NHS
Improving Quality

Providing access to interventional radiology services, seven days a week

British Society of Interventional Radiology

Contents

Foreword by Professor Erika Denton and Professor Duncan Ettles

More than ever before, the NHS is attempting to focus care around the needs of our patients, ensuring we offer them a safe environment in which to receive care and treatment, irrespective of the point in the patient's journey or indeed the day that they require that care.

To this end we are looking at whole pathways of care across the system that may cross both organisational boundaries, or between different types of provision across the health and social care system.

Providing access to Interventional Radiology services, seven days a week pulls together the responses from three annual national Interventional Radiology (IR) surveys and intelligence gathering from across England. NHS Improving Quality have reviewed IR services across the country and confirmed that more improvement work is necessary to ensure equitable access to IR services for patients seven days a week (1).

Cutting across several clinical specialties this report explores some of the issues and challenges in delivering high quality IR services both nationally and locally and seeks to share good practice and innovations around novel delivery models. It provides practical guidance for assessing your own service as well as service improvement ideas that some networks have adopted, which could be adapted to improve services further.
The core purpose of this publication is to highlight key features that constitute a safe and effective IR service. I recommend that you use it to review the IR services you provide or commission to ensure delivery of an effective and sustainable IR service.

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Executive summary

Interventional radiology procedures are low volume and have a number of complex challenges. The service configuration at each Trust differs and is dependent on the number and the skill mix of interventional radiology consultants in the Trust. It is a service that supports a wide range of clinical pathways.

Based on the work of the NHS England Seven Day Services Forum and NHS Improving Quality's Seven Day Services Improvement Programme (SDSIP), the focus for the 2013/14 interventional radiology programme has been to develop networks to deliver seven day access for nephrostomy, embolisation for haemorrhage and embolisation for post-partum haemorrhage. Nephrostomy is a core interventional radiology service required for patients with a potential to deteriorate and require urgent intervention. Embolisation for haemorrhage usually, but not exclusively, is performed as an emergency/ urgent intervention. Embolisation for post-partum haemorrhage may involve pre-delivery planning and be performed as an emergency/ urgent intervention.

KEY MESSAGES

- **High quality interventional radiology services are essential for safe and effective patient care**
- **There is variation in the provision of interventional radiology throughout England, particularly for potentially lifesaving emergency and out of hours procedures**
- **Networked delivery models will be essential to improve access to interventional radiology. There are challenges in developing effective operational delivery networks, primarily due to the shortfall in the recruitment of consultant interventional radiologists**
- **A good well resourced interventional radiology service can contribute to significant savings (both financial and non-financial), as well as improve patient outcomes along care pathways in both planned and emergency care. (See example of interventional radiology impact for peripheral vascular disease in diabetic patients)**
- **Understand your current service provision to support your improvement efforts (see Appendix B for suggested base lining templates)**

Introduction

Interventional radiology is a comparatively new sub-specialty of radiology, sometimes known as 'surgical radiology'. It is often mistakenly viewed as a purely diagnostic radiology service where patients and the clinical community are commonly unaware of the benefits of interventional radiology treatments. The procedures require the use of imaging techniques to guide interventional instruments into blood vessels and organs, to diagnose and treat a wide range of clinical conditions. These innovative techniques can often provide patients with a better treatment option to conservative management or surgery, as the techniques are minimally invasive and reduce the physical trauma to the patient and the infection risk, therefore, enabling the patient to have an easier and faster recovery often as a day case. Interventional radiology interventions can also be highly beneficial in urgent and emergency situations.

Diagnostic radiologists sometimes perform some of the simple image guided procedures such as nephrostomy and abscess drainage, but interventional radiologists are sub-specialists who perform the wider range of interventional procedures. Interventional radiologists are also often required to work in clinical sub-specialties, which mean that skill mix and numbers of interventional radiologists available in each specialty can be limited as there is a national shortage of interventional radiologists nationally, and this can hinder the level of service an acute hospital can provide.

In December 2013, NHS England published *Everyone Counts: Planning for patients 2014/15 to 2018/19* (2). It included a number of offers to NHS commissioners, to give them the insights and evidence they need to produce better local health outcomes. It stated, that the NHS will move towards routine services being available seven days a week. It is supported by; *Towards Best Practice in Interventional Radiology* (NHS Improvement, 2012)(3) , which sets out case studies using interventional radiology service delivery models that provide benefits for patients and staff.

To support seven day woking, the National Medical Director,

Professor Sir Bruce Keogh, established the NHS Services, Seven Days a Week Forum, to consider the consequences of the non-availability of clinical services across the seven day week, and provide proposals for improvements to any shortcomings. The Forum has established thematic workstreams which include clinical standards that specifically relate to diagnostics and intervention/key services.

Diagnostic standards

The supporting information for Standard 5 Diagnostics states, 'where a service is not available on site (e.g. Interventional Radiology / Endoscopy or Magnetic Resonance Imaging (MRI) clear patient pathways must be in place between providers.'

Standard 6 Intervention/Key Services states, 'Hospital inpatients must have timely 24 hour access, seven days a week, to consultant-directed interventions that meet the relevant specialty guidelines, either on-site or through formally agreed networked arrangements with clear protocols, such as:

- Critical care
- Interventional radiology
- Interventional endoscopy
- Emergency general surgery.

To support this, NHS Improving Quality's 2013/14 Interventional Radiology Improvement Programme has focused on facilitating the development of interventional radiology networks and the completion of the third annual national interventional radiology survey.

This has been with the support of the British Society of Interventional Radiology (BSIR) and the BSIR Safety and Quality Group. The BSIR has representation from the Medicines and Healthcare products Regulatory Agency (MHRA) and the Society of Interventional Radiology Nurses and Radiographers. Whilst promoting best practice, the BSIR has also identified 15 exemplar sites across the UK based on an agreed set of quality standards (4).

