Standards for providing a 24-hour interventional radiology service
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.

Current standards documents

Standards for the communication of critical, urgent and unexpected significant radiological findings
Standards for Self-assessment of Performance
Standards for Radiology Discrepancy Meetings
Standards in Vascular Radiology
Standards for Ultrasound Equipment
Standards For Iodinated Intravascular Contrast Agent Administration To Adult Patients
Standards for Patient Consent Particular to Radiology
Standards for the Reporting and Interpretation of Imaging Investigations
Cancer Multidisciplinary Team Meetings – Standards for Clinical Radiologists
360° Appraisal – Good Practice for Radiologists
Individual Responsibilities – A Guide to Medical Practice for Radiologists
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For the safety of patients, it is necessary that acute hospital trusts have formal and robust arrangements to ensure provision of emergency services 24 hours a day every day, of the year. The provision of interventional radiology is no exception and all patients regardless of geography and hospital size should have access to interventional techniques if required. Several surveys have shown that this is not currently occurring. The majority of radiology departments report either no interventional on-call rota or informal arrangements without adequate resource. This suggests that there is an unmet need for intervention in many hospital trusts. In addition, only a small number of radiology departments report formal lines of referral to other trusts which can provide interventional radiology services on a full-time basis. Such unclear arrangements are a potential risk to patients and put unfair pressure on individual radiologists and certain hospital trusts.

There needs to be clarity about the services that can and cannot be offered by individual departments and clear pathways for referral if we are to develop a better resourced and collaborative national interventional radiology service.

The emphasis of this document is to encourage trusts to:

- Put patient safety first, recognising the essential role of interventional radiology in the provision of modern medical care
- Recognise the resources and manpower required to provide an interventional radiology service
- Be clear and transparent regarding the local provision of interventional radiology services
- Decide what is, and what is not possible to provide in and out of hours
- Enter into discussions with strategic healthcare authorities, primary care trusts and other trusts in the region to make arrangements which ensure robust and coherent regional interventional radiology service provision 24 hours a day, seven days a week.

This standard is intentionally brief. It clarifies which services patients should have access to and suggest potential solutions to ensure 24-hour interventional radiology cover. It is stressed from the outset that the provision of appropriate diagnostic imaging is vital to the success of interventional radiology.
The demand for all types of radiological imaging and intervention on a 24-hour, seven days a week basis has increased significantly in recent years. The term ‘24-hour radiological imaging services’ applies equally to elective and acute services.

Interventional techniques are now at the forefront of management of many life-threatening emergencies (Table 1).

Every acute trust has a duty to ensure that there are formal arrangements to secure provision of elective and emergency interventional radiology services. Several surveys have shown that this is not occurring. Fewer than 10% of hospitals are currently providing 24-hour interventional services due to insufficient resource. This situation puts patients at risk.

### Table 1. Management of emergencies using interventional techniques

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<td>Thoracic aortic aneurysm, traumatic dissection and the complications of Type B dissection, ruptured peripheral aneurysms</td>
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<tr>
<td>Acute peripheral and visceral ischaemia</td>
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<td>Managing sepsis secondary to upper urinary tract and biliary obstruction (often urgent though rarely an emergency)</td>
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<td>Draining intra-abdominal and intra-thoracic abscess (often urgent, though rarely an emergency)</td>
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<td>Colonic stenting (often urgent, though rarely an emergency)</td>
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Introduction
Recommendations for individual departments and trusts

The following issues should be addressed.

1. **Recognition that in the absence of provision of IR services patients will be placed at risk.**\(^1\)\(^{-10}\)
   
   There should be exploration of ways in which a comprehensive service may be offered by internal reorganisation, maintenance of core skills, additional funding/training/appointments, or external networking.

   Discussion should take place with the clinical governance department about the implications of a lack of 24-hour access.

2. **There should be clarity within the trust and among referring clinicians and service commissioners about what interventional radiology services are available and when they are available.**

   If a service is not available at all, within or outside routine working hours, for example, embolisation for acute haemorrhage, this should be known to the clinical governance committee. Where there is an unmet clinical need, discussions can take place with commissioners about purchasing appropriate services from another trust.

