

# **‘Interventional Radiology (IR): Improving Quality and Outcomes for Patients’**

**A Report from the National Imaging Board**

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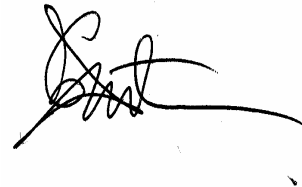
# Interventional Radiology (IR): Improving Quality and Outcomes for Patients

## Foreword

This report has been produced to inform and stimulate discussion about how Interventional Radiology (IR) Services can support the QIPP (quality, innovation, productivity and prevention) agenda. The document has been produced by interventional radiologists, nurses, radiographers, a patient representative and members of the Department of Health and National Imaging Board.

The report illustrates how the NHS can improve quality, safety and productivity while delivering comparable or better outcomes for patients with shorter hospital stays and fewer major complications. It describes how IR services can help to ensure patient safety whilst delivering the highest quality care.

I would like to thank those who have been involved for contributing their time and expert knowledge to produce this report to inform the implementation of the changes to IR service delivery described here.



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## Executive Summary

### Key points:

- There is variable provision of interventional radiology (IR) services throughout the NHS in England that can result in a variation in the quality of care delivered to patients both in emergency and planned care pathways.
- Although the National Imaging Board represents services in England, many of the references refer to the situation across the U.K. and it was the opinion of the authors that the report will be of interest to all four health administrations in the UK.
- IR is one of many areas of medicine increasing the use of minimally invasive procedures. Many other specialties are using minimally invasive techniques to good, cost effective, effect e.g. laparoscopic surgery.
- There is increasing evidence of what comprehensive IR services can contribute to an acute hospital with emergency patients, suggesting that it is essential to ensure that such services are available at all times.
- IR services and skills are required both in and out of routine hours and need to be delivered by a service with appropriate equipment and well trained doctors, nurses and radiographers.
- An effective, well resourced IR service can contribute to significant efficiencies (financial and non financial) in care pathways in both planned and emergency care.
- An educational campaign is needed to inform health care professionals and health care commissioners of the necessity of ensuring an effective IR service.
- Interventional Radiology uses minimally invasive techniques that continue to rapidly change and evolve. Post-graduate training in IR needs a dedicated training structure and career pathway introduced for all grades of IR Staff, and to offer enough places to ensure that IR services can be accessed by all acute hospitals with emergency patients.
- IR needs to have a clearly defined identity: there would be benefits in its recognition as a distinct sub-specialty within radiology.
- IR facilities and equipment need to be appropriate to the type of work undertaken and in terms of investment should be considered equivalent in importance to surgical theatres. The geographical proximity of IR rooms to CT facilities and emergency rooms is important to the safety of patients.

## Introduction

1. This report has been prepared by a specially convened sub-group of the National Imaging Board (NIB) to provide advice for commissioners and service providers of Interventional Radiology Services.
2. 'High Quality Care for All: NHS Next Stage Review Final Report' <sup>[1]</sup> (NSR) sets out its ambitions for health care in the NHS and specifically mentions interventional radiology (IR) as a discipline which can deliver quality, innovation and cost effectiveness.
3. The vision of the NSR is of a very different experience of health, treatment and care for patients, carers and the public based on the following expectations:

*everyone will have access to specialist innovative treatments and patients will be supported in making the best choices for their treatment and care*

*services will be delivered conveniently, at times and in places that suit peoples personal circumstances*

*all advice, care and treatment will be assured as high quality with specialist centres where necessary to deliver excellence*

*those who have an immediate need will receive an immediate response*

*everyone will be offered booked appointments so that the experience of unwanted waiting will be removed, with waiting times and waiting lists ceasing to be an issue for patients*

*people will have confidence in their local health services and in the NHS*

4. The Review placed 'quality at the heart of everything that we do'. It defined the components of quality as 'care should be patient centred, efficient, with defined safe outcomes, and that there is universal access to care that is equitable across the service.'
5. This report describes the current provision of IR services across England and how this can be developed to further improve outcomes for patients. It details a vision, and a plan for IR services that could achieve those ambitions.

