



# **Guidelines for nursing care in interventional radiology**

**Third edition**

**April 2023**

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## 1 Background

The provision of appropriate nursing support in a department of clinical radiology is a vital component in the provision of patient care. This document outlines the issues, sets out models for nursing staff and describes the role of the interventional radiology nurse in the management of patients who are undergoing interventional radiology treatment. As trusts have a wide variety of interventional radiology work and, therefore, different nursing requirements, the document does not identify a specific model but tries to ensure that the appropriate level of nursing and nursing experience are available in every department.

It is vital to ensure that patients are safe within the department of clinical radiology, and to ensure that adequate and safe monitoring of the patient occurs before, during and after interventional procedures. This should be recognised as a key risk management issue for the trust.

It is recognised that there may be difficulties in appointing nurses, even when the trust has provided an adequate establishment. Departments of clinical radiology should have proper priority within hospitals where there is a shortage of registered nurses and should not be left as the last area to receive nursing applicants. This may be addressed with the appointment of a senior radiology nurse (Band 7 or 8), with authority to manage the nursing budget within radiology and acting as a key figure within the department. The senior radiology nurse should have access to a designated Matron who has responsibility for supporting development of the radiology nursing team as part of their remit.

The clinical radiologist should make sure that appropriate support is available, where possible. This document aims to assist in that process.

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## 2 Recommendations

The highly technical field of interventional radiology nursing requires knowledge, skills, creativity and versatility that should be offered by competent individuals, suitably trained and qualified to perform the required tasks to the highest standards. This also includes support staff.

Appropriately banded interventional radiology registered nurses should be available in all departments of clinical radiology undertaking interventional radiology procedures, if the care delivered is to be of high quality and low risk. This will also allow the future career progression of staff and alleviate staffing issues.

The suggested career structure might be:

- A radiology modern matron/nurse manager Band 8a
- A radiology nursing manager/senior sister/charge nurse Band 7
- A radiology sister/senior staff nurse Band 6
- A radiology staff nurse Band 6
- A radiology staff nurse Band 5
- A nursing support worker\* Band 4
- A nursing support worker Band 2–3 with National Vocational Qualification (NVQ)/ Scottish Vocational Qualification (SVQ) Level 2–3 or equivalent that is, diploma/ Qualification Credit Framework (QCF).

Banding for nursing support workers could equate to a certain level of experience, although this is dependent on the individual and their competence being assessed by a senior nurse in the department.

Please note the above terminology may need to be modified for Scotland to equivalent grades.

Safety and monitoring of patients should be a priority in interventional radiology departments. Registered nursing staff and nursing support workers are a vital part of the interventional radiology team and should be available for all interventional radiological procedures.

Departments of clinical radiology carrying out interventional radiology procedures should have sufficient registered nursing and support staff to carry out those procedures adequately and safely, both within the normal working day and outside conventional working hours. For patients who need to undergo general anaesthetic procedures, there should be sufficient skilled staff available to carry these out safely.

Departments undertaking interventional procedures vary in size, range of skill mix, and in the number and complexity of interventional radiological procedures they perform. Large dedicated interventional radiology departments should have sufficient registered nurses and support staff to provide clinically acceptable cover outside the normal working day and at weekends. Small departments carrying out occasional interventional procedures as emergencies at these times should ensure that a structure is in place to provide a sufficient number of appropriately trained registered nurses. Although not always ideal, this may be achieved in conjunction with operating theatre and ward nurses or shared networking with local trusts.

\* Nursing support workers, previously designated as healthcare assistants and assistant practitioners.

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### 3 Introduction

Vascular and non-vascular interventional radiology is an established and expanding field. Many patients attend for day-case procedures, but a significant number are inpatients, some of whom are extremely ill at the time of their procedure.

Although general anaesthesia is occasionally required, the nature of minimally invasive vascular and non-vascular interventional radiology means that most procedures are carried out in conscious patients, who are often sedated. Like all surgical procedures, the techniques used require the full attention and concentration of the operator. Experienced and appropriately trained registered nurses are, therefore, vital members of the interventional radiology team. Their responsibilities are similar to those of nurses in operating theatres, with the additional responsibility of caring for the conscious patient.

