

Module Overview

Please note: This module must be read in conjunction with the [Fundamentals of the Framework](#) (including glossary and acronym list).

Medical imaging is a generic term used to define the use of conventional and sophisticated diagnostic practices. Medical imaging encompasses general radiography, ultrasound, computed tomography (CT) scan, fluoroscopy, mammography, angiography, interventional radiology, magnetic resonance imaging (MRI) and bone mineral densitometry. Nuclear medicine is delineated separately from medical imaging services in the CSCF due to differing capability requirements for clinical and technical support, staff training and accreditation. Cardiac diagnostic and interventional imaging is also not covered here, as it constitutes a section of the Cardiac Services module.

Medical imaging services vary according to several factors, including:

- > geographic location of the service and proximity to required support services
- > modalities available and complexity of procedures able to be provided
- > capacity to develop documented processes with public and private service providers.

Medical imaging uses informatics solutions to transfer process and analyse images. A variety of technologies, such as picture archiving and communication systems (PACS) or teleradiology, may be required to augment service provision. Individual patient records must be maintained by both the initiating and providing sites and exchanged within clinically relevant timeframes.

Interventional radiology is defined as a subspecialty of radiology, in which minimally invasive procedures are performed using image guidance. The Royal Australian and New Zealand College of Radiologists (RANZCR) and Interventional Radiology Society of Australasia (IRSA) have divided interventional radiological procedures into two groups—Tiers A and B—as outlined at the specific levels. The ability of a health service to perform interventional radiology procedures is dependent on having suitably skilled and credentialed radiologists, appropriate equipment and facilities and access to other medical specialists. Interventional neuroradiology is an additional subspecialty provided by a group of specialists who have undertaken specific additional training that is recognised by the Conjoint Committee for Recognition of Training in Interventional Neuroradiology (CCINR).

Service Requirements

In addition to the requirements outlined in the [Fundamentals of the Framework](#), specific service requirements include:

- > compliance with the *South Australia Radiation Protection and Control Act 1982* and *South Australia Radiation Protection and Control (Ionising Radiation) Regulations 2015* including:
 - > possession licence and compliance certificate for each piece of equipment which produces ionising radiation
 - > access to service engineers with qualifications and experience relevant to model and make of equipment being used
 - > compliance with Radiation Safety Plan (RSPP)
 - > provide relevant clinical indicator data to satisfy accreditation and other statutory reporting obligations.
- > compliance with SA Health policy directives and guidelines that are referenced at:
 - > [SA Health Policy Directives](#)
 - > [SA Health Policy Guidelines](#)
 - > [SA Health Clinical Directives and Guidelines](#)

Workforce Requirements

The CSCF does not prescribe staffing ratios, absolute skill mix, or clerical and/or administration workforce requirements for a team providing a service, as these are best determined locally and in accordance with relevant industrial instruments. Where minimum standards, guidelines or benchmarks are available, the requirements outlined in this module should be considered as a guide only. All staffing requirements should be read in conjunction with the *Health Care Act 2008*, Awards and relevant Enterprise Agreements including, but not limited to:

- > SA Health Salaried Medical Officers Enterprise Agreement 2017
- > SA Health Visiting Medical Specialists Enterprise Agreement 2017
- > SA Health Clinical Academics Enterprise Agreement 2014
- > Nursing/Midwifery (South Australian Public Sector) Enterprise Agreement 2016
- > SA Ambulance Service Enterprise Agreement 2017
- > SA Modern Public Sector Enterprise Agreement: Salaried 2017

In addition to requirements outlined in the [Fundamentals of the Framework](#), specific workforce requirements include:

- > appointed radiation safety officer
- > qualified radiology medical physicist accessible for consultation on optimisation, dosimetry, quality assurance and additional matters relating to radiation protection in medical exposure
- > where MRI services are available, MRI safety training is provided
- > staff with required competencies in order to administer contrast and manage allergic reactions
- > where radiographers are not available or require support in rural and remote locations, x-ray operators may provide a limited general x-ray imaging service. (X-ray operators complete a short training course and require ongoing training and support from a qualified radiographer who takes on the role of radiographic advisor)
- > medical specialists performing Interventional Neuroradiology (INR) procedures must meet the requirements for training and ongoing clinical skill maintenance as defined by the CCINR.

