GETTING IT RIGHT FIRST TIME

Radiology

GIRFT Programme National Specialty Report

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GIRFT is delivered in partnership with the Royal National Orthopaedic Hospital NHS Trust, NHS England and NHS Improvement

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Foreword from Professor Tim Briggs GIRFT Programme Chair

I am delighted to recommend this Getting It Right First Time review of radiology, led by Dr Katharine Halliday, clinical lead for radiology, with the support of Dr Giles Maskell, senior clinical advisor and radiology advisors Elaine Quick and Lucy Beeley.

This report comes at a time when the NHS has undergone profound changes in response to the COVID-19 pandemic. The terrible and unprecedented events of 2020 - and the extraordinary response from everyone working in the NHS – add greater significance to GIRFT's recommendations, giving many of them a new sense of urgency.

Actions in this report to increase agility and flexibility can help the NHS as it faces the substantial challenge of recovering services while remaining ready for any future surges, by operating more effectively and safely than ever before.

Together with the GIRFT team, Katharine, Giles, Elaine and Lucy have applied the GIRFT approach to radiology. Radiology is vital to almost every specialty and every part of the NHS, and is pivotal to our ability to provide high quality, effective and timely treatment and care to patients. I firmly believe this review shows we can unlock substantial improvement not just in radiology but across patients' treatment pathways.

As part of the review of radiology services in England, the team visited more than 150 hospital units. Implementing the recommendations in this report will help radiology services to maximise capacity and manage increasing demand, while delivering a patient-centred service. The report also finds opportunities to make better use of data and reduce procurement and litigation costs.

The GIRFT programme began following my review of orthopaedic surgery in 2012. That review was driven by a desire to ensure better care and outcomes for patients and to fix the issues faced by colleagues in my own specialty. With a small team, we visited more than 200 sites, meeting more than 2,000 surgeons, clinicians, support staff and trust managers. Almost everybody acknowledged that the NHS must review all unwarranted variation in the quality and efficiency of the services we deliver.

Together we set out to understand the impact of that variation by reviewing data, discussing challenges and debating solutions. At the end of the process we were able to make evidence-based recommendations and to share the good practice we found. Today, with the support of my fellow clinicians and the British Orthopaedic Association, those recommendations are helping to improve care and patient outcomes, as well as saving the NHS millions of pounds.

That support is crucial. GIRFT cannot succeed without the backing of clinicians, managers and all of us involved in delivering care. So I am pleased to hear how supportive people have been as Katharine has been carrying out her review.

My greatest hope is that GIRFT will provide further impetus for all those involved in delivering and using radiology services to work together, shoulder to shoulder, to create solutions and improvements that have seemed out of reach for too long.

Professor Tim Briggs *CBE*

GIRFT Programme Chair and National Director of Clinical Improvement for the NHS.

Professor Tim Briggs is Consultant Orthopaedic Surgeon at the Royal National Orthopaedic Hospital NHS Trust, where he is also Director of Strategy and External Affairs. He led the first review of orthopaedic surgery that became the pilot for the GIRFT programme, which he now Chairs.

Professor Briggs is also National Director of Clinical Improvement for the NHS.

Introduction

It's been a tremendous privilege to act as the clinical lead for radiology for the GIRFT programme. Over the last two years, I have had the opportunity to visit services around the country, meet with inspiring and dynamic people and gain a deeper understanding of the challenges facing our specialty. The teams we met are, for the most part, doing an extraordinary job, and the experience has been both enjoyable and eye-opening.

Going into the process, there were several things I expected to see, and they have proven to be true. The demand for imaging services has never been higher – and it is only going to grow. Almost all trusts need more staff to meet this demand: not just radiologists and radiographers, where the shortfalls have been well-documented, but across the whole team. There is huge pressure too on equipment: the majority of trusts have less than they need, given the demands they are facing.

There is also an urgent need for more physical space in many radiology services. Units are cramped into small areas, often at the centre of the hospital. Patient dignity is often compromised, with inadequate waiting areas and a lack of privacy. This issue must be addressed at the same time as commitments are made for investment in radiology, because without improvements to the space, there will be no room for the much-needed additional equipment, or to house more staff.

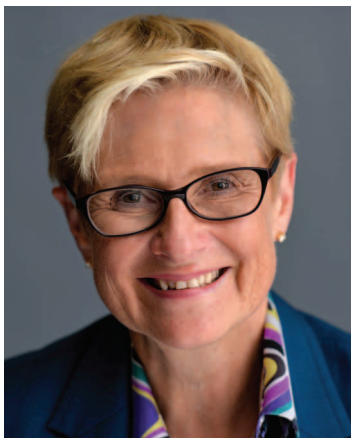
It is possible that the NHS England and NHS Improvement strategy for imaging networks, published towards the end of our deep-dive visits, will assist with this – encouraging services to work together and make smarter use of all their facilities. However, it is essential that as we move to a more networked way of working, the needs of patients remain central: in particular, the need to offer imaging at a time and place that is convenient to them.

The recommendations we have made start by focusing on providing a patient-centred service. We then look at opportunities to increase capacity from within our existing resource envelope, in particular by making better use of the skills of the whole team. We focus on IT and data, and then examine ways that services may be able to manage demand more effectively, including through more controlled and transparent outsourcing.

It may be apparent that I began this introduction talking about my own experiences and expectations, but that the recommendations are made by "we". I have been fortunate to have had the support of three outstanding advisors: Giles Maskell, throughout, and latterly Elaine Quick and Lucy Beeley. Their insights and different perspectives have been critical to shaping our recommendations and the supporting actions that will help change ways of working. I thank them all for their input.

