and MRI personnel should be identical. Specifically, one should assume that non-MRI personnel, health care practitioners, or MRI personnel may enter the bore of the MRI scanner during the MRI imaging process. Non-emergent patients are MRI safety–screened on site by a minimum of two separate individuals. At least one of these individuals is level 2 MRI personnel. At least one of these two screenings is performed verbally or interactively. Emergent patients and their accompanying non-MRI personnel may be screened only once, providing the screening individual is level 2 MRI personnel. Patient weight is verified as this is necessary for both SAR limits and for determining gadolinium injection dose.

MRS2.1.2 **M** ☐ There are documented screening procedures in place for all individuals who enter the MRI environment.

The screening procedures take into consideration the following:

MRS2.1.3 **M** ☐ a multi-tiered (duplicate) approach.
MRS2.1.4 **M** ☐ conscious patients.
MRS2.1.5 **M** ☐ unconscious patients.
MRS2.1.6 **M** ☐ supporting individuals.
MRS2.1.7 **M** ☐ clients and staff.

MRS2.1.9 **M** ☐ There is a process in place to review previous or to request pre-MRI imaging to rule-out metallic or other implanted objects that may be contraindicated in an MRI scan.

MRS 2.2 Standardized and detailed screening forms include questions on MRI hazards and contraindications including, but not limited to:
Note: Examples of screening forms are available on www.mrisafety.com[22]

MRS2.2.1 **M** ☐ pacemakers.

MRS2.2.2 **M** ☐ aneurysm clips.
MRS2.2.3 **M** ☐ metallic and/or electronic implants.
MRS2.2.4 **M** ☐ metallic foreign bodies.
MRS2.2.5 **M** ☐ pregnancy status.
Intent: There is no scientific basis to believe that an MRI examination is hazardous to a pregnant woman; however, in view of the relatively limited experience with this clinical diagnostic modality, an individual assessment is made for each pregnant patient.
MRS2.2.6 **M** ☐ allergies and conditions that require an assessment prior to contrast use (e.g. history/risk factors of kidney disease or dialysis, previous MRI contrast agent allergic reaction, etc.).

MRS 2.3 Device and object screening is an effective component of MRI safety.

MRS2.3.1 **M** ☐ All facilities have ready access to a strong handheld magnet (≥ 1000 gauss) or ferromagnetic detection system to supplement the thorough screening practice of the service.
Guidance: Conventional metal detectors are not permitted as they may not be able to differentiate between ferrous and non-ferromagnetic materials nor are they able to detect small, potentially dangerous metal fragments in or on the patient.
MRS2.3.2 **M** ☐ Handheld magnets are stored securely outside of Zone III.
MRS2.3.4 **M** ☐ There is a current MRI safety reference used as a guide in determining the MRI safety of certain implanted metallic or electronic devices and/or foreign objects.
Guidance: The service must either have the most current Reference Manual for Magnetic Resonance Safety, Implants and Devices or internet access to www.mrisafety.com.

MRS 3.0 Safety precautions prevent accidents and injuries in the MRI environment.

MRS 3.1 All ancillary equipment intended to be taken into the MRI scan room is clearly identified.
Intent: Particularly with regard to non-clinical and incidental equipment, current products marketed with ill-defined terminology such as "non-magnetic," or outdated classifications such as "MRI-compatible," are not to be presumed MR safe. Similarly, any product marketed as "MR safe" but with metallic construction or components are to be treated with suspicion. Objects intended for use in Zone IV, including non-clinical incidental products such as stepping stools or ladders, which are not provided with manufacturer or third-party MRI safety test results under the new ASTM criteria, are facility tested.
MRS3.1.1 **M** ☐ The ancillary equipment intended to be taken into the scan room has clear and appropriate MR safe or MR conditional safety labels.
Intent: No equipment or devices are brought into the MRI environment unless it is proven to be MR safe or MR conditional. The safety of "MR conditional" items is verified with the specific scanner and MRI environment in which they will be used.
MRS3.1.2 **M** ☐ All equipment used for sedation and monitoring, resuscitation, and anesthesia and monitoring is MR safe or MR conditional, operational and readily available.