Specific Risk Considerations

In addition to risk management outlined in the [Fundamentals of the Framework](#), specific risk considerations for medical imaging services include:

- > Maintenance of compliance with the Commonwealth Department of Health Capital Sensitivity for Diagnostic Imaging Equipment.

| Medical imaging services | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6 |
|--------------------------|--|--|---|--|--|--|
| Service description | <ul style="list-style-type: none"> > provides low-risk ambulatory care services during business hours and may provide some limited after-hours services. > involves a mobile or fixed, general x-ray unit and is predominantly delivered by x-ray operators. > computed radiography equipment is available to acquire images and facilitate image transfer. > must be able to provide resuscitation and stabilisation of patient emergencies until transfer or retrieval to a back-up health facility. > must have documented processes with a public or suitably licensed private health facility for patient referral and transfer to/from a higher level of service. > transfer occurs within 24 hours. | <ul style="list-style-type: none"> > provides a low-risk ambulatory care and inpatient service. > predominantly delivered by x-ray operators supported by sole radiographer. > may be a designated room on-site with a fixed x-ray unit and computed radiography. > depending on range of services provided at the facility (e.g. day hospital), a mobile image intensifier may be the only modality available. > access to ultrasound for non-complex conditions or an outreach service may be available. | <ul style="list-style-type: none"> > may have diagnostic ultrasound services for more complex conditions, which may include obstetric and breast ultrasound. > sites may perform examinations involving contrast. > CT service may also be available off-site and provided under arrangement with another facility. | <ul style="list-style-type: none"> > may provide services under sedation/anaesthesia. > may provide fixed-room fluoroscopy, on-site CT services, complex ultrasound, interventional radiology Tier A, and mammography and interventional breast imaging services but not all modalities described in this section will be provided in all services; however, where they are, minimum requirements for provision of safe imaging service are described. > may provide CT services with appropriate clinical support and preferably with a supervising radiologist on-site and must develop documented CT processes with radiologist to provide necessary level of supervision and support to the service. > protocols also required that identify: <ul style="list-style-type: none"> – clinical indications for conducting CT – indications for administration of contrast – acquisition of images and timely interpretation. > similarly, if facility or service wishes to provide fluoroscopy services, radiographer and radiologist and/or suitably authorised, qualified and experienced health professional must be in attendance during procedure. | <ul style="list-style-type: none"> > provide MRI services. > provide Tier B interventional radiology services and endovascular aneurysm repair. > Tier B procedures include: <ul style="list-style-type: none"> – all vascular interventional procedures other than basic diagnostic angiography i.e. stents, angioplasty, thrombolysis, thrombectomy, atherectomy, embolisation, retrieval of foreign bodies, and laser and mechanical angioplasty – Neuro procedures: diagnostic cerebral, spinal and head and neck angiography, para-spinal tumour embolisation, sialography and salivary gland stone removal, sympathectomy, carotid stenting, intra-arterial administration of a medication (for example verapamil) for the treatment of intracranial vasospasm (typically secondary to subarachnoid haemorrhage), embolisation of branches of the external carotid artery for the purposes of treating severe epistaxis and tumour treatment (typically pre-operative), treatment of facial and head and neck arteriovenous and venous malformations, neurophysiological testing (Wada test), endovascular treatment of carotid artery dissection and vertebral artery dissection where the dissection does not extend intracranially and endovascular treatment of extracranial aneurysms of the carotid and vertebral arteries (and branches) | <ul style="list-style-type: none"> > provide Interventional Neuroradiology (INR) procedures > INR procedures include: <ul style="list-style-type: none"> – endovascular treatment of intracranial arterial aneurysms – endovascular clot (and other embolic particle) removal for the treatment of acute stroke (including but not limited to mechanical thrombectomy) – endovascular treatment of carotid artery dissection and vertebral artery dissection where the dissection extends intracranially – intracranial venous stenting – endovascular treatment of intracranial arteriovenous malformations and dural arteriovenous fistulae – endovascular treatment of spinal cord arteriovenous malformations and spinal dural arteriovenous fistulae – endovascular treatment of intracranial vasospasm using angioplasty balloons – diagnostic cerebral angiography involving the selection of intracranial vessels |

