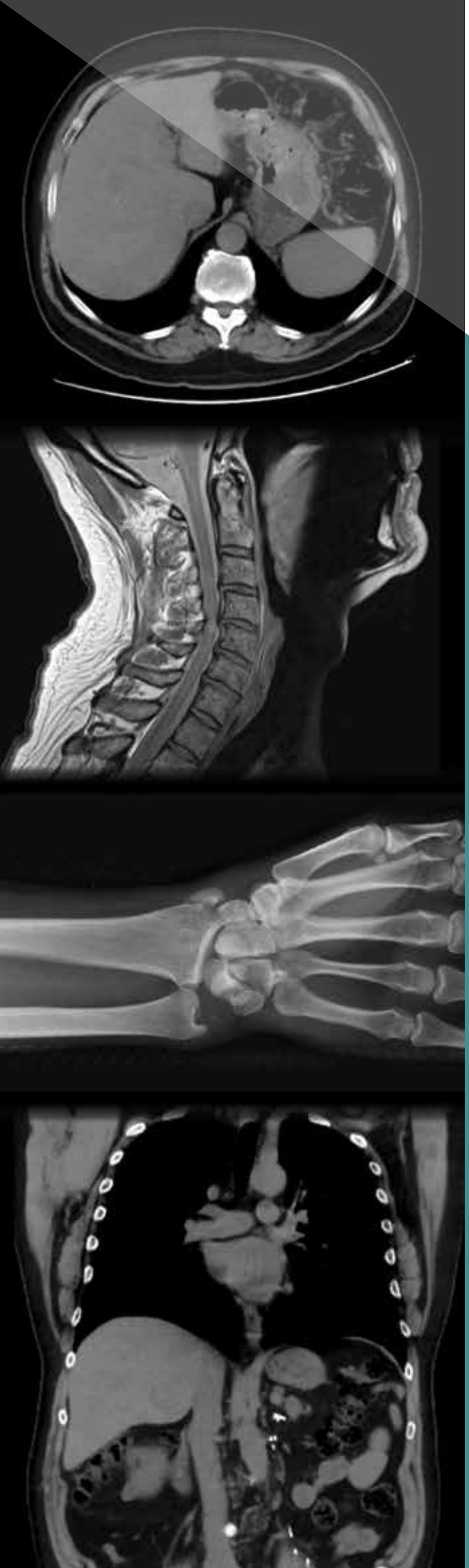

The Royal Australian
and New Zealand
College of Radiologists®

The Faculty of Clinical Radiology

STANDARDS OF PRACTICE

for Diagnostic and Interventional Radiology

Version 10.2 - 2017

Standards of Practice for Diagnostic and Interventional Radiology

Version 10.2

Faculty of Clinical Radiology

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ABOUT THE COLLEGE

The Royal Australian and New Zealand College of Radiologists (RANZCR) is a not-for-profit association of members who deliver skills, knowledge, insight, time and commitments to promote the science and practice of the medical specialties of clinical radiology (diagnostic and interventional) and radiation oncology in Australia and New Zealand.

The Faculty of Clinical Radiology, RANZCR, is the peak bi-national body for setting, promoting and continuously improving the standards of training and practice in diagnostic and interventional radiology for the betterment of the people of Australia and New Zealand.

Our Vision

RANZCR as the peak group driving best practice in clinical radiology and radiation oncology for the benefit of our patients.

Our Mission

To drive the appropriate, proper and safe use of radiological and radiation oncological medical services for optimum health outcomes by leading, training and sustaining our professionals.

Our Values

Commitment to Best Practice

Exemplified through an evidence-based culture, a focus on patient outcomes and equity of access to high quality care; an attitude of compassion and empathy.

Acting with Integrity

Exemplified through an ethical approach: doing what is right, not what is expedient; a forward thinking and collaborative attitude and patient-centric focus.

Accountability

Exemplified through strong leadership that is accountable to members; patient engagement at professional and organisational levels.

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INTRODUCTION

Purpose and Scope

The Royal Australian and New Zealand College of Radiologists (RANZCR) is committed to setting, promoting and continuously improving standards of practice for clinical radiology, encompassing diagnostic imaging and interventional radiology, for the betterment of the people of Australia and New Zealand.

The College is the primary organisation in Australia and New Zealand for setting standards of practice for clinical radiology; these are set out in the *RANZCR Standards of Practice for Diagnostic and Interventional Radiology*. This document sets minimum standards to support and ensure the delivery of safe, high quality diagnostic imaging and interventional radiology services in both community-based and public hospital settings. These standards also provide a framework for practices to implement and maintain continuous quality improvement.

The RANZCR Standards are made freely available to all medical imaging stakeholders, and are applicable to all diagnostic imaging and interventional radiology services.

Background

The RANZCR Standards were first developed in 1997. In earlier versions, the ISO/IEC 17025: 2005 Standard provided a quality management framework in which the RANZCR Standards were applied for the purposes of practice accreditation under the RANZCR/NATA Medical Imaging Accreditation Program. However, in 2006 the College resolved to include quality management principles specifically designed for medical imaging practice within the RANZCR Standards.

The standards are reviewed regularly to reflect progress in clinical practice, technology and quality management systems. Amendments may also be issued between major versions. Standards and documents referenced in the RANZCR Standards are subject to updates either by the College or external authors.

How to Interpret and Implement These Standards

Depending on the scope of its medical imaging services, a practice is expected to meet the generic requirements listed in Sections 1 to 7, and any specific modality requirements listed in Sections 8 to15.

Example 1: A practice providing solely ultrasound services is not expected to comply with the standards relating to radiation safety requirements listed in Sections to 7, but is expected to comply with all other standards described in Sections 1 to 7, as well as the relevant ultrasound standards described in Section 15 (depending on the scope of ultrasound services provided by the practice).

Example 2: A practice providing CT, general x-ray, MRI, mammography and ultrasound services is expected to comply with all of the standards described in Sections 1 to 7, as well as the modality specific requirements described in Sections 9, 10, 12, 13 and 15 (depending on the scope of modality-based services provided by the practice).

Government Regulation

Each medical imaging practice is responsible for ensuring that it complies with all relevant Commonwealth/ State/Territory/New Zealand legislation. Legislative requirements may take precedence over some standards detailed in this document (eg. retention times for patient records). References made in this document to legislation are not intended to be exhaustive.

Practices should meet relevant Commonwealth/State/Territory/New Zealand and local regulations governing Work Health and Safety, Discrimination, Building, Disabled Access, Equal Opportunity of Employment and Utilities (Water, Gas and Electricity).

The Commonwealth Government of Australia has established legislative requirements to determine eligibility for Medicare benefits under the Health Insurance Act 1973, and associated regulations for the practice of diagnostic imaging. For the purposes of determining eligibility for MBS benefits, legislative and regulatory requirements take precedence over the RANZCR Standards. However, this does not preclude a practice from pursuing the standard of practice expressed in the RANZCR Standards if it is set above Commonwealth requirements.

Not all medical imaging services addressed in this document are eligible under the MBS.

The College recognises that The Commonwealth has implemented the Diagnostic Imaging Accreditation Scheme (DIAS), which is underpinned by the Practice Accreditation Standards www.diagnosticimaging.health.gov.au. The standards underpinning the DIAS are not yet as broad in scope as the RANZCR Standards, and the College encourages The Commonwealth to use the RANZCR Standards as a reference point when reviewing, updating and extending the Practice Accreditation Standards.

In New Zealand International Accreditation New Zealand (IANZ) administers a radiology practice accreditation program underpinned by the New Zealand Code of Radiology Management Practice[1], which references the RANZCR Standards.

Acknowledgements

The College gratefully acknowledges the extensive work undertaken by the Standards of Practice and Accreditation Committee in the ongoing development of the RANZCR Standards.

Standards of Practice and Accreditation Committee:

Dr Cheryl Bass, Dr Richard Beedie, Dr Vineet Berera, Dr Fraser Brown, Dr Elizabeth Carter, Dr Winston Chong, Prof. Michael Ditchfield, Dr Peter Downey, Dr Anusha Naidoo, Dr Nicholas Ferris, Dr Nick Pang, Dr Frank Parrish and Dr Andrew Scott.

The College would also like to acknowledge the dedicated work of the members of each of the modality reference groups which contribute to the RANZCR Standards.

Feedback

The College seeks feedback from all stakeholders in the medical imaging sector. The College welcomes suggestions for improvement in the Standards, and encourages stakeholders to notify the College of any apparent discrepancies or ambiguities.

Please forward feedback to standards@ranzcr.edu.au.

ACRONYMS AND ABBREVIATIONS

AANMS	Australasian Association of Nuclear Medicine Specialists
AAPM	American Association of Physicists in Medicine
AC	Attenuation Correction
ACHS	Australian Council on Healthcare Standards
ACPSEM	Australasian College of Physical Scientists & Engineers in Medicine
ACR	American College of Radiology
AED	Automated External Defibrillator
AHPRA	Australian Health Practitioner Regulation Agency
AIR	Australian Institute of Radiography
ALS	Advanced Life Support
AnC	Anatomic Correlation
ANZAPNM	now known as: AANMS Australasian Association of Nuclear Medicine Specialists
ANZBMS	Australian and New Zealand Bone and Mineral Society
ANZCA	Australian and New Zealand College of Anaesthetists
ANZSNR	Australian and New Zealand Society of Neuroradiology
APC	Annual Practicing Certificate
APP	Australian Privacy Principles
ARC	Australian Resuscitation Council
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASA	Australian Sonographers Association
ASAR	Australian Sonographer Accreditation Registry
ASMIRT	Australian Society of Medical Imaging and Radiation Therapy (formerly Aust. Institute of Radiography)
ASUM	Australasian Society for Ultrasound in Medicine
AVM	Arteriovenous Malformation
BMD	Bone Mineral Densitometry
BMUS	British Medical Ultrasound Society
CCD	Charge-Coupled Device
CPD	Continuing Professional Development
CPR	Cardiopulmonary Resuscitation
CR	Computed Radiography
CSANZ	The Cardiac Society of Australia and New Zealand
CT	Computed Tomography
CTC	CT Colonography
CTCA	CT Coronary Angiography
CTDI	CT Dose Index
DAP	Dose Area Product
DI	Diagnostic Imaging
DIAS	Diagnostic Imaging Accreditation Scheme
DICOM	Digital Imaging and Communications in Medicine
DLP	Dose Length Product
DR	Digital Radiography
DRACR	Diploma of Royal Australasian College of Radiologists

DRANZCR	Diploma of the Royal Australian and New Zealand College of Radiologists
DRL	Diagnostic Reference Levels
DXA	Dual-energy X-ray Absorptiometry
ECG	Electrocardiogram
FRANZCR	Fellow of the Royal Australian And New Zealand College of Radiologists
FTE	Full Time Equivalent
HL7	Health Level 7
HL7 CDA	HL7 Clinical Document Architecture
IANZ	International Accreditation New Zealand
IEC	International Electrotechnical Commission
IHE	Integrating the Healthcare Enterprise
IHE-PDI	IHE Portable Data for Imaging
IRSA	Interventional Radiology Society of Australasia
ISO	International Organization for Standardization
IV	Intravenous
MBS	Medicare Benefits Scheme
MP	Megapixels
MQAP	Mammography Quality Assurance Program
MRI	Magnetic Resonance Imaging
MRTB	Medical Radiation Technologists Board
NATA	National Association of Testing Authorities, Australia
NEMA	National Electrical Manufacturers Association
NHMRC	National Health and Medical Research Council
NMBA	Nursing and Midwifery Board of Australia
OAIC	Office of the Australian Information Commissioner
PACS	Picture Archiving and Communication System
PDY	Professional Development Year
PET	Positron Emission Tomography
PRL	Practice Dose Reference Level
QA	Quality Assurance
QC	Quality Control
QCT	Quantitative Computed Tomography
RACP	The Royal Australasian College of Physicians
RACS	Royal Australasian College of Surgeons
RANZCR	Royal Australian and New Zealand College of Radiologists
RIS	Radiology Information System
SMPTE	Society of Motion Picture and Television Engineers
TGA	Therapeutic Goods Administration
TIPS	Transjugular Intrahepatic Portosystemic Shunt
TLD	Thermoluminescent Dosimeter
WFUMB	World Federation for Ultrasound in Medicine and Biology

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1 | PRACTICE MANAGEMENT SYSTEM

The practice shall establish, implement and maintain a documented management system which covers all activities performed at the practice's permanent site and at sites located away from its permanent facilities (eg. mobile services).

The management system shall be communicated to, understood and implemented by all personnel.

The integrity of the management system shall be maintained at all times, including when changes to the service occur, ensuring the quality of all work performed.

1.1 Practice Management System

The practice shall implement a practice management system.

Indicators

1. The senior management of the practice ensures that the required operational policies, procedures and practicemanagement system are implemented, applied and are continuously improved.
2. The practice ensures that all personnel familiarise themselves with and commit themselves to policies and procedures and implement these in their work.

1.2 Quality Manual

The practice shall maintain, regularly review and update a quality manual to support the practice management system.

Notes: The quality manual is intended to be appropriate to the scope and size of the practice. Practices may like to consider designing their manual so that it answers succinctly who does what, when, where and why in relation to the quality and safety of the services provided, and whether simple tools such as an organisational chart can be used to define the levels of responsibility within the practice.

Indicators

1. The quality manual includes a quality policy defining the quality objectives.
2. The quality policy is issued under the authority of senior management, and includes:
   a) management's commitment to good professional practice and compliance with these RANZCR standards; and
   b) continual improvement of the effectiveness of the management system and to the quality of all services provided.
3. It includes policies relating to the management system.
4. It outlines the structure of the practice's documentation hierarchy.
5. It makes reference to supporting documentation.
6. It defines the role and responsibilities of management personnel, including the Quality Manager.

1.3 Quality Manager

The practice shall appoint a quality manager (however named), with direct access to senior management. The quality manager shall have defined responsibility and authority for implementing and maintaining the practice's management system.

Notes: The role of a quality manager may be fulfilled differently in different practice settings, and accordingly may be fulfilled in a co-ordinated manner across more than one position in the practice.

Indicators

1. The practice personnel records identify:
   a) the quality manager and his/her associated job description; OR
   b) that the role of quality manager is fulfilled within the practice across more than one position, and the practice can identify which personnel members fulfil this role and how this is co-ordinated.

1.4 Documentation

The practice shall document and control its policies and procedures. A master list of controlled documents shall be maintained which identifies the current version and distribution of documents.

Notes: Document control is a system of managing, distributing and controlling documents in order to eliminate use of unauthorised, obsolete and/or superseded documents. This system should be appropriate to the scope and size of the practice, sustainable and practical to maintain.

Indicators

1. The practice has established a documentation system appropriate to the size and scope of the service.
2. All documents are uniquely identified to include the date of issue or revision number, page numbering (including total number of pages) and the issuing authority.
3. Procedures are established to define how changes to documents are to be made and controlled including documents maintained in computerised systems.
4. All documents are periodically reviewed and revised when necessary, and approved or reapproved by authorised personnel prior to issue.
5. Only current versions of documents are available.
6. Where handwritten amendments to documents are allowed, and pending the re-issue of the documents, the amendments are initialled and dated.
7. Master copies of old and/or superseded document versions are retained or archived for legal and knowledge preservation purposes and are appropriately identified.
8. When its examinations involve remote reporting via teleradiology, the practice has documentation clearly defining the agreed responsibilities of both the examining and reporting sites. This includes issues of liability, patient safety, transmission arrangements, report turnaround times and confidentiality.

1.5 Records

Procedures shall be established for the integrity, identification, collection, storage, protection and disposal of records.

Notes: Records kept for paediatrics/children - in some jurisdictions, if the patient was less than 18 years of age at the date of the last record, the records must be kept until the patient attains or would have attained 25 years of age.

Indicators

1. The practice records are legible, identifiable to the responsible personnel, held secure to prevent loss or unauthorised access, and retrievable.
2. Original data (electronic or hard copy) are retained for a minimum of 3 years or according to relevant legislation, unless such records are scanned into the Radiology Information System (RIS).

3. Where such original records are in hard copy format, these are only disposed of within the retention period after they have been scanned into the RIS and checked for completeness.
4. Corrections to records ensure that the original recording is not made illegible and that the correction is initialled and dated. Equivalent measures are taken for records held electronically.
5. All records (including billing records and reports, but excluding images) are retained in accordance with the appropriate statutory requirement depending on the state/territory. Where such a regulatory requirement does not exist, the practice retains records for a minimum of 36 months.
6. There are procedures in place which ensure that electronic records are protected, backed up and unauthorised amendment of such records is prevented.
7. The practice has a disaster recovery system that addresses the risk of network failure and also takes into consideration PACS, image failure and teleradiology services.
8. Where data is transmitted across a wide area network, such as the internet, it is encrypted or protected by a username and password.

1.6 Corrective and Preventive Action

The practice shall have corrective and preventive action processes.

Indicators

1. The practice has a process for identifying and investigating non-conforming work and departures from authorised policies and procedures, and for implementing corrective action/s accordingly.
2. It has a process for identifying and implementing preventive action to eliminate the causes of potential non-conformities, incidents and adverse clinical events.
3. Corrective and preventive action activity is recorded.

1.7 Continuous Quality Improvement

The practice shall establish a program of continuous quality improvement for the key areas of operations. This program of activity will include corrective and preventive action and be supported by internal audits, and assessments conducted by external bodies where applicable.

Indicators

1. The practice has implemented a continuous quality improvement schedule which establishes a risk register, and ensures that an audit is carried out and reported on at regular intervals against these standards and the practice's own policies and procedures.
2. Such an audit occurs at least annually.
3. Procedures are in place to ensure the objectivity and impartiality of auditors and the audit process itself.
4. This audit includes review of the practice's corrective and preventive action processes and activity, and the effectiveness of any such action taken.
5. It has records of participation in and compliance with external quality assurance activities where these are available (including image reviews).
6. Through this process, the practice identifies key areas of its operations for quality improvement, and implements appropriate training accordingly.

1.8 Feedback and Complaints

The practice shall have a policy and procedure for obtaining feedback from patients and referrers and for resolving complaints.

Indicators

1. Feedback is actively sought from patients and referrers to ensure appropriate service provisions, patient and referrer satisfaction and continuous quality improvement.
2. The practice has a policy covering the procedure for handling complaints which is available to the public and referrers and adhered to by personnel.
3. Records are maintained of all feedback, complaints, investigations and corrective actions taken.

1.9 Management Review

Senior management shall regularly review the practice management system to ensure continuing suitability and effectiveness in support of patient care and to introduce any necessary changes for improvements.

Indicators

1. Records of management system reviews are kept together with any action plans, outcomes and monitoring activities.

1.10 Supplies

The practice shall establish policies and procedures to ensure that purchased goods or services comply with defined performance criteria and/or regulatory requirements and are only obtained from approved suppliers which are selected on the basis of their ability to meet specified requirements.

Indicators

1. The practice has implemented a procedure to manage purchasing of services and supplies whereby a listing of all suppliers, contractors and consultants is maintained, and all commitments to purchase are recorded and describe the product/s being ordered.
2. Purchased products and services are verified at appropriate intervals.
3. Purchased materials and products are stored in designated storage areas within the facility which is designed to prevent damage and deterioration to the product prior to use.
4. Where special storage conditions are required to prevent deterioration (eg. refrigeration), procedures are in place to ensure those conditions are adequately controlled and maintained.
5. When purchasing or upgrading equipment and software required and/or used for all procedural activities, the practice obtains an IHE Integration Statement for the current model/version being purchased or upgraded from the manufacturer.

