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Clinical Radiology

The Royal College of Radiologists

Standards for providing a seven-day acute care diagnostic radiology service

Faculty of Clinical Radiology

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RCR Standards

The Royal College of Radiologists (RCR), a registered charity, exists to advance the science and practice of radiology and oncology. It undertakes to produce standards documents to provide guidance to radiologists and others involved in the delivery of radiological services with the aim of defining good practice, advancing the practice of radiology and improving the service for the benefit of patients.

The standards documents cover a wide range of topics. All have undergone an extensive consultation process to ensure a broad consensus, underpinned by published evidence where applicable. Each is subject to review four years after publication or earlier if appropriate.

The standards are not regulations governing practice but attempt to define the aspects of radiological services and care which promote the provision of a high-quality service to patients.

All of the standards produced by the RCR can be found on the College website at www.rcr.ac.uk/standards

Current standards documents

Standards of practice and guidance for trauma radiology in severely injured patients, Second edition

Standards for intravascular contrast administration to adult patients, Third edition

Standards for the provision of an ultrasound service

Standards of practice of computed tomography coronary angiography (CTCA) in adult patients

Cancer multidisciplinary team meetings – standards for clinical radiologists, Second edition

Standards for Learning from Discrepancies meetings

Standards for radiofrequency ablation (RFA), Second edition

Standards for patient confidentiality and PACS and RIS

Standards for the communication of critical, urgent and unexpected significant radiological findings, Second edition

Standards for patient consent particular to radiology, Second edition

Standards of practice and guidance for trauma radiology in severely injured patients

Standards and recommendations for the reporting and interpretation of imaging investigations by non-radiologist medically qualified practitioners and teleradiologists

Standards for the NPSA and RCR safety checklist for radiological interventions

Standards for the provision of teleradiology within the United Kingdom

Standards for a results acknowledgement system

Standards for providing a 24-hour diagnostic radiology service

Standards for providing a 24-hour interventional radiology service

Standards for Self-assessment of Performance

Standards for the Reporting and Interpretation of Imaging investigations

Standards for Ultrasound Equipment

Foreword

The Royal College of Radiologists (RCR) recognises that acutely ill patients must have access to high-quality diagnostic radiology services at all times. However, the RCR also understands the very significant demands that providing a high-quality seven-day diagnostic acute care radiology service will place upon radiologists, the colleagues with whom they work and the systems upon which they rely. The safe, successful and sustainable provision of such a service therefore demands a high level of commitment, investment and resourcing.

The purpose of this document is to highlight, for commissioners and providers, the standards that should be taken into account when designing and providing such a service. The College appreciates the challenges of meeting these standards. The hope is that these standards will help in making a business case for the necessary increases in human and financial resources.

To ensure patient safety and optimal outcomes, it is essential that radiologists are not fatigued and always have 11 hours of continuous rest in a 24-hour period, in line with the requirements of the UK Working Time Regulations.[1] The occupational health of staff must not be compromised.

Acute care diagnostic radiology is not as an isolated service. It can only be delivered as part of a provider's broader delivery of all seven-day acute care services.

This document replaces *Standards for providing a 24-hour diagnostic radiology service* and should be read in conjunction with the RCR documents *Provision of interventional radiology services* and *Investing in the interventional radiology workforce: the quality and efficiency case*.[2,3]

I would like to acknowledge the work and commitment of the members of the RCR's Clinical Radiology Professional Support and Standards Board and the Clinical Radiology Faculty Board. In particular, thanks are due to Dr Shah Khan, who led the revision of this document and all the members of the working party: Dr Daniel Rose, Professor Iain Robertson, Dr Tony Newman-Sanders, Dr John Somers, Dr Diana Rosof-Williams and Ms Susan Johnson.

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Vice-President, Clinical Radiology
The Royal College of Radiologists

Recommended standards

Standard 1
Safe radiological staffing is required to deliver satisfactory patient outcomes.

Standard 2
Clinicians treating acutely and critically ill patients should have timely access to a radiologist when their skill is likely to aid diagnosis and/or provide therapeutic intervention.