## What is Interventional Radiology?

6. Interventional Radiology (IR) is a minimally invasive alternative to open surgery or medical interventions that uses radiological image guidance (fluoroscopy, ultrasound, computed tomography [CT] or magnetic resonance imaging [MRI]) to effect treatment.
7. The basic skills of an interventional radiologist are in image interpretation and, therefore, core diagnostic radiology is at the heart of interventional radiology training. However, because it has developed over the last 45 years, within a diagnostic discipline, the role of IR as a therapeutic specialty is often ignored and misunderstood. IR is as different to diagnostic radiology as surgery is to medicine, but just as a surgeon needs the diagnostic skills of a physician, the interventional radiologist requires the same skills as the diagnostic radiologist.
8. There is hardly any area of hospital medicine where IR has not had some impact on patient management. Although the interventional radiologist has many techniques at their disposal, these fall into five broad categories:
  - Opening up blocked arteries and any other tubular structures in the body using catheters, wires, balloons and stents;
  - Closing down bleeding arteries from any cause (gastro-intestinal bleeding, obstetric or gynaecological bleeding, traumatic bleeding, bleeding after surgery) by occluding these arteries with embolisation;
  - Draining fluid collections (obstructed kidneys or abscesses) using image guided catheter placement;
  - Destroying tumours in the liver and elsewhere using local delivery of chemotherapy, embolisation or ablation techniques (e.g. cryotherapy or radiofrequency ablation);
  - Working alongside vascular surgeons to deliver minimally invasive treatments of thoracic and abdominal aneurysms.
9. It should be recognised that not every interventional radiologist has all these skills. Some continue to specialise in the area of their diagnostic radiology specialty.

## Equipment & Facilities

10. As IR has developed within diagnostic imaging departments, many units have utilised existing X-ray rooms which were adapted for the purpose. IR requires dedicated facilities, which should conform to the infection control standards of operating theatres. These facilities should be staffed by a specifically trained team comprising radiologists, radiographers, nurses and support staff. Occasionally anaesthetists and operating department practitioners will be present when appropriate. Currently around 90% of interventional procedures in the brain and approximately 10% of other interventional procedures require anaesthetic support although the percentage of the latter is increasing as procedures become more complex.
11. These facilities need to be equipped with appropriate digital screening equipment and large enough to facilitate anaesthetic equipment with piped gases. This

needs to be supported by appropriate facilities for recovery and day case care with appropriate staffing.

### **Interventional Radiologists**

12. Interventional radiologists are radiologists who have chosen to pursue further training in IR. This often requires a specifically funded year 6 training post where standard training takes five years or extended Certificate of Completion of Training (CCT), often abroad.
13. The majority of interventional radiologists also contribute to the diagnostic radiology workload of the department. There is, as yet, no formal recognition of IR as a sub-specialty and the consequence of this is reflected in the lack of extended IR training available within radiology training schemes. Many potential interventional radiologists do not pursue IR as a career, either because they do not wish to undertake full diagnostic radiology training or because they make life style choices when they realise the demands of a career in IR (in particular the on call commitment is currently high <sup>[2]</sup>).
14. The result is that access to IR services is very variable throughout England ranging from a few hospitals that have no service, the majority of hospitals that have a limited service between 9.00am and 5.00pm Monday to Friday, to a small number of centres that provide a comprehensive 24/7 service with between three and six radiologists <sup>[3]</sup>.
15. Because IR is not recognised as a distinct sub-specialty, this has resulted in confusion amongst commissioners, SHAs and PCTs regarding diagnostic and interventional radiology with a consequently variably funded service that has to compete for resource with diagnostics within radiology.
16. There are very few formal arrangements regarding the transfer of very sick patients requiring IR, both in and out of hours. Therefore, the majority of such patients potentially undergo more complex and more expensive open surgery, or are transferred ad hoc to the few centres that can offer the service. To support pathways which change traditional surgical management for an IR procedure, funding needs to be made available in different ways.
17. To date there has been no distinct coding system for the variety of IR procedures and most NHS coding departments find it a challenge to assign any code to the procedure performed. Nor is IR appropriately well served by the HRG structure.

## Why is an Interventional Radiology Service so important?

18. There is extensive literature demonstrating that appropriate, timely radiology intervention enhances patient safety, patient experience and patient outcomes with proven efficiencies to the service <sup>[4-15]</sup>.
19. The following cases, all of which have happened in the last 12 months, are an illustration. We have obtained full consent from these patients or their relatives to include these cases as examples.