As at least one-third of patients requiring vascular and non-vascular intervention present as emergency cases, it follows that there is a need for interventional radiology nurses to be available on a 24-hour basis. The importance of the interventional radiology nurse was highlighted by the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) report on interventional vascular and neurovascular radiology.<sup>1</sup>

This document will help in the identification of the nursing requirements of a department of radiology. It can also be used to encourage the trust to ensure appropriate employment of skilled interventional radiology registered nurses and support staff to improve the comfort of patients and ensure their safety. It is not designed to prescribe specific standards, as the range of work undertaken by departments and the nursing requirements will vary.

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### 4 What is interventional radiology?

Interventional radiology is a sub-specialty which uses image guidance to carry out diagnostic and/or therapeutic procedures in a minimally invasive fashion, usually in the setting of the radiology department. For the purpose of this document, interventional radiology encompasses any procedure which is invasive.

This document does not discuss routine diagnostic procedures such as barium enemas and intravenous injections of contrast medium. Instead, it concentrates only on procedures that involve the insertion of a cannula, catheter or wire into a patient. This will include non-vascular procedures such as percutaneous transhepatic cholangiogram (PTC), nephrostomy and image-guided biopsy, as well as the wide range of vascular interventional procedures, from angiography to aneurysm stent grafting and stroke thrombectomy.

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### 5 Models of nurse staffing in the interventional radiology department

Some procedures, such as ultrasound-guided biopsy, might be considered safe to be performed without nursing support. However, it is always important to consider what is best for the patient. The majority of patients have considerable anxiety about even an apparently simple procedure, and, from the patient's point of view, appropriate support is highly desirable.

For relatively simple procedures such as biopsies, this support could be from suitably trained nursing support workers, where it has proved challenging to recruit interventional radiology nurses. There are various roles within the healthcare support workforce, including healthcare assistant (HCA) or assistant practitioners (AP) however, the term nursing support workers will be used in this document.

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The employment of nursing support workers with appropriate and relevant training, competence and further education can be used to support radiology activity. However, such roles should not replace that of a registered nurse. Nursing support workers should work under clear protocol and robust supervision and should not be placed in positions where there is a need to make stand-alone clinical judgements.

Whenever analgesia or sedation is given, careful monitoring of the patient is mandatory and registered nursing support is therefore essential.<sup>4</sup> Similarly, where procedures are more complex and require scrubbed assistance, this assistance should normally be from an experienced interventional radiology registered nurse.

When nursing support is inadequate, patients will be left in the care of radiographers who have other tasks to perform and whose training is different from that of a qualified nurse. Although skills mix initiatives may provide radiographers with the necessary training for monitoring patients, this may not always be desirable, particularly with the present high workload in their core tasks, and their involvement in radiological skills mix initiatives often precludes this as an option. Nursing support is not optional for invasive procedures, it should be considered essential both within hours and out of hours. It is, therefore, necessary for departments of clinical radiology carrying out interventional procedures to have an adequate number of appropriately registered nurses to provide effective in-hours and out-of-hours nursing cover. The following are models as to how this might be achieved.

### Departments with a large interventional radiology workload

Departments should have sufficient whole-time equivalent registered radiology nurses to provide at least one in five on-call cover. This ensures the availability of dedicated interventional radiology staff who are familiar with the department and its equipment, who also have a sound knowledge of interventional radiology techniques and have proven competence verified by the senior radiology nurse. This is a similar structure to that of most operating theatres and has the additional advantage of more clearly defining the role of the interventional radiology nurse within the nursing community and for nurse managers. In many departments this will require extra staff resource, but financial problems should not be used as an excuse for not staffing departments adequately and thus compromising patient safety.