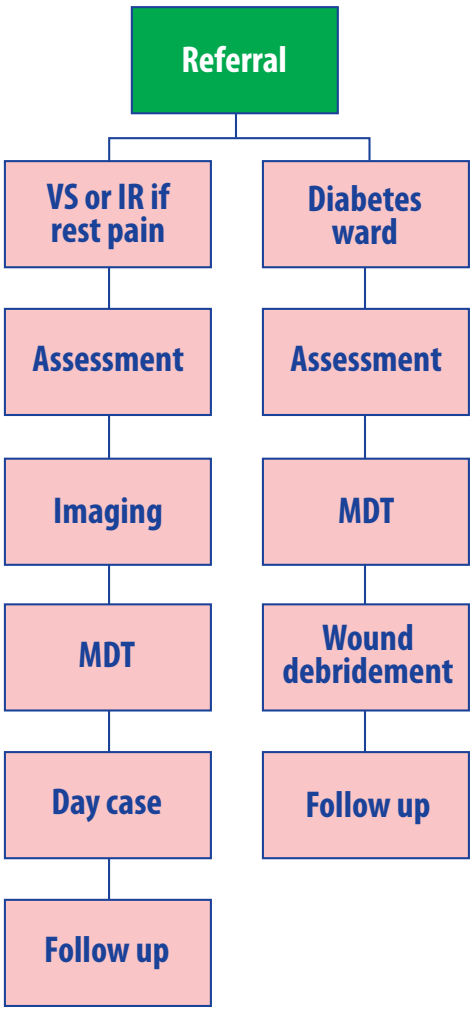
CASE FOR CHANGE

- NICE Guideline (CG119): Management of Diabetic Foot
- NICE Guideline (CG141): Acute upper gastrointestinal bleeding overview
- NICE Guideline (CG147): Lower limb peripheral arterial disease
- NICE Guideline (IPG127): Endovascular stent-graft placement in thoracic aortic aneurysms and dissections
- DH Clinical Policy: Cardiovascular Disease Outcomes Strategy
- The Role of Emergency and Elective Interventional Radiology in Postpartum Haemorrhage (Good Practice No. 6), Royal College of Obstetricians and Gynaecologists (2007)
- Investigation into 10 maternal deaths at, or following delivery at, Northwick Park Hospital, North West London Hospitals NHS Trust, between April 2002 and April 2005, Healthcare Commission (2006)
- Interventional Radiology: Improving Outcomes and Quality for Patients (Department of Health, 2009) and Interventional Radiology: a guide to service delivery (Department of Health, 2010) Annex C Adverse events
- The NHS Atlas of Variation in Diagnostic Services (NHS and Public Health England, 2013) www.rightcare.nhs.uk/index.php/atlas/diagnostics-the-nhs-atlas-of-variation-in-diagnostics-services

The Sheffield Experience

By using early re-vascularisation and interventional radiology procedures instead of conservative management, Sheffield experienced a 70% reduction in the amputation rate.

Patient pathway



VS - Vascular Surgery
IR - Interventional Radiology
MDT - Multidisciplinary team

Economic benefits

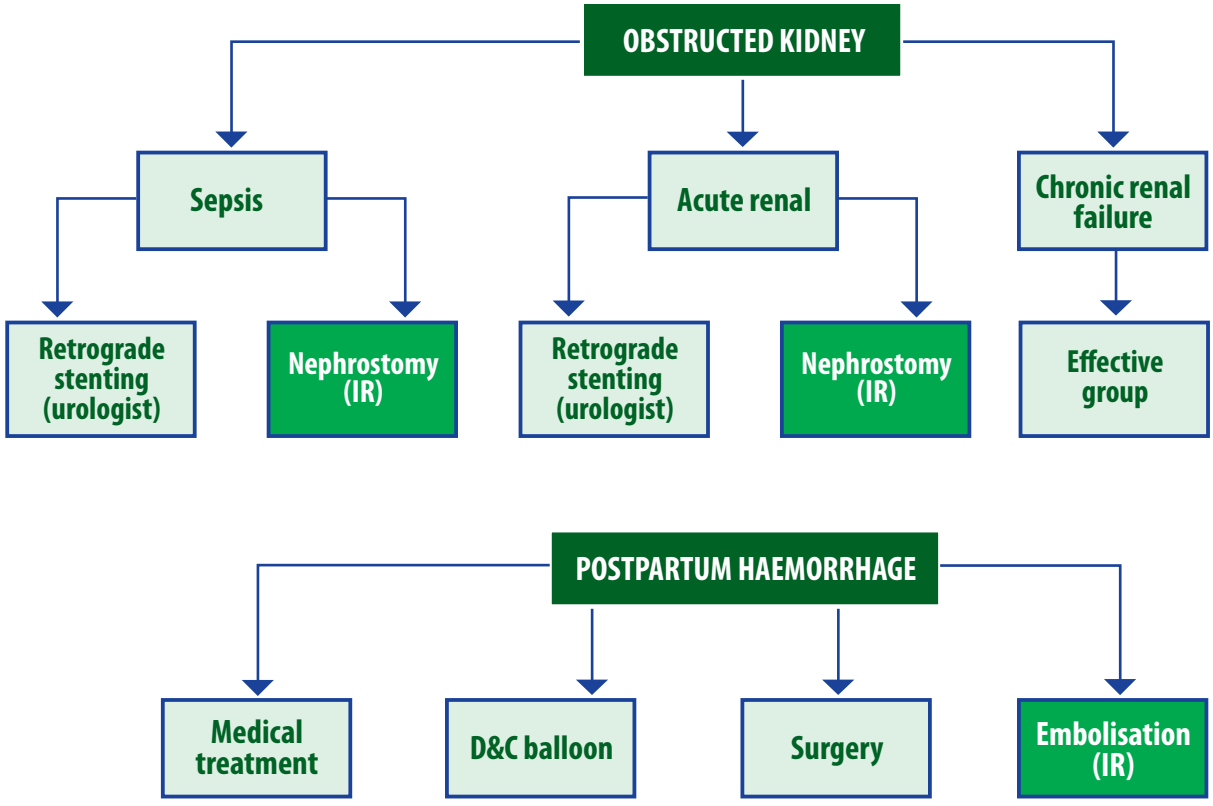
The clinical and economical value of early re-vascularisation for peripheral vascular disease in diabetic patients.

Burden of disease in the UK (diabetes 5% prevalence)	**Population size**
Diabetic population	3,380,684
Diabetics with peripheral vascular disease	676,131
Amputations - diabetic patients	8,684
Comparison of lower limb amputation rate in diabetic population	**Percentage rate**
UK	0.26%
Germany	0.21% (UK 38% higher)
Italy	0.16% (UK 17% higher)
Comparison of procedures and hospital costs	
Angioplasty (IR)	£1898
Stenting (IR)	£2393
By-pass (surgery)	£6460
Amputation (surgery)	£12,075