| Medical imaging services | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6 |
|--|---------|---------|---------|---|---|---------|
| <p>Service description</p> <p><i>(continued)</i></p> | | | | <ul style="list-style-type: none"> > may insert peripherally inserted central catheters (PICCs) under imaging guidance (e.g. ultrasound plus / minus fluoroscopy). > where mammography service provided, ultrasound and interventional breast imaging services may be available. > image-guided breast procedures require radiologists. > with interventional radiology, the types of services provided in Level 4 interventional radiology service would be those defined by IRSA and RANZCR as Tier A. > where Tier A procedures performed, must be access to either on-site surgical support or documented processes with service capable of accepting patients on emergency transfer within 60 minutes for peripheral interventions and within 30 minutes for aortic / visceral / renal interventions in normal circumstances. > can provide resuscitation and stabilisation of emergencies, in line with RANZCR guidelines, until transfer or retrieval to a back-up facility. > may have access to off-site MRI and bone mineral densitometry services. | <ul style="list-style-type: none"> – venous and arteriovenous graft interventions other than basic diagnostic venography or fistulography i.e. thrombolysis, angioplasty, stents, atherectomy, pulmonary embolectomy / thrombolysis and caval filter insertion – biliary intervention, including transjugular intrahepatic portosystemic shunt – thoracic intervention i.e. embolisation of arteriovenous malformations, bronchial stents, occlusion of bronchopleural fistulae and bronchial artery embolisation – gastrointestinal intervention i.e. oesophageal and duodenal stents, percutaneous gastrostomy, gastrointestinal vascular procedures other than diagnostic angiography, i.e. embolisation, chemo-embolisation and transplant intervention – urological intervention e.g. renal artery embolisation, angioplasty or stenting, and percutaneous nephrolithotomy – gynaecological: fallopian tube recanalisation, embolisation of fibroids and bilateral internal iliac occlusion – orthopaedic: percutaneous vertebroplasty and percutaneous discectomy. <p>> May have on-site or access to bone mineral densitometry services.</p> | |