The provision of two nurses per dedicated interventional room is appropriate. At least one should be Band 5 or above. In some circumstances, depending on the type of procedure and level of training and experience available, a nursing support worker may be acceptable under strict protocols. However, they will need adequate supervision and should not be put in the position of having to make 'stand-alone' clinical judgements. Computed tomography (CT) and ultrasound rooms will require the availability of either one or two interventional nurses if complex interventions are being performed on sedated patients. Where procedures such as endoscopic retrograde cholangiopancreatography (ERCP) are performed in these rooms, particularly when the patient is under general anaesthesia, sufficient skilled staff must be available, as set out by the association of anaesthetists,<sup>5</sup> a registered radiology nurse may not then be required. CT and ultrasound should have their own dedicated, adequately trained and qualified individuals who will assist with the simpler invasive procedures such as biopsy or drainage in non-sedated patients, where a trained nurse may not be required.

### Small departments or those that only perform a small number of interventional radiology procedures

Interventional radiology nurses should be available to deal with all daytime procedures. This provision may be met by a combination of full- and part-time specialist interventional registered nurses. The service may be supplemented during the day and particularly out of hours in one of two possible ways – both of which have disadvantages.

Existing theatre staff could be trained in interventional radiological techniques and departmental management, providing both in-hours and out-of-hours cover. Such nurses would have to be nominated and spend some time in radiology departments to familiarise themselves with the geography of the department, location of equipment and the techniques. However, this approach has disadvantages.

- Most theatres already run a skeleton staff for out-of-hours work and operative procedures are often delayed during the night and at weekends due to limited theatre access. This option would clearly increase that burden.
- The interventional radiological cases might be considered as being of secondary importance when pressure is high.
- While there are many similarities between the environments of the operating theatre and the interventional radiology suite, the two are distinctly different and much thought should be given as to whether it is reasonable or safe to ask nursing staff to carry out both sets of duties safely.

Existing ward or casualty nurses who understand the department and radiology techniques could be trained in interventional radiology nursing. This approach also has disadvantages.

- Many wards and casualty departments are understaffed, not only in hours but particularly out of hours, and the use of bank and agency nurses is high in some hospitals.
- Even with training, such nurses are unlikely to have the skills and experience to carry out interventional radiological nursing safely.

In both of the above scenarios it is essential that nurses from other settings within the hospital who provide out-of-hours interventional radiology cover regularly rotate through the IR department and perform elective duties in order to maintain competencies in specific out-of-hours IR procedures and techniques.

### Nursing support workers

Where it has proved impossible to recruit interventional radiology nurses and where the above models have not been possible, the employment of nursing support workers, with appropriate training and further education, might provide support commensurate with the level of interventional radiology activity in a given department. However, such support can never entirely replace that of registered nurses, the absence of whom might determine or limit the type of procedure that an individual department can safely perform. Nursing support workers should work under protocol and close supervision and should not be placed in positions where they need to make stand-alone clinical judgements.

## Radiographers

Radiographers' primary role is to undertake imaging within the department and are generally in short supply and should not be diverted from their primary responsibilities. However, in smaller departments, with appropriate training as for nursing support workers, they may be able to provide support to the IR nursing teams under defined protocols.

## The role of the interventional radiology nurse and the nursing team

A detailed description of the role of the interventional radiology registered nurse and nursing support workers in the interventional room is given in the Appendix 1. This is intended to be a statement of the core work undertaken and is provided to inform trust and nursing managers who may be unaware of the sophisticated requirements of interventional radiology.

Training will depend on the complexity of the procedures but the RCN (2012) *Core competencies for imaging nurses* should be used to aid continuing professional development (CPD) of interventional radiology nurses.<sup>6</sup>

Interventional radiology nurses should have appropriate bands/grades commensurate with the responsibilities undertaken and this should be stated for each post.

Interventional radiology nurses and support staff should always have knowledge of resuscitation to the appropriate level (immediate life support or above training is preferable for nursing staff) and should have continued training in resuscitation techniques.

The roles that interventional radiology nurses fulfil in departments of clinical radiology are cited below. The performance of a number of cited tasks by the interventional radiology nurse does not relieve the clinical radiologist of the overall responsibility for ensuring that they have been undertaken and that any relevant facts have been acted on. It is the primary responsibility of the registered nurse or support worker to monitor the patient and ensure their safety.