2 | FACILITIES

Practice facilities shall support the delivery of safe, quality diagnostic and/or interventional radiology services. These facilities shall be clean and constructed to optimise patients' comfort (including their need for privacy) and to accommodate special needs.

2.1 Facilities for Imaging Procedures

The practice facilities shall be such as to allow the safe and correct performance of diagnostic and/or interventional radiology services.

Indicators

1. The practice's facilities comply with legislative requirements.
2. Access to and use of areas affecting the quality of the imaging procedures and/or safety of patients and personnel is controlled.
3. There is effective separation between neighbouring areas in which there are incompatible activities.
4. The cleanliness of the facilities is maintained.

2.2 Patient Facilities

The practice has patient facilities suitable to the range of services that are provided.

Indicators

1. The practice has facilities available which optimise the comfort of its patient population.
2. Facilities are available for disrobing which ensure the privacy of patients.
3. Patient facilities are designed to accommodate special needs required by the patient population of the practice.

3 | EQUIPMENT

The practice shall ensure that all equipment (including software) is appropriate to its use and that it is appropriately maintained so that imaging results are consistently of diagnostic quality.

Notes: The transition from analogue film images to digital images remains in progress. As such, the standards relating to digital image acquisition and distribution remain under ongoing review. Further amendments may therefore be issued in relation to this version of the RANZCR Standards of Practice for Diagnostic and Interventional Radiology.

3.1 General

The practice must ensure that all equipment and its software (including that outside the practice's permanent control) required for all procedural activities carried out at the practice is available, functional, capable, calibrated, compliant with regulatory requirements, and has an appropriate program of quality control testing.

Notes: There are modality specific equipment requirements in these Standards.

Indicators

1. The practice holds state/territory regulatory compliance certificates for each piece of diagnostic and/or interventional radiology equipment it operates within the relevant jurisdiction. Such certificates shall be as current as the regulatory environment permits.
2. Records of such compliance testing are held at the practice site.
3. It carries out quality control, maintenance and calibration of equipment used for all of its imaging services and maintains records of all such activity.
4. Records of remedial actions are kept for the operational life of the equipment at the practice.
5. Such quality control and maintenance activity is carried out in accordance with both manufacturers' guidelines and regulatory requirements.
6. The practice complies with legislation concerning the procurement, sale or disposal of any equipment which generates ionising radiation.

3.2 Equipment Inventory

The practice shall maintain a current equipment inventory, which is supplemented by an equipment register.

Indicators

1. The practice maintains a current equipment inventory which includes (but is not limited to):
   - Name of item, manufacturer, serial number (or other identifier)
   - Notice/certificate of registration or licence, where applicable.
2. For equipment acquired after 1 January 2000, this inventory includes:
   - Condition when acquired (ie, new, re-conditioned)
   - Date of installation.

3. The equipment inventory is supplemented by an equipment register which, for each piece of equipment, contains:
    - The acceptance performance certificate
    - The instruction manual
    - A statement of the manufacturer's specifications
    - Current formal statement of modifications made to the equipment, and/or its operating software and applications, after purchase.

3.3 Equipment – Sedation and Monitoring

In practices where procedures requiring sedation are performed, equipment for sedation and monitoring of sedated patients shall be available on site and shall be appropriate for the patient population and the procedure(s) performed.

Practices shall comply with the requirements set out in the ANZCA PS09 Guidelines on Sedation and/or Analgesia for Diagnostic and Interventional Medical, Dental or Surgical Procedures[2].

Indicators

1. Sedation is only performed in a location which is equipped with the resources to deal with a cardiopulmonary emergency according to the ANZCA PS09 Guidelines[2].
2. These resources include:
    - Sufficient room to perform resuscitation
    - Appropriate lighting
    - Adequate suction source, catheters and handpiece
    - A supply of oxygen and suitable devices for the administration of oxygen to a spontaneously breathing patient
    - Means of inflating the lungs with oxygen (eg. a self-inflating bag and mask) with ready access to a range of equipment for advanced airway management (eg. masks, oropharyngeal airways, laryngeal mask airways, laryngoscopes, endotracheal tubes)
    - Appropriate drugs for cardiopulmonary resuscitation and a range of intravenous equipment and fluids including drugs for reversal of benzodiazepines and opioids
    - A pulse oximeter
    - A sphygmomanometer or other device for measuring blood pressure
    - Ready access to an ECG and a defibrillator
    - A means of summoning emergency assistance
    - Facility-based access to devices for measuring expired carbon dioxide.
3. Where sedation of paediatric patients is carried out:
    - The monitoring equipment is capable of measuring oxygen saturation, end tidal CO2 and (non-invasively) blood pressure
    - There is separate oxygen saturation monitoring for the recovery area
    - There are facilities and equipment for endotracheal intubation of children.
4. The practice complies with any regulatory and/or licensing requirements applicable to the use of sedation.

3.4 Equipment – Anaesthesia and Monitoring

Where warranted by the patient population and procedure(s) performed, equipment for general anesthesia and the monitoring of anaesthetised patients shall be available on site.

Practices shall comply with the requirements set out in the ANZCA's PS55 Policy Recommendations on Minimum Facilities for Safe Administration of Anaesthesia in Operating Suites and Other Anaesthetising Locations [3].

Indicators

1. Equipment for general anaesthesia and the monitoring of anaesthetised patients is available on site and meets the requirements set out in the ANZCA PS55 Policy[3].
2. Where procedures are carried out on paediatric patients requiring anaesthetic:
   - Anaesthetic monitoring equipment is capable of measuring oxygen saturation, end-tidal CO2, and (non-invasively) blood pressure.
   - There is separate oxygen saturation monitoring for the recovery area and there are facilities and equipment for endotracheal intubation of children.
   - Procedures on children under one year of age requiring general anaesthesia are not performed in units without specialist paediatric facilities.
3. The practice complies with any regulatory and/or licensing requirements applicable to the use of anaesthesia.

3.5 Equipment – Resuscitation

Resuscitation equipment shall be immediately available for management of adverse events (see notes), including adverse reactions to intravenously administered contrast media, and other specific risks appropriate to the practice profile.

Notes: Adverse events may include but are not limited to: vaso-vagal reaction; post biopsy haemorrhage (superficial and deep); post drainage visceral perforation; post biopsy pneumothorax, including tension pneumothorax; and hypotension following spinal injections.

Paediatric patients require paediatric resuscitation equipment.

Indicators

1. The practice maintains current inventories for resuscitation equipment and associated drugs.
2. The practice carries the minimum resuscitation equipment required to perform Advanced Life Support[4] including an Automated External Defibrillator (AED).
3. This equipment is immediately available and maintained so that it is in working order whenever intravenous or other contrast administration takes place.
4. The practice has a process for checking that resuscitation drugs are current, and not out of date, and records these checks.

3.6 Computers and Automated Equipment

3.6.1 Computers and Automated Equipment – General

The practice shall ensure that when computers or automated equipment are used for acquisition, processing, recording, reporting, storage or retrieval of data that they are appropriate for the scope of use.

Indicators

1. The practice ensures that documented instructions for use of software at the practice are available.
2. Procedures are established and implemented for protecting the data and include:
   - Integrity and confidentiality of data entry or collection
   - Data storage
   - Data transmission

- Data processing
- Back up protocols
- Disaster recovery systems with particular consideration of digital imaging and teleradiology services.

3. Computers and automated equipment are maintained to ensure proper functioning.
4. Appropriate environmental and operating conditions are provided to ensure optimal functioning of computer hardware.

3.6.2 Diagnostic Workstations

Diagnostic workstations shall have the appropriate functionality to support the delivery of quality diagnostic imaging.

Indicators

1. The practice's image processing equipment and management procedures are such that the image manipulation performed by medical imaging team members is reflected accurately in the images seen on the reporting station used by the radiologist.
2. The display systems used for reporting by the radiologist provide the following minimum functions to support accurate interpretation of images by the radiologist for all modalities:
    - Panning
    - Image Magnification
    - Rotation
    - Window level and width adjustment
    - Measurement
    - Density Measurement
    - Total number of images in study.

3.6.3 Monitors

The practice shall ensure that diagnostic imaging monitors are appropriate for the activity for which they are used.

Notes: There are additional modality specific monitor requirements in these standards.

Regarding matrix size: 1024 x 1024 minimum – it is noted that, depending on the pattern of work in the practice, this may require frequent zooming and panning to adequately review most CR/DR images; if there is a substantial CR/DR component to the workload, a higher resolution monitor should be considered.

Indicators

1. The practice ensures that initial quality assurance and subsequent reporting of images for PACS or teleradiology is performed on primary monitors.
2. The practice's primary monitors comply with the following characteristics:
    - Brightness: at least 350 cd/m2 brightness
    - Luminance ratio: at least 250:1
    - Pixel pitch 0.2 mm in a typical 53 cm display
    - Grey Scale: at least 8 bit gray scale capable
    - Colour monitors: at least 24 bit colour display
    - Greyscale calibration using the Greyscale Display Function (DICOM part 14)
    - Ambient lighting: extraneous room light minimised, ie, dimmer switches and opaque window blinds available; 20-40 lux is recommended
    - Matrix size: minimum 1024 x 1024.
3. It ensures that secondary monitors are only used for reviewing medical images, usually in association with the relevant medical imaging report, and are not used to provide a medical interpretation[5].

3.7 Digital Imaging Data

3.7.1 Digital Image Data Management

The practice shall ensure that digital image data is managed appropriately in relation to digital image file format, storage, retention and archiving.

Notes: The Australian Government and health sector stakeholders are working to agree on the requirements for image retention and archiving. As such, the requirements in these standards are interim requirements until such time as the Australian Government makes its recommendations.

Indicators

1. The practice has implemented systems which ensure that digital images can readily be made available in a DICOM-compliant format, where one is available for the modality in question.
2. When storing digital images, the practice uses lossless compression where feasible and otherwise uses compression ratios as recommended in the RANZCR compression guidelines[6].
3. The practice digital archiving system has capacity, or is being expanded in order to establish such capacity, to store a record of each examination for a minimum period of 6 months. The archiving system permits retrieval of the images in a DICOM-compliant format.
4. The practice has established a retention schedule which identifies the studies for which longer term retention is required. This schedule is reviewed at least annually.
5. The practice ensures there is sufficient data storage capacity relative to the retention schedule.

3.7.2 Exchange of Digital Imaging Data and Reports – General Requirements

3.7.2.1 Exchange Media and File Systems

When providing diagnostic images on portable media, the practice shall only use media and file systems which are compliant with the IHE Portable Data for Imaging profile.

Notes: Current IHE profiles are available at www.ihe.net.

Indicators

1. When exchanging diagnostic images in a digital format on a portable device, the medium used is either compact disk, compliant with ISO/IEC 10149 (CD-R), or another medium which allows compliance with the IHE-PDI profile.
2. The file system of such media is compliant with ISO 9660:988(E) – level 1.
3. The practice shall be able to provide a complete set of diagnostic quality images, when appropriate to the needs of the patient and/or the referrer.

3.7.2.2 Malicious Software

The practice must take reasonable steps to ensure that no malicious software (viruses, trojans, spyware, etc.) is included on media used in the exchange of diagnostic imaging data.

Media intended to have data recorded on only one occasion must be tested to exclude malicious software, and then be closed to data alteration or addition.

Notes: It is noted that protocols to address malicious software issues are able to be implemented at a network level or at a workstation level.

Indicators

1. The practice has implemented and documented a protocol whereby a check is carried out to confirm that there is no malicious software on disks which record digital imaging data, or in systems used in the exchange of diagnostic imaging data.
2. For portable media, once this check is carried out successfully and no further data is to be written to the disk, such media are ‘closed’ to data alteration or addition.
3. Media which are only intended to have data added on one occasion are similarly checked and ‘closed’ to data alteration or addition.

3.7.2.3 Exchange of Digital Imaging Data and Reports Using Portable Media: IHE PDI profile

All portable data image media issued by the practice shall meet appropriate standards.

Notes: DICOM viewer requirements are described under item 3.7.2.4 in these standards.

It is anticipated that there will be a necessity for practices to participate in a compliance testing program to ensure the consistent implementation of IHE across diagnostic imaging services.

Indicators

1. The practice has implemented systems that ensure that all portable media issued by the practice are compliant with the IHE PDI profile.
2. The practice ensures that all such media contain a "readme.txt" file which is situated in the root directory, even if web content is not supported.
3. This readme.txt file contains a copy of the generic facility (not patient-specific) information provided on the label and external packaging.
4. This readme.txt file contains information about DICOM viewer software, and information about the requirements for HTML viewers required to read web content.
5. When providing diagnostic imaging data as web content, such content is compliant, and:
    a) a default web page (index.htm) is used as a the landing page for end users, and contains the same key information as that used on the media and package;
    b) the web page includes appropriately formatted images (eg. JPEG) and links to help files and software for accessing DICOM file content if this is provided; and
    c) where web content is used to display non-diagnostic images, the fact that these are non-diagnostic is clearly conveyed to the user either in the instructions or by annotation of individual images.
6. If diagnostic imaging reports are included on the portable media, they are:
    a) DICOM compliant and stored according to the IHE PDI profile; OR
    b) in the HL7 version 2 or HL7 Clinical Document Architecture formats; OR
    c) in PDF file format.

3.7.2.4 Use of Embedded DICOM Viewer on Portable Media

The use of DICOM viewers on portable data image media shall be subject to appropriate protocols.

Notes: The use of DICOM viewers on portable data image media shall be subject to appropriate protocols. In relation to placement of instructions for running a DICOM viewer, it is recognised that some media (eg. Universal Serial Bus, or USB) will not be of sufficient size to enable this to be recorded on the media label.

Indicators

1. The practice ensures that when a DICOM viewer is provided on such media that such viewers do not auto-load.
2. Instructions for starting the viewer are present on the media label, media folder and readme.txt file, and an online manual is available.
3. The viewer and help files are located in and can be loaded from the index.htm page.
4. Where the software does not load (eg. incorrect operating systems), the viewer will terminate with an intelligible error message.
5. Loading the viewer is not dependent on pre-existing components (eg. Java, MS components), and these components only load from the disk if they are required.
6. Minimum specifications in regard to the computer equipment required to run the DICOM viewer software are included in the information provided on the media label, media folder, readme.txt file, and the online manual. Correspondingly, any limitations of the viewer are declared.

3.7.2.5 Electronic Reports

When reports are stored electronically, the practice shall ensure that they are retrievable in both a human readable format and one which can be readily communicated electronically so that it can be imported directly into Australian clinical information systems.

Notes: HL7 CDA reports will eventually support both human and machine readability requirements. If desired a paper copy of the report can be included in the storage envelope/folder (as is the current practice in some centres with film bags).

Indicators

1. The practice has implemented procedures for the electronic storage of imaging reports which ensure that:
   a) one copy is in a format which can be read by a human being (a 'human-readable' format); and optionally
   b) one copy is stored in accordance with the Australian Standards AS4700.2.2007[7] or AS4700.7.2004[8] (computer readable formats).
2. Such data is stored for a minimum of 36 months, or the minimum applicable legislative requirement, whichever is the longer.

3.8 Media Requirements

3.8.1 Media selection

Media shall be selected to be fit for the purpose, use and long term storage requirements of the radiology practice as well as the expected range of end users and consumers.

Notes: Media come in different qualities based on factors such as dyes used and manufacturing tolerances. Medium selection may be based on the advice of the CD production system or subject to a trial and error testing process.

IHE does not recommend that portable media are used for archive purposes. Imaging services are advised to discuss this with their IT systems vendor, read any product disclaimers and seek independent advice about recommendations for media type suitability and storage advice.

The selection of media is determined by technical factors involving the media printer and can not be pre-determined.

Indicators

1. Media used for long term storage or archive shall be appropriate to the planned period of archive, with appropriate back-up arrangements in place.
2. Media used for portable use meets the requirements set out under item 3.7.2.1 Exchange Media and File Systems in these standards.

3.9 Digital Media Labelling, Packaging and Storage

3.9.1 Portable Media Labelling

The image media portable device shall be labelled with human readable information. The label shall contain all necessary information relating to the data recorded on the device in a clear and legible font to support readability at all ages. This information shall include the sole archive status or retention policy of the diagnostic imaging service and whether the device contains the only long term digital record (see Notes).*

The content of the label on the device, on the storage package and represented on the device itself will be consistent.

Notes: Automated media production systems can print on the device and label without direct user input. Systems that cannot do this should consider using on-screen prompts displaying suggested label fields, which are read then printed on the device.

As many devices have a similar form (120mm disc), a statement of the type of device included in the labelling information will assist in troubleshooting if the device does not load.

Storage only on CD is not recommended.

Indicators

1. The practice ensures that devices used for the exchange of diagnostic image data have labels directly printed onto their surface.
2. Labelling information includes as a minimum:
    - Patient Name
    - Patient ID
    - Date of birth
    - Media creation date
    - Date of Examination/s
    - Name of institution creating the CD and contact details
    - Media type and identifier in the format “media type”, “instance number” of “total number of media in series”
    - Statement about sole archive status or retention policy of the DI service
    - A statement that contents are confidential.

3.9.2 Portable Media Storage and Packaging

Media shall be stored in a cool environment and in a light-free, environmentally neutral package which is known not to contain chemicals that can degrade the media.

These media shall be packaged and stored in a way that clearly differentiates them from other computer or entertainment media, and supports the requirements for instructions and labelling.

Notes: There are a vast range of storage options from paper or soft plastic pouches, through different designs of hard plastic case, and storage envelopes (which may be post office approved) or media folders.

Options for media storage include:

- Standard paper or plastic pouches

- Hard plastic ‘jewel cases’

- Sealable envelopes of A5 or A4 size

- Folders containing CD/media pouches or process for fixing the CD.

Indicators

1. The practice ensures that storage of blank (unused) portable media is consistent with the media manufacturer’s guidelines.
2. The practice has implemented a process which ensures that when no further imaging or report data is to be written to portable media, the portable media is consistently stored in packaging which is suitable for transfer to the patient or referring practitioner and which is immediately identifiable as a medical record.
3. Such packaging has suitable internal storage for the portable media to avoid accidental loss.
4. This packaged portable media is stored according to the media manufacturer’s guidelines until dispatch.

3.9.3 External Labelling

The storage envelope or folder for portable digital image media shall be appropriately and consistently labelled.

Indicators

1. The practice ensures that all media storage envelopes or folders are affixed with a label printed in size 11 or greater font containing the same contents as per the media label specifications expressed under clause 3.9.1).
2. This label is placed under a flap in the event that the package is to be sent by post in order to protect patient privacy.

3. The contents of envelope are clearly defined and expressed.
4. Practice name and contact details are clearly expressed.
5. Detailed instructions for common operating systems are included on the label with clear instructions on how to load the CD and access the electronic help files or further instructions, OR advice that written instructions for this are contained within the package.
6. The label includes a statement that the contents are confidential medical records, with a clear return address if the package is located.

3.10 Reporting Environment

The reporting environment must be organised to ensure optimal reporting conditions for the medical practitioner.