| Medical imaging services | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6 |
|--------------------------|---|--|--|---|---|---|
| Service requirements | <p>As per module overview, plus:</p> <ul style="list-style-type: none"> > for general radiography <ul style="list-style-type: none"> – radiographic advisors responsible for ensuring appropriate protocols are developed and implemented – compliant x-ray requests signed by authorised person – limited scope general x-ray protocols for x-ray operators – access to radiologists for reporting and to discuss findings – medical practitioner (rural general practitioner) may in limited circumstances, be responsible for interpreting the images. | <p>As per Level 1, plus:</p> <ul style="list-style-type: none"> > full range of X-ray images not restricted when a radiographer is on duty. > access to point of care ultrasound. > mobile image intensifier may be available to provide fluoroscopy assistance for minor procedures; where the facility/ service provides mobile fluoroscopy services, a radiographer licenced for fluoroscopy must be in attendance during this procedure. > services performing fluoroscopy develop and implement a documented quality assurance program that, as a minimum, includes reviewing screening times and dosages at least monthly, and conducting a department-based image review program. | <p>As per Level 2, plus:</p> <ul style="list-style-type: none"> > where ultrasound services provided, imaging is undertaken by sonographer or medical practitioner trained in ultrasound. > rural and remote services (as recognised by Medicare Australia) comply with supervision requirements, including sonographers performing ultrasounds have access to medical libraries and teleradiology, and/or telephone access to reporting radiologist or medical practitioner. > where intravenous contrast examinations are performed, the following resources are readily available: <ul style="list-style-type: none"> – local policy for information on emergency management processes – resuscitation trolley and automatic defibrillator – medical practitioner on-site in the event of emergency – paediatric resuscitation equipment where children are treated. | <p>As per Level 3, plus:</p> <ul style="list-style-type: none"> > access—24 hours—to a radiologist to interpret/report on CT images, discuss an examination and alter the conduct of the procedure, if necessary. > on-site CT service with demonstrable and documented protocols that determine: <ul style="list-style-type: none"> – which CT examinations require intravenous contrast (including type, strength and volume of contrast to be administered) – screening of patients for contrast risk – consent requirements – technical protocol required for the clinical indication – consultation requirements with supervising radiologist, and image reviewing and reporting arrangements. > access to electrocardiograph, blood pressure monitoring and pulse oximeter where angiography is performed, patient acuity is high or sedation is used. > complex ultrasound may be provided for diagnosing deep vein thrombosis, and vascular and musculoskeletal conditions, and for performing Doppler studies undertaken by sonographer or medical practitioner trained and qualified (e.g. FRANZCR, DDU) in ultrasound. | <p>As per Level 4, plus:</p> <ul style="list-style-type: none"> > CT service that supports increased complexity of clinical interventions, which may include diagnostic cardiac angiography (refer to the Cardiac Services module). > each MRI unit must: <ul style="list-style-type: none"> – be registered with RANZCR MRI Program – align with MRI Supervision Framework – have different levels of supervision applied to specific components of MRI examination. MRI requests to be reviewed and protocol drawn up by an appropriately qualified MRI medical practitioner before examination occurs. MRI Level IB supervision generally applies (as above), except: <ul style="list-style-type: none"> • for examinations to be flagged as requiring (or possibly requiring) contrast • for examinations to be flagged as requiring an MRI radiologist review before discharge • where facility identifies those clinical conditions / examinations that routinely require prompt MRI radiologist review before discharge (e.g. suspected cord compression). > all MRI examinations reported by radiologist with appropriate qualifications and experience. > radiologist with appropriate credentials and clinical privileges has responsibility for: | <p>As per Level 5, plus:</p> <ul style="list-style-type: none"> > MRI service that supports more complex service profile / higher acuity patients. > interventional radiology service that supports more complex service profile for complex / higher acuity patients. > neurosurgery facilities and neurosurgeon must be available on-site when an interventional neuroradiology procedure is performed. |

| Medical imaging services | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6 |
|---|---------|---------|--|--|--|---------|
| <p>Service requirements</p> <p><i>(continued)</i></p> | | | <ul style="list-style-type: none"> > access to an off-site CT service provided under an arrangement with another facility (refer to Level 4 service requirements). | <ul style="list-style-type: none"> > access to MRI services may be available off-site and provided under an arrangement with another facility—see Level 5 for service characteristics. | <ul style="list-style-type: none"> – specifying use and dosage of contrast agents. – specifying pulse sequences being performed. – assuming quality of images and interpretations. > where patients are sedated / anaesthetised for MRI procedures: <ul style="list-style-type: none"> – patients are monitored appropriately – monitoring equipment must be MRI safe and accessible both in and out of MRI magnet room – for children, equipment sizes appropriate to paediatric patients must also be available – for procedures involving anaesthesia, a registered nurse plus an anaesthetic technician/assistant to the anaesthetist is required (refer to ANZCA's recommendations on minimum facilities for safe anaesthesia practice outside operating suites). – breast imaging includes access to the higher level modalities required for diagnostic surveillance and may be provided in conjunction with a high-risk clinic. | |