### Preoperative role

Pre-assessment of planned admissions is an established role of the interventional radiology nurse in some hospitals. Agreed protocols and an integrated care pathway should be established so that the nurse is able to assess the patient's suitability for treatment as an outpatient or day case, avoiding unnecessary and sometimes prolonged use of beds, thus optimising resources and potentially avoiding delays in patient treatment.

During pre-assessment, the nurse instigates routine investigations and subsequently reviews and acts on the results according to agreed protocols and pathways (for example, ensuring that patients receive intravenous hydration before contrast injections, where necessary).

The nurse needs to possess knowledge of all relevant interventional procedures to be able to inform the patient about the procedure and answer any questions the patient may have.

### Intra- and post-procedure role

Within the interventional suite, the nurse's role is to help plan the safety and care of the patient during the procedure, together with the other members of the multidisciplinary team. Two registered nurses may be required within the dedicated interventional room when complex procedures are being performed: one scrub nurse working directly



with the interventional radiologist during the procedure and the second monitoring the patient, particularly with regard to pain relief/sedation, providing emotional support and documenting any ongoing procedural information deemed necessary.

The second nurse will also be ensuring that items of equipment required during the procedure are available and documented appropriately following use (see Appendix 1, Section 3).

Interventional radiology nurses must have relevant competencies for cannulation and intravenous drug administration (in accordance with national nursing and trust policies). With the expansion of their roles, interventional radiology nurses must demonstrate evidence of up-to-date training and competence.

### **Peri-procedure role**

Interventional radiology nurses have a particularly vital role in supporting complex procedures such as endovascular aneurysm repair (EVAR) and stroke thrombectomy, where they need to be familiar with the necessary range of specialist equipment and anticipate the needs of the interventional radiologist during the procedure as a scrub nurse (Appendix 1, Section 3).

The early recognition of adverse reactions to contrast media is also part of the remit of the interventional radiology nurse. Following the procedure, patients may require intensive nursing supervision in an observation area or day-case ward. Some patients will also need to be reviewed on the ward following the procedure. The clinical status of the day-case patient needs to be assessed before discharge.

Day-case units within departments of clinical radiology are now an essential part of interventional radiology. Models for such units exist in many UK and European interventional radiology departments. These should be staffed by suitably qualified nurses who understand and have experience of both vascular and non-vascular interventional radiology. Such units differ from established day-case wards for surgery or cardiology because of the unique and varied nature of interventional radiology, and the varied requirements of patients post procedure. Registered nursing staff should be supported by nursing support workers. A minimum staffing ratio of one Band 5 nurse and one suitably qualified individual should be provided for each four beds.

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## **6 Teaching**

Interventional radiology is a progressive and expanding specialty. There is, therefore, a requirement for a programme of CPD for the nursing staff involved to maintain competencies and keep up to date. This could be provided through practice educators, interdepartmental teaching and external training courses.

It is highly desirable that all student nurses – as part of their education – have some experience of interventional radiology. Therefore, the aim should be to encourage senior radiology nurses to pursue this with the attached university for training. This experience will raise awareness and understanding of interventional procedures, with clear implications for improvement in the care of such cases in the ward environment. The student allocation is paramount in planning for the future workforces if interventional radiology is to expand.

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Knowledge of those aspects of radiation protection relevant to interventional radiology nursing practice is a statutory requirement. All departments should provide such training to all staff.

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## 7 Role development

There is great potential to develop the role of the interventional nurse and nursing support workers with appropriate training.

An extended role for nurses might include nurse-led services such as hysterosalpingograms, patient pre-assessment, the evaluation of procedure requests, minor procedures such as arteriography, venography and venous access, protocols-led discharge of patients, patient consent, telephone or outpatient clinic follow-up and liaison with other specialties, including appropriate multidisciplinary team (MDT) meetings.

Nursing support workers may be able to develop their role to incorporate patient care pre- and post-procedure, as well as assisting during procedures.