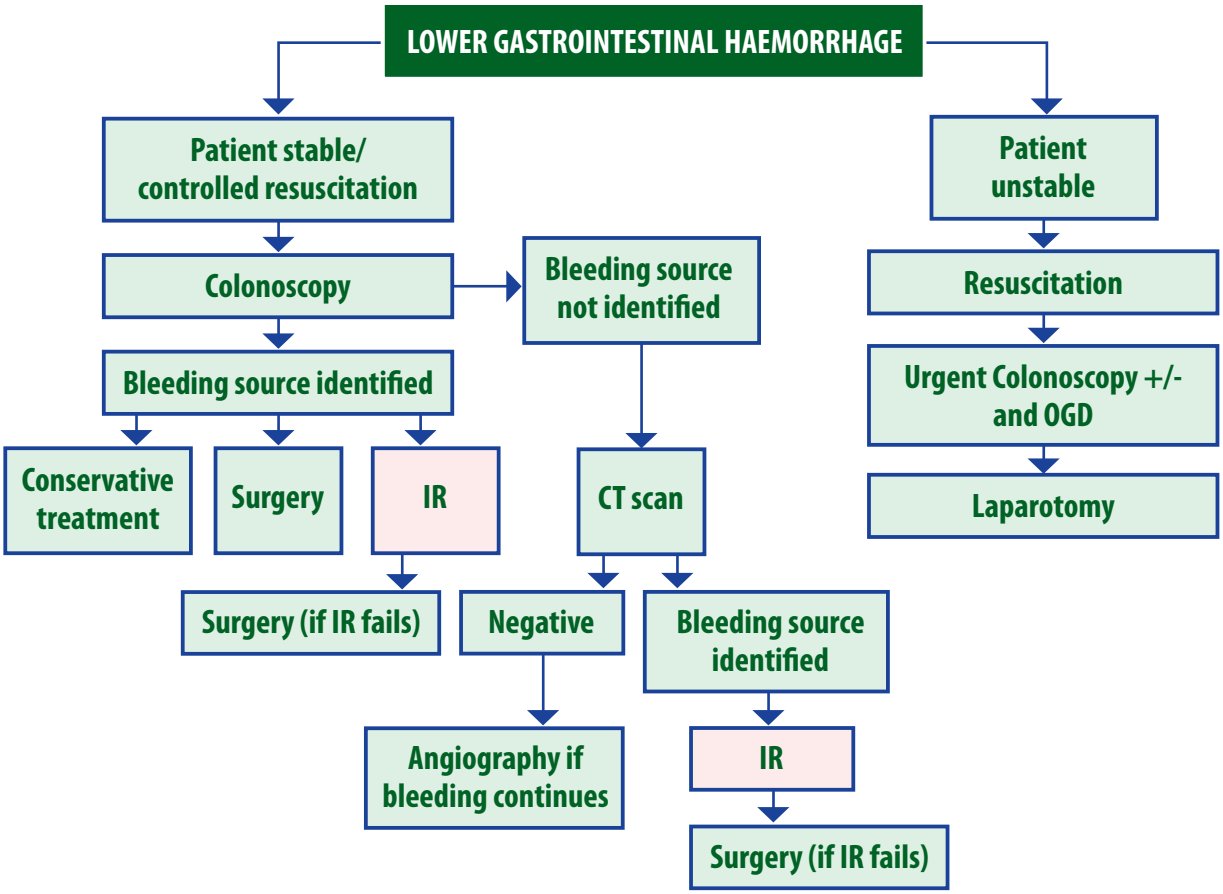
Focus on procedures

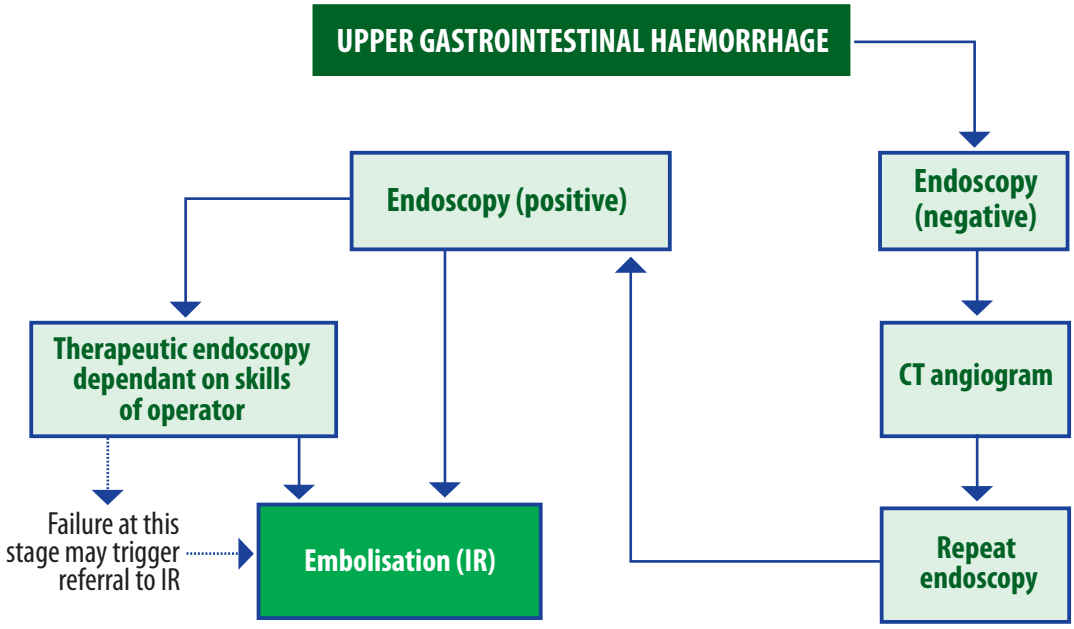
Procedure	Descriptor
1) Nephrostomy	An artificial opening created between the kidney and the skin used to drain urine from the kidney to a bag outside the body
2) Embolisation for haemorrhage	A minimally invasive procedure which involves the selective occlusion of blood vessels to prevent haemorrhage
3) Embolisation for post-partum haemorrhage	A minimally invasive procedure which involves the selective occlusion of blood vessels to prevent haemorrhage in childbirth

Possible patient pathways - where interventional radiology procedures could be utilised



IR - Interventional Radiology





IR - Interventional Radiology

National picture - where are we now and where are we going?

Interventional radiology survey 2013

A third annual interventional radiology survey of all hospitals in England, to demonstrate the level of access to 24/7 interventional radiology services was conducted in Autumn 2013. The survey focused on the 3 procedures (nephrostomy, embolisation for haemorrhage and post-partum haemorrhage), plus endovascular intervention (covering other core interventional radiology procedures). The self assessment results confirmed improvements in the 24 hour service provision for 2 of the 3 key procedures, nephrostomy and embolisation for haemorrhage, as well as for endovascular intervention (covering other core interventional radiology procedures), and provided a base line for embolisation for post-partum haemorrhage. Further improvements are expected throughout 2014 having gained an insight into Trusts' annual interventional radiology plans.

National RAG status for nephrostomy

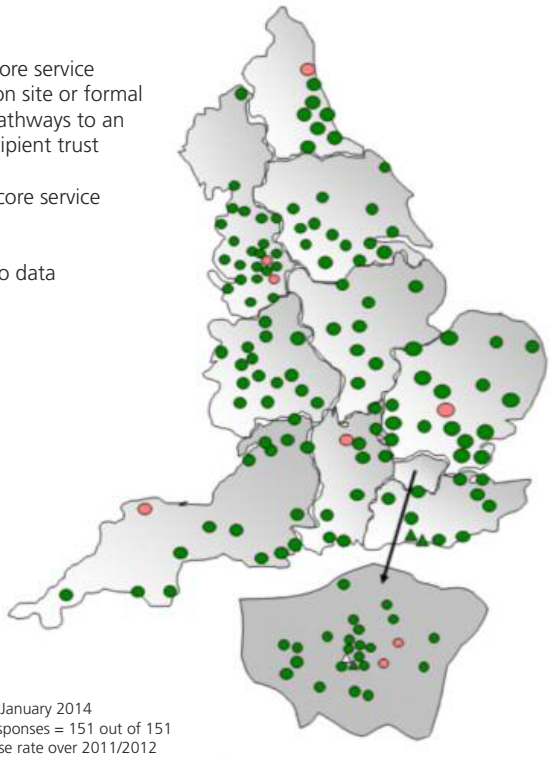
Nephrostomy in hours service provision 2012

KEY

GREEN: Core service provision on site or formal national pathways to an agreed recipient trust

RED: No core service provision

WHITE: No data



Data as at 10 January 2014
Number of responses = 151 out of 151
100% response rate over 2011/2012

Nephrostomy in hours service provision 2013

KEY

GREEN: Core service provision on site or formal national pathways to an agreed recipient trust