Standard 3
Rostering arrangements for the delivery of acute care diagnostic radiology services should ensure adequate rest is possible before and after each shift. Ad hoc on-call arrangements, for example, for intervention, are inappropriate and should be replaced by more formal arrangements. To ensure patient safety, it is important that radiologists are not fatigued and always have 11 hours of continuous rest in a 24-hour period, in line with the requirements of the UK Working Time Regulations.[1]

Standard 4
Radiologists reporting from home and teleradiologists reporting outsourced imaging for acutely ill patients should have workflow efficient access to previous imaging, reports, electronic patient records (EPRs), multiplanar processing facilities and voice recognition reporting.[4,5]

Standard 5
Robust information technology (IT) infrastructures should be in place to support image and report sharing.

Standard 6
Radiologists reporting acute imaging should be supported by secretarial or clerical staff to facilitate the communication between radiologists and the referring doctors. This particularly applies to critical, significant or unexpected report communication.

Standard 7
There should be clarity from the provider about what acute care services are provided on site on a 24-hour basis and referral protocols should be agreed.

Standard 8
Radiology information systems (RIS) and picture archiving and communication systems (PACS) support should be available seven days a week.

Standard 9
To provide an effective acute care diagnostic radiology service, it should be delivered as part of a provider's delivery of all seven-day acute care services and not as an isolated service.

Standard 10
IT systems should enable efficient electronic text feedback to all radiologists involved in emergency imaging or intervention, to benefit patients and facilitate learning.

Standard 11
All radiologists reporting imaging of acutely ill patients or intervening on them should have well-defined efficient telephone communication systems that permit urgent discussion with clinicians who have overall responsibility for such patients.

Standard 12
Health providers and commissioners that sign up to providing seven-day acute care diagnostic radiology services must ensure that such services are adequately staffed and resourced to provide a sustainable high-quality service, protect the health and wellbeing of staff and to ensure that patient safety is not compromised.

Standard 13
When any aspect of acute radiology services cannot be provided on a 24-hour basis, this should be formally reported and placed on the provider's risk register. Business cases for alternatives for providing that acute radiology service should be urgently developed and discussed with the provider's management.

Standard 14
Large networks of radiologists may facilitate sustainable acute seven-day rotas.[6]

1. Introduction

The RCR recognises that patients who are acutely ill must have access to a high-quality diagnostic radiology service regardless of the time or day on which they present. The way that acute care diagnostic radiology services are designed and delivered will vary from location to location and it is vital that such services are funded and designed to take account of local health needs and the local health economy. The College does not underestimate the difficulties and challenges that providing a seven-day acute care diagnostic radiology service will pose for many commissioners and providers. Services may face the challenge of redesigning their entire acute care provision, of which acute care diagnostic radiology services form one (albeit vital) part. Significant levels of human and financial investment may be required. The College is also conscious that failure to invest in an efficient, effective and safe acute care diagnostic radiology service is likely to be detrimental to patient safety and patient outcomes and to have a negative impact on staff morale.

The purpose of these standards is therefore to highlight the difficulties and challenges that providing a high-quality seven-day acute care diagnostic radiology service poses and to set out the standards that need to be taken into account when evaluating, designing and providing such a service.

2. Requirements for the provision of a seven-day acute care diagnostic radiology service

It is essential that a whole-team approach is taken when considering seven-day acute care diagnostic radiology service delivery to ensure that radiologists, radiographers, nurses, support staff, administrative staff and portering services are fully involved and able to contribute. Inevitably, providing a seven-day acute care diagnostic radiology service is likely to require additional resources to fund the cost of increased staffing and the running of services. To be cost effective and to optimise patient care, acute care diagnostic radiology services should be provided as an integral part of a comprehensive seven-day service by all acute clinical services, rather than as an isolated service.[7,8]

The service should be delivered by appropriately trained and General Medical Council (GMC) registered radiologists or, when agreed by the provider, delegated to appropriate accredited providers and supported, if necessary, by an appropriate role extension.[9–11]

A radiologist should be immediately contactable for the management of acutely ill patients at all times. Radiologist rostering that supports acute care service delivery should be safe and sustainable.

Ad hoc rotas are not appropriate. Radiologists' working hours for all employers, taken together, should comply with the European Working Time Directive (EWTD) and UK Working Time Regulations. The Working Time Regulations (1998) implement the EWTD (1993) in UK law.[1, 12]

Radiologist involvement in the management of acutely ill patients (both locally or working for an outsourced service provider) may involve:

- Offering advice on the need for imaging, imaging pathways and the appropriate timing of any investigations and being available for discussions about results with clinicians as required[13]
- Reviewing previously obtained images where relevant
- Reporting diagnostic imaging in a timely fashion
- Effectively communicating reports on critically ill patients, including documenting when direct telephone communication occurs and with who[14,15]
- Recording and reporting ad hoc reports and addendums[16]
- Discussing the need for invasive procedures with clinicians and how these can be best carried out within the local or networked arrangements
- Advising further clinical liaison when appropriate.