Indicators

1. The practice ensures that reporting conditions are confirmed as acceptable for diagnostic image interpretation by each of its medical practitioners providing the reporting services.
2. The reporting environment ensures:
   - the minimum amount of light reflection on the monitor where interpretation is being made;
   - displays are placed ergonomically at reading level for each medical practitioner;
   - the displays are placed away from areas that may cause image degradation such as magnetic fields and electronic transformers.

3.11 Quality Control Testing

3.11.1 Quality Control Testing – General

The practice shall implement, maintain and follow a planned program of quality control activity.

Indicators

1. The practice has implemented protocols and procedures for performing quality control activities for each modality at defined intervals. These include appropriate instructions for remedial action.
2. It ensures that measurements and other results of all quality control activities are recorded so that trends are detectable.
3. Records of remedial actions are kept for the operational life of the equipment at the practice.

3.11.2 Quality Control Testing – Diagnostic Workstations and Teleradiology Equipment

The practice must have a Quality Control (QC) program in place relevant to the scope of digital imaging and teleradiology services provided.

Notes: For monitor quality control testing, the assessment protocol described in Section 4.10.5. Evaluations Using Anatomical Images contained in the paper Assessment of Display Performance for Medical Imaging Systems: AAPM TG18 Report[5] is recommended for guidance.

Indicators

1. The practice has implemented a quality control program for digital imaging and teleradiology services which ensures the monitoring and evaluation of the effective management, safety and proper performance of acquisition, digitization, compression, transmission, archiving and retrieval functions, and backup and recovery of the system.
2. The QC program also monitors the environmental conditions under which reporting of digital and teleradiology examinations is carried ou,t in accordance with the requirements stated under item 3.10 in these standards.
3. The QC program includes:
   - Test images and clinical reference image availability
   - Service and maintenance records

- Monitors and image display characteristics in accordance with the visual evaluation techniques as described in item 3.6.3 in these standards
- Environmental conditions.

4. This QC includes review of diagnostic image quality by the medical practitioner (in the case of teleradiology services this includes the reporting medical practitioner).
5. The practice ensures that:
   - Monitor quality assurance testing comprises as a minimum monthly SMPTE test pattern assessment whereby the quality is to the satisfaction of the reporting medical practitioner/s.
   - Conformance tests of display systems are documented and retained for ongoing quality assurance.

4 | PERSONNEL

The practice shall ensure that its personnel arrangements support the delivery of safe, quality diagnostic and/or interventional radiology services.

4.1 General

4.1.1 Personnel – General

All tasks associated with the delivery, supervision, support and management of diagnostic and/or interventional radiology services shall be supervised or carried out by personnel who are qualified to perform such tasks in accordance with these standards. The practice shall ensure that any regulatory requirements in relation to qualifications, registration or licensing of its personnel have been satisfied.

All personnel responsible for the delivery, supervision and support of these services must be free from any conflict of interest that may adversely affect the quality or integrity of the services provided.

Indicators

1. The practice maintains personnel records including details of qualifications, professional and/or regulatory registration, licenses and their currency.
2. Current job descriptions are maintained for all positions, which define the responsibilities and authorities of personnel according to their qualifications.
3. The practice has a documented policy describing the deputisation arrangements for key positions.
4. There are procedures in place to ensure that any potential conflict of interest that it or any of its personnel have in relation to the service's activities are identified, reported, recorded and avoided.
5. The practice ensures that each of its personnel are aware of the practice's policies and procedures in relation to the confidentiality and security of patient personal information and has agreed to abide by the practice's privacy policy and other relevant rules.

4.1.2 Recruitment of Personnel

The practice shall have a systematic process for the recruitment and selection of new personnel.

Indicators

1. The practice has a process which ensures the systematic recruitment of personnel in a manner appropriate to the size and scope of the service.
2. The process for the recruitment and selection of new personnel is documented.
3. This process ensures that a formal credentialing process is implemented that ensures that personnel selected meet the minimum requirements for the position.

4.1.3 Orientation

The practice shall have an orientation program that is undertaken by all personnel employed or engaged by the service in the delivery, supervision, support and management of diagnostic and/or interventional radiology services.

Indicators

1. The practice undertakes orientation activity for new personnel that is appropriate to the scope and responsibility of each position.
2. Such orientation is recorded in personnel records.

4.1.4 Training

The practice shall ensure that its personnel undertake any ongoing training needed to comply with requirements for professional registration, licensing and to gain or retain competence in the application of systems and equipment used in the service and, where necessary, shall ensure that resources are available to allow such training.

Indicators

1. The practice maintains permanent records of internal or external training that its personnel undertake to gain or retain competence in the application of systems and equipment used in the practice.
2. It ensures that the personnel involved with the provisions of its digital imaging and/or teleradiology services have undertaken training in the policies and procedures for digital imaging and/or teleradiology, and that such training is recorded in the relevant personnel records.
3. Medical imaging personnel undergo regular performance reviews to support their professional development and quality improvement.

4.2 Qualifications, Registration and Licensing

4.2.1 Qualifications – Radiologist

The practice's diagnostic and/or interventional radiology services shall be provided by a radiologist who holds either a current DRANZCR/FRANZCR certificate or equivalent specialist recognition, and meets all applicable radiation and medical board registration requirements in the relevant jurisdiction/s in which he/she is providing these services.

The radiologist must have the credentials and meet any other applicable requirements set out in the modality specific requirements for each modality or procedure he/she performs.

Notes: In New Zealand a radiologist must be registered with the Medical Council of New Zealand, hold an appropriate radiation licence under the Radiation Protection Act 1965, and hold an Annual Practicing Certificate (APC).

Indicators

1. The practice ensures that medical board registration is current for each radiologist, and holds a copy of such current medical board registration documentation for each radiologist which is supported by either a current DRANZCR/FRANZCR certificate or equivalent specialist recognition.
2. The practice ensures that each of its radiologists providing services requiring the use of ionising radiation holds a current radiation licence, and that this is recorded by the radiation safety officer in a radiologist radiation licence register.
3. Where remote reporting services are provided by the practice, it holds copies of the current medical board registration documentation and radiation licences of each of its radiologists providing such services for both the jurisdiction/s where such imaging examinations are performed and the jurisdiction/s where the interpretation and reporting service is generated.
4. The practice ensures that each radiologist or medical practitioner holding equivalent specialist recognition has completed CPR training within the past 3 years, and maintains a register of the training completed and training expiry dates for all radiologists[9].
5. Radiologists who perform sedation are credentialed according to the ANZCA PS09 Guidelines[2].
6. The practice ensures that all of its radiologists undergo 3 yearly visual acuity testing by a registered optometrist or opthalmologist where it is confirmed that each radiologist is able to read a minimum of Times Roman N4.5 or equivalent letters at not less than 30 cm with one or both eyes, either corrected or unncorrected.

4.2.2 Qualifications – Radiographer

A radiographer must have any licenses and current professional registration required for the jurisdiction(s) in which he/she is practising, including any radiation operator's licences required for use of ionising radiation.

Notes: In New Zealand a radiographer shall hold a current Licence to Practice by the Medical Radiation Technologists Board or equivalent acknowledged by RANZCR.

Indicators

1. The practice maintains a register for, and holds copies of, current AHPRA Medical Radiation Practitioner registration records for each of its radiographers.
2. The practice ensures that each of its radiographers providing services requiring the use of ionising radiation holds a current radiation licence, and that this is recorded by the radiation safety officer in a radiographer radiation licence register.

4.2.3 Qualifications – Nurse

Nursing personnel working within the practice must have current professional registration for the jurisdiction(s) in which they are working.

Indicators

1. The practice holds a copy of the current registration record for each of its nurses.

4.2.4 Qualifications – Medical Physicist

A radiology medical physicist must be certified in Radiology Physics.

Indicators

1. The practice ensures that its medical physicists are registered on the ACPSEM Register of Qualified Medical Physics Specialists in the Radiology Medical Physics Specialty.

4.2.5 Qualifications – Service Personnel

The practice shall ensure that all personnel servicing its systems and equipment are suitably qualified.

Indicators

1. The practice has a procedure for obtaining confirmation from the service provider/s that service personnel are appropriately qualified and/or certified for the scope of service activity carried out.

4.2.6 Qualifications – Administrative Staff

Administrative staff shall have undertaken or be undertaking training to perform medical administration tasks.

Indicators

1. The practice holds administrative staff personnel record/s, which include associated records of training appropriate to the size and scope of the service.

4.3 CPD

4.3.1 CPD – General

The practice shall encourage and support personnel participating in continuing professional development (CPD) required for the specific tasks which they perform.

Notes: CPD activity may be undertaken through a staff member's professional body (eg. RANZCR in the case of radiologists, a radiographer's CPD program such as or equivalent to the ASMIRT CPD program).

Some additional CPD requirements are set out in modality-specific requirements.

Indicators

1. The practice has implemented a policy to encourage and support participation by its personnel in their CPD ahctivity.

4.3.2 CPD – Radiologists

Participation in CPD activity shall be maintained by all radiologists providing diagnostic imaging services in order that they may keep abreast of rapidly changing practice in this area of medicine.

Notes: There are specific CPD requirements for practice in certain modalities. These are described the modality's requirements.

Indicators

1. The practice ensures that each of its radiologists provide it with evidence of ongoing participation in the RANZCR CPD program (or equivalent).

4.3.3 CPD – Radiographers

Radiographers shall participate in a radiographer's CPD program such as or equivalent to the ASMIRT CPD Program.

Indicators

1. The practice ensures that each of its radiographers provides it with evidence of ongoing participation in either the ASMIRT's CPD program, or an equivalent program of CPD.

4.3.4 CPD – Nurses

Nurses shall participate in the Nursing and Midwifery Board of Australia (NMBA) CPD program.

Indicators

1. The practice ensures that each of its nurses provides it with a copy of their current NMBA CPD declaration.

5 | PROFESSIONAL SUPERVISION

The practice shall meet the Professional Supervision requirements in these standards, ensuring at all times the safety and quality of each patient's imaging examination.

5.1 General

Each component of a diagnostic imaging service shall be carried out under the professional supervision of a radiologist.*

Certain tasks may be delegated under specified conditions to team members with the required professional expertise to undertake these tasks independently but under the radiologist's professional supervision.

*Notes: *The performance of diagnostic medical imaging services carried out under the leadership of a radiologist is defined as professional supervision.*

Diagnostic imaging services are provided in multi-disciplinary teams comprised of members with the required expertise drawn from various professional groups (eg. radiologists, radiographers, sonographers and medical physicists). The individual professional responsibilities of team members are interdependent, and collectively enable the effective delivery of this service.

The components of professional supervision are:

1. *Professional Competence*
2. *Review of Appropriateness of Request & Patient Preparation*
3. *Performance of Imaging Examination*
4. *Interpretation & Reporting*

Indicators

1. The practice has protocols in place to ensure that the radiologist's professional supervision requirements are satisfied through either:
   a) personally conducting all or particular tasks associated with the relevant component of the imaging service; OR
   b) direct (face-to-face) supervision of the other members of the imaging team as the relevant component of the imaging service is undertaken; OR
   c) task delegation through the implementation of and adherence to appropriate written protocols to be followed by members of the imaging team, under the radiologist's direction.
2. These professional supervision protocols also provide for different triggers for seeking radiologist input, and are consistent with patient management policies and procedures (as per 7.1).
3. The practice ensures that when teleradiology or remote reporting services are provided in accordance with appropriate written protocols under the direction of its radiologist/s, the professional supervision protocols are clearly written, readily available and implemented at the site at which the examination takes place as well as at the reporting site.

5.2 Professional Competence

The practice shall ensure that where there are specific competencies required for a particular imaging examination, the personnel involved with that imaging examination are suitably qualified and experienced.

Indicators

1. The practice's professional supervision arrangements ensure that all personnel involved in a medical imaging examination are appropriately qualified and experienced according to the specific requirements of the examination.
2. Where personnel are not considered to be sufficiently experienced, the professional supervision arrangements ensure that appropriate supervision protocols are in place to support the personnel and ensure the safety and quality of the patient's examination.

5.2.1 Trainee Radiologist

A qualified radiologist must be available to provide on site direct supervision of trainee radiologists for any/all components of the medical imaging service at all times in hours, and be readily available to provide advice and backup at all times out of hours.

Indicators

1. Practice rosters ensure that all trainee radiologists have a qualified radiologist (as per 4.2.1) available to provide direct (face-to-face) supervision for all components of the medical imaging service in hours.
2. These rosters ensure that all trainee radiologists have access to a rostered qualified radiologist (as per 4.2.1) for all components of the medical imaging service who is available to provide advice and backup at all times out of hours.

5.2.2 Student and PDY Radiographers

All radiography students shall have on site supervision by a qualified radiographer.

Graduate radiographers undertaking their Professional Development Year (PDY) shall have on site supervision by a qualified radiographer.

Indicators

1. Practice rosters for the past twelve months (including out of hours arrangements) demonstrate that:
   - Undergraduate student radiographers are directly supervised by a qualified radiographer.
   - Graduate radiographers undertaking their PDY program have on site supervision by a qualified radiographer.
2. Supervision arrangements and rosters for PDY radiographers are consistent with the ASMIRT PDY requirements, and these radiographers do not undertake limited independent imaging duties until they have successfully completed the PDY Interim Assessment and have the approval of the practice to do so.

5.2.3 Trainee Medical Physicist

Medical physicists undergoing training must be appropriately supervised.

Indicators

1. The pracice ensures that if trainnee medical physicists are involved in the delivery of imaging services, they only do so under the supervision of an ACPSEM certified medical physicist.

5.3 Review of Appropriateness of Request and Patient Preparation

5.3.1 Requests

A diagnostic imaging procedure may be undertaken upon receipt of a clinically appropriate request made by a medical practitioner. A request for a diagnostic imaging procedure made by one of the following

allied health practitioners shall be undertaken providing the requested imaging procedure is directly related to the allied health practitioner's recognised field of expertise:

A chiropractor, dental practitioner, nurse practitioner (who is credentialed and authorised to make such requests), oral and maxillofacial surgeon, osteopath, physiotherapist, podiatrist or prosthodontist registered or licensed under state or territory laws.

A request may be accepted when it is in a format whereby sufficient clinical information is provided to allow the clinical appropriateness of the requested procedure to be determined.

Indicators

1. The practice ensures that the following information is provided in requests prior to an imaging examination being undertaken:
    - Patient name, date of birth
    - Study requested
    - Clinical indication for the examination
    - Date of request
    - Signature and printed name of requesting health professional, and their contact details
    - Requestor provider number (for private patients)
2. Consultation with the patient to clarify information provided in the request is carried out as necessary and in accordance with professional supervision protocols.
3. The practice has implemented a process by which, when a request is made, the referrer and the practice have agreed on the format in which the images resulting from the examination need to be provided in order to be clinically useful, and that the practice has confirmed it is able to provide the images in this format.

5.3.2 Review of the Request

Before undertaking a requested diagnostic imaging procedure, the radiologist shall consider the appropriateness of the procedure requested based on the clinical information provided for the diagnosis of the patient's condition. This task may be delegated to other members of the medical imaging team.

Particular consideration should be give to the paediatric patient population when considering the appropriateness of the procedure requested.

Indicators

1. The practice has documented procedures for reviewing requests which ensure that the requested examination is appropriate to the needs of the referrer and the patient.
2. The professional supervision protocols provide for different triggers for seeking radiologist input for the review of requests by delegated medical imaging team members.
3. The practice ensures that the radiologist is readily contactable to discuss and, if necessary, alter the conduct of the imaging examination.
4. Information is recorded relevant to the study/ies being performed on each patient and is obtained by the medical imaging team prior to the examination. Depending on the examination, this information may include the presence of any allergies, pregnancy status and previous studies.
5. When a request contains insufficient information to determine the appropriateness of the request, the practice has documented procedures which ensure that all reasonable attempts are made to obtain the required information as necessary from the referring practitioner, and/or consultation with the patient to clarify information provided in the request is carried out as necessary.
6. When patients are undergoing special examinations such as MRI, angiography, prostate biopsy and examinations requiring the use of contrast, additional specific information is obtained and recorded.
7. Practice protocols ensure that prior to an examination being performed, the patient has been informed of the examination to be performed, the associated risks (where applicable, eg. contrast), and has provided an appropriate form of consent commensurate to these risks.

8. When reviewing requests and preparing for imaging of paediatric patients, every effort is made to:
   a) use a non-ionizing radiation modality, providing it will obtain the required imaging data for diagnosis; and
   b) make minimal use of sedation and anaesthesia[10][11].

5.3.3 Substituted and Additional Procedures

When it is determined from the clinical information provided in a request that a different diagnostic imaging examination or modality would be more appropriate, or an additional examination is necessary, the appropriate test/s shall be performed and all reasonable steps shall be taken to contact the requesting practitioner before providing the substituted or additional examination or modality.

Indicators

1. Practice records show that when an additional or substituted examination is called for the imaging report is notated accordingly.
2. These records demonstrate that all reasonable efforts are made to contact the requesting practitioner, and actual communication that is made is recorded.
3. The records show that before proceeding with a substituted or additional examination the patient is informed of the change of service and has provided consent in a format commensurate with the risks associated with the examination being performed.

5.3.4 Patient Preparation

The practice shall have processes for ensuring that a patient has complied with any preparation requirements (eg. fasting) for the procedure that is being performed.

Indicators

1. Information on pre-examination preparation required by patients for particular examinations is made available to patients and referrers.
2. Procedures have been implemented to confirm correct patient preparation has been completed prior to an imaging examination, and include provision for patients who are inappropriately prepared.
3. Where such preparation relates to contrast administration, this conforms with the requirements of the RANZCR Guidelines for Iodinated Contrast Administration[12].
4. Where such preparation relates to sedation, this conforms with the requirements of the ANZCA PS09 Guidelines[2].

5.3.5 Utilisation of Medical Imaging Techniques

From time to time, the practice shall provide referrers with information regarding the merits of the various diagnostic imaging techniques so that referrers can make informed decisions about the diagnostic information and relative value of the range of studies provided.

Notes: Practices are encouraged to use evidence-based consumer resources such as www.insideradiology.com.au.

Indicators

1. The practice has representative information sheets and/or documentation of communication to referrers.

5.4 Performance of the Imaging Examination

5.4.1 Performance of the Imaging Examination

Documented imaging protocols shall be available and include all necessary information for the proper conduct of the examination taking into account any specifications for the required qualifications, experience and specialisation of the personnel.

Where specific tasks are delegated to members of the medical imaging team, the protocols shall indicate

any specific circumstances under which personnel shall seek further guidance and/or input from the supervising radiologist.

Notes: The protocols shall specify, for example, that for each specified circumstance/situation that a radiologist shall be available to either:

- immediately personally attend the patient

- personally attend the patient within a specified set timeframe

- provide immediate verbal advice

- provide verbal advice within a specified set timeframe.

Indicators

1. The practice has documented professional supervision protocols for the performance of imaging examinations, and these protocols are developed under the professional supervision of the radiologist.
2. These protocols ensure that where it is known the radiologist is not available to provide appropriate additional input for particular modalities or examinations as detailed in the protocols, the medical imaging team members do not proceed with an examination.
3. Examinations which require sedation of the patient are not undertaken unless an appropriately trained radiologist is available to immediately personally attend the patient and the safety requirements described under 6.6.1 and 6.6.3 are met.
4. The protocols cover radiographic factors, positioning, sterile tray set-up, and after care according to the relevant examinations and/or modalities performed at the service.
5. These protocols also address medical emergencies.
6. Imaging protocols for paediatric patients are optimised to obtain the required imaging data while delivering the lowest radiation dose possible and with minimal use of sedation and anaesthesia[10][11].