### Endovascular treatment of peripheral vascular disease

#### Case 1

A frail 85 year old female presented as an emergency to her local hospital with an acutely painful white leg that was already starting to lose motor function. There were no palpable pulses.

At midnight Magnetic Resonance Angiography demonstrated occlusion of the pelvic/iliac and thigh (superficial femoral) arteries. The interventional radiologist treated the iliac artery occlusion by placement of a stent.

After five days rehabilitation the lady went home.

20. In the case illustrated, this patient was fortunate. Any delay in diagnosis or treatment would have led to her leg almost certainly being amputated. Acute loss of arterial blood supply (critical limb ischaemia) is a frequent emergency. Since major surgery carries a significant morbidity and mortality, endovascular techniques are the treatment of choice for most patients.
21. Frail elderly patients make a poor recovery from amputation and only rarely become independently mobile <sup>[4]</sup>. Not only is this less good for patients, but the community costs of caring for an immobile elderly patient are very high.
22. Currently in most hospitals in England there is not the capacity to provide a formal emergency service of this type. Most patients in this situation have surgery and a proportion have avoidable amputations.

### Endovascular treatment of bleeding

#### Case 2

A 74 year old female presented with lower rectal bleeding. The bleeding was so severe that the patient was in a critical condition.

The hospital had on-call Interventional and Diagnostic Radiology. She was taken directly from A&E to CT where the site of bleeding in her ascending colon was determined. She was then taken to the IR suite where angiography confirmed bleeding from the site indicated on the CT scan. The bleeding artery was occluded and bleeding successfully stopped with three micro-coils costing £40 each.

After three days recovery on the ward she was discharged home.

23. Bleeding from the large bowel is a common condition particularly in the elderly. Conventional surgery in this group has high in-hospital mortality. Minimally

invasive embolisation techniques are considered by the majority of surgeons to be first choice treatment for all gastrointestinal bleeds that do not settle spontaneously or which cannot be controlled by non-invasive means.

24. Access to embolisation services is much more variable than angioplasty services. Without access as described above, this patient would have needed open surgery, which would not have been without risk to the patient, requiring her to stay in hospital longer. The hospital would have consumed a considerable amount of resources, required time on the Intensive Therapy Unit (ITU) and involved significantly more bed days.

### Draining of abscesses and obstructed kidneys

#### Case 3

A 42 year old male presented on a bank holiday weekend to his local hospital with rigors and left loin pain. He was clearly septic. The on-call surgeon organised an ultrasound, which demonstrated an obstructed left kidney. A diagnosis of pyonephrosis was made. The surgeon asked for an emergency nephrostomy (drainage of kidney).

Because the patient was admitted over Easter no IR service was available for four days. The patient was managed with antibiotics. He was admitted to ITU with overwhelming sepsis and multi-organ failure and later died.

25. In contrast to the first two cases, Case 3 illustrates the consequences of an acute hospital being unable to carry out a relatively simple IR procedure. An obstructed kidney requires urgent (within hours) drainage.
26. This case is similar to a case presented in the 2009 NCEPOD report 'Acute Kidney injury - Adding insult to injury' <sup>[18]</sup>. The placement of a nephrostomy drain in a patient with pyonephrosis (kidney obstructed with infected urine) is a relatively simple life saving procedure. Whilst the hospital in the case above had sufficient on-call surgeons and diagnostic radiologists, the lack of an IR service had serious repercussions. Most hospitals do not have a 24/7 IR service and many do not have robust referral guidelines.

### Embolisation for traumatic haemorrhage

#### Case 4

A 32 year old male was involved in a road traffic accident. At triage he was stable. 60 minutes later he became haemodynamically unstable and was thought to be bleeding from a fractured pelvis demonstrated on an x-ray. Although a CT scan had been requested he was taken straight to theatre and had a laparotomy. No bleeding point could be found and he was packed and closed with an external traction device to his pelvis. At the end of his operation he had received 32 units of blood and 10 units of blood products.

14 hours after the operation it was clear he was still bleeding. He was taken back to theatre and his abdomen was reopened. Again, no bleeding point was identified and he was repacked and closed. By 16 hours he had had 92 units of blood and 20 units of blood products.