MRS3.1.3 **M** ☐ Floor markings indicate the safe location of the MR conditional equipment.
Guidance: For example, physiological monitoring device performance and safety may be impacted if they are too close to the magnet.

MRS3.1.5 **M** ☐ There is a clearly marked, readily accessible MR conditional or MR safe fire extinguisher physically stored in Zone III or Zone IV.

MRS3.1.6 **M** ☐ All conventional fire extinguishers not tested and verified MR safe or conditional are restricted from Zone III.

MRS 3.2 Patient safety is monitored before, during and after a MRI examination.

MRS3.2.2 **M** ☐ There is appropriate operating console ergonomics so the technologist has a direct view of the patient down the bore of the magnet.

MRS3.2.3 **M** ☐ Mechanisms are in place to ensure patient communication during the examination.

MRS3.2.4 **M** ☐ For superconducting systems, adequate hearing protection is provided to all individuals remaining in the scan room during the examination.

MRS3.2.6 **M** ☐ The MRI system consists of either a detachable MRI transport table or chair or a table top with trolley device or MRI compatible transfer device for the purpose of emergency egress from the scan room.

MRS 3.3 Equipment is safety monitored and maintained.

MRS3.3.1 **M** ☐ The MRI system produces a warning and abort scan when RF power deposition limits are exceeded.

MRS3.3.2 **M** ☐ There is adequate ventilation in the equipment (e.g. gradient and RF amplifier) and cryogen storage room.

MRS3.3.4 **M** ☐ Helium dewar storage in patient areas is prohibited and when stored in staff areas is not left unattended for an extended length of time.

SAFETY EDUCATION

MRS 4.0 The MRI service has a comprehensive magnetic safety program.

MRS 4.1 There is an MRI safety manual with policies and procedures that includes:

MRS4.1.1 **M** ☐ responding to a fire alarm and fire within the scan room when staff is either present or absent in the service.

Evacuation quench provisions for superconductive magnets include:

MRS4.1.2 **M** ☐ a clearly marked quench-activation device.

MRS4.1.3 **M** ☐ evacuation procedures for patients and staff.

MRS4.1.4 **M** ☐ a fail-safe ventilation path for quenched helium.

MRS4.1.5 **M** ☐ a protocol for managing the worst case scenario quench (e.g. gaseous helium does not vent out of the scan room and displaces oxygen).
Guidance: The protocol includes the methods for the rescue of patients and staff in the above mentioned worst case scenario quench. Care is necessary to ensure it is safe to enter the room to rescue a patient.

MRS 4.2 Ongoing safety education is provided to MRI personnel.

MRS4.2.1 **M** ☐ There is a designated MRI safety officer.
Intent: Until a training course for Magnetic Safety Officers is readily available in B.C. the qualifications for a Magnetic Safety Officer will be established based on the individual's knowledge of the work, hazards, and the control measures associated with magnetic fields necessary to perform the duties of the Safety Officer.

MRS4.2.2 **M** ☐ All individuals working within at least Zone III have documentation verifying successful completion of at least one of the MRI safety live lectures or prerecorded presentations approved by the MRI medical leader. Attendance is repeated at least annually, and appropriate documentation is provided to confirm these ongoing educational efforts.

MRS 4.3 Education is provided to non-MRI personnel who may come in contact with the magnet.

Intent: For the safety of firefighters and other emergent services responding to an emergent call at the MRI facility, it is recommended that all fire alarms or other emergent service response calls originating from or located in the MRI facility are forwarded simultaneously to a specifically designated individual from among the facility's MRI personnel. This individual, if possible, is on- site prior to the arrival of the firefighters or emergent responders to ensure that they do not have free access to Zone III or Zone IV. The facility might consider assigning appropriately trained security personnel, who have been trained and designated as MRI personnel, to respond to such calls. In any case, all MRI facilities arrange to prospectively educate their local fire marshals, firefighters' associations, and police or security personnel about the potential hazards of responding to emergencies in the MRI suite. It is stressed that even in the presence of a true fire (or other emergency) in Zone III or Zone IV; the magnetic fields may be present and fully operational. Therefore, free access to Zone III or Zone IV by firefighters or other non-MRI personnel with air tanks, axes, crowbars, other firefighting equipment, guns, etc., might prove catastrophic. See also Magnetic Safety Accreditation Standard MRS 1.2.3.

