

Quality Standards Checklist for Modern IR Departments¹

I. Infrastructure and Equipment

Peri-procedural Areas

☐ Dedicated IR Office / Administrative Workspace

☐ Patient Consultation and Consent Room

- Dedicated space for patient assessment, informed consent, and patient information provision

☐ Medication Preparation Area

- Designated area for medication preparation and storage according to institutional and regulatory policy

☐ Preparatory and Recovery Rooms with Procedural Monitoring and Emergency Readiness

- Recommended ratio: 3–4 monitored preparation/recovery bays per IR suite
- Continuous physiological monitoring capability
- Oxygen and suction supply
- Immediate access to advanced life support equipment (resuscitation trolley)
- Access to day-case or short-stay beds to support same-day admission/discharge pathways
- Organized to ensure patient privacy
- Children must be recovered in an area that is segregated from adult patients.

☐ Dedicated IR Planning and Imaging Review Room

- Separate room for image review, procedural planning, MDT discussion, and post-procedural assessment

¹ <https://www.cirse.org/society/cirse-vision-for-the-future-of-ir-overview/therapies-and-treatment/further-reading-from-the-therapies-and-treatment-task-force/>

- Diagnostic-quality PACS workstations with full RIS/EHR integration and access to external imaging sources

☐ Training and Education Facilities

- Office space with computers
- Designated areas for training and simulation

☐ Patient reception areas for booking patients in and discharge.

IR Procedural Zone

☐ Scrub Area

- Surgical scrub area immediately adjacent to the IR suite

☐ Control Room: Dedicated control room for operation of imaging equipment (recommended minimum ~36 m²)

- PACS/RIS integration with image viewing and interpretation workstations, access to external imaging sources

☐ In-room Storage for Essential Procedural Equipment

- Designated storage space within the IR suite for critical procedural supplies and emergency equipment
- Recommended minimum ~15 m² per IR suite

☐ Additional Equipment and Inventory Storage

- Separate nearby storage room for additional stock, less frequently used equipment, and consumables
- Structured inventory management system to ensure availability of critical supplies, particularly for emergency IR care

☐ Environmental and Technical Infrastructure

- Adequate ventilation and air exchange systems appropriate for interventional procedures
- Air conditioning and electrical utilities with backup power supply
- Consideration of clean/dirty workflow separation according to infection control standards

Angiosuite Requirements

☐ Angiosuite Room

- Dedicated IR procedural suite with uninterrupted availability for IR procedures
- Recommended procedural room size approximately $\geq 60 \text{ m}^2$ ($\geq 74 \text{ m}^2$ for hybrid angio/CT suites), depending on local design standards

Imaging Equipment

☐ Flat-panel DSA System (floor or ceiling mounted)

- Fixed C-arm fluoroscopy system
- Large field-of-view detector (typically $> 30 \text{ cm}$)
- High-resolution fluoroscopy
- Road-mapping and last-image hold capability
- Pulsed low-dose acquisition modes

☐ 3D / Advanced Guidance Capabilities

- Rotational angiography and CBCT capability
- Image fusion (CT/MR to fluoroscopy)
- On-table reconstruction workstation

☐ Dose Management System

- Real-time DAP/Air-Kerma display
- Dose alerts and monitoring systems
- Automated dose logging integrated with PACS/RIS for quality assurance
- Low dose protocols for paediatric cases, ideally for a range of patient ages/weights
- Dose reference limits for paediatric cases, ideally for a range of patient ages/weights

☐ Fluoroscopy Table System

- Carbon-fibre tabletop
- High weight capacity
- Longitudinal and lateral travel with tilt capability
- Compatibility with large-bore introducers

☐ Contrast Injection System

- Dual-head power injector with programmable protocols
- Logged injection profiles

- Adequate space for injector positioning and for safe preparation/warming of contrast media

☐ Integrated Ultrasound System in the IR Suite

- Dedicated ultrasound machine with convex and linear probes
- Colour Doppler capability
- Available for vascular access and ultrasound-guided interventions

☐ Hybrid Angio-CT Capability

Cross-sectional Imaging Integration

☐ Dedicated IR-controlled CT scanner available for IR procedures, ideally within or adjacent to the IR department to ensure unrestricted 24/7 access. CT workflow suitable for interventional procedures, including:

- Scrub areas
- Patient monitoring capability
- Sterile procedural setup
- Availability of emergency/support equipment
- Interventional guidance software (e.g. needle guidance or planning tools)

☐ Ultrasound Availability Outside the Angiosuite

- Scrub areas
- Additional ultrasound equipment available for peri-procedural assessment, emergency evaluation, and CT/US-guided procedures outside the angiosuite

Anaesthesia and Physiological Support

☐ Physiological Monitoring

- Full physiological monitoring available in the IR suite, including ECG, blood pressure (non-invasive and invasive where required), SpO₂, capnography (EtCO₂), and temperature monitoring

☐ Anaesthesia Support

- Immediate access to anaesthesia services for elective and emergency procedures, with defined SOPs for escalation and high-risk cases. This should include access to paediatric anaesthesia services in centres where children are treated in IR.