AMBER: Plan in place to provide service/formal pathway within the next 12 months

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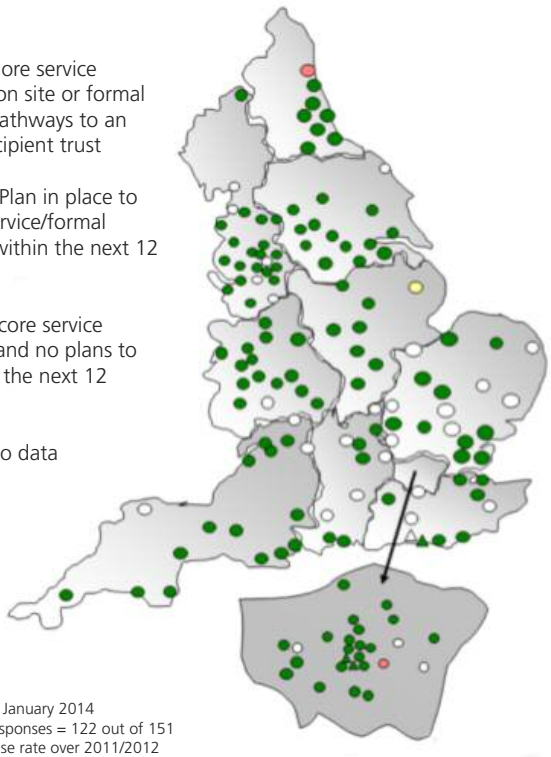

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Nephrostomy out of hours service provision 2012

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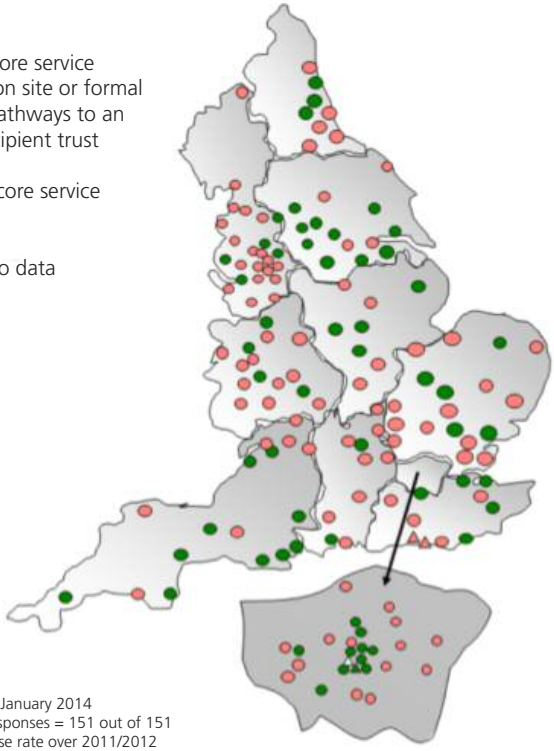

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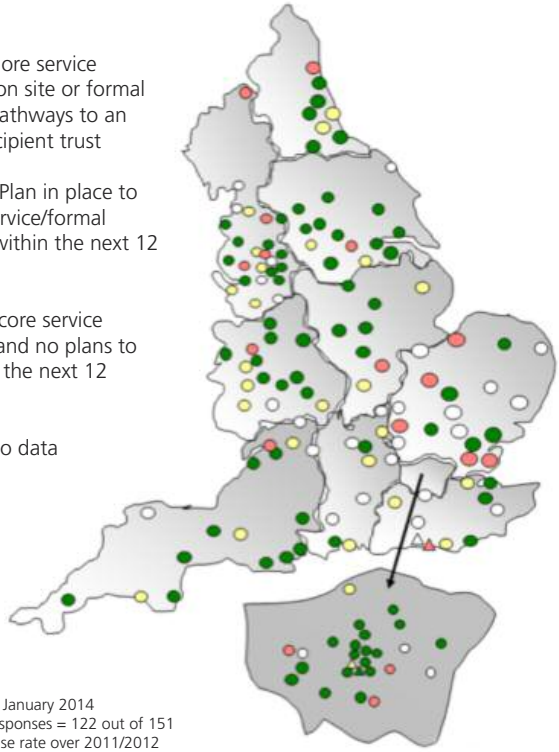

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National RAG status for embolisation for haemorrhage

Embolisation for haemorrhage: general in hours service provision 2012

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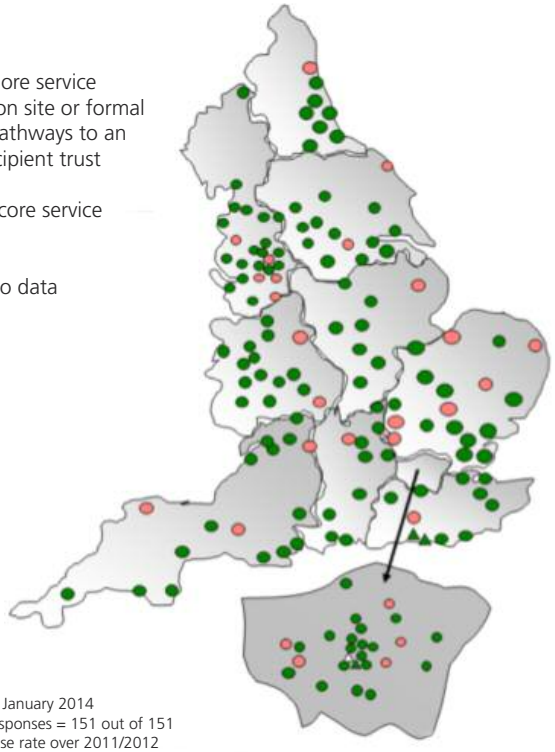

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Embolisation for haemorrhage: general in hours service provision 2013

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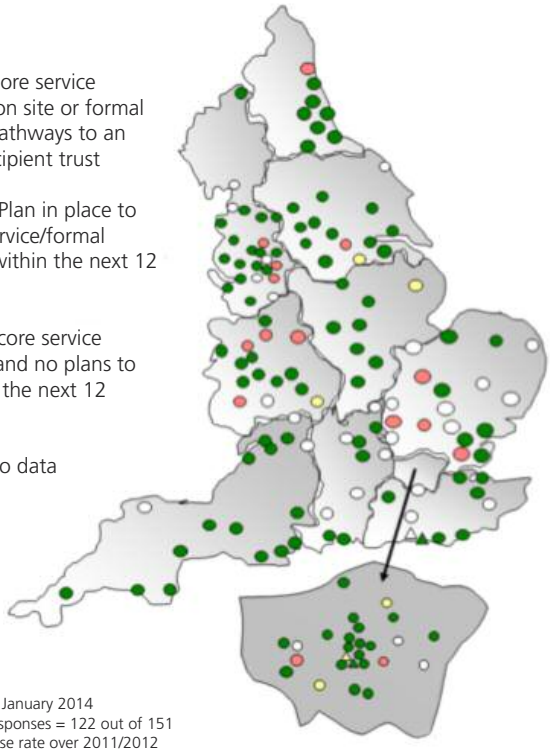

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Embolisation for haemorrhage: general out of hours service provision 2012