5.4.2 Performance of the Imaging Examination – Administration of Contrast

The practice shall have protocols in place which ensure the appropriate use and administration of contrast.

*Notes: *The registered medical practitioner must hold current medical board registration in the jurisdiction in which the examination takes place.*

Indicators

1. The practice has professional supervision protocols in place in relation to administration of contrast which screen all patients for history of relevant contrast allergy, current medications, risk factors that increase the likelihood of contrast-induced renal impairment, and medical conditions that may result in life threatening complications from contrast administration.
2. These protocols determine when the radiologist responsible for overseeing the study must be contacted for advice before contrast is administered.
3. The task of administering contrast is only delegated to personnel who are trained in venipuncture consistent with Appendix A Personnel Administering Intravenous Contrast.
4. The protocols determine the dose and type of contrast medium that is administered, by whom it is administered, and under whose authorisation.
5. The administration of contrast to a patient is recorded, including the batch number of the contrast administered.
6. These protocols ensure that a currently registered medical practitioner* who is aware of this responsibility shall be immediately available to personally attend and treat the patient in case of a complication of intravenous contrast administration or other medical emergency.

5.5 Interpretation and Reporting

5.5.1 Interpretation and Reporting the Results

A single named radiologist is to be responsible for the supervision, interpretation and reporting of the entire study. Where a trainee radiologist has reported under supervision, this should be indicated in the report.

Where substantial input regarding supervision, interpretation or reporting has been provided by additional radiologists or suitably qualified medical practitioners, this should be also be acknowledged in the report. A single named radiologist however, remains responsible for the entire study.

Reports must address all information requested by the referrer, required by the procedure and necessary for the interpretation of the results.

Notes: The Collegre recommends the RANZCR Radiology Written Report Guideline[13] as a resource which provides best practice advice to radiologists and radiology trainees about the radiology written report.

Indicators

1. Primary diagnosis is only performed on images which are of acceptable diagnostic quality to the reporting radiologist.
2. The imaging reports include at least the following:
    - A title (eg. Imaging Report)
    - Name and address of the practice, and location/site where the imaging procedure(s) was performed if different to the address on the report
    - Referrer's name
    - Date of issue of the report
    - Unique identification of the patient (ie. full name and date of birth, or medical record number)
    - Date of imaging procedure(s)Identification of the modality used
    - Imaging procedure(s) results and, where appropriate, the units of measurement
    - Record/s of the administration of any medication and/or contrast
    - Opinions and interpretations
    - Name of reporting radiologist.
3. The use of electronic signatures at the practice complies with relevant legislation.
4. Protocols ensure that if countersigning reports created by a colleague, the radiologist only does so if he/she is satisfied that the content of the report is correct.
5. The practice ensures that where an amendment or addendum to a report is made, this must be identified as such on the report and under whose authority it has been made.
6. If preliminary reports are prepared, the practice has a process for reconciling any differences between preliminary and final reports and for ensuring that this is communicated to the referrer.
7. The practice has implemented a policy governing the provision of verbal and written reports to referring medical practitioners.
8. Comparison with prior studies is included in reports where these prior studies are available and relevant.

5.5.2 Remote Reporting

The practice and the reporting radiologist must ensure that the remote reporting radiologist has access to the same referral and clinical information as an on-site radiologist.

Indicators

1. The practice ensures that protocols for transmission of imaging data are available at the transmitting and receiving sites appropriate to the scope of examinations being performed.
2. These protocols are specific to each examination type being performed and include references to the following:
    - The examination
    - Acquisition method including resolution
    - Compression type and level for each examination
    - Image orientation

- Image sequence selection
- Urgency of examination
- Transmission time
- The number of images in the series.
- The personnel responsible for the examination at the examination capture site.

3. Patient data is identifiable and contains the following information:
   - Full name
   - Unique identifier
   - Date and time of examination
   - Diagnostic imaging service name
   - Type of examination
   - Compression type and level
   - Patient notes (including the request for the patient's examination which is transmitted either by facsimile or electronically)
   - Annotations including side markers.
4. The practice ensures that where data transfer occurs, compression levels are selected according to practice quality requirements based on test pattern analysis, and are subject to ongoing clinical image review by the radiologist.

5.5.3 Communication of Imaging Findings and Reports

The practice shall ensure that reports are made available in a clinically appropriate, timely manner and shall carry out regular reviews at least once every year on the time between the performance of the study and the issuing of the report.

Notes: The ACHS Clinical Indicator for the reporting of in-patient films[14] shall be referred to in relation to in-patient examinations.

Services should refer to the ACR Practice Guideline for Communication of Diagnostic Imaging Findings as a guideline for further detail[15].

When considering the framework to identify urgent and non-urgent findings, it is recommended that practices refer to the Massachusetts Coalition for the Prevention of Medical Errors Communicating Critical Test Result recommendations for guidance [16].

Indicators

1. The practice has a documented policy for report turnaround times which sets out expected turnaround times for defined urgent and non-urgent findings.
2. The practice maintains records of regular reviews of reporting turnaround times in accordance with this policy, and implements and records corrective action should there be any indications that the designated reporting times are not being met.
3. If there are urgent and significant unexpected findings, there is a protocol which ensures that:
   a) the reporting radiologist uses all reasonable endeavours to communicate directly with the referrer or an appropriate representative who will be providing clinical follow-up;
   b) a record of actual or attempted direct communication is maintained by the practice; and
   c) the reporting radiologist co-ordinates appropriate care for the patient if they are unable to communicate such findings to the referring clinician.

5.5.4 Consultation with Referrers

The practice shall ensure that there are mechanisms in place to enable the referrer to discuss imaging findings with the reporting radiologist.

Indicators

1. The practice has implemented a policy for consultation with referrers, including the provision of information to referrers regarding imaging strategies which are appropriate for particular clinical problems.
2. This consultation includes advice on the current transition from film-based to digital image transfer with advice on the advantages of digital techniques and requirements for appropriate viewing equipment.

5.6 Quality

5.6.1 Image Review – General

The practice shall implement, maintain and follow a documented program of image review by peers for each modality performed at each of its sites.

Some modalities have specific image review requirements which are described in the modality specific requirements.

Indicators

1. Where these are not required elsewhere in these standards, the practice participates in or is working towards a peer-based image review for each modality that it provides.
2. Unless specified differently elsewhere in these standards, such reviews are carried out at least annually.

6 | SAFETY

The practice shall conduct all diagnostic and/or interventional radiology examinations in a manner which ensures the safety of patients, personnel and the environment. As a minimum all applicable regulatory requirements shall be met.

6.1 Safety of the Practice Environment

The practice shall monitor accommodation and environmental conditions as required by the relevant imaging specifications (including regulatory requirements) and where they influence the quality and safety of medical imaging services.

Indicators

1. Where equipment is found to be defective it is taken out of service, clearly labelled and not returned to service until it has been repaired and shown by calibration and/or checks to meet relevant acceptance criteria.

6.2 Infection Control – General

All applicable regulatory health-related infection control guidelines shall be followed.

Notes: In New Zealand practices should refer to the Health Quality and Safety Commission's Infection Prevention and Control Program[17].

Indicators

1. The practice documents all policies and procedures for all infection control issues, including sterilisation/ disinfection and hand hygiene.
2. These policies and procedures comply with the applicable regulatory standards and the NHMRC Australian Infection Control Guidelines[18] and the Australian Immunisation Handbook[19].

6.3 Radiation Safety

6.3.1 ALARA Principle

The practice shall apply the ALARA principle ('as low as reasonably achievable') to each radiological procedure performed, and must document radiation safety policies and procedures which aim to minimise radiation exposure, in accordance with the ALARA principle.

Indicators

1. The practice can demonstrate through its radiation safety policies, procedures, and imaging protocols that it applies the ALARA principle to each radiological procedure that is performed.
2. The practice records patient doses and aggregates these annually in order to establish Practice Dose Reference Levels (PRLs).
3. These PRLs are reviewed annually to determine the need for dose optimation activity.
4. PRLs are also reviewed against national DRLs where these are published[20].

6.3.2 Compliance with Radiation Safety Legislation

The practice shall comply with the requirements of all radiation safety legislation.

Indicators

1. The practice retains all records required under relevant radiation safety legislation (including national, state/territory, New Zealand and local government legislation) and under the directions of relevant regulatory authorities (including: state/territory/New Zealand radiation safety agencies, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)[21][22].
2. It retains records of any corrective action notices issued by radiation safety regulatory bodies, and the corrective action taken.
3. It retains records of any corrective action the service itself deems necessary to comply with the requirements of relevant radiation safety legislation and the corrective action taken.

6.3.3 Radiation Safety Officer

Where ionising radiation is used, the practice shall appoint a radiation safety officer whose responsibility it is to ensure that the practice adheres to relevant radiation safety legislation at the practice site.

Indicators

1. The practice has appointed a radiation safety officer who maintains the requisite skills to fulfil the position criteria contained in the radiation safety officer job description.
2. The radiation safety officer monitors changes in the legislation, adjusts policies and activities accordingly and communicates these to practice personnel.
3. The radiation safety officer co-ordinates record keeping in relation to radiation safety at the practice.

6.4 Waste Management

Practice waste shall be stored and disposed of safely and in a manner which complies with the relevant regulatory/legislative requirements.

Indicators

1. The practice has implemented procedures addressing the storage and disposal of contaminated/medical waste and the use of laundry and linen services, which comply with the relevant regulatory/legislative requirements.

6.5 Use of Contrast Media

The practice shall ensure the safe use of contrast media and have a protocol for the management of adverse reactions to contrast media.

Notes: Practices may wish to assign 'the Resuscitation Officer' as the designated CPR training officer in order to efficiently and economically manage CPR training across the practice.

Indicators

1. The practice has implemented a procedure for the use of contrast media which ensures that the service complies with the current versions of the RANZCR contrast guidelines[12][23].
2. It has a policy which ensures appropriate storage and use of contrast media in accordance with National Recommendations for User-applied Labelling of Injectable Medicines, Fluids and Lines[24].
3. It has designated personnel who hold current CPR certification and are trained in the appropriate management of contrast reaction and the use of resuscitation equipment to support the management of adverse reactions to contrast.
4. It has a clearly identified staff member who ensures that resuscitation equipment and drugs etc. are present and in a state of readiness.

5. It maintains a documented plan of management for likely adverse events due to contrast reactions, which includes as a minimum:
    a) a prominently displayed documented procedure describing the management of reactions, and reference to 'Emergency management of anaphylaxis in the community'[25];
    b) identification of personnel responsible for managing the treatment of contrast reactions; and
    c) a protocol for transfer of a patient to an acute care facility if required.

6.6 Sedation and Anaesthesia

6.6.1 Use of Sedation - Under Review

The practice shall ensure the safe use of sedation.

Notes: Practices should refer to Item 7.4 in these standards in relation to discharge procedures.

Indicators

1. The practice has implemented policies and procedures which ensure the safe management and use of sedation. The policies and procedures identify personnel who are adequately trained and authorised to select patients for, administer sedation to and manage sedated patients.
2. These policies and procedures are consistent with the ANZCA PS09 Guideline[2].
3. It records drugs used for sedation, the person administering the drugs and the management of sedated patients.

6.6.2 Use of Anaesthesia

The practice shall ensure the safe use of anaesthesia.

Notes: Practices should refer to Item 7.4 in these standards in relation to discharge procedures.

Indicators

1. The practice has implemented policies and procedures which ensure its management of the use of anaesthesia is consistent with ANZCA PS55 Policy[3] and ANZCA PS09 Guideline[2].
2. It ensures that personnel administering general anaesthesia are trained anaesthetists with assistance as defined in ANZCA PS55[3] and ANZCA PS09 Guideline[2].

6.6.3 Use of Medications

The practice shall ensure that all medications used in imaging procedures are used appropriately, labelled appropriately and are stored according to the manufacturer's guidelines.

Notes: This standard applies to medications used for sedation and anaesthesia and all other medications other than contrast media, which are addressed in 6.5.

Indicators

1. The practice has implemented a medications management process that identifies patients at risk from adverse reactions and ensures that only appropriately qualified and authorised personnel administer medications.
2. It has designated personnel who hold current CPR certification and are trained in the appropriate management of adverse reactions to medication and the use of resuscitation equipment to support the management of these.
3. It has a clearly identified staff member who is designated as the resuscitation officer to ensure that resuscitation equipment and drugs are present and in a state of readiness in the case of an adverse reaction to medication.
4. Medications are clearly labelled in accordance with the National Recommendations for User-applied Labelling of Injectable Medicines, Fluids and Lines[24].

5. The practice medications inventory demonstrates that all medications are stored and disposed of according to manufacturer's guidelines.
6. It has designated personnel who hold current CPR certification and are trained in the appropriate management of contrast reaction and the use of resuscitation equipment to support the management of adverse reactions to contrast.

7 | PATIENT MANAGEMENT

The practice shall ensure that patient management procedures address the needs of patients and support the practice in its delivery of safe, quality diagnostic and/or interventional radiology services.

7.1 General

The practice shall have procedures for the management of patients which address all provisions necessary to protect the interests of the patient and the service.

These procedures shall be designed to ensure the safety and well-being of patients, visitors accompanying patients, and children in the care of patients whilst in the practice.

Notes: Resources to support quality and safety measures for patient management are available from the Australian Commission on Safety and Quality in Healthcare www.safetyandquality.gov.au.

Indicators

1. The practice has implemented patient management policies and procedures which include patient transportation, reception, patient comfort, patient preparation, falls prevention, privacy, clinical handover and post-procedure observation and discharge; these policies and procedures are consistent with the current Australian Charter of Healthcare Rights[26].
2. These policies and procedures address the early identification and management of patients at increased risk of, or who are critically ill.
3. These patient management policies and procedures provide for patients whose examinations involve teleradiology.

7.2 Patient Identification and Records

The practice shall have a system for uniquely identifying patients and records relating to them, which shall occur from the time the patient presents through to all stages of the examination.

Notes: The College notes that in the absence of consensus among stakeholders on the appropriate archiving period for digital images by imaging providers, implementation of an interim minimum period of 6 months should be applied. It is recognised that longer term digital storage is likely to become a requirement, subject to development of appropriate infrastructure to facilitate tracking and transfer of digital images.

There are many implications around establishment of a retention period that involve consideration of infrastructure, centralised repositories for data and cost; not all of these factors are within the control of imaging providers.

Some examinations may require a longer retention period, but agreement on a longer retention period for individual cases will need to be arrived at through consultation between the referring practitioner and the imaging specialist.

Indicators

1. The practice has a patient identification system which uniquely identifies each patient (eg. full name and date of birth or full name and medical record number).
2. It ensures the correct patient identification is maintained on all records, including reports.

3. The practice has implemented a system whereby it can ensure that:
    - Diagnostic quality images are recorded of all examinations performed with digital techniques as per item 3.7.1 in these standards.
    - Where images are not stored on films or portable media held by the patient, digital or film images of diagnostic quality are retained for 6 months OR the applicable statutory period whichever is the longer, and shall be available to the referring doctor (or related clinician managing the patient's care, where appropriate) consistent with the requirements stated under item 5.3.1, Indicator 3.
    - The practice has implemented protocols that identify which studies require an extension to this retention period, and ensure that this occurs.
4. Examination records include patient identification, the date and, where necessary, time of the study and the practice name imprinted on them.
5. The identity of the person who performed the study is available either on the image or other associated records such as the worksheet, request form, etc.
6. When images are provided with a report, a record is made of the method of transfer (portable media, film, electronic transmission or other) and of the person to whom the images were provided (i.e. patient or referrer).

7.3 Correct Patient, Site and Procedure

The practice shall ensure that prior to a procedure being performed it is the correct intended procedure to be performed on the correct patient, at the correct site on the patient.

Notes: Existing state or territory health department policies may be adopted or used for guidance in developing a practice procedure.

Indicators

1. The practice has implemented a 'time out' protocol which ensures that prior to a procedure being performed the medical imaging personnel performing the examination confirm that the correct procedure is being performed on the correct site of the correct patient, and that this process is documented in the patient's record.
2. This protocol ensures that where a component of the correct patient, correct site, correct procedure is found to be incorrect, corrective action is taken and is documented in the patient's record.
3. This protocol is consistent with the Australian Commission on Safety and Quality in Health Care's protocols[27].

7.4 Discharge Procedure

The practice shall have a documented policy for the discharge of sedated patients, or those who have been anaesthetised.

Indicators

1. The practice has implemented a procedure which ensures that patients who have been sedated or placed under anaesthetic are discharged in the care of a responsible adult after appropriate recovery.
2. Such patients are provided with clear instructions concerning driving, operation of equipment etc.

7.5 Patient Consent

The practice shall ensure that patients have access to appropriate information to make an informed decision prior to an imaging examination being undertaken and to prepare for the examination itself.

Notes: The format of consent will differ according to the level of risk associated with each imaging examination. For example, consent may take the form of 'implied consent' following verbal discussion with patients in the case of general x-ray examinations of extremities. More complex examinations and those involving contrast will require more definitive, written consent.

The RANZCR Medical Imaging Consent Guidelines[28] are recommended as a useful resource when approaching patient consent.

InsideRadiology[29] is also recommended as a useful resource to practices in providing referrers and patients with information on imaging procedures.

Indicators

1. The practice provides comprehensive information to patients on the imaging procedure to be performed prior to it being undertaken.
2. The information includes:
    - Pre-treatment preparation and/or instructions
    - Post-treatment and/or discharge instructions
    - Fee information
    - Risks
    - Involvement of students/trainees
    - The role of the person performing each stage of the examination.
3. The practice meets or is developing capacity to meet the communication needs of non-English speaking patients in providing such information.
4. It maintains records of patient consent.

7.6 Privacy Policy

7.6.1 Privacy Policy

The practice shall have a privacy policy relating to all practice activities, including those involving teleradiology.

Indicators

1. The practice has implemented a privacy policy which:
    a) governs the use of patient personal information within the service and its disclosure to other parties;
    b) addresses the 13 Australian Privacy Principles (APPs) set out in Schedule 1 of the Privacy Amendment (Enhancing Privacy Protection) Act 2012, which amends the Privacy Act 1988[30] ;
    c) complies with other laws and any applicable codes of practice governing personal privacy, confidentiality of clinical information and data protection in the relevant jurisdiction;
    d) is publicly available; and
    e) allows the patient to access their clinical records.
2. It documents in its Privacy Policy if, where and why its management of patients' personal information varies from the Australian Privacy Principles[30] if this occurs.

7.6.2 Patient Consent to Use of Information

The practice shall implement a procedure for seeking the consent of patients to the proposed use of their personal information.

Indicators

1. The practice has implemented a procedure for gaining patients' consent to the use of their personal information.
2. The method by which consent is sought is consistent with the practice's privacy policy, and sets out in plain language the proposed uses of personal information (which includes images, reports and requests).
3. The practice seeks patient consent for the use of the patient's personal information:
    - In image review and clinical audit

- For reporting to referring providers and others involved with the patient's care
- Onward referrals
- Storage in teleradiology systems
- Providing images and reports on request to clinical providers subsequently caring for the patient.

7.6.3 Patient Consent to be Recorded in Information Systems

The practice shall have information systems that are capable of recording the patient's consent and any restrictions on the use of personal information.