The on call vascular radiologist was contacted who said he would come in straight away. However, it took two hours for the clinical team to arrange the transfer of the patient to the catheter lab. Within 25 minutes of arriving in the lab, the interventional



radiologist had identified the single artery bleeding in the pelvis and had embolised it with glue. The anaesthetist who had been trying to keep up with the patients' blood loss said that "it was like turning off a tap".

However, the patient died 48 hours later of multiorgan failure secondary to his clotting problems, which could not be reversed and was caused by the transfusion requirement over 18 hours.

27. This case illustrates a recurrent problem for IR. Often other clinical staff have a significant lack of knowledge about the benefits of IR over open surgical techniques. This case also highlights the need for 24/7 appropriate imaging to complement IR<sup>[9, 19]</sup>. In this case, early CT would have identified the site of bleeding immediately as in Case 2. IR at this stage would almost certainly have significantly reduced the transfusion requirement and prevented the resultant clotting problems leading to multi organ failure.
28. The 'Acute Trauma Life Support Guidance - New Edition' will recommend embolisation as the first line treatment in the management of major traumatic bleeding, unresponsive to conservative management<sup>[16]</sup>. The absence of such services has been recognised in the 2007 National Confidential Enquiry into Patient Outcome and Death (NCEPOD) report 'Trauma: Who cares?'<sup>[17]</sup>, which identified an inappropriately low use of such services in the UK, which it states is 'likely to be due to the lack of Interventional Radiology Consultants who possess the necessary expertise'.
29. There is extensive literature indicating that endovascular procedures are as effective as surgery but with fewer complications<sup>[4-15]</sup>. The recent 'mild to moderate intermittent claudication' (MIMIC) trial demonstrated endovascular superiority<sup>[6]</sup>.

### Uterine artery embolisation (UAE)

30. Although so far we have highlighted the role of IR in the emergency pathway, there are a wide variety of procedures that are effective in planned care. Case 5 illustrates this.

#### Case 5

A 36 year old female was offered hysterectomy for symptomatic fibroids. She had read about uterine artery embolisation and requested referral. Her gynaecologist told her they did not have an interventional radiologist who could do UAE and insisted that hysterectomy was best for her. After three appointments he told her that, though he could refer her to another gynaecologist in a hospital that did offer UAE, he could not refer her directly to an interventional radiologist because there was no mechanism to do so and that the local SHA would not fund UAE. Her GP referred her to an interventional radiologist in a hospital 200 miles from her home. Because this took over 12 months to sort out, she opted to pay for UAE privately. This was technically and clinically successful. She returned to work within a week of the procedure and has had no further problems.

31. UAE is a minimally invasive way of treating uterine fibroids that are symptomatic. The procedure usually takes less than one hour and patients are often treated as day cases or are in hospital for an overnight stay. The treatment is effective, safe, and, compared to surgery, has a shorter hospital stay, more speedy return to normal activities and work, and is more cost effective<sup>[12]</sup>. UAE has been shown in five randomised controlled trials to be safer and as effective as hysterectomy. The

National Institute for Clinical Excellence (NICE) recommend it for women with menorrhagia secondary to uterine fibroids who have failed medical treatment. Yet in 2008-09, 8,000 women in England and Wales underwent hysterectomy for fibroids (HES data) and 400 underwent UAE. UAE is offered by only 15 hospitals in England and Wales. Availability of UAE across the country is limited by a lack of interventional radiologists and lack of awareness on the part of commissioners.

32. A similar technique is used to manage maternal bleeding after childbirth (postpartum haemorrhage) and for this, indication needs to be immediately available. However, the 24/7 availability of this life saving procedure is poor and few hospitals have formal treatment and patient pathways to deal with it<sup>[20]</sup>.