Education is provided to:

MRS4.3.1 **M** ☐ housekeeping staff.
Guidance: Housekeeping staff only enter Zone IV when no patient is in the MRI room and when level 2 personnel are in the facility to supervise.

MRS4.3.2 **M** ☐ municipal emergency response staff.
Guidance: The MRI safety officer is to make arrangements with the fire fighter educator to ensure MRI safety is included in the orientation of new staff and as part of their periodic training schedule.

MRS4.3.3 **M** ☐ security staff.
Guidance: Security staff only enter Zone IV when level 2 personnel are in the facility to supervise.

NUCLEAR MEDICINE STANDARDS

Introduction:
In addition to the Global Modality Accreditation Standards, the modality specific Accreditation Standards for Nuclear Medicine provide additional mandatory requirements and best practices for accreditation in the modality of Nuclear Medicine.

IMAGING PROCEDURES

NM 3.0 Standard protocols result in examinations appropriate for their intended use in clinical decision-making.

NM 3.2 Protocols include all the information necessary to perform the examination.
Protocol information includes:

NM3.2.1 **M** ☐ the equipment/supplies needed.

NM3.2.2 **M** ☐ a description of patient positioning (e.g. supine, prone, posterior, anterior, head in, head out, arms up, arms down, etc.)

NM3.2.3 **M** ☐ technical parameters.
Guidance: The protocols are to include technical parameters such as camera setup (e.g. collimator, zoom, orbit and orbit type, gating, etc.) and computer acquisition instructions (e.g. views, timing of views, timing/counts per view and attenuation correction if used.)[23]

NM 3.3 Examinations are performed following established protocols.

NM3.3.1 **M** ☐ Protocols are readily available to staff performing the examination.

NM3.3.2 **M** ☐ Protocols are equipment specific.

NM 3.4 There are established protocols in place for the preparation and administration of radiopharmaceuticals.

NM3.4.1 **M** ☐ Written protocols for the preparation and administration of radiopharmaceuticals are readily available.

NM 3.5 There are established protocols in place for the preparation and administration of pharmacologic agents.

NM3.5.1 **M** ☐ Policies and procedures are in place for technologists who administer pharmacologic agents.
Guidance: See also Medical Staff Accreditation Standards DMS 4.0 regarding delegation of medical acts.

NM3.5.2 **M** ☐ Written protocols for the preparation and administration of pharmacologic agents are readily available.

APPROPRIATE PHYSICAL ENVIRONMENT

NM 6.0 The design and layout of the nuclear medicine service's physical space allows service delivery to be safe for patients and staff.

NM 6.1 Nuclear medicine procedures are performed in an environment designed to ensure patient safety.

NM6.1.1 **M** ☐ Therapeutic procedures are performed in locations with consideration for radiation safety precautions.

Appropriate space is available for the following functions:

NM6.1.2 ☐ "Hot" and "Cold" patient waiting areas.
NM6.1.3 **M** ☐ "Hot" and "Cold" patient washrooms.
NM6.1.4 **M** ☐ radiopharmaceutical preparation.
NM6.1.5 **M** ☐ cell labeling.
NM6.1.6 ☐ administration of radiopharmaceuticals (e.g. injection).

NM 6.2 Exercise and/or pharmacologic stress testing is performed in a safe environment and according to established protocols.

NM6.2.6 ☐ There is adequate space to facilitate the stress testing equipment.
NM6.2.7 **M** ☐ There is an emergency crash cart immediately accessible.
NM6.2.8 **M** ☐ An emergency drug tray is available in the room.