Indicators

1. The practice has implemented, or is working towards implementation of a process for recording patients' consent in the service's information system.
2. This information system is or will be capable of flagging any personal information that is subject to restricted consent.

7.7 Open Disclosure

The practice shall implement an open disclosure program.

Indicators

1. The practice operates an open disclosure program which is consistent with the National Open Disclosure Framework[31].

8 BMD

8.1 BMD Records

Practices shall comply with the requirements for the retention of non-medical records contained in the Accreditation Guidelines for Bone Densitometry[32].

Indicators

1. Practice records demonstrate that raw data from all scans is stored using long-term electronic storage mediums.
2. Quality control data relevant to the validation of scans are also stored.
3. These records are stored for a minimum of 10 years, or for the minimum applicable statutory requirements (whichever is longer).

8.2 Equipment

8.2.1 BMD – Equipment

Practices performing Bone Mineral Densitometry must comply with the equipment and instrumentation requirements for compliance testing and calibration in the Accreditation Guidelines for Bone Densitometry[32].

Indicators

1. The practice equipment records demonstrate that acceptance testing has been, and compliance testing of BMD equipment is, carried out according to regulatory requirements.
2. Operation manuals for the BMD equipment are readily available to personnel operating BMD equipment.
3. A BMD equipment maintenance program has been implemented and all aspects of the densitometer performance are checked according to the manufacturer's specifications.
4. Records are kept of all communications with the manufacturer, subsequent to installation of the machine.
5. All software updates are implemented as soon as practicable.
6. All faults discovered are remedied and the fault and remedial action activity are recorded.
7. Records of calibration, QC, repair and maintenance of each item of equipment are kept for the life of the equipment.

8.2.2 BMD Equipment Quality Control

Practices performing BMD must comply with the quality control requirements of the Accreditation Guidelines[32] and the BMD In Vivo Short Term Precision Testing Guideline[33].

Indicators

1. In addition to those required by the manufacturer, the practice's BMD equipment operation manuals include quality control monitoring requirements and quality assurance criteria which are consistent with Appendices 2 and 4 of the Accreditation Guidelines[32].

2. If the unit fails any of the quality control procedures it is evaluated in accordance with the operating manual. With repeated failures, patient measures are suspended until the equipment is thoroughly evaluated by an engineer recognised to do so by the relevant regulatory body.
3. If there is a suspicion that previous patient results may be inaccurate, a retrospective re-analysis of the relevant data is performed.
4. Quality control activity, including corrective and preventive action, is recorded.
5. Subject to any required regulatory approval the practice performs In Vivo Short Term Precision Testing[33] on all DXA machines upon installation and after every major service/repair.

8.3 BMD – Personnel

8.3.1 BMD Technologist Qualifications

A BMD Technologist's qualifications shall meet those specified in the Accreditation Guidelines[32].

Notes: A BMD technologist who was operating BMD equipment as at 1 November 2000 and who has certification of competence by a radiologist meets these guidelines.

A BMD technologist who commenced operating BMD equipment after 1 November 2000 and before 31 December 2004 who has certification of competence by a radiologist shall also have a tertiary qualification in radiography/nuclear medicine/nursing.

A BMD technologist commencing operation of BMD equipment after 31 December 2004 must have completed the undergraduate and postgraduate training requirements set out in the Accreditation Guidelines[32].

Indicators

1. The practice's BMD technologists have either:
   a) certification by a radiologist that as at 1 November 2000 they were operating BMD equipment and were deemed competent to do so; OR
   b) a tertiary qualification (degree or diploma) in the field of radiography, nuclear medicine, science or nursing, and additional post-graduate training in bone densitometry; OR
   c) certification of their BMD training from the ANZBMS.
2. Only radiographers meeting the qualifications described in 4.2.2 perform quantitative computed tomography (QCT) examinations.
3. The BMD technologists hold current regulatory radiation licenses or registration where these are available.

8.3.2 BMD Service Engineers - Qualifications

BMD Service Engineers must comply with the Accreditation Guidelines[32].

Indicators

1. The practice's BMD equipment is tested for compliance and maintained by a service engineer accredited to do so by the relevant regulatory body/ies, and where appropriate, the ACPSEM.

8.3.3 BMD - Radiologist or Medical Specialist CPD

A radiologist or other medical specialist practising BMD shall comply with the CPD requirements set by the Accreditation Guidelines[32].

Indicators

1. The practice's radiologist/medical specialist providing the BMD services maintains a BMD reference library which he/she updates annually.

8.4 BMD – Professional Supervision

8.4.1 BMD Technologist Responsibilities

The responsibilities of the BMD technologist shall comply with those described in the current version of the Accreditation Guidelines[32].

Indicators

1. The scope of responsibilities of the practice's BMD technologists covers:
    - Personal preparation and positioning of the patient
    - Personal conduct of the scan
    - Personal analysis of the scan, and preparation of the report for checking by the radiologist or reporting medical specialist
    - Quality control, quality assurance and equipment performance activity.

8.4.2 Performance of the BMD Examination

Professional supervision protocols for the performance of BMD examinations shall comply with those described in the current version of the Accreditation Guidelines[32].

Indicators

1. These protocols ensure the maintenance of a BMD procedure manual under the professional supervision of the radiologist/medical specialist.
2. Only validated methods are used and these are documented in the BMD procedure manual.
3. The practice's BMD reference library is available to support and supplement this BMD procedure manual.
4. BMD examinations are conducted in accordance with the practice's BMD procedure manuals.
5. The practice's professional supervision protocols for BMD examinations ensure that the radiologist/medical specialist is readily contactable to discuss and, if necessary, alter the conduct of the examination.

8.4.3 BMD – Reports

Practices shall comply with requirements for reports contained in the Accreditation Guidelines[32].

Indicators

1. In addition to those items required under 5.5.1, the practice's BMD reports contain:
    - Type of densitometer, scan mode, software version
    - Type of scan
    - Quantitative result
    - Reference intervals and their source
    - Reference to previous studies, where applicable.
2. Practice protocols ensure that all reports are checked and approved by the supervising radiologist/medical specialist prior to issue.

8.4.4 BMD – Interpretation and Consultation

The radiologist/medical specialist providing BMD services shall be readily available to provide a consulting service to referring clinicians in order that they may obtain authoritative advice from the radiologist/medical specialist (or under their delegation, the BMD technologist).

Indicators

1. The practice's professional supervision protocols ensure that a consultation service is available to referring practitioners whereby they can obtain information in relation to a patient's BMD examination, which includes:

- The precision and accuracy of methods used in the unit, including in vivo and in vitro precision estimates for all scans performed in the unit
- The statistical significance of results and their relation to reference intervals, this includes data on the source of the reference interval used for scan interpretation
- The scientific basis and the clinical significance of the results
- The suitability of the requested procedure to solve the clinical problem in question
- Further procedures which may be helpful.

9 | CT

Including Dental Cone Beam CT

9.1 Equipment

9.1.1 CT Performance Testing

The practice shall undertake all quality control requirements as determined by the manufacturer including maintenance and calibration.

Indicators

1. The practice maintains a fully documented program of quality control for CT.
2. Action is taken to remediate any variations from normal that are indicated by such testing and records are kept of any remedial action taken.
3. Preventative maintenance is scheduled, performed and recorded by a qualified service engineer on a regular basis in accordance with manufacturer specifications. Service performed to correct system deficiency is recorded and the records are maintained at the site where the equipment is located.

9.1.2 Monitor Resolution – CT

Monitors for image interpretation must be appropriate to the modality being used and for the scope of examinations performed.

Indicators

1. The reporting and interpretation of CT examinations are carried out using monitors meeting the requirements of 3.6.3, with the exception that the monitor resolution may be reduced whilst still facilitating full resolution display (eg. 1024 x 768 pixels for 512 x 512 CT images).

9.2 Personnel

9.2.1 Medical Practitioner – CT

The medical practitioner providing CT services shall meet the qualifications requirements set out in item 4.2.1 in these standards.

Indicators

1. The practice's CT services are provided by a radiologist who holds a current DRANZCR/FRANZCR certificate or equivalent specialist recognition.
2. The practice's CT Coronary Angiography (CTCA) services are provided by a specialist who holds current registration as a CTCA specialist with the Conjoint Committee for the Recognition of Training in CT Coronary Angiography.
3. The practice's CT Colonography (CTC) services are provided by a radiologist who is currently recognised to do so by the RANZCR CT Colonography Accreditation Committee.

9.3 Professional Supervision

9.3.1 Review of Appropriateness of Request

The practice shall ensure that the review of the request and patient preparation for CT examinations is carried out under appropriate professional supervision.

Indicators

1. Protocols are in place so that inappropriate studies can be avoided and triaged to non-ionizing radiation based imaging techniques.
2. The practice maintains professional supervision protocols for CT which set out criteria regarding indications for patients who should or should not receive contrast agent, the appropriate dose of contrast agents for CT examinations, and indicate when consultation with the supervising radiologist is required.
3. The protocols include flags for mandatory radiologist image review prior to the patient leaving the site.
4. The practice ensures that the radiologist is readily contactable to discuss and, if necessary, alter the conduct of the imaging examination.
5. Any regulatory requirements in relation to on-site supervision by the radiologist/s for this component of the service are also met.

9.3.2 Performance of CT Examinations

The practice shall ensure that the radiologist is responsible for the implementation and adherence of appropriate written protocols to be followed by members of the imaging team for this component of the imaging service.

Indicators

1. The practice has protocols for CT examinations which have been developed and implemented under the professional supervision of the radiologist, and which are followed by the medical imaging team.
2. These protocols ensure that a radiologist is available (either on-site or remotely) to review a patient's images in order to alter the conduct of the examination or scanning protocols as required.
3. These protocols ensure that CT examinations, either with or without IV contrast, are performed by a radiographer (as per 4.2.2), and that the radiologist is readily contactable to discuss and, if necessary, alter the conduct of the imaging examination in or out of hours.
4. These protocols ensure that the task of obtaining intravenous access for administering intravenous contrast for CT examinations is only performed by a medical practitioner or delegated to a radiographer, nurse or other person who is adequately trained in venipuncture and the administration of contrast[12].
5. These protocols ensure that the radiologist or other medical practitioner who is aware of this responsibility shall be immediately available to personally attend and treat the patient in case of a complication of intravenous contrast administration or other medical emergency.
6. Any regulatory requirements in relation to on-site supervision by the radiologist for this component of the service are also met.

9.3.3 Interpretation and Reporting of CT Examinations

A CT examination shall be interpreted and reported by a diagnostic imaging specialist.

The interpreting radiologist is responsible for the interpretation of all information on the axial source images obtained from all phases of the examination (eg. pre-contrast, arterial phase, venous phase and delayed phase) as well as any 2D and 3D reformatted imagines and cine loops resulting from the study.

Indicators

1. CT examinations at the practice are interpreted and reported by a medical practitioner holding the qualifications described in item 4.2.1 in these standards.

9.3.4 Quality

9.3.4.1 CT - Image Quality

The practice shall complete the RANZCR CT Image Review Self Audit protocol[34] and Worksheet[35] for each CT unit at least annually. The practice shall take action to remediate any variations from normal that are indicated by the audit and shall maintain a record of actions taken.

Indicators

1. The practice's RANZCR CT Image Review Self Audit records demonstrate that the practice:
   - Completed this protocol within 3 months of installation
   - Completes this protocol at least annually
2. Any variations from normal are recorded.
3. Any corrective or preventive action required is taken and is recorded as part of the audit process.

9.3.4.2 CT Dose

The practice shall maintain and regularly review CT scanning protocols to ensure they are optimised to limit patient radiation exposure.

Where the CT unit being used is capable of displaying DLP or CTDI figures, the practice shall review CT patient dosimetry for specific common scan protocols, and shall document the typical DLP for the specified protocols. Where relevant national DRLs exist, typical patient doses shall be regularly compared with the DRLs. Significant deviation of typical doses above (or below) national DRLs must be investigated with a view to optimisation of doses while maintaining image quality.

Indicators

1. Practice records show that its radiologists maintains and regularly review CT scanning protocols, which are optimised to limit patient radiation exposure.
2. Where the CT unit being used is capable of displaying DLP or CTDI figures, the practice reviews CT patient dosimetry at least annually for specific common scan protocols and documents the typical DLP for the specified protocols.
3. Through this process, the practice establishes Practice Dose Reference Levels (PRLs) for CT.
4. Any significant deviation above (or below) previous PRLs are investigated and a dose optimisation program is conducted that addresses this deviation while maintaining diganostic image quality.
5. Where national DRLs exist[20], PRLs are regularly compared with these national DRLs.
6. Significant deviation of PRLs above (or below) DRL's are investigated and a dose optimisation program is conducted that addresses this deviation while maintaining diganostic image quality.

10 | GENERAL X-RAY

10.1 Equipment

10.1.1 Monitors – General X-Ray, CR/DR

Monitors for image interpretation must be appropriate to the modality being used and for the scope of examinations performed.

Indicators

1. The interpretation and reporting of general x-ray, CR/DR examinations are carried out on monitors with a minimum resolution of (1600 x 1200) 2 MP Colour/Monochrome.

10.2 Personnel

10.2.1 Operators of General Radiography Equipment

General x-ray examinations must be performed by personnel who hold the relevant jurisdiction's use licence (however named) and restrict their practice to the scope of this licence.

Notes: Medicare Australia has criteria for 'rural and remote' status which practices should meet if the personnel providing general x-ray examinations are other than a radiographer qualified as per item 4.2.2.

Indicators

1. The particular circumstances of the practice are such that the personnel operating the general x-ray equipment hold a current relevant jurisdiction/s use or operator's license (however named) and restrict their practice to the scope of that licence.
2. The practice meets all regulatory conditions relating to supervision of such personnel.

10.3 Professional Supervision

10.3.1 Fluoroscopy Examinations

The practice shall ensure that appropriate professional supervision arrangements are implemented for fluoroscopic examinations depending on the nature of the examination.

Indicators

1. The practice protocols and corresponding rosters ensure that the radiologist responsible for each fluoroscopic examination is available to personally attend the patient.
2. The practice ensures the safe use of contrast for fluoroscopic examinations according to item 5.4.2 in these standards.

10.3.2 Quality

10.3.2.1 General X-Ray Image Review – Plain Film

The practice shall ensure that x-ray repeats are monitored and reviewed in adherence to the ALARA principle.

Indicators

1. The practice performs repeat analysis for general x-ray examinations and records results and corrective actions where required.
2. It uses this repeat analysis to monitor dose usage and image quality in its general x-ray services.

10.3.2.2 CR/DR Performance Testing

The practice shall maintain a QA program specifically designed to assess the performance of its CR/DR equipment.

Indicators

1. The practice follows the manufactures' equipment testing guidelines and the RANZCR General X-ray QA and QC Guideline[36] for all its CR/DR equipment and maintains records of this activity.
2. The practice has implemented, or is working towards implementation of a process which maintains dose output records (commencing from acceptance testing) and reviews dose optimisation at least 6 monthly, ensuring that any general increase in dosage levels is identified, examined, corrected as necessary and recorded.
3. It maintains records of repeat analysis for CR/DR examinations and takes and records any required corrective action.

10.3.2.3 Fluoroscopy – Image and Screening Time Review

The practice shall implement, maintain and follow a documented QA program for fluoroscopy procedures.

Indicators

1. The practice's review of its fluoroscopy services includes a 6 monthly review of screening times.
2. The practice either conducts or is working towards implementation of an internal fluoroscopy image review program which is subject to an annual audit by the medical and non-medical imaging team members.

10.4 Safety

10.4.1 Radiation Safety – Fluoroscopic Examinations

A log must be maintained of screening times and (where the fluoroscopy equipment is capable of this) dose for all fluoroscopic examinations.

Corrective action shall be taken as necessary to minimise patient exposure.

Indicators

1. The practice records screening times for all fluoroscopic examinations.
2. The practice records the Dose Area Product (DAP) for all fluoroscopic examinations or where that is not possible, the average kVp and mAs is recorded.
3. The practice takes and records any corrective action that is necessary to minimise patient exposure.

11 | INTERVENTIONAL RADIOLOGY

Notes: It has been determined by IRSA that there are two tiers of PERIPHERAL interventional radiology: Tier A and Tier B. These are defined in Appendicies B and C.

11.1 Facilities

11.1.1 Interventional Radiology Suite – Tier A Procedures

The Interventional Radiology suite used for Tier A procedures must be of sufficient size to allow safe patient transfer from bed to table, to allow room for all the fixed hardware and movable hardware such as physiological monitors, resuscitation trolleys and any patient support systems, and to allow adequate space for the operating team and support personnel.

Indicators

1. The CT and ultrasound rooms have sufficent space to allow safe patient transfer from bed to table.
2. The interventional radiology suite used for Tier A interventional radiology procedures allows sufficient room for all fixed hardware and movable hardware such as physiological monitors, resuscitation trolleys and any patient support systems without compromising either the transfer of the patient or the operating team and support personnel's ability to manage the patient.
3. The suite is equipped with Advanced Life Support (ALS)[4] equipment.

11.1.2 Interventional Radiology Suite – Tier B Procedures

The interventional radiology (or angiography) suite used for Tier B interventional radiology procedures must be of sufficient size to allow safe patient transfer from bed to table, to allow room for all the fixed hardware and movable hardware such as physiological monitors, resuscitation trolleys and any patient support systems and to allow adequate space for the operating team and support personnel.

Indicators

1. The interventional radiology/angiography suite used for Tier B interventional radiology procedures at the practice is of sufficient size to allow safe patient transfer from bed to table.
2. The angiography suite allows sufficient room for all fixed hardware and movable hardware such as physiological monitors, resuscitation trolleys and any patient support systems without compromising either the transfer of the patient or the operating team and support personnel's ability to manage the patient.
3. The suite is equipped with ALS[4] equipment.

11.1.3 Interventional Neuro-radiology Facilities

Intracranial, spinal, and neural axis neuro-interventional procedures shall only be performed where appropriate facilities and suitably qualified personnel are available.

Indicators

1. The practice ensures that intracranial, spinal and neural axis neuro-interventional procedures are performed only when/if neurosurgical facilities are available on site and a neurosurgeon or other appropriate clinical specialists are available either on site or on call.

11.2 Equipment

11.2.1 Angiography

The practice shall ensure that appropriate equipment is used for angiography procedures.

Notes: Carotid stenting (and the associated required extra cranial and intracranial angiographic imaging) is recognised in these standards as both a peripheral intervention (Conjoint Committee for Peripheral Endovascular Intervention) and an extra-cranial neuro-intervention (Australian and New Zealand Society for Neuroradiology). Therefore, the equipment requirements under 11.2.1 OR 11.2.2 apply for extra-cranial carotid stenting.

Mobile image intensifiers are not recommended for diagnostic angiography on a routine basis as they may have limitations in real time image quality, stored image data handling, permanent image quality (hard copy), comparative increase in radiation dose to patients and staff, and increased contrast material requirements. Further, as their output is less than 50kW, their use leads to inferior images in thick body parts. Mobile flat panel technology can be used for diagnostic angiography on a temporary basis, eg. to cover fixed equipment breakdown.