| Medical imaging services | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6 |
|-------------------------------|---|---|---|---|--|--|
| Workforce requirements | <p>As per module overview, plus:</p> <p>Medical</p> <ul style="list-style-type: none"> > access to specialist radiologist participating in medical imaging service with Fellowship of the Royal Australian and New Zealand College of Radiologists (FRANZCR) and be registered with AHPRA/MBA as a specialist radiologist. > access to medical practitioners for care and treatment. <p>Allied Health</p> <ul style="list-style-type: none"> > access to appointed radiographic advisor for supervision of x-ray operators. <p>Other</p> <ul style="list-style-type: none"> > x-ray operators shall be appointed in rural and remote facilities where sole radiographer service needs support or where no radiographer service exists to ensure community access to limited x-ray service. > ongoing support and supervision of x-ray operators provided by nominated radiographic advisor. > competency assessment by endorsed diagnostic radiographer approved by Radiation Health prior to x-ray operator's licence renewal. > x-ray operators shall have access to appropriate training and support as documented in local radiation safety and protection plan. | <p>As per Level 1, plus:</p> <p>Medical</p> <ul style="list-style-type: none"> > access to medical practitioner, with appropriate credentials in administration of diagnostic ultrasound, for consultation where ultrasound provided in areas classified as rural and remote locations (as recognised by Medicare Australia). <p>Allied Health</p> <ul style="list-style-type: none"> > radiographers / sonographers: <ul style="list-style-type: none"> – registered as medical imaging technologists with Australian Health Practitioner Regulation Agency and or ARAR – available and contactable (e.g. by telephone) to provide advice to x-ray operators. | <p>As per Level 2, plus:</p> <p>Medical</p> <ul style="list-style-type: none"> > suitably trained on site radiologist or medical practitioner with supervision responsibility for all contrast media examinations; however, administration of contrast may be delegated to radiographer or registered nurse (radiographer or nursing staff member is available to observe patient post-procedure). > where radiologist not available, medical practitioner must be present at all times when contrast is administered. > access—24 hours—to a radiologist to interpret/report on CT images. > an anaesthetist must be accessible for consultation/support where it has been identified administration of contrast poses known risks. <p>Nursing</p> <ul style="list-style-type: none"> > staffing levels in accordance with the relevant industrial instruments. > access to registered nurse/s in services with higher levels of patient acuity. <p>Allied Health</p> <ul style="list-style-type: none"> > access to radiographers with licence endorsement to provide appropriate imaging service. | <p>As per Level 3, plus:</p> <ul style="list-style-type: none"> > where patient requires sedation, registered nurse with appropriate competency or anaesthetist must be responsible for patient's airway and for providing care. <p>Medical</p> <ul style="list-style-type: none"> > radiologist performing Tier A procedures must hold current Fellowship of the Royal Australian and New Zealand College of Radiologists (FRANZCR) certificate and be registered with AHPRA/MBA as a specialist radiologist. > radiologist performing Tier A procedures must: <ul style="list-style-type: none"> – demonstrate currency of ongoing activity in performing such procedures > access to radiologist for clinical governance oversight available during business hours. > access to other medical specialists with appropriate credentials relative to services provided for the interventional procedures being performed. <p>Nursing</p> <ul style="list-style-type: none"> > staffing levels in accordance with the relevant industrial instruments. > nursing staff accessible on-site during business hours and available after hours, as required. | <p>As per Level 4, plus:</p> <p>Medical</p> <ul style="list-style-type: none"> > specialists performing Tier B procedures (excluding interventional neuroradiology/procedures) must hold current Fellowship of the Royal Australian and New Zealand College of Radiologists (FRANZCR) and be registered with AHPRA/MBA as a specialist radiologist > medical practitioners performing Tier B procedures must demonstrate current, ongoing activity in procedures. > access—24 hours—to radiologist. > radiologist reporting and interpreting MRI examinations must hold current Fellowship of the Royal Australian and New Zealand College of Radiologists (FRANZCR) and be registered with AHPRA/MBA as a specialist radiologist must meet RANZCR guidelines for supervising and reporting MRI studies. They must also meet RANZCR MRI CPD requirements. > radiologist with credentials in breast MRI. | <p>As per Level 5, plus:</p> <p>Medical</p> <ul style="list-style-type: none"> > specialists performing interventional neuroradiology procedures must meet the requirements for training and ongoing clinical skill maintenance as defined by the Conjoint Committee for Recognition of Training in Interventional Neuroradiology (CCINR). > Medical practitioners performing the above Tier B procedures must demonstrate current, ongoing activity in procedures. <p>Nursing</p> <ul style="list-style-type: none"> > staffing levels in accordance with the relevant industrial instruments. > registered nurses with specific competencies relevant to services being provided. <p>Allied Health</p> <ul style="list-style-type: none"> > specialist radiographers with neuro-interventional competency assigned to that modality with responsibility for service delivery and quality. |