3. **Clear pathways should be in place for treating patients appropriately when the interventional radiology service is not available.**

   The trust’s clinical governance committee and relevant referring clinicians need to be aware of the situation. This will allow discussion about planned patient pathways when the service is not available, for example, default to surgical treatment, and also document an area of possible need for service development.

4. **Out-of-hours service provision must be subject to a formal rota.**

   It is not sustainable, safe or timely to rely on ‘ad hoc’ methods of trying to find a suitable radiologist who is not officially on call. Nor is it acceptable to assume that another trust will be willing or able to provide the service without official and agreed service level agreements.

   A mechanism should be in place for informing clinical teams in advance about when services will and will not be available, so that all involved are clear about when alternative non-radiological treatments or referral will be required.

5. **There should be recognition of the resource implication of supporting a 24-hour interventional service in terms of diagnostic imaging and manpower.**\(^11\)\(^{-14}\)

   Appropriately trained radiographers and nurses are required to support a full-time interventional radiology service as are CT and ultrasound facilities.

6. **Onward referral pathways must be clear.**

   When a service is not provided on a 24-hour basis, and when this usually results in patients being transferred to other trusts, this pattern of referral requires clarification with the clinical governance committees and agreement on the part of the receiving trust.

   It is not sufficient to assume that another trust will accept patients without such agreements. When there is a clinical need for a service on a routine or emergency basis but this cannot be provided locally and patients are transferred elsewhere:

   a. **Formal contractual agreements should be in place with any trust to which patients are transferred**

   b. **Protocols should be in place describing the arrangements for transfer**

   c. **Transfer must be in a timely fashion**

   d. **Arrangements for appropriate funding need to be in place.**
1. All doctors are bound to adhere to General Medical Council (GMC) guidance and must comply with the principles and values set out in GMC Good Medical Practice.\(^\text{13}\)

When a radiologist who is designated to be on call is consulted about a patient, it is incumbent on that individual to advise the clinical team appropriately, even if they are unable to carry out the requested examination/procedure themselves.

This may include advice on alternative imaging/treatment or transfer to the agreed alternative provider.

2. Radiologists should not normally carry out procedures with which they are unfamiliar.\(^\text{1,12}\)

Previous guidance from The Royal College of Radiologists (RCR) has indicated that a radiologist should not carry out, at night, an investigation or treatment that they do not carry out during the day.\(^\text{15}\) If a service is required on a reasonably regular basis then individual radiologists must maintain the necessary skills. Inevitably, there will be a risk-benefit analysis in any individual case. The risks of transfer of the patient,\(^\text{16-18}\) the presence or absence of any alternative therapies, and the experience of the radiologist will all need to be taken into account.

If it is agreed among all the doctors involved that because of difficulties, or danger of transfer or delay, it is in the best interests of the patient to be treated by a less experienced radiologist locally, the situation should be made clear to the patient (and/or their relatives if appropriate) and informed consent obtained.

3. Radiologists should recognise that ad-hoc on call rotas are not in the best interest of patients.\(^\text{14}\)

This form of service provision is unsatisfactory and may conceal a lack of safe, robust and reliable service provision. Formal interventional radiology rotas should be supported by appropriate nursing and radiographic staff.

There must be a safe environment for performing the procedure, including patient monitoring and anaesthetic help when required together with liaison with the appropriate clinical team.

4. It is the duty of the radiologist to report any risk management concerns to the trust’s clinical governance committee.\(^\text{14}\)

This applies when a radiologist has concerns regarding any aspect of the provision of the radiology service.
Departmental leads should ensure the following.

1. Local agreement is reached among radiologists in clinical departments about what services are provided on call. Discussion about maintenance of and definition of what constitutes ‘core’ radiological skills among local radiologists and how these may be maintained should take place. Attendance at relevant continuing medical education (CME) courses such as those provided by the British Society of Interventional Radiology and the RCR is advisable and it may be necessary to update practical skills by spending time in larger departments.