Robust communication systems should be in place to facilitate these processes. Radiologists must be supported by secretarial and clerical staff to facilitate the communication of critical and significant reports.

In addition:

- Radiologists should not carry out an investigation or procedure for which they are not trained or which they are not competent to perform. If such a service is required on a regular (if infrequent) basis, then appropriate seven-day arrangements must be developed locally or commissioned elsewhere

- Appropriate support, supervision and advice for radiologists in training, radiographers and nurses who deliver elements of seven-day acute care services should be provided
- A robust IT infrastructure with seven-day fail-safe contingency arrangements should exist in case of RIS/PACs failure/issues[17]
- Contingency plans should also be in place to address equipment failure and any personnel issues.

The overriding principle should be that responsibility for the local radiology service remains with the local provider.

Local agreements, Ionising Radiation (Medical Exposure) Regulations (IR[ME]R) employer's procedures and other policies and protocols should be developed, available and publicised for:

- The timing of examinations
  - So that seriously ill patients are dealt with immediately and non-urgent cases do not overwhelm the system
- The availability of urgent/emergency diagnostic or interventional examinations[2,3]
  - Where the referral process varies by time of day this should be very clear
  - Services may partner with other providers to ensure that referrers have appropriate access for their patients
- Examinations that do not require radiologist justification of referrals, for example, plain films.

Emergency admissions multidisciplinary meetings, where radiologists can play an important role in optimising patient care and patient flow with input from all acute stakeholders, are evolving. These meetings should be adequately resourced to ensure the provision of a consistent and sustained service.

Consideration should be given to the use of itemised service level agreements and referral decision support systems to empower appropriate use of the radiology service and facilitate adequate funding for safe staffing and equipment maintenance.

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3. Duties of those providing the service

The definition of which duties are included in the provision of seven-day acute care diagnostic radiology services is dependent on the nature and extent of service provision and the commissioning and contractual context in which they are provided. This context varies considerably across the National Health Service (NHS).

CASE STUDY 1

A suite of standards for the provision of 24/7 services has been developed in London. These encompass acute medical and surgical care, critical care, paediatric and maternity services. Included in it are a set of standards pertaining specifically to radiology, which include: prompt access to interventional radiology, rapid access to inpatient ultrasound (US), computed tomography (CT) and magnetic resonance imaging (MRI) and a set of report turnaround time targets. Initially these were set up and audited by the Strategic Health Authority (SHA) but, since the NHS reorganisation, the standards have been taken on by commissioner collaboratives and urgent and emergency care networks. It is anticipated that compliance with such standards will be included in contracts for the provision of diagnostic imaging services.

There must be clarity across a health economy as to what is meant by a seven-day acute care diagnostic radiology service. In practice this will usually mean critical and emergency imaging and image-guided procedures 24 hours a day 7 days a week.

Providers and commissioners need to agree a clear specification of the acute service that is expected to be delivered and which elements are the responsibilities of:

- Individual organisations
- Formal imaging networks including interventional radiology services
- Formal outsourcing or teleradiology arrangements.

Informal or ad hoc arrangements should be avoided wherever possible and when they cannot be avoided there should be:

- An explicit gap analysis and risk assessment
- A plan with timed milestones to deal with the risks and to formalise the network arrangement.

Once clarified, it is incumbent on healthcare providers who sign up to delivering seven-day acute care diagnostic radiology services to:

- Engage proactively with the radiology department and empower its leaders to deliver the necessary service change
- Demonstrate a clear alignment with the wider provision of seven-day acute care services such that the investment in providing timely imaging and appropriate reports is matched by appropriate availability of senior clinical decision makers and, where necessary, multidisciplinary review[7,8]
- Provide adequate resources to ensure that the quality of the acute care diagnostic radiology service, the health and wellbeing of staff and patient safety are not compromised

- Ensure that any substantial changes in staff conditions and/or job plans are achieved through negotiation and agreement with staff and their representative bodies/trade unions.