| Medical imaging services | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6 |
|---|---|---------|---|---|---|---------|
| Workforce requirements <i>(continued)</i> | <ul style="list-style-type: none"> > facility managers and radiation safety officers shall ensure all authorised persons are aware of, and comply with licence restrictions imposed on x-ray operators at their facility. > access to service engineers with qualifications and experience relevant to model and make of equipment in use by service. | | <ul style="list-style-type: none"> > radiographers who have been delegated administration of intravenous contrast must demonstrate competence in contrast administration and intravenous cannulation. > radiographers with clinical competency and experience appropriate to the modalities / services being provided. > maintain registration on the ASAR. <p>Other</p> <ul style="list-style-type: none"> > access to medical imaging assistants and operational officers. | <ul style="list-style-type: none"> > where after-hours interventional services provided, registered nurses with relevant qualifications and experience in medical imaging practices. <p>Allied Health</p> <ul style="list-style-type: none"> > radiographer with licence endorsement, clinical competency and experience appropriate to modality being provided must be present to operate each apparatus. <p>Other</p> <ul style="list-style-type: none"> > access to advanced infection control skills when required. | <p>Nursing</p> <ul style="list-style-type: none"> > staffing levels in accordance with the relevant industrial instruments. > registered nurses available after hours to assist radiologists with interventional procedures. > nurse / midwife may be required to stay with and provide care for patients needing specialist care. <p>Allied Health</p> <ul style="list-style-type: none"> > senior specialist radiographers assigned to each of modality areas with responsibility for service delivery and quality. | |
| Specific risk considerations | > Nil | > Nil | > Nil | > Nil | > Nil | > Nil |

| Support services requirements for Medical Imaging services | Level 1 | | Level 2 | | Level 3 | | Level 4 | | Level 5 | | Level 6 | |
|--|---------|------------|---------|------------|---------|------------|---------|------------|---------|------------|---------|------------|
| | On-site | Accessible | On-site | Accessible | On-site | Accessible | On-site | Accessible | On-site | Accessible | On-site | Accessible |
| Anaesthetic | | | | | | | | 3 | | 4 | 5 | |
| Intensive care | | | | | | | | 4 | | 4 | 5 | |
| Pathology | | | | | | | | 5 | | 5 | | 5 |
| Pharmacy | | | | | 2 | | 3 | | 4 | | 4 | |
| Surgical | | | | | | | | 4 | 5 | | 5 | |