## The Current Situation for IR Services in England

33. In 2000 NCEPOD<sup>[15]</sup> recognised the importance of IR techniques to manage the emergency patient but commented, ‘the increased demand for interventional procedures is, as yet, unmet by the number of consultant radiologists who are available to satisfy that need’. A further NCEPOD enquiry in 2005<sup>[21]</sup> found that overall, less than a quarter of Trusts provide any on-call IR service and even fewer provide complete 24/7 cover simply through the lack of an interventional radiologist. This NCEPOD report recommended that ‘Trusts should ensure the availability outside normal working hours of radiology services’, but this has not yet happened. In the majority of hospitals there is no dedicated IR on-call rota and even the simplest IR procedures are often not available to emergency patients after 5 pm and at weekends or bank holidays.
34. Recent surveys by the Royal College of Radiologists (RCR 2008)<sup>[22, 23]</sup> found that outside London only 11 hospitals in the UK offered a formal out of hours IR service and only eight of these can offer all aspects of emergency IR treatment. In London only six hospitals offer out of hours IR.
35. 40 hospitals had no formal rota but have a “goodwill service” when an interventional radiologist, if able, will attend. Often the nurse and radiographer attendance is also on a goodwill basis. Such ‘goodwill’ is inappropriate for critical care in a modern health service.
36. Formal arrangements for transfer of patients for IR procedures and networking existed between only four hospitals.
37. Even at specialist paediatric hospitals the IR service out of hours is based on goodwill. At one dedicated paediatric hospital there are three interventionalists, only two of whom are full time. A common scenario is described by one IR radiologist:
- “The adult radiologists won’t do anything paediatric out of hours so the three of us informally agree to come in if we are available, i.e. if they can get hold of one of us, which they usually can ... The paediatric surgeons are still not happy with this and want a 24/7 rota – which is impossible with our staffing levels. We would need three more to have a rota...”<sup>[24]</sup>*
38. Increasingly, most radiologists who do not undertake IR work during the day feel it is unsafe to perform these procedures out of hours and therefore are not prepared to perform relatively simple IR procedures, such as percutaneous nephrostomy. In many units, no emergency IR service is on offer at all, even on an ad hoc basis.
39. These findings are against a background of increasing evidence that comprehensive IR services are essential in an acute hospital that admits emergency patients. For instance, an investigation at Northwick Park Hospital into 10 maternal deaths identified a lack of IR availability as a contributing factor<sup>[20]</sup>.
40. The result is not only a potentially unsafe emergency service, but one where costly open surgical treatments are being offered to vulnerable, critically ill patients.

## Improved Efficiency by the Increasing Use of IR

41. The benefits to the patient of an IR service in terms of the three main components of quality as stated in 'The Next Stage Review - High Quality Care for All' [1], namely - patient safety, experience and outcomes, are clear. It is important, in the current economic climate and Quality, Innovation, Productivity and Prevention agenda (QIPP), to look beyond these at the role of IR in improving the efficiency and cost effectiveness of our services.

42. Table 1 describes two real cases admitted on the same day, with the same problem (ruptured aneurysm), but very different outcomes - patient 2 died the day after patient 1 was discharged. The table also compares the resources and costs associated with open surgery and IR to effect treatment:

**Table 1**

<b>PATIENT 1</b>	<b>PATIENT 2</b>
<ul style="list-style-type: none"> <li>• 24<sup>th</sup> March 2009 @13.25;</li> <li>• 78 years old patient admitted via A+E;</li> <li>• Ruptured AAA diagnosed on CT;</li> <li>• Shocked;</li> <li>• 13.50 in catheter lab - surgeon has exposed right femoral artery;</li> <li>• 14.05 interventional radiologist has inserted a stent graft and occluder;</li> <li>• 14.50 surgeon has completed crossover graft;</li> <li>• Patient goes to HDU for one night;</li> <li>• 25<sup>th</sup> March - goes to vascular ward;</li> <li>• 31<sup>st</sup> March - discharged home.</li> </ul>	<ul style="list-style-type: none"> <li>• Same day @ 14.25;</li> <li>• 78 year old patient admitted via A+E;</li> <li>• Ruptured AAA diagnosed on CT;</li> <li>• Shocked;</li> <li>• 14.30 decision made to perform open repair in theatre;</li> <li>• 14.45 arrives in emergency theatre;</li> <li>• 19.00 open repair finished and patient arrives in theatre recovery;</li> <li>• 20.00 patient arrives in ITU;</li> <li>• Patient stays on ITU for 8 days;</li> <li>• 27<sup>th</sup> March - patient requires dialysis;</li> <li>• 1<sup>st</sup> April - patient dies of multi-organ failure.</li> </ul>
<p><b>FINANCIAL COSTS</b></p> <ul style="list-style-type: none"> <li>• A&amp;E resuscitation;</li> <li>• CT scan;</li> <li>• staff;</li> <li>• IR suite;</li> <li>• consumables = £4,350*;</li> <li>• one night HDU cost =£500*;</li> <li>• 6 days ward costs.</li> </ul>	<p><b>FINANCIAL COSTS</b></p> <ul style="list-style-type: none"> <li>• A&amp;E resuscitation;</li> <li>• CT scan;</li> <li>• staff;</li> <li>• emergency theatre;</li> <li>• 8 days ITU at £1,800 per day = £14, 400*.</li> </ul>