Human performance in all activities, including patient care, depends on morale. The impact of changes in working conditions should optimise morale, recruitment and retention.

Radiology services should ensure that the safety and quality of the service are not compromised, that adequate resources are secured and that all relevant staff are appropriately engaged and competent to provide the service.

Individual radiologists must satisfy themselves that they have the necessary competence to provide those elements of the service which fall to them and that they are able to maintain the necessary clinical exposure and professional development to sustain that competence.

Standard 12

Health providers and commissioners that sign up to providing seven-day acute care diagnostic radiology services must ensure that such services are adequately staffed and resourced to provide a sustainable high-quality service, protect the health and wellbeing of staff and to ensure that patient safety is not compromised.

Standard 13

When any aspect of acute radiology services cannot be provided on a 24-hour basis, this should be formally reported and placed on the provider's risk register. Business cases for alternatives for providing that acute radiology service should be urgently developed and discussed with the provider's management.

4. Methods of delivering the service

Currently the main models for delivery of seven-day acute care services involve a combination of:

1. Provision by the locally employed radiologists
   - On-site presence of local radiologists (usually weekdays, less so at weekends and also some may participate in acute admissions multidisciplinary team meetings)
   - Home workstations and laptops (may be used in the evenings, at weekends and at night)
2. NHS collaborative radiologist networks
3. Outsourced teleradiology networks (not defined by regional boundaries).

Local provision

This has been the traditional model of service provision.

Many radiology services have seen relentless year-on-year increases in demand that have not been matched by commensurate staffing.[2,18,19] There have been difficulties in recruitment and retention, specialisation and other commitments, such as multidisciplinary team meetings (MDTMs). These have rendered the provision of all elements of the acute services – weekday, weekend and overnight diagnostic radiology by local radiologists – unsustainable and/or unsafe. Hence, a combination of service models may be necessary to provide the range of radiology services required by acutely ill patients.

There is no single solution which will deliver comprehensive, safe, timely, effective, efficient diagnostic radiology and intervention for all types of providers and at all geographical locations.

Providing seven-day acute care diagnostic radiology services requires additional staff to ensure patient safety and to achieve optimal outcomes and must be supported by appropriate occupational health services.

CASE STUDY 2

In 2009 a new model of acute care was developed in West Hertfordshire based around a purpose built 120 bed acute admissions unit (AAU) with a seven-day consultant delivered service. There are daily ward rounds at consultant level in surgery and medicine. Within the AAU there is a dedicated radiology unit equipped with CT and ultrasound and staffed by consultant radiologists. The model continues to evolve as demand and clinical practices change. The AAU has grown to 156 beds, including medical and surgical assessment units and dementia friendly acute services. Currently 60 hours of radiology time are provided on site between 08:00–20:00 Monday to Friday and one radiologist 09:00–18:30 on Saturdays, Sundays and bank holidays. A telemedicine outsourcing solution is used outside of these hours. Managing the radiologists' rota is challenging and has required the adoption of a sophisticated IT solution. Adoption of the AAU model resulted in reduced lengths of stay and general improvement in key performance indicators. Radiology currently meets NHS England investigation turnaround times but the model has and continues to require significant increased investment.

Regional networks

Networks between neighbouring and/or more remote providers may allow successful delivery of seven-day acute care diagnostic radiology and interventional services by making efficient and effective use of limited radiology resources and enabling accurate and timely interpretation of scans/interventions.[8,20]

Overnight and weekend networked radiology working has been implemented in specialist or regional centres, for example, in acute paediatric neuroradiology services. Use in acute care diagnostic radiology services would benefit patients, enhance the health and wellbeing of radiologists and foster training.