| Legislation, regulations and legislative standards | Non-mandatory standards, guidelines, benchmarks, policies and frameworks (not exhaustive & hyperlinks current at date of release of CSCF) |
|---|--|
| <p>In addition to what is outlined in the Fundamentals of the Framework, medical imaging services must comply with the following:</p> <ul style="list-style-type: none"> > Australian Radiation Protection and Nuclear Safety Agency. Radiation Protection Series No.14. Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation; 2008 > Diagnostic Imaging Accreditation Scheme Standards, Department of Health and Ageing (DoHA). www.health.gov.au/internet/main/publishing.nsf/Content/diagnosticimaging-accred2 > Health Insurance (Diagnostic Imaging Services Table) Regulations > Radiation Protection and Control Regulations 2015 | <p>In addition to what is outlined in the Fundamentals of the Framework, the following may be relevant to medical imaging services:</p> <ul style="list-style-type: none"> > Australasian Society for Ultrasound in Medicine. Policies and Statements B1. Policy on Diagnostic Ultrasound Services. ASUM; 1999. www.asum.com.au > Australian Institute of Radiography. Professional practice standards for the accredited practitioner. 2013. https://www.asmirt.org > Australian Institute of Radiography. Guidelines for radiographers involved in venepuncture. AIR; 2009. https://www.asmirt.org > Australian Institute of Radiography. Guidelines for professional conduct for radiographers, radiation therapists and sonographers. https://www.asmirt.org > Australian and New Zealand College of Anaesthetists. Recommendations on minimum facilities for safe anaesthesia practice outside operating suites. ANZCA; 2000. www.anzca.edu.au > Australian and New Zealand College of Anaesthetists. Technical standard T1: Recommendations of minimum facilities for safe administration of anaesthesia in operating suites and other anaesthetising locations. ANZCA; 2008. www.anzca.edu.au/resources/professional-documents/ > Australian College of Operating Room Nurses. ACORN standards, nursing roles, guidelines and position statements. ACORN; 2008. www.acorn.org.au > Australian Sonographers Association. Guidelines. www.a-s-a.com.au > Interventional Radiology Society of Australasia. Guidelines for credentialing for interventional radiology. www.irsau.com.au/guidelines.html > Royal Australian and New Zealand College of Radiologists. RANZCR Guidelines including: <ul style="list-style-type: none"> – Guidelines for Diagnostic Ultrasound Services – Guidelines for Iodinated Contrast Administration 2016 – Guidelines on the Use of Gadolinium-Containing MRI Contrast Agents October 2013 – MRI Safety Guidelines > Royal Australian and New Zealand College of Radiologists. RANZCR Standards of practice for diagnostic and interventional radiology. www.ranzcr.edu.au > Royal Australian and New Zealand College of Radiologists/Australian and New Zealand Society of Neuroradiology/Interventional Radiology Society of Australasia. RANZCR/ANZSNR/IRSA Guidelines for Accreditation and Credentialing in Interventional Neuroradiology. www.ranzcr.edu.au > Training Education and Assessment Program (TEAP) in Diagnostic Imaging Medical Physics training requirements of the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM) https://www.acpsem.org.au/whatacpsemdoes/training-education-assessment-programs > Registration of Qualified Medical Physics Specialists and Radiopharmaceutical Scientists registration requirements of the ACPSEM https://www.acpsem.org.au/whatacpsemdoes/the-acpsem-register-2 > Conjoint Committee Guidelines for Recognition of Training in Interventional Neuroradiology (INR) http://www.ccinr.org.au/guidelines/ > The Australian and New Zealand Royal College of Radiology (RANZCR) Training Requirements in Interventional Neuroradiology Procedures Guidelines. https://www.ranzcr.com/fellows/clinical-radiology/professional-documents/?searchword=Neuroradiology&ordering=published.date+DESC&direction=asc&limitstart=0 |

Subspecialty Overview - Interventional Neuroradiology

- > Interventional Neuroradiology (INR) uses percutaneous and endovascular techniques in the treatment of adult and paediatric patients with disease of the brain, head and neck, spinal cord and vertebral column. The INR service sits within the governance of the radiology department but works in close collaboration with other clinical services within the hospital, most specifically neurology/stroke, vascular surgery, anaesthesia, ICU and neurosurgery. Clinicians providing the INR service are required to fulfil the independent Australian and New Zealand standards of the Conjoint Committee for INR (CCINR) for training and ongoing credentialing. The health care facility providing a 24/7 INR service requires ready access to other imaging modalities 24/7 including MRI, CT and Ultrasound. The facility also requires access to an ICU with neurosurgical experience and a dedicated neurology / stroke unit.
- > Modern imaging requirements and the development of image guided interventions has resulted in a large increase in neuroradiology workload most recently with endovascular stroke thrombectomy. It is important that this work is managed safely within a service that is fit for purpose. Important integrated responsibilities include training and education, research and development and working closely with colleagues in a wide variety of other specialties through multidisciplinary team (MDT) working.
- > SA Health Clinical Directive – Interventional Neuroradiology Scope of Clinical Practice defines a set of INR procedures and the training requirements for medical practitioners to be able to perform INR procedures in SA Health facilities to allow for an INR scope of clinical practice to be clearly delineated.