- Availability of anaesthesia equipment, oxygen supply, suction, and space for anaesthesia personnel where required

☐ Emergency Preparedness

- Immediate access to advanced life support equipment (e.g. resuscitation trolley, airway management equipment, defibrillator)
- Defined pathways for escalation to ICU/HDU and access to massive haemorrhage protocols where applicable

Radiation Safety

☐ Structural Radiation Protection

- Ceiling-mounted shields, table skirts, mobile barriers
- Lead aprons and thyroid protection in multiple sizes

☐ Personal Dosimetry and Monitoring

- Personal dosimetry system for all staff
- Defined exposure monitoring and reporting procedures
- Pregnancy radiation policy in line with regulations

☐ Radiation Safety Systems

- Real-time dose monitoring and structured dose documentation
- Regular radiation safety training and certification

II. Service Organization

Hygiene, Infection Control and Regulatory Compliance

- ☐ Compliance with national hygiene and infection control standards
- ☐ Defined clean/dirty workflows and ventilation standards
- ☐ Requirements adapted to procedural invasiveness

Clinical Pathways and Procedural Processes with defined written protocols

- ☐ Documented referral, assessment, procedural, recovery, and follow-up pathways
- ☐ Disease-specific IR pathways available

IR Clinical Outpatient Model

- ☐ Structured outpatient clinic pathways implemented
- ☐ Defined responsibility for clinical follow-up
- ☐ Patient information and consent materials available

Multidisciplinary Practice and Case Review

- ☐ Regular morbidity and mortality meetings
- ☐ Participation in multidisciplinary team meetings
- ☐ Structured internal case review processes

Quality Management and Audit

- ☐ Audit and quality improvement processes implemented
- ☐ Outcome and complication monitoring implemented
- ☐ Radiation dose monitoring integrated into QA
- ☐ Incident reporting and structured review systems implemented

Regional Service Delivery and Emergency Access

- ☐ 24/7 IR access provided
- ☐ Defined referral and transfer pathways
- ☐ Image exchange capability available

- ☐ Time-to-treatment benchmarks monitored
- ☐ Integration with emergency, ICU, surgical, and anaesthesia escalation pathways

Training and Professional Development

- ☐ Training framework aligned with CIRSE curriculum
- ☐ Structured supervision and competency development pathways
- ☐ Support for continuing education, simulation training, and research

III. Staff Requirements

Interventional Radiologists

- ☐ Six dedicated IR consultants to sustain 24/7 rota
- ☐ Two additional IR consultants for clinics, research, teaching, administration, and leave cover
- ☐ One IR physician per active IR suite per session
- ☐ IR fellows/trainees aligned with procedural volume

IR Nurses

- ☐ Dedicated IR-trained nursing staff and health care associates/helpers
- ☐ Per active IR suite:
 - One scrub nurse
 - One circulating nurse
 - One monitoring nurse when sedation required
- ☐ Preparation/recovery nursing support (~1 nurse per 3–4 monitored patients)

Interventional Radiographers/Technicians

- ☐ Dedicated IR radiographer per active suite, 1 or 2 depending on layout and training requirements.
- ☐ Training in advanced imaging and radiation optimization
- ☐ Staffing structure supporting emergency and prolonged procedures

Anaesthesia Support

- ☐ Dedicated anaesthetist during daytime IR lists
- ☐ Anaesthesia nurse when GA/deep sedation used
- ☐ 24/7 anaesthesia support for emergencies

Administrative and Support Staff

- ☐ Dedicated administrative staff for scheduling and documentation
- ☐ Support staff for patient logistics and workflow

Emergency IR Team (24/7)

- ☐ On-call IR consultant
- ☐ IR-trained nurse
- ☐ IR radiographer
- ☐ Anaesthesia support
- ☐ Defined backup/escalation pathway

Sustainability and Staff Wellbeing

- ☐ Rota structure allowing adequate rest periods
- ☐ OOH IR team not simultaneously responsible for diagnostic emergency workload where feasible