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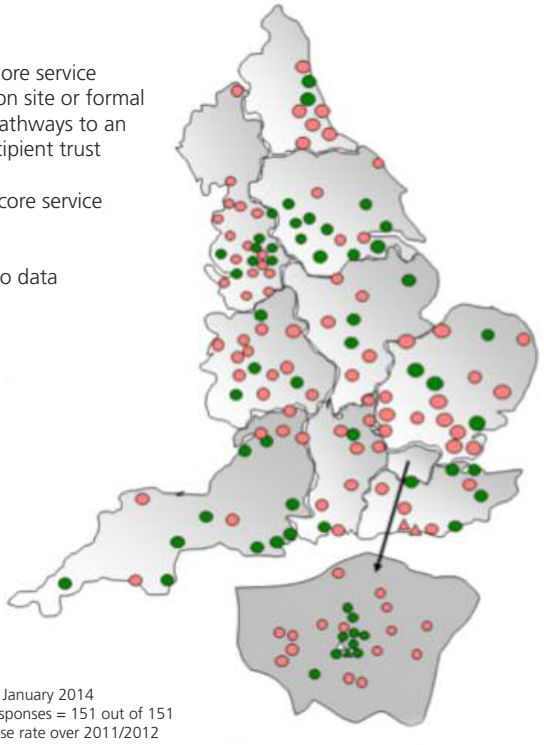

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Embolisation for haemorrhage: general out of hours service provision 2013

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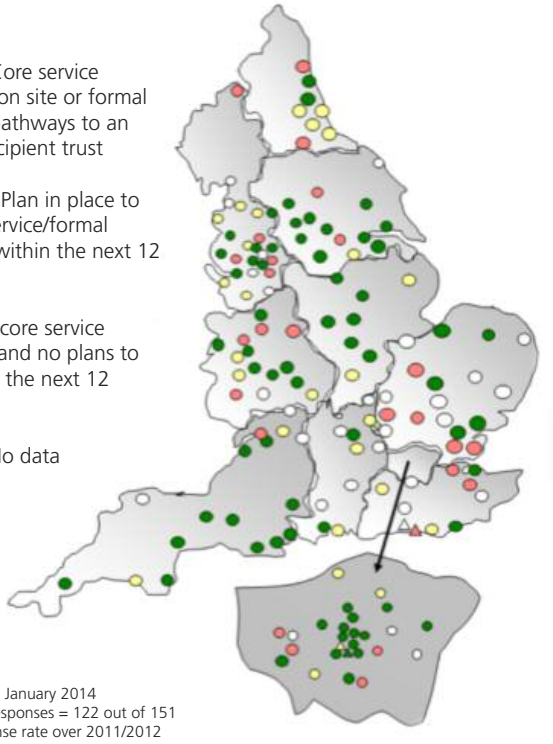

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National RAG status for endovascular intervention

Endovascular intervention in hours service provision 2012

KEY

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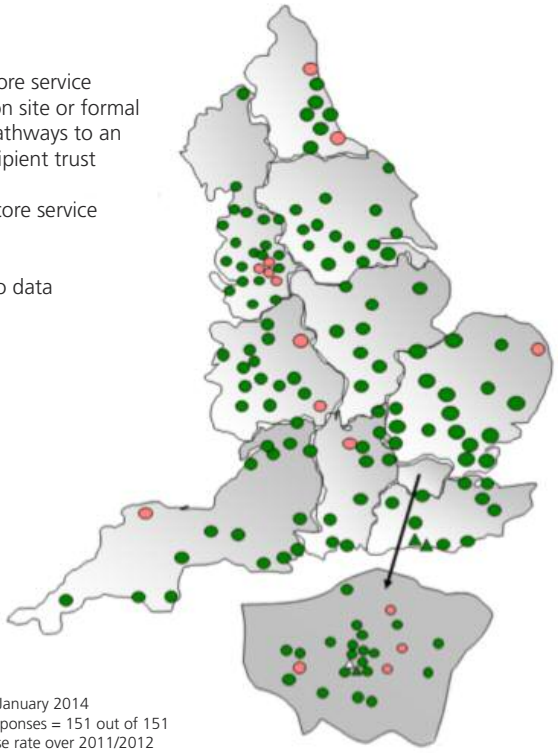
RED: No core service provision

WHITE: No data



Data as at 10 January 2014
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100% response rate over 2011/2012

Endovascular intervention in hours service provision 2013

KEY

GREEN: Core service provision on site or formal national pathways to an agreed recipient trust

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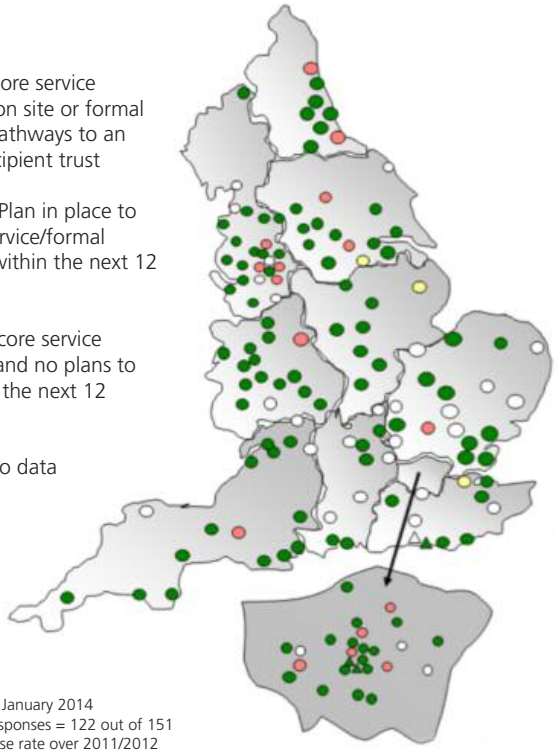

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Endovascular intervention out of hours service provision 2012

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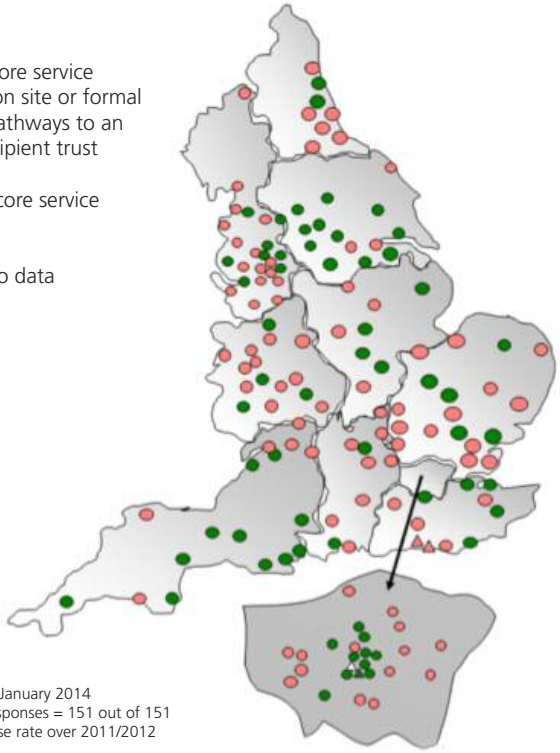

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Endovascular intervention out of hours service provision 2013