Key factors in the development of successful regional networks include:

- Investing in a teleradiology platform which enables multi-institutional efficient reporting by radiologists (IT system investment)[17]
- Ensuring that the teleradiology platform has access to the full imaging history within the local PACS[21–23]
- Providing radiologists with efficient access to blood results, histopathology reports and so on in the local IT systems
- Clarifying how money follows work transfer from one provider to another
- Ensuring an appropriate workload distribution, for example, if one provider loses radiologists and no longer has the spare capacity to help another provider
- Developing cross-provider human resources management (contracts, pensions and so on)
- Addressing work–life balance issues, sickness and maternity leave arrangements, health concerns and so on[4]
- Addressing the concerns of radiologists working for smaller providers about potential loss of specialist reporting, risks of deskilling and being left with routine work only
- Using standardised imaging protocols and pathways for common conditions across the service providers
- Establishing clear communication pathways and appropriate IT infrastructure to permit direct access to previous examinations and reports and the ability to deliver a typed report to the referrer.[13–15,24]

Outsourced teleradiology networks

Outsourced teleradiology services are used by many radiology services to provide acute care out-of-hours diagnostic radiology cover. When outsourcing is used to deliver all or part of a seven-day radiology service, the responsibility for ensuring appropriate standards of service are achieved rests with the organisation providing the service, for example, a teleradiology company, not with the local organisation. However, those who commission outsourcing must have arrangements to monitor report turnaround times, feedback from referrers on report quality and patient outcomes. They must also retain responsibility for initiating prompt remedial action if the service is not safe and effective.

Whatever model is adopted, to assure safety and instil confidence, the standards of radiology practice should be commensurate with those provided during core hours, for example, the skills and experience of non-UK radiologists providing a teleradiology service must be subject to the same rigorous appraisal and revalidation arrangements as for UK radiologists.

UK radiologists participating in the delivery of UK-based outsourcing services should ensure that they remain compliant with appropriate legislation relating to the Working Time Regulations.[1,12] Fatigue may pose a risk to patient safety and use of the audit trail in RIS/PACS can enable monitoring in this regard. The potential medico-legal implications of this have been noted.[25–31]

Standard 14

Large networks of radiologists may facilitate sustainable acute seven-day rotas.[7]

5. Junior diagnostic radiology staff

Junior diagnostic radiology staff should have ready access to a consultant radiologist for advice and a second opinion at all times while reporting acute imaging studies.

Junior staff, especially those operating as the principal contact with referrers, have a responsibility to ensure that results are communicated effectively.

The important training opportunities associated with dealing appropriately with emergency referrals, diagnosis and the treatment of acute problems should be recognised. However, there should be timely senior review/supervision of reports and interventions carried out by junior staff with appropriate feedback to ensure patient safety and to maximise the educational benefit of such opportunities.

6. Radiographers, nurses and other staff

Radiographers, nurses and other staff must have access to a consultant radiologist for advice and support at all times.[10] Services will also need to consider how to provide emergency support, safe manual handling, escorts and additional patient care outside of the immediate radiology examination, for example, access to toilet facilities.

Outside core hours, radiographers often work alone without peer support when performing scans on acutely ill, sometimes unco-operative patients. Safe staffing levels for all staff involved in delivering seven-day acute diagnostic radiology/interventional services should be provided, along with adequate training and rostering to maintain skills for the type of radiography/nursing performed out of hours. When outsourcing scans, the role of the radiographer in the process of scanning and liaising with the outsourced provider should be clear and supported.

7. Resources required to provide the service

The provision of seven-day acute care diagnostic radiology services must be supported by adequate resources, this includes:

- Equipment availability – for image acquisition
- RIS – for exam scheduling and reporting
- PACS – for reporting
- Staff
  - Radiologists
  - Radiographers
  - Clerical and administrative (to support radiologists and radiographers – reception, patient transfer, liaison with clinicians and result communication)
  - IT support staff.

The main costs of providing a seven-day service will relate to additional staffing. The running and maintenance of equipment and the use of consumables also need to be considered.

The provision of seven-day acute care diagnostic radiology services makes additional demands on the existing IT infrastructure and requires extended functionality of the 'office-hours' systems.

The normal reception and triage of requests needs to be supplemented by a system of telephone calls and appropriate senior triage. This is particularly important if third party reporting services are used.

Due to the nature of out-of-hours imaging, it is particularly important to have a robust protocol for ensuring that the relevant clinician is notified of any significant or unexpected findings in a timely way.[14] This is most often by telephone, but increasingly RIS, PACS and EPR systems can be used to communicate with clinicians and to ensure an audit trail.[15] There need to be clear written protocols on the communication of critical and unexpected findings – whether it is via telephone or electronic means.[14] They need to be followed consistently whatever the time of day.

The use of systems such as the image exchange portal to transfer images to other organisations on an elective or urgent basis is no different out of hours.[17] A robust staffing support structure is required at all times to facilitate effective image transfer.

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