\* costings based on the same set of data

43. A similar argument can be put forward for other procedures such as uterine artery embolisation (UAE) for symptomatic fibroids. The Health Technology Assessment Programme (HTA) funded the 'Hysterectomy Or Percutaneous Embolisation For Uterine Leiomyomata?' (HOPEFUL) study [7, 12]. Its conclusion regarding the health economics were that overall UAE was associated with lower mean cost (£2,536 versus £3,282) and a small reduction in quality of life (8.203 versus 8.241 Quality of Life Years - QALYs) when compared with hysterectomy. However, when the quality of life associated with the conservation of the uterus was incorporated in the model, UAE was shown to be the dominant strategy – lower costs and greater QALYs.

44. The Next Stage Review looked at the Payment by Results (PbR) process to help drive quality and patient choice. IR practice covers a diverse spread of procedures and the Office of Population Censuses and Surveys (OPCS) coding has insufficient capacity to cater for this diversity. The approved process of coding by 'approach, site and procedure' can be accurate but is currently cumbersome and underused by coding departments within Trusts.
45. The HRGv3.5 classification did not adequately recognise the diversity of IR and resulted in a system unsuitable for IR. An Expert Working Group was setup in 2003 and charged with the development of new IR HRGs for the new HRG4 classification, however these new codes were not included when HRG4 was implemented for payment under PbR in 2009. Following further development it is expected that appropriate IR HRGs will be available in the next two to three years. Until these new IR HRGs are implemented, there will not be any underlying reference costs available to direct the development of tariffs for IR. The PbR team are intending to flag HRGs that have a significant proportion of IR activity within them as part of the 2010/11 Tariff.
46. Therefore currently, the lack of a clear funding approach to common IR procedures impedes the use of the best clinical pathway for patients by financially rewarding hospitals for carrying out a less optimal procedure for the patient e.g. hysterectomy rather than UAE.

## Workforce

47. It is clear that the delivery of a quality IR service is dependent on the availability of a team of health care professionals trained in image guided, minimally invasive techniques supported by the appropriate resources. An IR team consists of radiographers and nursing staff led by interventional radiologists.
48. Workforce and training issues within IR have become pressing. The speciality has developed at a rate where many departments are encountering problems providing a comprehensive service as suggested in best practice guidelines. With this increase in workload there has also been an increase in the complexity of procedures undertaken in patients who are often very unwell and have complex needs.
49. One of the key constraints to developing IR is the lack of appropriately trained staff. Whilst there is a pressing issue to recognise the requirement for trained interventional nurses and radiographers, without properly trained interventional radiologists, the service will not improve<sup>[25]</sup>.
50. Currently, most staff in radiology departments still work predominantly Monday to Friday between the hours of 8am to 6pm. Increasingly, many IR staff work across sites following the amalgamation of NHS Trusts. Such staff have to deliver both a diagnostic radiology and an IR service and tend to be on a general radiology on-call rota. In addition, many radiologists that practice some intervention are not trained or have little experience of the sort of cases that require out of hours intervention.

## Interventional Radiologists

51. As previously stated, IR has evolved within the diagnostic specialty of radiology. This has prevented the development of a distinct identity, which would help clinicians, hospitals, patients and commissioners to understand the value of IR as distinct from diagnostic radiology.
52. The dual role of interventional radiologists has compromised the development of referral pathways, different from the traditional referral pathway for other diagnostic procedures.
53. Several documents have identified that there are insufficient interventional radiologists within the UK, resulting in a service that is of variable regional quality, does not support patient choice and has become an issue of patient safety<sup>[15, 17, 18, 20, 21]</sup>.
54. IR consultant numbers need to be substantially increased to allow a safe emergency service, but also one that can respond to patients' routine needs. The Vascular Society, in a recent document that defines service provision for patients with vascular disease, advised that within any sizeable unit there should be the same number of interventional radiologists as vascular surgeons<sup>[26]</sup> and on-call rotas should be between 1 in 6 and 1 in 8 according to service provision.