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## Appendix 1

### Roles of the interventional nurse and nursing support worker

The roles of the interventional radiology nurse and nursing support worker in the management of the patient undergoing treatment are outlined here.

#### 1. Pre-procedural nursing care

The comprehensive pre-procedural care of patients requiring vascular and/or non-vascular interventional radiology is essential. This involves assessing the physical and psychological well-being of a patient through pre-procedural assessment. At this time their drug, medical and social histories can be obtained. Most patients, despite their best efforts, have little understanding of the procedures they are about to undergo. Experienced nurses are often in a position to assess the degree of knowledge and anxiety before the procedure, thereby allaying patient fears through explanation and reassurance. The nurse will be assisted in this task by the provision of patient information leaflets – many of which have been generated by the RCR/ British Society of Interventional Radiology (BSIR) in conjunction with the Clinical Radiology Patients' Liaison Group of the RCR ([www.bsir.org/patients/patient-information-leaflets](http://www.bsir.org/patients/patient-information-leaflets)).

The nurse may:

- Support and inform family members and carers who often accompany patients for both elective and emergency procedures
- Liaise with referring doctors and ward staff to ensure pre-procedural work is completed
- Prepare equipment for the safe care of the patient during the procedure
- Communicate with other members of the interventional radiology team regarding the patient, thereby promoting good working relationships within the team
- Identify and act on potential hazards to both patients and staff and, where appropriate, act to prevent patient injury
- Identify potential complications of various drugs used during the procedure, including contrast media
- Be able to obtain the patient's consent for the procedure in line with local policy.

#### 2. Intra-procedural patient care

During any interventional radiology procedure, the nursing staff are an important aspect of the interventional radiology team, either in a circulating or scrubbing role. While involved in the procedure, the nurse can expect to:

- Participate in the planning of the procedure and the management of the procedural list
- Assess, plan and implement the total care of the conscious or conscious-sedated patient (this includes the monitoring of pulse, blood pressure, electrocardiogram (ECG), capnography and oxygen saturation)
- Participate in, and ensure the completion of, the World Health Organization (WHO)/ National Patient Safety Agency (NPSA)/Radiology safety checklist<sup>7</sup>
- Co-ordinate and document planned patient care during the procedural phase
- Create a safe and therapeutic environment for both the patient and staff
- Practise and monitor the correct wearing of gowns, gloves and masks where necessary
- Practise the principles of asepsis and act as a lead professional in infection control
- Communicate effectively with other members of the interventional radiology team.

### 3. Nursing and support duties during the procedure

The scrub nurse prepares sterile instruments and equipment ready for the procedure.

Before the procedure the scrub nurse's duties should be to:

- Ensure notes are available
- Ensure completion of the WHO/NPSA radiology checklist, in conjunction with the rest of the IR team, which includes
  - Re-confirming patient identity in line with trust policy
  - Checking the requirements for the procedure with the clinical radiologist, collecting any equipment and instruments needed and confirming they are in date
  - Checking the patient has given informed consent and, where appropriate, signed the consent form
  - Confirming with the patient and clinical radiologist the correct procedure, site and side of the intervention<sup>5,6</sup>
  - Confirming patient allergies and other risk factors
- Ensure that the patient is placed safely on the radiology table
- Gown and glove using an aseptic technique
- Drape the trolleys and bowl stands with sterile drapes, with or without pre-packed sets
- Assemble sutures, needles, blades and other necessary sterile equipment with the assistance of the circulating nurse
- Assist in skin preparation and draping

During the procedure the scrub nurse should:

- Dispense catheters, wires, swabs and other equipment as needed, and clean and flush catheters and wires as required
- Prepare and make ready implantable or other devices to be used, in accordance with the manufacturer's instructions for use, as appropriate
- Keep an accurate account of catheters, wires and blades collected during the procedure and make sure that drugs in syringes are labelled appropriately and are in date
- Anticipate the needs of the clinical radiologist by continually observing the progress of the procedure.