The contents of the emergency drug tray include:

NM6.2.9 **M** ☐ nitroglycerine, in tablet or aerosol spray.
NM6.2.10 **M** ☐ epinephrine.
NM6.2.11 **M** ☐ atropine.
NM6.2.12 **M** ☐ intravenous supplies.
NM6.2.13 **M** ☐ parenteral antihistamine.
NM6.2.14 **M** ☐ parenteral antiemetic.
NM6.2.15 **M** ☐ short-acting bronchodilator (e.g. salbutamol) either in a metered-dose inhaler with a spacer device or as a solution with a nebulizer administration unit, ventolin nebules or as a discus device.
NM6.2.16 **M** ☐ a beta-blocker (if performing pharmacological stress testing).

ACCEPTANCE TESTING AND QUALITY ASSURANCE

NM 12.0 Equipment testing is performed prior to clinical use.
See also Equipment and Supplies Accreditation Standards DES 2.1.

NM 12.1 Acceptance testing is performed by a medical physicist after purchase and prior to clinical use of gamma camera systems.
Acceptance testing includes an assessment of:

NM12.1.1 **M** ☐ multiple-window registration.
NM12.1.2 **M** ☐ maximum count rate.
NM12.1.3 **M** ☐ 20% loss count rate.
NM12.1.4 **M** ☐ system sensitivity for each collimator.
NM12.1.5 **M** ☐ pixel size calibration.
NM12.1.6 **M** ☐ camera performance at high count rate.
NM12.1.7 **M** ☐ center of rotation verification for all camera head configurations and collimator sets used clinically.
Guidance: Center of rotation protocol is to be performed according to manufacturer protocol.
NM12.1.8 **M** ☐ intrinsic and extrinsic spatial resolution.
Guidance: A slit phantom (or equivalent) is used to assess the intrinsic and extrinsic (with collimators) spatial resolution.
NM12.1.9 **M** ☐ tomographic uniformity reconstruction.
NM12.1.10 **M** ☐ extrinsic uniformity.
Guidance: An extrinsic (with collimators) uniformity flood is to be acquired for 30 million counts on all collimators routinely used to verify collimator integrity.
NM12.1.11 **M** ☐ high count intrinsic uniformity, according to manufacturer's recommendations.
Guidance: Using a point source of ^{99m}Tc, acquire a 30 million count flood; compare values to manufacturer's values.
NM12.1.12 **M** ☐ uniformity for radionuclides other than ^{99m}Tc, according to manufacturer's recommendations.
Guidance: An intrinsic (without collimators) uniformity flood is to be acquired for 5-10 million counts for other radionuclides routinely used.
NM12.1.13 **M** ☐ a Jaszczak or equivalent phantom reconstruction.[24]
Guidance: An equivalent phantom is defined as a phantom recommended by the manufacturer, recognized by a national or international body (e.g. ACR, IAEA), or fabricated specifically for the gamma camera system and validated by a medical physicist.
NM12.1.14 **M** ☐ tomographic resolution.
Guidance: Perform a SPECT of capillary tubes to assess tomographic resolution.
NM12.1.15 **M** ☐ energy resolution.
Guidance: Use the manufacturer's algorithm.

NM 12.2 Acceptance testing is performed after purchase and prior to clinical use of <u>well counter systems.</u>

Acceptance testing of well counter systems includes an assessment of:

NM12.2.1 **M** ☐ crystal energy resolution.
NM12.2.2 **M** ☐ linear geometry and sensitivity.
NM12.2.3 **M** ☐ minimum/maximum detectable levels.
NM12.2.4 **M** ☐ counting efficiency.
NM12.2.5 **M** ☐ radionuclide window settings.

Acceptance testing of well counter systems includes:

NM12.2.6 **M** ☐ a calibration using a reference standard.
NM12.2.7 **M** ☐ a chi-square reproducibility test.
NM12.2.8 **M** ☐ a normalization for multi-well systems.

NM 12.3 Acceptance testing is performed after purchase and prior to clinical use of <u>uptake probe systems.</u>

Acceptance testing of uptake probe systems includes an assessment of:

NM12.3.1 **M** ☐ crystal energy resolution.
NM12.3.2 ☐ minimum/maximum detectable levels.
NM12.3.3 **M** ☐ counting efficiency.
NM12.3.4 **M** ☐ radionuclide window settings.