Indicators

1. The practice ensures that when diagnostic angiography procedures are performed, a fixed high resolution (at least 512x512) matrix image intensification system or flat plate CCD system with at least a 25cm field and with digital acquisition and subtraction is used.
2. The practice ensures that when mobile image intensifiers are used, it is only in conjunction with peripheral vascular interventions and not for routine diagnostic angiography:
   a) where fixed units are available in the facility, the mobile unit is only used in conjunction with an operative procedure (eg. combined end-arterectomy and angioplasty); and
   b) carotid stenting procedures are not carried out using mobile units.

11.2.2 Neuro-Angiography

Practices shall comply with the equipment requirements contained in the RANZCR, ANZSNR, IRSA Guidelines for Accreditation and Credentialing in Interventional Neuroradiology[37].

Notes: Carotid stenting (and the associated required extra cranial and intracranial angiographic imaging) is recognised in these standards as both a peripheral intervention (Conjoint Committee for Peripheral Endovascular Intervention) and an extra-cranial neuro-intervention (Australian and New Zealand Society for Neuroradiology). Therefore, the equipment requirements under 11.2.1 OR 11.2.2 apply for extra-cranial carotid stenting.

Indicators

1. The practice's equipment inventory demonstrates that its equipment for neuro-angiography procedures complies with the RANZCR, ANZSNR, IRSA Guidelines for Credentialing in Interventional Neuroradiology[37]

11.2.3 Angiographic Injector

The practice shall use appropriately equipped angiographic injectors.

Indicators

1. The practice ensures that when angiographic injectors are used they are capable of varying injection volumes and rates and have appropriate safety mechanisms to prevent over injection.

11.2.4 Equipment for Non-vascular Procedures

For non-vascular interventional procedures, all imaging modalities which are appropriate to the case in question must be available on site or the patient shall be referred to another site where these modalities are available.

Indicators

1. The practice ensures that all imaging modalities appropriate to non-vascular interventional procedural requirements are available on site and that patients are referred to another service when these modalities are not available.

11.2.5 Supplies

The practice must maintain sufficient supplies of devices for the range of interventional procedures performed at the site, and for the treatment of possible complications.

Indicators

1. The practice's supplies records show that it maintains sufficient supplies of devices for interventional procedures and the treatment of possible complications.

11.2.6 Physiological Monitoring

Equipment for physiological monitoring of patients undergoing interventional procedures shall be appropriate to the procedure being performed.

Notes: Direct pressure monitoring is advisable for pulmonary arteriography and may be required for determining intravascular pressure gradients in peripheral and visceral diagnostic angiography.

Indicators

1. For Tier A procedures, ECG and blood pressure monitoring is available when angiography is performed. If patients are ill or receive conscious sedation, a pulse oximeter is also used.
2. For Tier B procedures, comprehensive physiological monitoring is available including ECG, blood pressure, and pulse oximetry.
3. Where warranted, further/supplementary equipment is used which is appropriate to risks associated with the procedures being performed.
4. Such additional equipment includes, where warranted, direct pressure monitoring for pulmonary arteriography and intravascular pressure gradients in peripheral and visceral diagnostic angiography.

11.2.7 Emergency and Resuscitation Equipment

When interventional procedures are performed, there must be ready access to complete emergency resuscitation equipment and drugs[4] .

Indicators

1. When interventional procedures are performed, the practice ensures that emergency resuscitation equipment and drugs are readily available and in working order and that attending personnel are trained in resuscitation[9]:
   - For Tier A procedures, ALS equipment and drugs[4] are available, accessible and ready for use
   - For Tier B procedures, ALS equipment and drugs[4] are available, accessible and ready for use.

11.3 Personnel

11.3.1 Radiologists – Interventional Radiology - Under Review

The radiologist performing interventional procedures must hold qualifications and maintain competency specific to the range of interventional procedures he/she is performing.

Indicators

1. The practice ensures that each radiologist performing Tier A procedures complies with the requirements listed under Item 4.2.1 in these standards.
2. The practice ensures that each radiologist performing Tier B procedures, excepting neuroangiography and/or interventional neuroradiology procedures, is in addition able to demonstrate that he/she meets one of the following current training and ongoing competency requirements:
   a) current training requirements as defined in the IRSA Guidelines for Credentialing for Interventional Radiology[38]; OR
   b) current Training Guidelines of the Conjoint Committee for the Recognition of Training in Peripheral Endovascular Therapy[39].

3. The practice ensures that each radiologist performing extra-cranial carotid stenting is able to demonstrate that he/she meets one of the following current training and ongoing competency requirements:
    a) RANZCR, ANZSNR, IRSA Guidelines for Accreditation and Credentialing in Interventional Neuroradiology[37]; OR
    b) current Training Guidelines of the Conjoint Committee for the Recognition of Training in Peripheral Endovascular Therapy[39].
4. In addition to the qualifications held for Tier A and Tier B procedures, the practice ensures that each radiologist performing neuroangiography and/or interventional neuroradiology procedures meets the current training and ongoing competency requirements as defined in the RANZCR, ANZSNR, IRSA Guidelines for Accreditation and Credentialing in Interventional Neuroradiology[37].
5. The practice ensures that when an endovascular or ablating device is to be used but is not listed on the TGA register, the radiologist performing the associated procedure/s is authorised by the TGA[40].

11.3.2 CPD – Interventional Radiology – Under Review

Radiologists performing Tier A and B procedures must demonstrate participation in relevant CPD activities.

Indicators

1. The practice holds records which demonstrate that its radiologists performing Tier A and/or B procedures including extra-cranial carotid stenting, participate in associated CPD activities recognised by their professional body, including clinical audit of their cases.
2. This CPD activity is consistent with the respective Tier A and Tier B and extra-cranial carotid stenting training requirements listed in Item 11.3.1 in these standards.

11.3.3 CPD – Interventional Neuroradiology – Under Review

Radiologists performing neuroangiography and/or interventional neuroradiology procedures must demonstrate participation in relevant CPD activities.

Indicators

1. The practice holds records which demonstrate that its radiologists performing neuroangiography and/or interventional neuroradiology procedures participate in associated CPD activities including clinical audit of their cases. These are consistent with the ongoing competency requirements listed in Item 11.3.1 in these standards.

11.4 Professional Supervision

11.4.1 Review of Appropriateness of Request – Review of the Referral for Interventional Radiology

The radiologist performing an interventional procedure shall personally attend the patient for this component of the imaging service and where warranted, shall include consultation with the appropriate members of the multidisciplinary team managing the patient's care.

Indicators

1. The practice ensures that the radiologist personally attends each patient undergoing interventional procedures for this component of the medical imaging service and that this is demonstrated in the practice records and patient history/notes.
2. The practice's professional supervision protocols ensure that where warranted, the radiologist includes consultation with multidisciplinary team members managing the patient's care for this component of the medical imaging service.

11.4.2 Examination Supervision – Interventional Radiology (Tier A & Tier B) and Interventional Neuroradiology

Interventional procedures must be performed by a suitably qualified radiologist who is credentialed by the practice where these procedures are performed.

Indicators

1. The practice ensures that its records demonstrate that interventional procedures are personally performed by suitably qualified radiologists who meet the requisite qualifications criteria described in 11.3.1.
2. Neurosurgery facilities and a neurosurgeon are available as per item 11.1.2 in these standards when an intracranial interventional neuroradiology procedure is being performed.

11.4.3 Interventional Radiology – Availability of Personnel

Appropriately trained personnel shall be available in the event of the need for emergency resuscitation.

Indicators

1. The practice protocols ensure that interventional procedures are performed only when personnel trained in emergency resuscitation and emergency resuscitation equipment and drugs are immediately available at the practice and in working order.
2. When Tier A interventional procedures are being performed, personnel trained in advanced life support are available in the event of a patient emergency.
3. When Tier B interventional radiology procedures are being performed, personnel trained in advanced life support are available in the event of the need for emergency resuscitation.

11.4.4 Interventional Radiology – Pre and Post-operative Assessment

All interventional radiologists (peripheral and neuro-interventionist) shall personally attend their patients in order to perform pre-operative and post-operative assessment of their patients, including obtaining consent.

Indicators

1. The practice's professional supervision protocols ensure that each radiologist performing interventional procedures personally either:
   a) attends their patients to make pre-operative and post-operative assessments; OR
   b) delegates this activity to an associate medical practitioner who is a member of the multidisciplinary team managing the patient's care.
2. Each radiologist performing interventional procedures personally either:
   a) obtains consent from each of his/her patients prior to a procedure being performed; OR
   b) delegates this activity to an associate radiologist who is a member of the multidisciplinary team managing the patient's care.

11.4.5 Interventional Radiology Quality Assurance and Improvement Program

A fully documented quality assurance and improvement program must be established to monitor the practice's standards of patient care. It must incorporate the full range of procedures that are performed and shall include a clinical audit at regular intervals.

Notes: Audit should include but not be limited to, all cases performed during the period of audit, review of any morbidities and mortality arising from these cases and action taken to minimise future complications.

Indicators

1. The practice has a quality assurance and improvement program for interventional radiology covering the full range of procedures that are performed at the practice.

2. Indicator thresholds and success rates for all interventional procedures performed by the practice have been established against external evidence-based criteria and are regularly assessed.
3. Policies and practices are reviewed at regular intervals, and action is taken to resolve any problems identified.
4. The quality assurance and improvement program shall include regular mortality and morbidity meetings.

11.5 Safety

11.5.1 Rapid Transport

The practice shall ensure the availability of and have a formal detailed protocol for rapid transport of patients undergoing Tier A Interventional Radiology procedures to an acute care facility.

Indicators

1. The practice has documented protocols which ensure the availability of surgical support for patients undergoing Tier A interventional radiology procedures.
2. The practice has protocols in place which ensure the rapid transport of interventional patients to an acute care facility ensuring timely access to appropriate treatment for all patients consistent with the risks associated with the interventional procedures being performed.

11.5.2 Surgical Support and/or Rapid Transport

When Tier B Interventional Radiology procedures are performed, the practice shall ensure the availability of surgical support or have a formal detailed protocol for rapid transport of patients to an acute care facility.

Indicators

1. The practice has documented protocols which ensure the availability of surgical support for interventional patients undergoing Tier B interventional radiology procedures.
2. The practice has protocols in place which ensure the rapid transport of interventional patients to an acute care facility ensuring timely access to appropriate treatment for all patients consistent with the risks associated with the interventional procedures being performed.
3. Interventional neuroradiology procedures are only performed in practice settings where neurosurgical support is immediately available onsite.

12 | MRI

12.1 Equipment

12.1.1 MRI Equipment Specifications and Acceptance Testing

The practice shall ensure that its MRI system meets the requirements of the Therapeutic Goods Administration (TGA) as contained in the Therapeutic Goods Act 1989 and amended by the Therapeutic Goods Amendment (Medical Devices) Bill 2002 and the Therapeutic Goods (Medical Devices) Regulations 2002.

The practice shall ensure that acceptance testing is carried out at the completion of the installation of the MRI unit prior to regular patient imaging.

Notes: Some states also require testing of the magnetic shielding of the system.

Indicators

1. The practice's equipment inventory shows that the MRI system meets TGA requirements.
2. The practice holds acceptance testing records which demonstrate that such acceptance testing follows AAPM[41], NEMA or other RANZCR-approved standards and includes tests of:
    - Magnetic field homogeneity
    - RF shield integrity
    - RF calibration
    - System signal to noise ratio
    - Signal uniformity
    - Geometrical distortion
    - Slice thickness and positioning accuracy or equivalent tests of gradient performance and RF pulse characteristics.
3. The minimum resolution of monitors used for interpretation and reporting of MRI is 1024x768 Colour/ Monochrome.

12.1.2 MRI Compatible Equipment (In-room Equipment)

The practice shall ensure that all in-room equipment used for sedation/anaesthesia monitoring and resuscitation is MRI-compatible, operational and readily available[42].

Indicators

1. Sedation and associated monitoring equipment for MRI procedures is available within the MRI magnet room, operational, and certified MRI-compatible by the manufacturer of the equipment.
2. Resuscitation drugs and equipment for the potential complications of sedation are immediately available, and all such equipment is operational and certified MRI compatible by the manufacturer of the equipment.
3. When paediatric patients are sedated, sedation and monitoring equipment of an appropriate size for paediatric patients is immediately available, operational and certified MRI compatible by the manufacturer of the equipment.

4. Anaesthesia equipment used in relation to MRI examinations is stationed in the magnet room for MRI, is operational and is certified as MRI compatible by the manufacturer.

12.1.3 MRI Quality Control Program

A documented quality control program must be maintained at the MRI site.

Notes: # Indirect tests of these parameters (eg. shim checks, tests of gradient and RF system performance) may be used.

Indicators

1. The practice maintains a documented MRI quality control program which assesses relative changes in system performance as determined by the MRI radiographer, service engineer, qualified physicists or supervising radiologist/s.
2. All quality control testing is carried out in accordance with specific procedures and methods such as those of AAPM[43] or those recommended by the manufacturer, and include tests of:
   - System signal to noise ratio
   - Signal uniformity
   - RF system stability
   - Ghost intensity (for systems with analogue RF subsystems)
   - Geometrical distortion#
   - Slice thickness and positioning accuracy#.
3. Phantoms used for the above tests include the RANZCR standard phantom/s, manufacturer-supplied phantoms, or other third-party equipment.
4. The practice ensures that regular servicing of the MRI system is carried out, and that service reports and corrective action records are held on site.
5. Preventative maintenance is scheduled, performed and recorded by a qualified service engineer on a regular basis in accordance with manufacturers' specifications.
6. Service performed to correct system deficiency is recorded and the records are maintained at the MRI site.

12.2 Personnel

12.2.1 Qualifications – MRI Radiologist

The medical practitioner reporting and interpreting MRI examinations must hold the radiologist qualifications described in item 4.2.1 in these standards, and must have completed an appropriate level of training in MRI demonstrated by registration with the RANZCR as an MRI radiologist .

Notes: As of 1 January 2013, the RANZCR MRI Supervising Radiologist credential was changed to MRI Radiologist. Certification as an MRI Radiologist is required for radiologists who have:

a) been awarded the DRACR or FRANZCR prior to 1 January 1995 who were not registered as an MRI Supervising Radiologist at 1 January 2013; OR

b) are Educational Affiliates or International Medical Gradutes who were not registered as an MRI Supervising Radiologist at 1 January 2013.

Indicators

1. The practice ensures that each of its radiologists interpreting and reporting MRI examinations for each MRI system operating at the service is registered with the RANZCR as an MRI Radiologist.

12.2.2 Radiologist CPD

The radiologist supervising and reporting MRI examinations must complete a minimum of 30 MRI specific CPD points every 3 years.

Indicators

1. The practice ensures that each of its radiologists is a current participant in the Quality and Accreditation Program.

12.2.3 Qualifications – MRI Radiographer

Radiographers who conduct MRI examinations must have appropriate training such as the ASMIRT Level 1 Certificate, or equivalent training and experience.

Indicators

1. The practice's MRI radiographers have training and experience that can be demonstrated in one of the following ways:
   a) meeting the requirements for the ASMIRT Level 1 Certificate; OR
   b) training and experience equivalent to that required for the ASMIRTs Level 1 Certificate, including at least 300 supervised clinical MRI examinations during the past 2 years; OR
   c) meeting the radiographer qualifications as stated in 4.2.2 with an additional minimum 3 months' FTE MRI experience and performance of at least 300 clinical examinations within the past 2 years; OR
   d) certificate of equivalency as conferred by the ASMIRT.
2. Radiographers training in MRI are supervised by:
   a) an MRI radiographer who either holds the ASMIRT Level 2 Certificate, or has equivalent qualifications and experience; OR
   b) an MRI radiographer, in conjunction with a supervising radiologist who has taken into consideration the student's previous MRI experience (including the number and range of studies), the needs of the MRI facility and the guidelines of the ASMIRT.

12.2.4 Qualifications – MRI Service Engineers

MRI service engineers must be qualified on the basis of training and experience. Their training must have included the model and manufacturer of the MRI equipment used at the practice, details of which must be certified by the service organization.

Indicators

1. The practice ensures that the service organisation providing service engineers for the MRI system confirm certification of the service engineers.

12.2.5 CPD – MRI Radiographer

MRI radiographers shall participate in a program of MRI-specific CPD activity such as the ASMIRT's CPD program.

Indicators

1. The practice ensures that its radiographers performing MRI examinations can provide evidence of MRI-specific CPD activity.

12.3 Professional Supervision

12.3.1 MRI System Supervision

Each MRI unit must be registered with the RANZCR MRI Quality Program in order to establish a consistent MRI supervision framework. Each unit shall have one designated Liaison MRI Radiologist with overall responsibility for running the unit, supervising the staff and maintaining practice standards within the unit, including ensuring that examinations are supervised by suitably qualified radiologists and MRI radiographers, and assuring the quality of images and reports.

Indicators

1. Each MRI unit holds current RANZCR MRI registration ensuring the professional supervision of the MRI unit is maintained by its nominated Liaison MRI Radiologist.
2. The nominated Liaison MRI Radiologist is responsible for designing and periodically reviewing the MRI unit's protocols, including those for safety screening, contrast usage, and pulse sequences performed, and implementing and ensuring adherence to these.
3. The nominated Liaison MRI Radiologist is responsible for ensuring that each MRI radiologist is participating in the RANZCR Quality and Accreditation Program.
4. The professional supervision protocols for MRI provide for delegation of duties to MRI radiographers.

12.3.2 Review of Appropriateness of Request and Patient Preparation – MRI

All requests shall be reviewed and protocoled by an MRI radiologist before an examination is undertaken, and, where appropriate, specific triggers for further review by the MRI radiologist shall be defined.

Indicators

1. The review of the request for an MRI examination is undertaken and protocolled by one of the practice's MRI radiologists.
2. Protocols define a list of examinations that routinely require prompt MRI Radiologist review before patient discharge (eg. suspected cord compression).
3. There is provision for the imaging protocol to require prompt MRI radiologist review of the images before patient discharge (eg. where it is unclear from the initial request whether additional pulse sequences or contrast administration will be required).
4. Safety screening follows RANZCR MRI Safety Guidelines[42] whereby an MRI Radiologist is available for telephone consultation within 10 minutes.

12.3.3 Screening of the Patient undergoing an MRI Examination

The practice shall have procedures to screen patients and all other personnel entering the MRI examination room for potentially hazardous implants and external devices.

See RANZCR MRI Safety Guidelines[42] and ARPANSA Safety guidelines for magnetic resonance diagnostic facilities[44].

Indicators

1. The practice ensures that all patients are screened prior to entering the MRI examination room for potentially hazardous implants and external devices including (but not limited to) intracranial aneurysm clips, cardiac pacemakers, and intra-ocular foreign bodies.
2. These MRI screening protocols ensure that other personnel entering the MRI examination room are screened prior to doing so.

12.3.4 Performance of the Imaging Examination – MRI

The practice shall ensure that each MRI examination is carried out under professional supervision arrangements appropriate to both the patient's clinical needs and the specific examination being undertaken.

Indicators

1. The practice's professional supervision protocols for MRI ensure that all MRI examinations requiring contrast are carried out under the supervision requirements stated in 5.4.2.
2. The protocols ensure that MRI examinations requiring sedation or monitoring of an unstable patient are only carried out when an appropriately trained medical practitioner is immediately available to personally attend the patient, and an MRI radiologist is immediately available to review the images.
3. The protocols ensure that when MRI examinations require image review prior to patient discharge, an MRI radiologist is available to do so within 10 minutes of the completion of image acquisition (either on-site or remotely).