At the end of the procedure the scrub nurse should:

- Check (and may apply) appropriate wound dressing
- Remove drapes and ensure that catheters or drainage tubes left in situ are secure and that haemostasis has been achieved
- Ensure that all equipment is accounted for and that sharps (that is, needles and blades) are disposed of according to Health and Safety Executive guidelines<sup>8</sup> and clear the working surface
- Dispose of all contaminated materials

- Ensure that the area around the wound dressing is clean and that the patient's gown and sheet are clean and dry
- Hand over to the ward nurse or the post-procedure nurse all documentation of the procedure.

The term 'circulating nurse' is used in many hospitals to refer to the nurse or support worker who is not scrubbed and who is responsible for assisting the scrub nurse and monitoring the patient throughout the procedure.

Before the procedure the circulating nurse should:

- Check that the procedural room is clean, has the appropriate temperature and humidity, and that suction apparatus, oxygen and any required lighting is in working order
- Ensure that emergency drugs are available and that the defibrillator and crash trolley are checked (ideally this should be done first thing in the morning)
- Collect the necessary catheters and equipment and check they are in date
- Prepare sterile gowns and gloves for the team and assist in tying gowns
- Open instruments and bowl packs and other necessary equipment for the scrub nurse.

During the procedure the circulating nurse or nursing support worker should:

- Reassure the patient and endeavour to resolve their concerns
- Connect any monitoring equipment required
- Monitor the patient at all times ensuring the comfort and safety of the patient and, where appropriate, record pulse, blood pressure and oxygen saturation
- Ensure that the clinical radiologist is aware of monitoring concerns or if the patient is in pain
- Remain in the procedural room throughout
- Replenish swabs, catheters and wires as requested
- Ensure a constant supply of contrast media, saline and required procedural drugs
- Provide and/or administer drugs, such as sedatives, anticoagulants and vasodilators, ensuring that they are in-date and check these with the scrub nurse or clinical radiologist†
- Ensure there is no unnecessary movement of staff through the procedure room doors
- Prepare the wound dressing and hand to the scrub nurse.

On completion of the procedure the circulating nurse or nursing support worker should:

- Ensure monitored readings are recorded and all drugs given are recorded and signed for
- Ensure that the clinical radiologist has prescribed the post-procedure medication
- Ensure completion and handover of all appropriate documentation including the post-procedure care plan
- 'Sign off' of the WHO/NPSA/RCR checklist ensuring it is completed and scanned onto the radiology information system (RIS).<sup>5,6</sup>

† This duty must be undertaken by a registered nurse.

The nursing support worker, with other members of staff, should:

- Help with removal of drapes and the preparation of the patient for return to the ward or recovery room
- Remove the instrument trolley and other equipment to a dirty utility area
- Ensure that the room is clean and prepared for the next case.

#### 4. Postoperative patient care

In some departments of clinical radiology, a specific room will be designated as a recovery or day-case area. Where this is the case, patients will often have to wait for ward nurse escort and transport back to a ward following handover of care given and any post procedure instructions. In addition, an increasing number of outpatient and day-case procedures are performed, and all these patients require care in the immediate post-procedural period. Many patients will still be sedated in the recovery area. Care of the post-procedural patient requires careful observation by the interventional radiology registered nurse and planned intervention for complications.

Such observations should include:

- Recognising the early signs of complications and acting upon these as appropriate
  - Maintenance of a patient's airway, which can become obstructed by the tongue, secretions or vomit
  - Observation of the rate and depth of respiration to treat respiratory depression if it occurs
- Maintenance of an adequate circulation – patients may become hypotensive during and after interventional procedures due to vagal stimulation or unplanned bleeding
- Observation of puncture site and relevant pulses, such as foot, radial and so on
- Neurological observations following cerebrovascular interventions, vertebroplasty and aortic stent grafting
- Skin colour and, in particular, development of pallor which could indicate shock
- Patient comfort – often the post-procedural patient is restless and can easily come to lie in an unsatisfactory position, which can cause undue pain and cause pressure necrosis, particularly in the elderly
- The degree of patient's pain and its control.


The patient should only be discharged from the unit when the departmental protocol for discharge is satisfied.



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