| Interventional Neuroradiology | Level 6 |
|-------------------------------|--|
| Service description | <ul style="list-style-type: none"> > the INR service provides emergent and elective treatment of diseases of the brain, sensory organs, head and neck, spinal cord, vertebral column and adjacent structures and the peripheral nervous system in adults and children. > endovascular approaches represent the most complex and potentially high-risk aspects of interventional neuroradiology. > care pathways include but are not limited to endovascular thrombectomy for acute ischaemic stroke and endovascular aneurysmal management. |
| Service requirements | <ul style="list-style-type: none"> > onsite 24/7 access to CT and MRI scanners capable of performing high end neuroimaging including but not limited to CT Angiography, CT Perfusion and MR perfusion. Additional equivalent CT and MR scanners should be available on site to support downtime and periods of increased demand. > onsite 24/7 access to a suitable interventional angiographic suite able to accommodate general anaesthesia. It is preferable but not essential that procedures be carried out under the image guidance of a bi-plane angiography unit with flat panel-CT capabilities and necessary software and hardware in order to perform high quality cerebral angiography including rotational 3D capability. It is recommended on site access to an appropriate second angiographic facility to cover periods of down time. > 24/7 and immediate access to appropriately trained nursing staff and radiographers. > all INR services require collaboration with neurosurgical and ICU services collocated at the same site as the INR service. > 24/7 access to anaesthetic services experienced in neurosurgery. > a sufficient number of neurology / stroke unit beds should be available in neurology / stroke units to accommodate interventionally treated neurology / stroke patients at any time. > 24/7 ability to accept referral of patient for INR services in a clinically appropriate time frame. > appropriate IT infrastructure to allow adequate access to home workstations and remote visualisation of imaging studies. > adequate supply of required software for management of elective and emergent case load. > access to multidisciplinary outpatient referral centre for planning and follow-up of patients managed in the INR service. > robust MDT forum for neurosurgical and neurology/stroke patients with audit of service outcomes. |

| Interventional Neuroradiology | | Level 6 | |
|-------------------------------|---|---|--|
| Workforce requirements | Medical <ul style="list-style-type: none"> > sufficient number of medical specialists that meet the requirements for training and ongoing clinical skill maintenance as defined by the Conjoint Committee for Recognition of Training in Interventional Neuroradiology (CCINR) to provide a 24/7 service. > 24/7 access to ICU services with neurosurgery experience. > 24/7 access to anaesthetic assistance with experience in neurosurgery. > 24/7 access to neurosurgery services. > 24/7 access to neurology / stroke services. > 24/7 access to vascular surgery services. | Nursing <ul style="list-style-type: none"> > staffing levels in accordance with the relevant industrial instruments. > sufficient staffing levels to enable 24/7 cover in interventional procedural rooms. | Allied Health <ul style="list-style-type: none"> > 24/7 access to radiographers with skills in advanced neuroimaging techniques for CT/MRI and angiography. > qualified radiology medical physicist assessable for consultation. > appropriate radiation licensing requirements need to be met. |
| Specific risk considerations | In addition to risk management outlined in the Fundamentals of the Framework, specific risk management requirements include: <ul style="list-style-type: none"> > awareness of procedural complexity and combination of anaesthetic risk appropriate to this level of service. | | |

The following table outlines the support service requirements for Interventional Neuroradiology. The table cross-references other modules in the CSCF, thereby recognising the interdependencies which exist between Interventional Neuroradiology and other specialty areas.

| Support Services Requirements for INR Service | Level 6 | |
|---|---------|------------|
| | On-site | Accessible |
| Anaesthetics | 6 | |
| Intensive Care Unit | 6 | |
| Surgical Services – Neurosurgery – Vascular Surgery | 6 | |
| Stroke / Neurology | 6 | |
| Perioperative | 6 | |
| Palliative care | 4 | |
| Pathology | 5 | |
| Pharmacy | 5 | |

For more information

SA Health
 Telephone: 08 8226 6891
www.sahealth.sa.gov.au

Public I1-1A



Acknowledgement: Used and adapted with the permission of Queensland Health



Government
of South Australia