55. Currently, there are insufficient numbers of trainees in IR in the UK and there are no dedicated year 1 to 5 IR training programmes. If an appropriate quality service is to be delivered this needs to be addressed.

### **IR Radiographers & Nurses**

56. Issues of recruitment and retention of dedicated IR nurses and radiographers affect many departments. Reasons are many including the lack of a structured career pathway, particularly for radiology nurses. Nursing within radiology is low profile and many hospital staff are unaware of the procedures performed or their complex nature. If the role of the IR nurse was more clearly defined within the nursing community this would help nurse managers to develop IR services when they are looking at resource implications and patient outcomes.

57. In 2006 the Royal College of Radiologists (RCR) and the Royal College of Nursing (RCN) published revised 'Guidelines for Nursing Care in Interventional Radiology' <sup>[27]</sup>. This document was created to emphasize the importance of nursing support, suggesting ideal staffing levels and appropriate on-call and training.

58. Most IR training for nurses and radiographers is in-house and most large departments have devised their own training and assessment documentation. This is not accredited, so most units do not accept other hospitals training, thus requiring staff to do additional local training when they move.

59. For IR nurses there are currently only two courses with academic credits run by universities within the UK. Neither course is mandatory. Many IR procedures are performed under conscious sedation, but training for this is limited, despite an increase in procedures requiring sedation. Many nurses find these courses difficult to access, either due to cost, the inability to attend the university (e.g. in London), or work commitments.

60. Many staff in IR departments are on Agenda for Change band 5 with little chance of promotion within their current role. This does not encourage staff to feel motivated or to stay within the speciality. A recent interrogation of the Society and College of Radiographers (SCoR) database showed that out of a UK diagnostic membership of 15,650 diagnostic radiographers only 533 reported that they work in cardiac/interventional units in England. The breakdown of figures shows 261 cardiovascular, 60 interventional and 212 angiography.

61. Role development and advanced practice for nurses and radiographers within IR is limited. There are some nurses and radiographers who have been able to extend their role to perform line insertions, run pre-assessment clinics and radiology day case units and this needs to be developed and encouraged. Many staff are frustrated by this lack of opportunity and leave for other specialities that offer more career opportunities.

62. Not all of the workforce problems associated with recruitment are due to lack of a career pathway. Financial reasons within individual organisations have also played a large part as registered staff are often viewed as expensive. Skill mix has been used very appropriately within diagnostic imaging departments and there are IR procedures that can be appropriately delegated, such as certain types of central line insertion in patients requiring chemo or long-term antibiotic. However,

careful consideration should be given to employing skill mix within IR services, given the current limitation of available training, in order not to compromise clinical care.



## Issues and Conclusions

63. IR is a key component of an emergency service for an acute hospital and also has a significant role to play in a number of planned care pathways.
64. As such, it is essential that patients should have access to this service 24 hours a day, seven days a week.
65. The current constraints to delivering such a service include:
- a lack of an appropriately trained workforce;
  - a lack of clarity on funding such a service within PbR;
  - a lack of awareness amongst commissioners and providers of the true role for IR;
  - a lack of dedicated training and consultant posts in IR with clear career pathways. This also applies to nurses and radiographers;
  - a lack of availability of appropriate diagnostic equipment e.g. modern CT and MRI;
  - a lack of access to out-patient clinics, admission rights, and support staff.
66. Current discussions with the DH Workforce Directorate on workforce planning suggest between 180 and 300 interventional radiologists are required to deliver a 24/7 service in the UK. At the moment, there are 40 delivering such a service.
67. Work is ongoing to develop appropriate IR tariffs but this is still some way from completion. Accurate information from appropriate hospitals is important to inform the development of accurate tariffs. HRG's that have been devised by the clinical specialty and are appropriate to IR are essential.
68. Unlike Europe, where IR is recognised as a distinct sub-division of radiology, the UK does not currently recognise IR as a separate sub-specialty for radiologists, despite it having clear clinical and training requirements, distinct from diagnostic radiology. This means that no dedicated assessment and recognition of competencies is undertaken.
69. Many elective services which should be provided by both large and medium sized hospitals are not available. Many patients are not offered the choice of cost effective minimally invasive IR treatments even when the evidence and guidelines recommend that they should be.
70. To address these issues we suggest the following need attention:
- i. Workforce**
- A review of the career pathway of interventional radiologists. To support this local organisations may need to review the continuing professional development of interventional radiologists and support staff in radiography.
  - There may well be implications under Agenda for Change (AfC) for the matching or evaluation to AfC bandings of staff involved in provision of this specialty. Such issues are usually considered locally by employing organisations in the NHS, but we suggest the scale of change envisaged

by this document merits the involvement of the Strategic Health Authority AfC leads to ensure some regional consistency in judgements about banding between different professional groups as the pattern and profile of interventional radiology in front line services change.