4. The protocols ensure that when all other MRI examinations are performed, an MRI radiologist is available for telephone consultation within 10 minutes of the completion of image acquisition.

12.3.5 MRI Procedures

Technical factors for standard MRI procedures for each anatomic site must be documented.

MRI procedures must be reviewed at least annually by MRI staff, including the nominated Liaison MRI Radiologist.

Indicators

1. The technical factors are documented for each anatomic site for standard MRI procedures commonly performed by the practice.
2. The practice records a review of MRI procedures by MRI staff, including the nominated Liaison MRI Radiologist, at least annually.

12.3.6 Quality

12.3.6.1 MRI Image Review

The practice shall register its MRI system with the RANZCR MRI Quality Program and meet all ongoing requirements of this program.

Indicators

1. The practice ensures that each of its MRI units holds current registration with the RANZCR MRI Quality Program.
2. It ensures that MRI clinical image review is performed in accordance with that Program and at intervals determined under the Program.
3. It ensures that images of an approved MRI phantom are submitted for review by RANZCR approved consultants, at intervals determined under the Program.
4. Protocols ensure that necessary quality assurance of the MRI system is performed at appropriate intervals.

12.3.6.2 MRI Quality Improvement Program

A documented systematic quality improvement program must be established and implemented under the direction of the Liaison MRI Radiologist to monitor relevant issues in patient care.

Indicators

1. The practice maintains an MRI quality improvement program under the direction of the Liaison MRI Radiologist which includes the recording of adverse events which includes but is not limited to carriage of inappropriate objects into the examination room, failure to complete an examination due to patient distress, and system malfunction.
2. The MRI quality improvement program includes periodic review of these records to identify opportunities to improve patient care.
3. The MRI quality improvement program attempts to correlate imaging findings with surgical, pathological and clinical outcomes.
4. The practice ensures that regular servicing of the MRI system is carried out, and that service reports and corrective action records are held on site.

12.4 Safety

12.4.1 MRI Safety

MRI safety practices and policies must be documented, enforced and reviewed at least annually by the supervising radiologist/s.

Indicators

1. The practice ensures that MRI safety practices and policies are enforced and reviewed at least annually by the Liaison MRI Radiologist.
2. Its MRI safety practices and policies comply with the RANZCR MRI Safety Guidelines[42] and ARPANSA document: Safety guidelines for magnetic resonance diagnostic facilities[44].
3. Its MRI safety practices and policies take into consideration potential interactions of the magnetic field with ferromagnetic objects in the environment of the scanner, and potential hazards posed by objects implanted within the patient as well as within personnel in the area.
4. The MRI safety policy includes:
   a) exclusion of the general population outside the 5 Gauss line with appropriate warning signs; and
   b) procedures to screen patients and all other personnel entering the MRI examination room for intracranial aneurysm clips, cardiac pacemakers, intra-ocular foreign bodies and other contraindicated devices (eg. cochlear implants).
5. An MRI safety education session is provided for all staff accessing the MRI area.
6. The MRI safety practices ensure that an appropriately equipped emergency cart is immediately available to treat serious adverse reactions and for resuscitation in case of respiratory or cardiac arrest within the MRI suite.

13 | MAMMOGRAPHY

13.1 Practice Management System

13.1.1 Labelling of Mammography Images

The labelling of mammography images must be sufficiently comprehensive to ensure that they can be unequivocally traced to the patient and to enable their interpretation.

Notes: It is recommended that images be labelled with the technical factors used including mAs, kV, compression force, compressed breast thickness, degree of obliquity for MLO views.

Indicators

1. The practice ensures that its mammography images are labelled with the following:
   a) A permanent identification label, preferably a flash label rather than a stick-on label in the case of film, which details:
      - Facility name
      - Patient's full name
      - Patient identification (eg. unique Medical Record Number or patient date of birth)
      - Examination date.
   b) Radiopaque markers (or electronic markers with CR/DR units) indicating laterality (R/L) and projection/view (MLO/CC etc.)
      - Placed near the aspect of the breast closest to the axilla
      - Placed on the cassette so they can be read from overhead (In the case of film screen and CR units)
      - Large enough to be clearly readable without being distracting
      - Utilising standard abbreviations.
   c) Radiographer's name, initials or unique radiographer identifier code either on the identification label or in radiopaque letters on the cassette holder.
   d) Cassette/screen identification by Arabic number written or pressed on screen to identify screens with artefacts or defects.
   e) A radiopaque (or electronic in the case of CR/DR units) dedicated mammographic unit identifier, eg. MQAP number.
2. With the exception of the markers indicating laterality and view, all labels are placed as far from the breast as possible.
3. Where initials are used on labels eg. radiographers' initials, a log of names and identifying initials are maintained.
4. Collimation is to the edge of the image so that as much of the image as possible will be exposed.
5. Image labelling does not obscure breast tissue.

13.2 Equipment

13.2.1 Diagnostic Mammography Equipment

Mammography must only be performed on dedicated mammographic equipment which has an adequate device for compression and has the ability to prevent scattered radiation from contaminating the image. Digital mammography requires dedicated equipment for image acquisition, evaluation and interpretation.

Indicators

1. The practice only performs mammography examinations on dedicated mammography equipment which complies with the equipment requirements of the RANZCR Mammography Quality Assurance Program (MQAP)[45].
2. It ensures that acquisition monitors used for mammography have a minimum resolution of 3MP and a minimum brightness of 100 cd/m2.
3. The interpretation and reporting of digital mammography examinations is carried out on monitors with a minimum resolution of 4.4MP, a maximum pixel pitch of 0.2mm, and a dynamic range (maximum:minimum brightness ratio) of at least 250; the mammographic image being displayed in monochrome.
4. The monitors used for the interpretation and reporting of digital mammography examinations have a minimum brightness of 450 cd/m2.

13.2.2 Diagnostic Mammography Quality Control for Mammography Units

There must be documented procedures for quality control checks as specified in the ACPSEM Standard for Facility Quality Control Procedures[46], and, for digital mammography systems, the RANZCR Guidelines for Quality Control Testing for Digital (CR&DR) Mammography[47] .

Indicators

1. The practice's MQAP records confirm that it carries out mammography quality control procedures according to the Mammography Quality Control Manual[48] and the Guidelines for Quality Control testing for Digital (CR&DR) Mammography[47].

13.2.3 Diagnostic Mammography Annual Equipment Testing

Mammography equipment must be tested annually in accordance with the ACPSEM Standards for Mammography System Performance and Medical Physics Testing[49] as required by the RANZCR Mammography Quality Control Manual[48].

For digital mammography systems, the Guidelines for Quality Control Testing for Digital (CR&DR) Mammography[47] shall also apply.

Indicators

1. Practice MQAP records demonstrate that a program of annual equipment testing for mammography is maintained.

13.2.4 Diagnostic Mammography Annual Equipment Testing – CR/DR Mammography Equipment

CR/DR mammography equipment shall be tested in accordance with the manufacturer's guidelines, and MQAP[45].

Indicators

1. Practice records demonstrate that its CR/DR mammography equipment meets the manufacturer's equipment testing guidelines, where applicable.
2. MQAP records demonstrate that the equipment also complies with the Guidelines for Quality Control Testing for Digital (CR&DR) Mammography[47].

13.3 Personnel

13.3.1 CPD – Radiologist

The practice must ensure that the radiologist interpreting mammograms meets the RANZCR's mammography CPD requirements.

Indicators

1. The practice can demonstrate that each of its radiologists who interpret mammograms for the service has accumulated 15 mammography specific CPD points in the past 3 years in mammography CPD activities recognised by the RANZCR CPD program.

13.3.2 CPD – Radiographer

The practice must ensure that each of its radiographers performing mammography examinations completes mammography specific CPD.

Indicators

1. The practice ensures that its radiographers who perform mammography examinations participate in at least 15 hours of mammography specific CPD every 3 years.

13.3.3 Qualifications – Equipment Assessors for Mammography Equipment

Equipment checks required by MQAP must be performed by an appropriately certified mammography equipment assessor.

Notes: As of 1 January 2012, ACPSEM certification of Equipment Assessors is awarded for one of the following:

a) Review of Screen Film Mammography Machines; or

b) Review of CR Mammography Machines; or

c) Review of DR Mammography Machines; or

d) Review of CR and DR Mammography Machines.

MQAP sites need to choose the assessor with the correct qualification to assess the type of equipment operated by the site.

Indicators

1. The practice's MQAP records show that annual mammography equipment testing is carried out by an equipment assessor who has been certified as such by the ACPSEM, and who has certification for undertaking assessments of the type of mammography equipment operated by the practice.

13.4 Professional Supervision

13.4.1 Professional Competence

The practice ensures that high quality diagnostic mammography is achieved by properly qualified radiographic and radiological staff who are able to tailor the examination to each patient's specific needs in accordance with pages 23.113 of the Mammography Quality Control Manual[48].

Notes: Radiographers wishing to gain advanced training in mammography are encouraged to seek recognition through the ASMIRT Certificate of Clinical Proficiency in Mammography or Advanced Breast Imaging Certificate or equivalent.

Indicators

1. The practice ensures that its personnel providing mammography services are appropriately qualified and experienced according to the requirements of these standards.
2. Its MQAP clinical image review records demonstrate that the practice consistently strives to achieve a consistent, quality mammography service.

13.4.2 Radiologists Interpreting Mammograms

The radiologist interpreting mammograms must do so on a regular basis.

Indicators

1. The practice ensures that only radiologists meeting the requirements set out in items 4.2.1and 13.3.1 in these standards interpret mammography examinations.
2. It ensures that these radiologists are rostered on a regular basis at a service performing mammography.

13.4.3 Review of Appropriateness of Request

The radiologist shall be readily contactable to discuss and, if necessary, alter the conduct of the imaging examination.

Indicators

1. Practice records show that the radiologist rostered for its mammography services is available to discuss the request and when necessary alter the conduct of the mammography examination.

13.4.4 Mammography Examinations

The radiologist shall be responsible for ensuring the implementation and adherence of appropriate written protocols to be followed by members of the imaging team.

The radiologist shall be available to personally attend the patient in order to alter the conduct of the examination.

Indicators

1. Practice records show that the radiologist rostered for mammography services is available to personally attend the patient and/or direct the radiographer in relation to positioning that is consistent with the Mammography Quality Control Manual[48] protocols.
2. Its professional supervision arrangements for mammography provide for the rostered radiologist being able to request repeat or additional projections (eg. magnification views) when these are required to achieve a diagnostic quality examination.

13.4.5 Diagnostic Mammography Image Review

Each diagnostic mammography unit must participate in MQAP[45] to ensure systematic peer-based clinical image audit and ongoing supporting quality assurance activity.

Indicators

1. The practice holds current MQAP records for each of its diagnostic mammography units.

13.6 Safety

13.6.1 Mammography Radiation Dose Limit

The practice must not exceed the mammography radiation dose limit requirements of MQAP[45].

Indicators

1. Practice mammography records show that the mean glandular dose as determined by the equipment assessor does not exceed 2mGy per view, using the RMI-156 phantom or another of equivalent constitution.

14 | NUCLEAR MEDICINE
UNDER REVIEW IN CONSULTATION WITH AANMS

14.1 Equipment

14.1.1 Equipment – Nuclear Medicine

A practice performing nuclear medicine examinations must comply with the equipment standards of the AANMS Standards for Accreditation of Nuclear Medicine Practices[50].

Indicators

1. The practice equipment inventory demonstrates that equipment used for nuclear medicine services complies with the requirements of the AANMS Standards[50] (gamma camera, dose collimator, gating ECG etc).
2. Where Gamma CT is used, the practice complies with the equipment requirements under item 9.1.1 in these standards.

14.1.2 Equipment – Cardiac Stress Testing

Equipment for clinical exercise stress testing must also comply with the requirements described in the AANMS Standards[50].

Indicators

1. The facilities and procedures for cardiac stress testing used at the practice comply with the Cardiac Society of Australia and New Zealand (CSANZ) Safety and Performance Guidelines for Clinical Exercise Stress Testing[51] and the joint CSANZ/ANZAPNM Guidelines for Pharmacological Stress Testing[52].
2. The practice has equipment and drugs available for advanced life support which comply with the requirements described in the AANMS Standards[50].

14.2 Personnel

14.2.1 Qualifications – Nuclear Medicine Specialist

In order to practice nuclear medicine, a radiologist or nuclear medicine physician must comply with the requirements for training in nuclear medicine and licence to use radioactive substances as described in the current AANMS Standards[50].

Indicators

1. The practice's nuclear medicine services are provided by radiologists or nuclear medicine physicians who:
   a) have met the training requirements of the Joint Specialist Advisory Committee of the RACP/RANZCR;
   b) are recognised as a specialist in nuclear medicine by the Specialist Recognition Advisory Committee (however named) of the practice's state/territory jurisdiction; and if applicable
   c) if reporting PET or PET-CT the specialist is PET credentialed.

2. Each radiologist or nuclear medicine specialist holds a current radiation license applicable to the provision of nuclear medicine services in the practice's state/territory jurisdiction.
3. Each of these specialists maintains a record of continuing professional development activity (which may include RANZCR/RACP program records) with specific details of nuclear medicine activities.

14.2.2 Qualifications – Nuclear Medicine Technologist

A nuclear medicine technologist must be accredited by the Australasian Association of Nuclear Medicine Specialists (AANMS), and hold current registration and a radiation operator's licence with the relevant jurisdiction in which the technologist is practising, where these are available.

Indicators

1. The practice ensures that its nuclear medicine technologists carry current accreditation with the AANMS.
2. Where these are available, each nuclear medicine technologist holds current registration and a current radiation operator's licence applicable to nuclear medicine services with the applicable regulator in the practice's state/territory jurisdiction.
3. Each nuclear medicine technologist can demonstrate participation in nuclear medicine continuing professional development activity (such as that offered by the AANMS Technologist CPD Program).
4. If a technologist operates a gamma CT unit for Attenuation Correction (AC) and Anatomic Correlation (AnC) appropriate training in operation of the CT component is demonstrated.

14.2.3 Trainee Nuclear Medicine Technologists

All trainees must have on-site supervision in an AANMS approved training department by an accredited nuclear medicine technologist at all times.

Indicators

1. The practice holds an AANMS accreditation certificate in relation to any trainee nuclear medicine technologists working at the practice.
2. As demonstrated through practice rosters, such trainees are supervised by an accredited nuclear medicine technologist at all times.

14.2.4 Qualifications – Nuclear Medicine Medical Physicist

A medical physicist providing support to nuclear medicine services shall be appropriately qualified and accredited to do so.

Indicators

1. The medical physicists providing support to the practice's nuclear medicine services are accredited in nuclear medicine physics by the ACPSEM or the relevant jurisdiction authority.
2. They hold current regulatory licenses to use radioactive substances, where applicable in the practice's state/territory jurisdiction.

14.3 Professional Supervision

14.3.1 Responsibility of the Specialist

The specialist in nuclear medicine shall comply with the Responsibility of the Specialist requirements in the AANMS Standards[50].

Indicators

1. Nuclear medicine specialists at the practice are responsible for the quality and safety of all procedures by nuclear medicine personnel at the practice.
2. This responsibility includes ensuring that such personnel are properly trained, qualified and competent to perform each procedure in which they are directed to participate.
3. The practice ensures that only the responsible nuclear medicine specialist is able to delegate responsibility to other persons to perform patient care tasks.

14.3.2 Responsibility of the Nuclear Medicine Technologist

A nuclear medicine technologist's responsibilities shall comply with the AANMS Standards[50].

Indicators

1. Practice records demonstrate that the nuclear medicine technologist responsibilities include radiopharmaceutical preparation and administration, imaging and data processing and the full range of nuclear medicine procedures under the supervision of the nuclear medicine specialist.

14.3.3 Examination Supervision – Nuclear Medicine

Examination supervision in the practice of nuclear medicine shall comply with AANMS Standards[50].

Indicators

1. The practice professional supervision protocols ensure that the nuclear medicine specialist is available to personally (physically) attend the patient during the conduct of the nuclear medicine examination.
2. They ensure that the nuclear medicine specialist determines the appropriateness of and monitors the quality of the procedure.
3. These protocols ensure that the nuclear medicine specialist is able to assess and influence the outcome of the examination.
4. These protocols allow for out-of-hours arrangements.

14.3.4 Technical Procedure Manual – Nuclear Medicine

The practice site shall prepare and maintain a technical procedure manual as set out in the AANMS Standards[50].

Indicators

1. The practice maintains a nuclear medicine procedure manual which has been established and is maintained by the nuclear medicine specialist/s.
2. This manual includes for each procedure performed by the practice:
    - A summary of patient conditions that may affect the physician's interpretation of the nuclear medicine procedure.
    - A description of instruments used and the control settings, and the technical and analytic steps followed in performing the procedure which comply with the requirements of the AANMS Standards[50].
    - Reagents or other materials used in the test, including a listing of any special precautions for the use of such substances and any restrictions on the source of supply.
    - Medical literature citations when appropriate for a more thorough understanding of the procedure.
    - A description of any special quality assurance measures specific to a procedure.

- A definition of quality control limits if appropriate.
- Instructions on any preliminary actions to be taken in case of deviation from acceptable limits before referring the problem to the nuclear medicine specialist.
- Examples of typical indications for performing procedure.
- Details of required quality control procedures.

3. This manual is reviewed annually by the nuclear medicine specialist.
4. Superseded procedures are clearly notated and are retained by the practice until such time as the retention period for reports relating to such procedures has expired.

14.3.5 Modification to Procedures

Where modifications to procedures are required and can be clinically justified, these modifications shall be noted in the patient records or in the consultation report as determined by the reporting nuclear medicine specialist.

Indicators

1. The practice notates either the patient records or the consultation report (as determined by the nuclear medicine specialist's directions) for any examinations where procedures are modified.

14.3.6 Reporting of the Nuclear Medicine Examination

Practices shall comply with the reporting standards contained in the AANMS Standards[50].

Indicators

1. The practice rosters demonstrate that the nuclear medicine specialist complies with the reporting requirements applicable to the metropolitan/provincial/remote status of the practice.

14.3.7 Contents of the Nuclear Medicine Report

The nuclear medicine report shall comply with the requirements described in the AANMS Standards[50].

Indicators

1. Copies of patient reports demonstrate that the contents of reports contain the requirements listed under 14.5.1 Nuclear Medicine Patient Records.

14.4 Safety

14.4.1 Nuclear Medicine Practice Safety

Practices shall comply with the standards for hazardous/toxic/biological materials contained in the AANMS Standards[50] and any current jurisdiction or Commonwealth regulatory requirements.

Indicators

1. The practice ensures that all toxic, irritant or caustic chemicals are appropriately labelled, and personnel are trained in use of such materials.
2. Suitable eye protection devices, impervious aprons and means for flushing materials from the skin or eyes rapidly in the event of accidental splashing are readily available in the practice.
3. Materials presenting a biological or other hazards are carefully handled and in accordance with a documented protocol to minimise risks to personnel and patients.
4. Eating and drinking is prohibited in patient care and laboratory areas of the practice.
5. Noxious, toxic or volatile materials presenting a hazard of airborne transport are handled in fume hoods providing adequate and safe venting to the atmosphere.
6. Nuclear medicine waste materials are disposed of according to regulatory requirements.

7. Aseptic technique is used when penetrating patient skin.

14.4.2 Nuclear Medicine Radiation Safety

The practice shall comply with all applicable radiation safety regulations.