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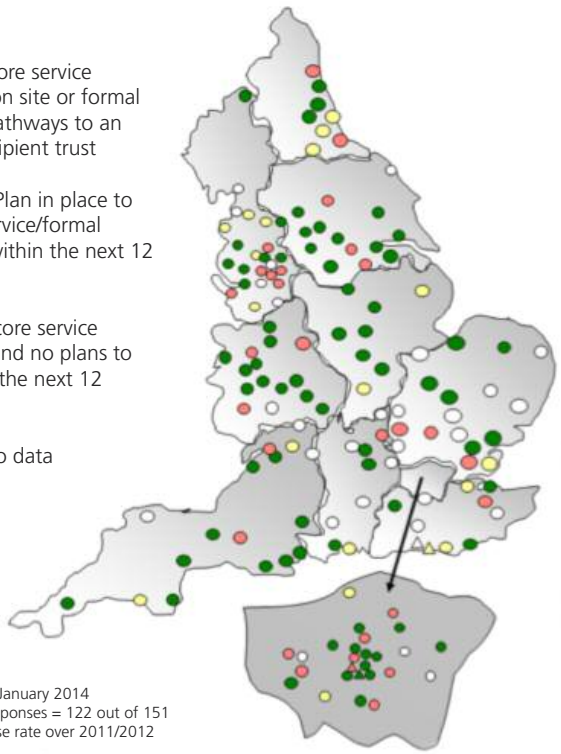

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National RAG status for postpartum haemorrhage

Embolisation for postpartum haemorrhage in hours service provision 2013

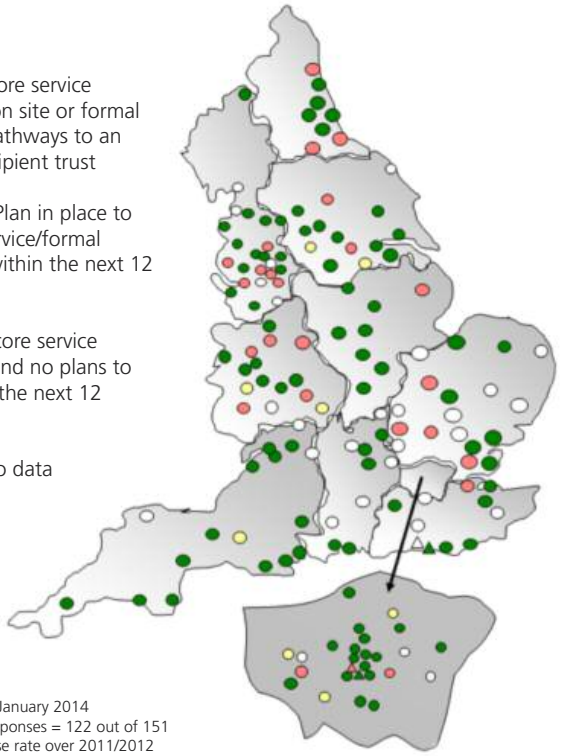
KEY

GREEN: Core service provision on site or formal national pathways to an agreed recipient trust

AMBER: Plan in place to provide service/formal pathway within the next 12 months

RED: No core service provision and no plans to provide in the next 12 months

WHITE: No data



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Embolisation for postpartum haemorrhage out of hours service provision 2013

KEY

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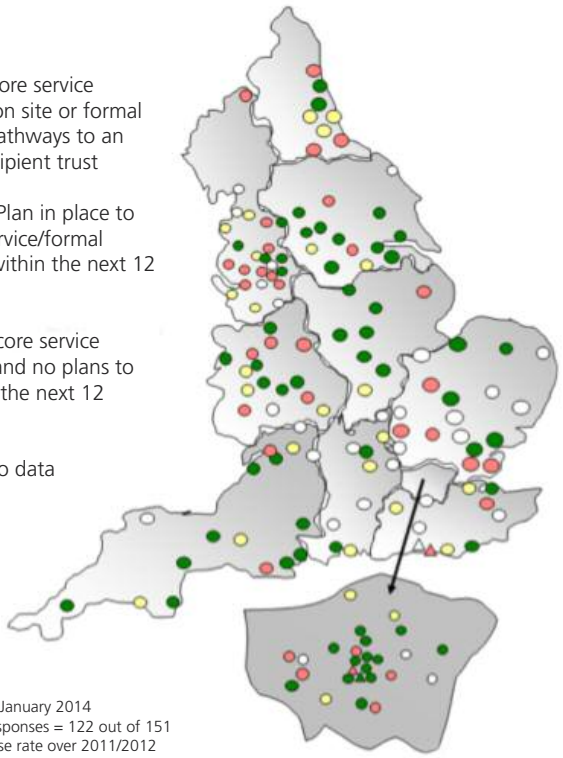

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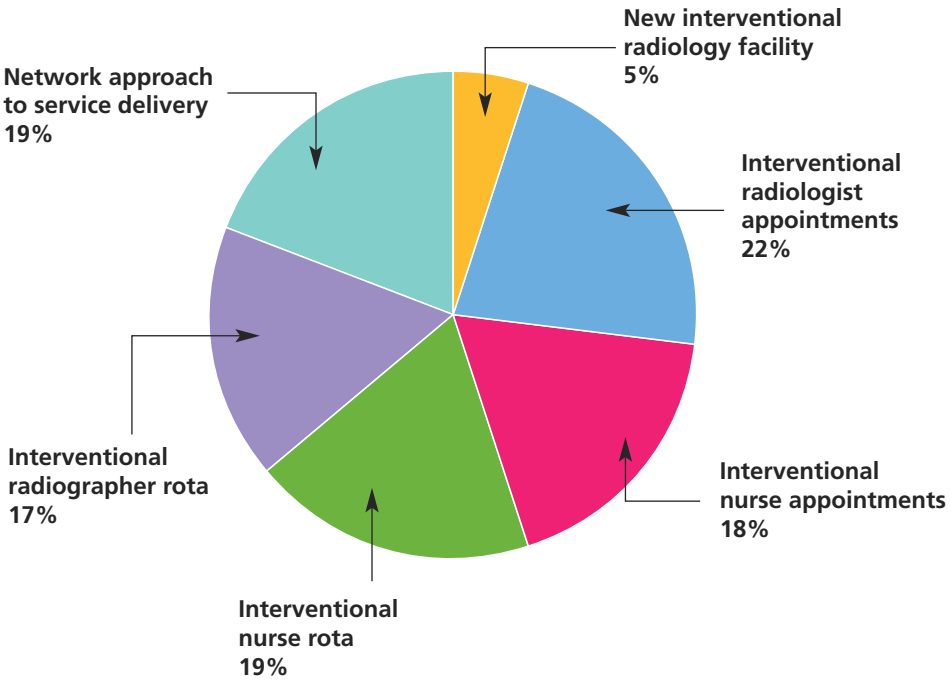
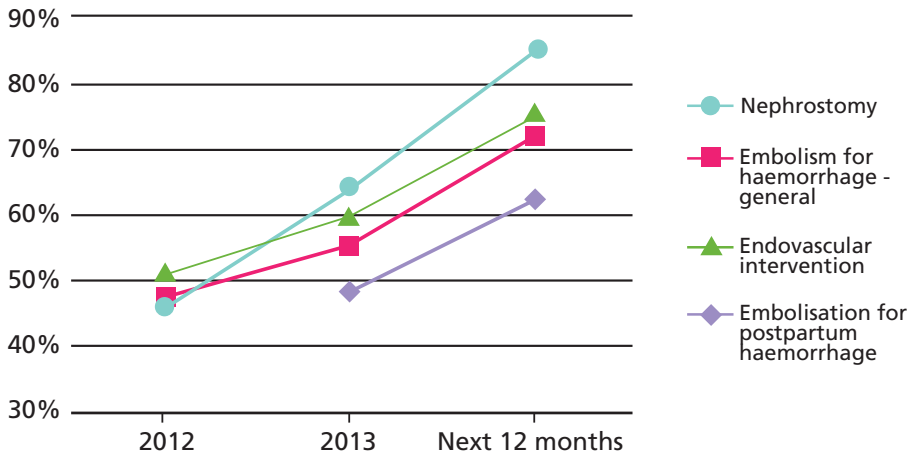
The national survey asked providers what they considered to be the rate limiting step in not providing a comprehensive interventional radiology service.