- Retention of existing staff is essential for maintenance of services and for training the workforce of the future. Staff retention may be influenced by several factors including local working conditions and facilities, terms of employment and pay, on-call commitments and opportunities for professional development and career progression. These should be reviewed by every service at a local level.

## **ii. Tariff and Funding**

- Appropriate HRGs and tariffs for IR should be developed as part of PbR. Many IR procedures are performed as part of a complex patient spell that is primarily part of another clinical specialty. Such IR procedures, though cost effective, are expensive. The identification of IR HRGs will help to ensure that the contribution of IR to the management of complex patients is recognised.
- Choose & Book should give consideration to establishing IR as a separate clinical sub-specialty so that patients can express choice and be referred directly to an interventional radiologist where appropriate. Local services need to change referral patterns to facilitate this.

## **iii. Training and Education**

- Senior medical staff and managers need to work to establish a robust case for investment in training for IR staff at local, regional, and national levels. It is accepted that no single workforce solution will be suitable for all environments and in most institutions a multi-faceted approach will be required.
- Revalidation should require individual doctors to demonstrate that they have been trained and assessed as competent in specific IR procedures, as well as meeting requirements as general diagnostic radiologists.
- Standards and training programmes for support staff working in IR departments (assistant practitioners, health care assistants and other unregistered staff) need to be developed to allow them to develop to their full potential and also provide role development opportunities for professional staff. Greater workforce flexibility would allow for more efficient working patterns and relieve some of the vulnerability associated with small teams.

## **iv. Service Provision**

- The profile of IR needs to be raised through dialogue with the wider NHS, local managers, purchasers and between specialties. A mechanism needs to be established to support this.
- More work is needed to model the most appropriate ways to deliver IR services. This is a costly service to provide at 'gold standard' level, and different levels of service could be delivered in different institutions. If a

tiered model of service is preferred then decisions will be needed about how patients access different levels of service and these will need to be carefully described so that access is equitable. Suggested models for delivery of service can be found in the recent RCR publication, 'Standards for the Provision of a 24 hour Interventional Radiology Service'<sup>[3]</sup>.

- Trusts need to review their IR services and identify deficiencies in local provision and the needs for service provision. A local model is required to deliver a local service and this should include a review of local working conditions and on-call rotas. This enables efficient use of staff and identifies opportunities for changes in skill mix and training. This work should include assessing the equipment currently in use and the requirement to deliver an appropriate level of service.

#### **v. Sub-specialty Status**

- Sub-specialty status would give IR a specific identity and do much to raise its profile as a career for doctors, radiographers and nurses. Care would be needed, however, to ensure that those diagnostic radiologists with good - if not complete - IR skills in their area of specialism are given due credit.

## Suggested Mechanisms for Change

### Providers:

- i. Review the current IR services available within their organisations with a formal risk assessment.
- ii. Develop plans to ensure an appropriate level of service. This should include appropriate, formal, out of hours arrangements.
- iii. Consider solutions outside their own organization where shortfalls are identified e.g. networks, hub and spoke models.
- iv. Ensure appropriate current resourcing levels.

### Commissioners and SHAs:

- i. Review the current interventional service available to the patients they serve in terms of quality and equitability of access.
- ii. Consider developing a strategy for the development of a comprehensive IR service including out of hours.
- iii. Explore the use of contract levers to drive changes and improvements to IR services at local level.

### National Level, Department of Health and Others:

- i. Complete work to develop appropriate tariffs for IR services.
- ii. Grant sub-specialisation status to IR.
- iii. Review and develop appropriate training for IR radiographers and nurses with development of advanced practitioner status to enhance career progression.
- iv. Develop dedicated IR training programmes with new National Training Numbers (NTNs) on a phased basis.

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