Indicators

1. The practice retains at the practice site all applicable radiation licenses pertaining to nuclear medicine and refers to them for confirmation of ongoing compliance.
2. Radiation safety policies and procedures contained in the practice's radiation safety manual specific to the practice's nuclear medicine services comply with all relevant radiation safety regulations.
3. Personnel are trained in radiation safety techniques according to the manual and have periodic in-service reviews.
4. Practice records confirm that personnel are monitored by TLD badges (or other regulatory compliant dosimeters).
5. Practice records demonstrate that a comprehensive program of radiation monitoring is followed and that radiation monitoring equipment is maintained and available for the detection of contamination and radiation exposure levels.
6. Procedures and resources have been implemented which ensure the correct handling of accidents involving radioactive materials and subsequent decontamination which complies with the relevant jurisdiction regulations.
7. A CTDI (milliGrays) and DLP (dose length product – milliGrays per centimetre) value for each CT component of a Gamma CT study is recorded and is available with the patient's images.

14.4.3 Radioisotopes – Preparation, Handling, Administration

Practices performing nuclear medicine procedures shall comply with the safety standards contained in the AANMS Standards[50].

Indicators

1. One month of the practice's records of radiopharmaceutical receipt, preparation and disposition demonstrates that appropriate measures are maintained for identification of radiation areas and the receipt, storage, and disposal of radioactive substances.
2. Radioactive material dispensed for administration to patients is calculated according to established protocols.
3. Its activity is measured prior to administration.

14.4.4 Blood Products

The practice performing nuclear medicine procedures shall comply with the standards regarding blood products contained in the AANMS Standards[50].

Indicators

1. The practice performs labelling of blood or blood products in-house, and has established a blood-labelling protocol which is adhered to by all applicable personnel under the professional supervision of the nuclear medicine specialist;
2. These ensure the correct re-administration of the blood products to the correct patient.
3. Blood products are prepared in aseptic conditions using at least a Class II enclosed system.
4. Externally supplied blood and/or blood products are verified for:
   a) patient identification upon receipt, and again immediately prior to administration; and
   b) radioactivity, with any discrepancy of more than 10% from the stated activity shall be clarified with the nuclear medicine specialist/physician to administration.

14.4.5 Handling of Biological Materials

The practice shall follow the requirements contained in the handling of biological materials by the practice meet the requirements of the AANMS Standards[50].

Indicators

1. The practice ensures that glassware contaminated with toxic or biologic materials is made safe as soon as practicable after use.
2. Bench-tops and area surfaces subject to substantial contamination risk should be covered with disposable protective materials when feasible which are discarded in a safe manner according to waste management protocols.
3. Practice protocols ensure that appropriate care is exercised in handling sera and other materials.
4. These ensure that due care is taken to avoid uncontrolled release of any potentially infectious material.

14.4.6 Cardiopulmonary Resuscitation and Basic Life Support

All personnel involved in patient care in the provision of nuclear medicine services shall be trained and retain competency in cardiopulmonary resuscitation procedures appropriate to the level of services provided by the practice.

Indicators

1. The practice ensures that all personnel, including nuclear medicine specialists and nuclear medicine technologists are trained in cardiopulmonary resuscitation procedures.
2. In accordance with Australian Resuscitation Council Guidelines[9], these personnel complete refresher training in CPR annually.

14.5 Patient Management

14.5.1 Nuclear Medicine Patient Records

The practice shall comply with the requirements of the AANMS Administrative Standard[50].

Indicators

1. The practice ensures that patient record identifies:
    - Patient name and unique identification code
    - Name of the referring medical practitioner
    - Request date
    - Name of the responsible nuclear medicine specialist
    - The nuclear medicine procedure performed as it is identified in the practice procedure manual, with notation and explanation of any special modifications of this procedure
    - Type, activity, route and injection site for any radioactive or non-radioactive substances administered to the patient
    - The name of the nuclear medicine technologist performing the procedure (where applicable)
    - The date that the procedure was performed
    - The date and description of findings of any procedures performed, with interpretive information including background information on the predictive value of the procedure or expected values on a reference population to inform referring practitioners.
2. The practice ensures that all nuclear medicine patient reports contain:
    - Patient name and unique identification code
    - Name of the referring medical practitioner
    - Name and signature of the responsible nuclear medicine specialist

- The nuclear medicine procedure performed as it is identified in the practice procedure manual, with notation and explanation of any special modifications of this procedure
- The date and description of findings of any procedures performed, with interpretive information including background information on the predictive value of the procedure or expected values on a reference population to inform referring practitioners.

14.5.2 Timeliness of Reporting

The practice shall ensure that the provision of nuclear medicine reports to referring medical practitioners meet requirements of the AANMS Standards[50].

Indicators

1. The practice ensures that generally nuclear medicine reports are provided to referring medical practitioners within 24 hours of the examination taking place.

14.5.3 Risks

All persons who may be exposed to radiation as a result of a nuclear medicine procedure must be advised of precautions they can take to minimise the radiation dose to other people.

Indicators

1. Written instructions are available to patients and provide advice on precautions that they can take to minimize their radiation dose, in particular for therapeutic procedures involving large potential exposures (eg. radioiodine or strontium therapy).
2. Precautions for children, pregnant and breast-feeding patients are observed, including warning signs, verbal inquiry by practice personnel and the provision of special instructions to a patient as required.
3. Dose calibration surveys are undertaken with regular assessment of prescribed radiopharmaceutical doses.

15 | ULTRASOUND

15.1 Equipment

15.1.1 Equipment

The practice shall ensure that all of its ultrasound equipment is appropriate for its intended use, is regularly maintained and is serviced by manufacturer-certified service engineers.

Indicators

1. Where the practice offers comprehensive ultrasound services (including general ultrasound, cardiac ultrasound , vascular ultrasound, urological ultrasound, obstetric and gynaecological ultrasound, and musculoskeletal ultrasound), it has equipment with following capability:
    - Colour doppler including power doppler
    - Spectral (pulsed) doppler
    - M-mode scanning
    - Linear transducer of frequency 12MHz or greater
    - Linear transducer of frequency 7MHz or greater
    - Curved linear array transducer of frequency 2.5MHz – 5MHz
    - Transvaginal transducer.
2. Where the practice offers general ultrasound services it has equipment with the following capability:
    - Colour doppler including power doppler
    - Spectral (pulsed) Doppler
    - Linear transducer of frequency 7MHz or above
    - Curved linear array transducer of frequency 2.5MHz - 5MHz.
3. Where the practice offers cardiac ultrasound services it has equipment with the following capability:
    - Colour doppler including power doppler
    - Continuous and pulsed wave doppler
    - M-mode scanning.
4. Where the practice offers vascular ultrasound services it has equipment with the following capability:
    - Colour doppler including power doppler
    - Spectral (pulsed) doppler
    - Linear transducer of frequency 7MHz or above.
5. Where the practice offers urological ultrasound services it has equipment with the following capability:
    - Colour doppler including power doppler
    - Spectral (pulsed) doppler
    - Linear transducer of frequency 12MHz or above
    - Curved linear array transducer of frequency 2.5MHz – 5MHz.
6. Where the practice offers obstetric and gynaecological ultrasound services it has equipment with the following capability:
    - Colour doppler including power doppler
    - Spectral (pulsed) doppler
    - M- mode scanning
    - Curved linear array transducer of frequency 2.5MHz – 5MHz

- Transvaginal transducer.

7. Where the practice provides Musculoskeletal Ultrasound services it has equipment with the following capability:
   - Colour doppler including power doppler
   - Linear transducer of frequency 12MHz or greater.
8. Monitors used for ultrasound examinations have a minimum colour/monochrome resolution of 1024x768.
9. The practice maintains its ultrasound equipment according to the manufacturer's recommended maintenance and servicing guidelines and uses only manufacturer-certified service engineers.

15.1.2 Equipment – Maintenance and Upgrades

All ultrasound equipment is maintained appropriately and meets currently accepted specifications.

Indicators

1. The practice regularly reviews the capability of its ultrasound equipment in consideration of available software and hardware upgrades, and meets any requirements of such upgrades when they occur.
2. It ensures that ultrasound equipment (hardware and software) is not more than 10 years old, or 15 years if the equipment has been upgraded.

15.2 Personnel

15.2.1 Qualifications – Sonographer

The practice shall ensure that its sonographers are appropriately qualified and accredited.

Notes: In New Zealand sonographers must be registered with the Medical Radiation Technologists Board (MRTB) [53], hold an Annual Practicing Certificate and follow the MRTB Code of Ethics for Medical Radiation Technologists [54].

Indicators

1. The practice ensures that its sonographers hold current ASAR membership[55].
2. It holds a copy of the current annual ASAR membership receipt for each of its sonographers.
3. It can demonstrate that each of its sonographers follows the ASA Code of Conduct[56].

15.2.2 Qualifications – Student Sonographers

The practice shall ensure that its student sonographers are appropriately qualified and accredited.

Notes: In New Zealand student sonographers must be registered with the Medical Radiation Technologists Board [53], hold an Annual Practicing Certificate and follow the MRTB Code of Ethics for Medical Radiation Technologists [54].

Indicators

1. The practice ensures that its student sonographers hold current ASAR membership[55].
2. It holds a copy of the current annual ASAR membership receipt for each student sonographer.
3. It can demonstrate that each of its student sonographers follows the ASA Code of Conduct[56].

15.2.3 Continuing Professional Development – Radiologists

The radiologist providing ultrasound services shall participate in ultrasound specific CPD.

Indicators

1. The radiologists providing the practice's ultrasound services can demonstrate evidence of ongoing continuing professional development activity specific to the range of ultrasound services they provide.

15.2.4 Continuing Professional Development – Sonographers and Student Sonographers

The practice shall ensure that its sonographers and student sonographers comply with the requirements of an ASAR approved CPD program.

Notes: In New Zealand sonographers must be registered with the Medical Radiation Technologists Board [53], hold an Annual Practicing Certificate.

Indicators

1. The practice ensures that its sonographers and student sonographers hold current ASAR membership[55].

15.3 Professional Supervision

15.3.1 Student Sonographers

All student sonographers must have on-site supervision by a radiologist or a sonographer accredited by ASAR in the relevant field/s of practice at all times.

Indicators

1. The practice ensures that its professional supervision arrangements provide for on-site supervision of student sonographers by either the radiologist or an ASAR-accredited sonographer so delegated by the radiologist.
2. It ensures that supervising sonographers are accredited by the ASAR in the fields of practice in which they are supervising.

15.3.2 Sonographers Performing Ultrasound Examinations in Remote Locations

Sonographers performing ultrasound examinations in rural and remote locations shall have appropriate professional supervision and clinical guidance from the reporting radiologist.

Notes: It is recognised that clinical supervision of ultrasound examinations in remote locations will be conducted via different methods depending on the examination setting and the experience of the sonographer conducting the examination. It is important that sonographers are supported clinically in these remote settings and in particular, that student sonographers are supported by both their sonographer peers and the reporting radiologist/s.

Indicators

1. The practice meets the criteria for 'rural and remote' status for Medicare.
2. The sonographer meets the requirements under items 15.2.1 and 15.2.4 in these standards.
3. Where a student sonographer is performing these examinations, he/she meets the requirements under items 15.2.2 and 15.2.4 in these standards and has either:
   a) completed one year of directly supervised training that has included the full scope of ultrasound examinations which he/she is performing at the practice; OR
   b) the reporting radiologist has determined that the student sonographer has completed sufficient training and obtained sufficient practical experience under direct supervision to perform a defined range of ultrasound examinations under remote supervision protocols as per Indicator 5 under this standard.
4. During the conduct of each ultrasound examination the radiologist is readily contactable to discuss the procedure with the sonographer or student sonographer and influence the examination.
5. The practice ensures that this clinical supervision is supported through on-site supervision and/or

teleradiology and/or internet access and/or telephone support, as is determined by the reporting radiologist.

6. The practice ensures that professional supervision arrangements for student sonographers in remote locations is consistent with those for qualified sonographers, but that it is exercised during the course of an examination so that appropriate imaging, decision making and review can be made at the time of the examination.
7. This supervision of student sonographers is supported by the additional resource of an ASAR accredited sonographer who provides guidance to the student sonographer through on-site supervision and/or teleradiology and/or internet access and/or telephone support, as determined by the reporting radiologist.
8. The practice conducts regular (at least annual) reviews of the quality of the remote ultrasound examinations in order to confirm that the supervision arrangements of these services do not compromise patient care.

15.3.3 Review of Appropriateness of Request – Ultrasound

The radiologist shall be readily contactable to discuss and if necessary, alter the conduct of the imaging examination in consideration of the examination request.

Indicators

1. The practice's professional supervision arrangements ensure the provision of clinically directed scanning for all ultrasound services.
2. Within these arrangements the radiologist has implemented and ensures adherence to appropriate written protocols to be followed by members of the imaging team for this component of the imaging service.
3. The professional supervision arrangements recognise that a radiologist may need to personally attend the patient in order to examine the patient prior to an ultrasound examination proceeding.

15.3.4 Performance of Ultrasound Examinations

Ultrasound scanning of the patient shall be performed by the radiologist, the sonographer acting on behalf of the radiologist, or the radiologist and sonographer in collaboration. When sonographers scan the patient, communication between the sonographer and radiologist shall be optimised in order to obtain maximum diagnostic information to support the management of the patient. The radiologist shall be available to personally attend the patient to discuss and influence the conduct of the examination. When the ultrasound scan reveals specified significant or unexpected findings the sonographer will communicate with the radiologist while the patient is on site to facilitate review of the patient by the radiologist and allow patient triage.

Indicators

1. The radiologist has implemented a system for communication with the sonographer. This communication may be verbal and/or by sonographer work sheets and/or annotated images.
2. The practice's professional supervision protocols and rostering for ultrasound examinations ensure that the radiologist is available and contactable and if necessary, is available to personally attend the patient, to influence and/or alter the conduct of the examination.
3. The practice has protocols in place that set out the criteria for which findings trigger the scan being brought to the attention of the radiologist while the patient is on site.

15.3.5 Interpretation and Reporting of Ultrasound Examinations

The responsibility for the conduct of the study and the production of the report lies with the radiologist. The radiologist's report shall draw upon all the available information, which may include communication with the sonographer, reviewing the sonographer's images, attending the patient to talk to, examine or scan the patient and/or observing the sonographer scan in real time. The report shall reflect the radiologist's expertise as a medical practitioner and medical imaging specialist.

Indicators

1. The report issued to referring clinician contains relevant clinical details and ultrasound findings and draws conclusions pertinent to the patient and the clinical indicators for the study and complies with the Radiology Written Report Guideline[13].

2. The practice ensures that when a sonographer is involved in performing an ultrasound examination, the sonographer's initial and surname is included in the record of the examination held by the practice.

15.3.6 Quality Assurance

The practice providing diagnostic ultrasound services shall carry out quality assurance and quality improvement activities relevant to the range of diagnostic ultrasound services it offers.

Indicators

1. The practice can demonstrate that its ultrasound services are subject to quality assurance and quality improvement activities which are designed to maintain and improve the quality of the ultrasound services it provides.

15.4 Safety

15.4.1 Ultrasound Safety

The practice shall ensure that it meets all safety requirements for the ultrasound services it provides.

Indicators

1. The practice ensures that sonographers and radiologists working at the site are aware of the potential thermal and mechanical bio-effects of ultrasound and that they meet the requirements set out in the BMUS Guidelines for the safe use of diagnostic ultrasound equipment[57].
2. The practice ensures that sonographers and sonologists working at the site meet the safety requirements set out in the WFUMB Policy and Statements on Safety of Ultrasound for the safe use of diagnostic ultrasound equipment[58].
3. It meets all regulatory requirements in relation to ultrasound safety.
4. Where the practice provides endocavity ultrasound examinations, it adheres to the ASUM Statement on the Disinfection of Transducers[59], or any other TGA approved high level disinfectant for medical devices. Where the relevant state/territory regulation requirements are greater, these are implemented.
5. The practice ensures that the use of solutions for sterilising and cleaning endocavity transducers complies with the relevant jurisdiction's occupational health and safety regulations.
6. The practice ensures it provides a safe working environment for sonographers and sonologists and meets recommendations contained in ASA and ASUM joint guidelines for reducing injuries to sonographers/ sonologists[60].

15.5 Patient Management

15.5.1 Information for Patients Undergoing Ultrasound Examinations

The practice shall provide appropriate information for patients undergoing ultrasound examinations.

Indicators

1. The practice ensures that its radiologists providing ultrasound services are responsible for determining:
   - How much of an ultrasound examination should be shown and demonstrated to a patient.
   - What examination information can be independently passed on to a patient by the sonographer.

APPENDICES

Appendix A – Personnel Administering Intravenous Contrast

Diagnostic imaging services must ensure that personnel who are involved in IV medication administration are regularly assessed for their competence.

Classes of persons considered to be suitably qualified/trained to administer intravenous medication within their context and scope of practice include the following (may not be all inclusive):

- medical practitioners
- dentists
- registered nurses
- enrolled nurses
- ambulance officers
- medical radiation scientists (Nuclear Medicine)
- medical radiation scientists (Radiography)
- anaesthesia technicians who have completed the Australasian Society of Anaesthesia Technicians Diploma Course
- clinical perfusionists who are certified by the Australasian Board of Cardio-vascular Perfusion as certified clinical perfusionists
- cardio-pulmonary technicians/technical officers
- anaesthesia technicians and clinical perfusionists in training, only under the direct supervision of a medical practitioner
- medical students, only under the direct supervision of a medical practitioner
- nursing students, only under the direct supervision of a registered nurse
- ambulance officers in training, only under the direct supervision of a qualified ambulance officer, medical practitioner or registered nurse.

Appendix B – Tier A Interventional Procedures

- basic diagnostic angiography and interventional techniques
- basic diagnostic angiography
- nephrostomy
- abscess and cyst drainage and biopsy
- simple venous access
- breast localisation
- joint arthrography and injection
- spinal tap, epidural and spinal nerve root block

Appendix C – Tier B Interventional Procedures

1. All neuro-interventional procedures intracranial and extracranial – these are subject to additional specific credentialing requirements determined jointly by the RANZCR, ANZSNR and IRSA
2. All vascular interventional procedures other than basic diagnostic angiography, i.e. stents (including carotid stenting with its associated intracranial and extracranial angiography), angioplasty, thrombolysis, thrombectomy, atherectomy, embolisation, retrieval of foreign bodies and laser and mechanical angioplasty
3. Venous and arterio-venous graft interventions other than basic diagnostic venography or fistulography, i.e. thrombolysis, angioplasty, stents, atherectomy, pulmonary embolectomy/ thrombolysis and caval filter insertion
4. Biliary intervention including TIPS
5. Thoracic intervention, i.e. embolisation of AVMs, bronchial stents, occlusion of broncho-pleural fistulae and bronchial artery embolization
6. Gastro-intestinal intervention, i.e. oesophageal and duodenal stents, percutaneous gastrostomy, gastrointestinal vascular procedures other than diagnostic angiography, i.e. embolisation, chemo-embolisation and transplant intervention
7. Urological intervention, i.e. renal artery embolisation, angioplasty or stenting, percutaneous nephrolithotomy
8. Gynaecological - fallopian tube recanalisation, embolisation of fibroids, temporary aortic occlusion
9. Orthopaedic - percutaneous vertebroplasty, percutaneous discectomy

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