Acceptance testing of uptake probe systems includes:

NM12.3.5 **M** ☐ a calibration using a reference standard.
NM12.3.6 **M** ☐ a chi-square reproducibility test.

NM 12.4 Acceptance testing is performed after purchase and prior to clinical use of <u>dose calibrator systems.</u>

Acceptance testing of a dose calibrator system includes:

NM12.4.1 **M** ☐ a geometrical sensitivity assessment.
NM12.4.2 **M** ☐ a constancy assessment.
NM12.4.3 **M** ☐ a linearity assessment.
NM12.4.4 **M** ☐ an accuracy assessment.

NM 12.5 Acceptance testing is performed after purchase and prior to clinical use of <u>SPECT/CT hybrid systems</u>.

NM12.5.1 **M** ☐ For all SPECT/CT hybrid systems, the radiation levels are monitored at critical areas in the imaging room (e.g. bedside, doorway, workstation, etc.).
NM12.5.2 **M** ☐ For SPECT/CT hybrid systems performing independent diagnostic CT, acceptance testing is performed according to CT 12.1 (CT12.1.1 – CT12.1.19).

NUCLEAR MEDICINE RADIATION SAFETY STANDARDS

MINIMIZING RADIATION EXPOSURE TO STAFF AND VISITORS

NMRS 1.0 Appropriate measures are in place to prevent unnecessary radiation exposure to staff and visitors.

NMRS 1.1 Imaging staff is aware of the risks of ionizing radiation and manage the risks appropriately.

NMRS1.1.1 **M** ☐ The nuclear medicine service has a radiation safety officer responsible for overseeing radiation protection.

NMRS1.1.2 **M** ☐ There are documented policies and procedures for radiation safety and for handling radioactive materials.
Guidance: A radiation safety manual is available in either hard copy or electronic format.

NMRS1.1.3 **M** ☐ Policies and procedures are in place to protect pregnant staff.[25]

NMRS 1.2 Radiation exposures to staff members are monitored through the use of personal dosimeters.

NMRS1.2.1 **M** ☐ All nuclear medicine staff, together with personnel (e.g. nurses) who routinely participate in radiation procedures, and others, likely to receive a radiation dose in excess of the action level specified by radiation protection guidelines are declared radiation workers and their radiation exposures are monitored with the use of a personal dosimeter.

NMRS 1.3 Radiation warning signage is clearly visible to alert patients, staff and visitors of the risks associated with radiation.

NMRS1.3.1 **M** ☐ Radiation warning labels and emergency contact information is posted at the entrance of each room that may contain a source of ionizing radiation.
Guidance: Refer to the Government of Canada – Nuclear Substances and Radiation Devices Regulations "posting of signage" requirements accessible at http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-207/page-8.html?texthighlight=section+23#s-23.

NMRS1.3.2 **M** ☐ Access control signs (e.g. authorized personnel only) are posted in the areas where radioactive materials are stored and handled.

MINIMIZING RADIATION EXPOSURE TO PATIENTS

NMRS 2.1 Mechanisms are in place to prevent unnecessary radiation to patients.

NMRS2.1.1 **M** ☐ There is signage posted, at a minimum, in the reception and patient changing/waiting areas that is clearly visible to alert women who may be pregnant to notify the technologist.

NMRS 2.2 **Procedures are in place to protect female patients of childbearing age.**

NMRS2.2.2 **M** ☐ If an examination is requested on a pregnant or potentially pregnant patient, there are documented procedures on how to proceed with the examination request.

MANAGING RADIOACTIVE MATERIALS

NMRS 3.0 **Radioactive materials are safely managed.**

NMRS 3.1 **Radiation safety is ensured when staff members handle radioactive materials.**

NMRS3.1.1 **M** ☐ The nuclear medicine service operates in compliance with the Canadian Nuclear Safety Commission (CNSC) regulations for medical diagnostic and/or therapeutic use of radioisotopes.
Guidance: Compliance includes but is not limited to a current CNSC license and the storage, handling, disposal of radioactive material, etc.