Rate limiting factors for not delivering service at present time (England)



Delivering and sustaining 24 hour interventional radiology services - percentage units providing 24 hour service cover for key procedures



The survey also asked interventional radiology services to comment on whether they were planning to deliver service changes within the next 12 months. Encouragingly it was the intention of many services to deliver more comprehensive service delivery models. However, considering the rate limiting steps as described by providers, it would require a further survey to determine whether they are successful in their ambitions.

The development of networked approaches and solutions with five regions in England has focused on the comprehensive baselining of services. Templates to support such work can be found in Appendix B, enabling providers to progress with defining and formalising pathways of care to ensure patients have access to interventional radiology services, seven days a week. Strong collaborative working between Trusts and good practice examples were particularly evident within the East Midlands network, where work is underway to address many of the challenges faced by interventional radiology service providers, such as the recruitment and retention of consultant interventional radiology radiologists.

Collaborative working and best practice examples from East Midlands Network

	Example 1	Example 2	Example 3
Networking	Joint appointments for interventional radiology vascular consultant(s) and/or vascular surgeon(s), to support 1 in 6 rota standards for vascular services	Formal pathways in place for referral of specialist and generic interventional radiology work to other centre	Links with local commissioners on increase in demand for endovascular aneurysm repair (EVAR) and fenestrated EVAR (FEVAR) and new Clinical Commissioning Policy for endovascular stent grafts in abdominal aortic aneurysm
Facilities and processes	4 dedicated beds in a day case area located in the department allowing direct patient observation and correct income allocation	Pre assessment done jointly by interventional radiology and vascular staff utilising a dedicated consulting room in the department	Standardised interventional radiology kit at two sites within the same Trust to support standard working and to facilitate cross site working
Funding	Focus on cost benefits of interventional radiology procedures, with good inter-department support from data managers in renal, vascular and neurological disciplines, allowing for patient and consultant level costing		
Staffing and team working	Well developed competency assessment framework for consultants, radiographers and nurses to support role development and skill mix utilisation		

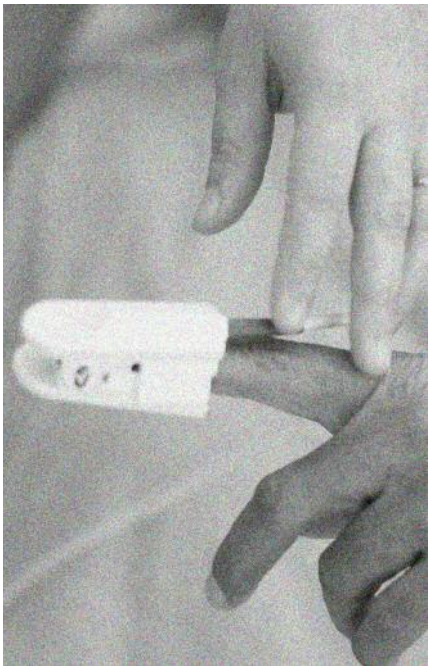
Emerging themes

Based on the work throughout 2013/14, the following emerging themes were identified for delivering seven day interventional radiology services, to support the NHS Services, Seven Days a Week Forum:

1. Patient safety/Adverse events – The interventional radiology adverse events (March 2013 - see Case for Change and Appendix A) are service aspirations and although endorsed by the BSIR they are not included in the 25 Never Events, which are reportable incidents for Trusts. There appears to be variation in the knowledge and understanding of the interventional radiology adverse events throughout England.

2. Workforce – The Centre for Workforce Intelligence report (December 2012) states that the national gap in interventional radiology consultant posts is in excess of 220 in England. Present training numbers will not meet this deficit. Interventional radiology training programmes are less formalised than other specialities, with recruitment from a pool of radiology trainees. European interventional radiology recruitment is underway but training in Europe is very different to the English/UK system and candidates require intensive training and supervision. This 'sellers' market means that the interventional radiology radiologist workforce is very mobile which creates service instability, particularly in 'hard to recruit to' locations. Some Trusts have secured joint interventional radiology consultant appointments or are exploring the potential for joint appointments as a solution to the national recruitment issue. In addition, the skills of individual interventional radiology consultants in Trusts often determine the services delivered, rather than a service based on population need.

3. Commissioning and finance – There is variation in understanding that interventional radiology can deliver a cost effective, safe and alternative service to more invasive procedures such as surgery. Tariff for interventional radiology procedures is not unbundled and coding is often an issue for interventional radiology departments. Some interventional radiology services are commissioned via national specialist commissioning.



4. Networks – Networking will be essential to improve access to interventional radiology. There are challenges in developing effective operational delivery networks, primarily due to the shortfall in the recruitment of consultant interventional radiologists.

Recommendations

The following recommendations need to be considered against the background of the NHS England, Seven Days a Week Forum.

RECOMMENDATIONS

- **Improving interventional radiology services should be part of a whole pathway approach, including patients and carers, referring clinicians (e.g. obstetricians for post-partum haemorrhage) and other key stakeholders**
- **Ensure there is wider engagement between Strategic Clinical Networks and the commissioning community and interventional radiology service providers, to further develop appropriate network solutions to delivering safe interventional radiology services, seven days a week**
- **Ensure that the clinical standards relating to interventional radiology within the NHS Services, Seven Days a Week Forum Findings are implemented**
- **Consider commissioning a quality and cost benefits analysis of interventional radiology procedures versus conservative management or treatment**

Appendix A:
BSIR/NHS Improving Quality Adverse Events

Adverse events avoided by the use of interventional radiology

The Department of Health recently published two important documents which highlighted the need for patients to have improved access to interventional radiology (IR) services[i] [ii]. The evidence base is cited in the two publications. The key drivers behind this work are:

- improvement in patient outcomes
- reduction in harm to patients who cannot access the appropriate procedure in a timely manner.

The following are scenarios which should no longer occur. Organisations should ensure that processes are in place to protect patients from harm in these situations and should report and investigate all such events.

Failure to be able to provide these services should be appropriately identified on Trust's risk registers. Such IR procedures need to be carried out with appropriate suppoort from multidisciplinary radiographic/nursing support so that timelines for these interventions can be met:

- High risk pregnancies should be delivered in hospitals with IR services who should be involved in the pre delivery planning.
- No patient should undergo laparotomy for lower gastro intestinal (GI) bleeding from any cause where embolisation may be appropriate without a referral to interventional radiology.
- No patient should undergo surgery for non-variceal upper GI bleeding without first undergoing endoscopic treatment, and if this fails or is inappropriate, interventional radiology.
- No patient with sepsis secondary to obstructed kidneys should wait longer than three hours for a drainage procedure such as nephrostomy.
- No severely injured patient should die of haemorrhage from pelvic trauma because of a lack of early imaging and referral for interventional radiology.
- No patient with a traumatic aortic dessection should have open surgery without a referral to interventional radiology for consideration of endovascular repair.
- No patient should have open surgical repair of a GI variceal haemorrhage which is refractory to all other treatments without a referral to interventional radiology for transjugular intrahepatic portosystemic shunting (TIPS).
- `no patient with symptomatic fibroids should undergo hysterectomy without being informed about all possible options including Uterine Artery Embolisation.