2. There is agreement with clinicians on treatment/alternative imaging pathways when a particular aspect of the imaging/interventional service is not available.

3. There is a mechanism for information to be available to clinicians on a daily/weekly basis about when services are/are not available.

4. Formal contracts exist with other trusts to which patients are transferred for imaging or intervention.

5. Locally agreed protocols and/or guidelines for referral for emergency imaging/intervention have the potential to reduce confusion and/or disagreement in individual cases. These protocols should be evidence-based and have been agreed with the local clinical governance committee and the relevant clinical teams.

6. Individual radiologists, in conjunction with clinical leads or their appraiser, should keep their range of skills and routine practice under review, with the aim of balancing subspecialty expertise with the maintenance of core skills needed to provide a trust-wide emergency radiology service (see 1 above).
Models of safe interventional radiology provision

Interventional radiology is a 'small specialty'; in other words, there is insufficient elective work in many hospitals to support the employment of sufficient interventional radiologists to provide a safe interventional radiology service during or outside working hours. The same problem pertains in many other specialties such as cardiothoracic surgery, interventional cardiology, neurosurgery, intensive care and so on. For these specialties, centralisation or networking have been the favoured solutions.\textsuperscript{18–20}

There is no single solution for provision of 24-hour cover, as geographical considerations may come into play. Collaboration can occur in a variety of local, sub-regional, regional or supra-regional forms.

When considering provision of safe interventional radiology services, there are three potential models of service provision (Table 2).

Table 2. Models for providing interventional radiology services

<table>
<thead>
<tr>
<th>Model</th>
<th>Advantages</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual centres could each provide a safe interventional radiology service.</td>
<td>Maintains the status quo in the short term. Provides local service.</td>
<td>It has been recommended that doctors providing a consultant-delivered service should not be on call on a rota more onerous than 1:6.\textsuperscript{20} This may not be achievable or cost-effective.</td>
</tr>
<tr>
<td>Several centres could collaborate to develop a network to provide a safe interventional radiology service.</td>
<td>Utilises existing staff and facilities across several sites.</td>
<td>Depending on the model either doctors or patients transfer. Doctors might have to provide cover for several hospitals. Most doctors prefer to work in familiar surroundings where they understand the operational systems and know the equipment and staff.</td>
</tr>
<tr>
<td>a. Patient moves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Interventional radiology moves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hub and spoke arrangement: Large specialist centres could provide services for a region on a full- or part-time basis.</td>
<td>Economy of scale of both staff and equipment. Simplifies provision of a robust resilient service in and out of hours. Depending on the model, allows maintenance and development of skills for interventional radiologists working in the periphery.</td>
<td>If the level of care was equivalent, most patients would prefer to be treated locally.</td>
</tr>
</tbody>
</table>

An additional possibility is for services to be developed on a regional basis and provided from large centres with doctors travelling to acute trusts for non-emergency and minor procedures but patients coming to the centre for emergency and complex procedures before returning to their local hospital to convalesce. In the context of a small service, this would improve provision of an interventional radiology service during periods of leave.

Approved by the Board of the Faculty of Clinical Radiology 2 March 2008
References

9. The role of emergency and elective interventional radiology in postpartum haemorrhage RCOG Good Practice No. 6 June 2007
15. The Royal College of Radiologists. Advice to clinical radiology members and fellows with regard to out of hours working. London: The Royal College of Radiologists, 1996.
Appendix 1. Safe interventional radiology service provision

The items below identify the elements of a safe interventional radiology service. It is assumed that a department will be appropriately staffed for the safe performance of interventional procedures, including the availability of trained radiographers and radiology nurses.

Vascular diagnosis and intervention

Arterial diagnosis

a. Interpretation of emergency CT, MR and ultrasound for the detection of vascular pathology.
b. Mesenteric angiography.
c. Trauma angiography.
d. Peripheral angiography.

Arterial intervention

a. Embolisation of haemorrhage: GI tract, urinary tract, trauma, bronchial, obstetric.
b. Management of acute arterial ischaemia: peripheral, renal, visceral by angioplasty stenting thrombolysis and thrombus aspiration.
c. Use of stent grafts for arterial/aortic rupture.
d. Stenting and stent grafting for the complications of Type B aortic dissection.