Protection is made available for the handling of radioactive materials by staff that includes:

NMRS3.1.2 **M** ☐ lead aprons and tongs.
Guidance: The facility may also provide free standing lead barriers as a means for personal protection.

NMRS3.1.3 **M** ☐ lead glass dose drawing station.

NMRS3.1.4 **M** ☐ lead syringe shields.

NMRS3.1.5 **M** ☐ lead bricks for the radiopharmaceutical lab.

NMRS 3.2 **Radioactive materials are safely and securely stored.**

NMRS3.2.3 **M** ☐ Radioactive material storage and decay areas are locked when not under the supervision of nuclear medicine personnel.

NMRS3.2.4 **M** ☐ There is a protocol for reporting the theft or loss of radioactive materials based on types and amounts of materials and any risk to the public.

NMRS 3.3 **Transportation of radioactive and hazardous materials complies with federal regulations.**[26]

NMRS3.3.1 **M** ☐ A nuclear medicine service that ships or receives biohazardous or radioactive materials has staff certified in the Transportation of Dangerous Goods (TDG).

NMRS3.3.2 **M** ☐ Shipping and receiving is handled or directly supervised by a person having obtained TDG certification.

BONE DENSITOMETRY STANDARDS

Introduction:
In addition to the Global Modality Accreditation Standards, the modality specific Accreditation Standards for Bone Densitometry provide additional mandatory requirements and best practices for accreditation in the modality of Bone Densitometry.

IMAGING PROCEDURES

BD 3.0 Standard protocols result in examinations appropriate for their intended use in clinical decision-making.

BD 3.2 Protocols contain all the information necessary to perform the examination.
Protocol information includes, but is not limited to:

BD3.2.1 **M** ☐ the equipment/supplies needed.
BD3.2.2 **M** ☐ a description of patient positioning.
BD3.2.3 **M** ☐ detailed instructions for acquiring and processing examinations.
Guidance: The protocols are to include parameters such as region of interest, bone tracing, rejection criteria, additional sites as required, and scan speed.

BD 3.3 Examinations are performed following established protocols.

BD3.3.1 **M** ☐ Protocols are readily available to staff performing the examination.
BD3.3.2 **M** ☐ Protocols are in place for the measurement of all skeletal sites used to determine BMD.
BD3.3.3 **M** ☐ Pediatric protocols are documented and available to staff.
BD3.3.4 **M** ☐ There is a consistent and accurate procedure to determine the patient's height and weight.
Guidance: Height is evaluated to determine possible vertebral compression fractures over the interval between examinations. Weight is evaluated to ensure that significant weight gain or loss is commented upon as a potential artifact and to ensure that the manufacturer's table limit is not exceeded.

EQUIPMENT

BD 11.0 Equipment is safely operated, and maintained and monitored in a manner that ensures performance specifications are met.

BD 11.1 The imaging service ensures that equipment is capable of achieving the desired image quality and complies with the requirements of the examination.

BD11.1.1 **M** ☐ The service has a height measuring device to accurately measure patient height.
Guidance: It is strongly recommended that the imaging service use a stadiometer for obtaining height measurements.
BD11.1.2 **M** ☐ The service has a device to measure patient weight to the nearest 0.1kg.

ACCEPTANCE TESTING AND QUALITY ASSURANCE

BD 12.0 Equipment acceptance testing is performed prior to clinical use.
See also Equipment and Supplies Accreditation Standards DES2.1.

BD 12.1 Acceptance testing is performed after purchase and prior to clinical use of equipment.
Acceptance testing includes visual and functional testing of the:

BD12.1.1 **M** ☐ mechanical properties.
BD12.1.2 **M** ☐ safety systems.

Testing includes an evaluation of the:

BD12.1.3 **M** ☐ radiation scatter.
BD12.1.4 ☐ radiation dose.
BD12.1.5 **M** ☐ baseline BMD values and quality control thresholds using phantom scans.

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