[i] Interventional Radiology: Improving Outcomes and Quality for Patients (2009) Gatway Reference: 12788
www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_109130

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Appendix B:
NHS Improving Quality base lining templates

		Name of Staff				
Services						
Major Trauma	In hours					
	Out of Hours					
Gastroentology	In hours					
	Out of Hours					
Hepatobiliary	In hours					
	Out of Hours					
Renal services	In hours					
	Out of Hours					
Acute Medical	In hours					
	Out of Hours					
Acute Surgical	In hours					
	Out of Hours					
Maternity Services	In hours					
	Out of Hours					
Renal dialysis	In hours					
	Out of Hours					
Gynaecology services	In hours					
	Out of Hours					
Oncology	In hours					
	Out of Hours					
Urology	In hours					
	Out of Hours					
Procedure						
Nephrostomy	In hours					
	Out of Hours					
Endovascular Intervention	In hours					
(angioplasty/stent /lysis)	Out of Hours					
Embolization- haemorrhage	In hours					
	Out of Hours					
TIPSS	In hours					
	Out of Hours					
EVAR	In hours					
	Out of Hours					
TEVAR	In hours					
	Out of Hours					
Uterine Fibroid Embolization	In hours					
	Out of Hours					
TACE	In hours					
	Out of Hours					
Renal dialysis access intervention	In hours					
	Out of Hours					

Criteria	Comments
Pre-visit RAG	
After-visit RAG	
Staffing	
Do you have dedicated IR staffing or do you use staff from other areas such as theatre to staff your department ?	
At the present time have you any IR radiologist vacancies? If yes how many? Have you had any recruitment problems?	
Can you give me details about your IR radiologist rota? Are all radiologists on the rota? Are any radiologists working sessions in other hospitals?	
Do you have an IR nurse rota? Do you have an out of hours rota? Are all nurses on the rota?	
Do you have an IR radiographer rota? Out of hours rota? Are all radiographers on the rota? Do you have any vacancies? Do you have any recruitment problems ?	
Do your nurses and radiographers have any enhanced practice skills? Do they do any generic working to cover out of hours work	
Do you have any dedicated staff for Admin/data management?	
IR facilities	
Have you dedicated Clinic rooms for Ir or are facilities shared with other departments?	
Do you have dedicated beds for day case IR patients? If not whose facilities do you share ?	
Can you describe your access to in patient beds if patients require an overnight stay?b?	
Do you have dedicated procedure rooms? If yes how many? If no what facilities do you share	
Equipment	
Do you have access to CT<30mins if required both in and out of hours?	
Do you have access to ultrasound within your department?	
Image transfer	
Service Delivery	
Do you feel that you have good support by the hospitals executive team? Do you feel that interventional radiology is understood by the executive team? Do you feel IR has a high profile within the Trust ?	
Are you a Major Trauma Centre? If no what role does your department have in the network to deliver trauma services to your population? Are any of your staff part of the trauma rotas?	
What role do you play in the delivery of vascular services in your network?	
Do you have agreed referral pathways with other specialties or trusts for interventions that are not available at your hospital?	
Do you have access to demand/ activity data? Is this data easily accessible? Do you have access to a analyst?	
Do you have an understanding of the real costs for IR?	
Do you have access to coding and income data? Are you confident that the coding of IR work is accurate ?	
Do you have in house pre-assessment for IR or do you use established surgical pre assessment	
Do you have any follow up clinics to review outcomes for Interventional radiology or does follow up take place in the specialities.	
Stock control	
previous to our email to you had you seen the information about Never Events (Adverse Events)? Do you collect any data on these adverse events? Which events ?	
Do you have any examples of good/exemplar practices which you could share with us with a view to disseminating across England as case studies	
Has your submitted survey changed ? Would you still self assess yourself as (RAG)? What is preventing you from moving on ?	

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Glossary

Angioplasty - Technique to widen narrowed or obstructed arteries

Angiography - Imaging technique used to visualize the inside of blood vessels and organs of the body

Core Interventional Radiology Service - A set of procedures defined for the purpose of the national survey. These procedures should be able to be provided by all Interventional Radiology Services and include Embolization; Nephrostomy and endovascular intervention

CT - Computed Tomography - Technology that uses computer-processed X-rays to make it possible to see three dimensional images of the body for diagnosis and therapeutic interventions

D&C balloon - Also known as a 'Bakri Balloon' and is made of silicone and specifically designed for the temporary treatment of post -partum haemorrhage

Embolisation - Selective occlusion of a blood vessel

EVAR- Endovascular aneurysm repair - The repair of a ruptured vessel which can be performed by open surgery or insertion of a stent graft (fabric covered tube) into the vessel

FEVAR - Fenestrated endovascular aneurysm repair - Aneurysm repair that uses a device with fenestrations or holes that will accommodate arterial branches such as renal arteries

Hemi-colectomy - Operation to remove part of the large bowel

Interventional Endoscopy - Techniques involving a tube with camera (endoscope) to perform minimally invasive diagnostic and treatment interventions

Interventional Radiology - A relatively new field of medical practice that uses imaging techniques to guide interventional instruments into blood vessels and organs to diagnose and treat a wide range of clinical conditions

Nephrostomy - An artificial opening created between the kidney and the skin which allows urine to be diverted from blocked kidneys

Non-variceal upper GI bleeding-bleeding in the gastro - Intestinal tract that is not due to haemorrhage prone dilated blood vessels

Post-partum Haemorrhage - Bleeding in the pelvic area (often the uterus) following child birth

Renal dialysis access intervention - Insertion of catheters or creation or repair of a renal fistula (a technique which joins an artery and a vein together to create a strong vessel to enable long term access for renal dialysis)

Ureteric stenting - A technique which involves insertion of a stent/tube into the ureter (the tube between the kidney and bladder which channels urine) to temporarily relieve a blockage

Specialist commissioning - Commissioning of specialist services that are often high cost and/or low volume through a national rather than local commissioning approach

TACE (transarterial chemoembolisation) - A minimally invasive procedure performed by interventional radiologists to restrict a tumour's blood supply and insert chemotherapeutic agents into the arteries supplying the tumour

TEVAR - Thoracic endovascular aneurysm repair

TIPS - Transjugular intrahepatic portosystemic stent shunting is a technique which creates an artificial channel within the liver. It is used to treat liver cirrhosis which frequently leads to intestinal bleeding, life-threatening oesophageal bleeding and the build-up of fluid within the abdomen

Unbundled tariff - Identification of the price of services such as radiology within the overall tariff

Uterine artery embolisation - A procedure where an interventional radiologist uses a catheter to deliver small particles that block the blood supply to the uterine body. The procedure is done for the treatment of uterine fibroids

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