Venous intervention

a. Insertion of IVC filter.
b. Mechanical pulmonary thrombectomy.
c. Thrombolysis for phlegmasia caerulia dolens and massive ilio femoral DVT.
d. Haemodialysis access: central venous catheter (CVC) fistula thrombolysis and thrombectomy.*
e. TIPS for variceal haemorrhage.**

Non-vascular diagnosis and intervention

Many of the skills required in this area are core radiological skills and departments should ensure that there are sufficient numbers of radiologists to provide these services in and out of hours.

a. General: image-guided drainage of abscess.***
b. Urological: nephrostomy to drain infected PC system, insertion of suprapubic catheter.***
c. Hepatobiliary: percutaneous drainage of infected biliary tree.***
d. Gastrointestinal: colonic stenting.***

* Fistula salvage is not required as an out-of-hours intervention but may occasionally be required over weekends and bank holidays.
** It is recognised that even in large centres uncommon procedures may not be performed by all interventional radiologists hence such interventions may not be available 24/7.
*** It would be rare for these procedures to be required at night-time but they may be required urgently during the daytime at weekends.
Appendix 2. Audit template

Assessment of a department’s provision of all aspects of a 24-hour interventional radiology service

The audit template can also be downloaded from www/rcr.ac.uk

Background

The demand for all types of radiological imaging and intervention on a 24-hour, seven day a week basis has increased significantly in recent years. The term ‘24 hour radiological imaging services’ applies equally to elective and acute services.

Interventional techniques are now at the forefront of management of many life-threatening emergencies. Every acute trust has a duty to ensure that there are formal arrangements to secure provision of elective and emergency interventional radiology services.1

The Cycle

The standard

- The interventional radiology service should be formally available 24 hours a day, every day of the year.
- Service is formally supported by an on-call rota for a named individual for each of the following groups: consultant radiologist, radiographer, interventional radiology nurse, anaesthetist when appropriate.
- Diagnostic imaging support such as CT is formally available 24 hours a day, every day of the year.
- Facilities and consumables are available for each of the services listed:
  - Vascular: arterial diagnosis, arterial intervention, venous intervention
  - Non-vascular: general, urological, biliary.

Target

100% compliance in all areas.

Assess local practice:

The indicator(s)

Affirmative answer to each question.

Data items to be collected

Questionnaire to be completed for each aspect of the service; that is, arterial diagnosis, arterial intervention, venous intervention, general, urological, biliary.

Suggestions for change if target not met

Any deficiency in service provision should be brought to the attention of the trust management. When not all services are available locally, departmental leads should ensure that:

- There is agreement with clinicians on alternative management pathways
- There is a mechanism for information to be available to clinicians about when services are not available
- Formal contracts exist with other trusts to which patients are transferred for intervention
- Locally agreed protocols for referral for emergency intervention have the potential to reduce confusion in individual cases. These protocols should be evidence-based and agreed with relevant clinical teams
- Individual radiologists should keep their range of skills and routine practice under review, with the aim of balancing subspecialty expertise with the maintenance of core skills needed to provide a trust-wide emergency radiology service.

Resources

Interventional imaging lead one hour to complete questionnaire and write up report and checklist for safe IR provision.
## Appendix 3. Checklist for safe IR service provision

Performing this simple audit will quickly identify whether your IR service is safe. This should be performed for each of the services specified in Appendix 1.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Service is formally available 24 hours day every day of the year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. If the answer to 1 is NO, is the service formally covered under contract with another trust?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Service is formally supported by on-call rota for a named individual for each of the following groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultant radiologist</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Radiographer</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Interventional radiology nurse</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Anaesthetist when appropriate</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4. Diagnostic imaging support such as CT is formally available 24 hours day every day of the year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Facilities and consumables are available for each of the services listed</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Any deficiencies identified in interventional radiology service provision should be acknowledged and acted upon in accordance with the standards provided above.
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