I am also very grateful to the Royal College of Radiologists and the Society and College of Radiographers for their support, and to the delegates who attended our stakeholder event in autumn 2019, which helped test and refine our recommendations.

Since these words were written COVID-19 has drastically affected the way healthcare is delivered worldwide. Rather than change our recommendations, the pandemic has made them even more pressing. Workforce and equipment shortages have been thrown into stark relief and cramped departments are woefully inadequate for social distancing. Agility and flexibility will be key in dealing with the large numbers of patients who are now waiting for investigations and this can only be achieved with cross-organisational working, good data and robust IT systems.



Dr Katharine Halliday

GIRFT Clinical Lead for Radiology.

Dr Katharine Halliday is past chair of the British Society of Paediatric Radiology from 2010 to 2016. She has been a consultant paediatric radiologist in Nottingham since 1998. She has a special interest in the imaging of non-accidental injury and provides expert opinion for cases throughout the UK.

Statements of support

Statement of support from the Royal College of Radiologists (RCR)

The investigation into variation and innovation across imaging services has been a rigorous undertaking by Dr Halliday and her GIRFT team, and the RCR is grateful to have been consulted for advice throughout.

The resulting report is truly comprehensive, clearly stating the pivotal role of imaging in patient care, alongside the complex and significant pressures facing departments, and making positive recommendations to improve diagnostic and interventional radiology provision across England.

As well as backing the RCR's calls for increased investment in departmental space, equipment and staffing, and the ongoing creation of imaging networks, the authors detail insightful suggestions for optimising imaging pathways and the use of resources and data. All of this will make NHS radiology more patient-focussed, accessible and efficient, and we strongly endorse the team's recommendations.

Case studies featured throughout the report demonstrate the achievements of hardworking and innovative departments, and it is now essential that providers support their radiology teams to upskill, adapt and adopt best practice.

We look forward to continued involvement with the GIRFT team and other national bodies to help realise the recommendations, with much work already underway.

Dr William Ramsden
Vice President for Clinical Radiology, The Royal College of Radiologists

Statement of support from the Society of Radiographers

The Society of Radiographers is pleased to see the publication of the GIRFT Radiology report. We are glad to have been consulted and informed on the process of visits to imaging departments across England. We very much support the way that this process focuses upon front-line clinical staff and managers to identify good practice in providing services in the face of the unprecedented pressures that are being experienced everywhere. The interests of patients are very much at the heart of the report and its recommendations. The SoR endorses the recommendations wholeheartedly.

The report paints a picture of the real world in imaging service provision, recognises where excellent and innovative responses are being made and challenges inconsistency, particularly where this seems to be against the interests of front line teams and the service users. The passion and commitment of front line staff shines through in the best practice examples and case studies. The report should be seen as a toolkit for good management of services and a call for NHS Trusts to ensure that their diagnostic imaging services are resourced and aligned to the Quality Standard for Imaging, to enable best practice in the interests of patients and staff alike.

Richard Evans OBE
Chief Executive Officer, the Society of Radiographers

Executive Summary

Recent years have seen a consistent, ongoing growth in demand for radiology services. In 2012/13, there were just over 35 million radiological examinations performed across the NHS in England. By 2018/19, that had risen to over 43 million.

The fastest growth has been in the more complex modalities – MRI and CT. In April 2012, there were 250,000 CT scans undertaken a month; by March 2019, this had doubled. For MRI, the increase over the same period was from around 170,000 a month to 320,000.

There seems little doubt that this pattern of growth will continue. Radiology is being used earlier and more extensively in the diagnostic pathway. It is at the heart of a growing number of screening programmes and health checks. At the same time, the use of interventional radiology is soaring, offering incredibly precise and minimally invasive surgery.

The radiology challenge

We believe that increased use of imaging is emphatically the right direction of travel for the NHS. But equally, it is clear to those who work in the service, and to those who work in other specialties that rely on diagnostic imaging, that radiology is struggling to keep pace with this demand.

The result is that some patients are waiting too long for essential imaging. Over half of patients referred for MRI or ultrasound wait more than 14 days for the test to take place. There is often a further delay before reporting is complete.

There are some obvious answers to this challenge: more staff and more equipment. Numerous reports have highlighted the shortfalls in the numbers of both radiologists and radiographers; in fact, we found that most trusts have gaps in their workforce across the entire radiology team, with clear consequences for meeting demand.

In terms of equipment, The Long Term Plan highlighted the NHS has "fewer MRI and CT scanners per capita than most OECD countries." Significantly, the numbers per capita have not increased over the last decade – the same period where demand for these modalities has all but doubled.

The pandemic has brought the shortage of equipment to the fore. After scanning a COVID positive patient, a machine cannot be used for several hours while the area is thoroughly cleaned. Throughput has been drastically reduced, which is particularly concerning in trusts with only one scanner.

Following the publication of the Long Term Plan, the government announced an additional £200m of funding for radiology equipment. While this is extremely welcome, it is allocated specifically for the replacement of old equipment, rather than increasing the number of scanners available.

The necessity for investment

In this context, we therefore unequivocally support the calls that have been made by the Royal College of Radiologists (RCR), the Society and College of Radiographers (SOR) and others – including patient groups and charities such as Cancer Research UK – for increased investment in expanding the radiology workforce and increasing the volume of equipment available.

But the purpose of the GIRFT programme is to identify ways to improve services from within the existing resource envelope. Through our visits to 152 units, and our analysis of radiology data, we have identified a range of opportunities to do so – addressing unwarranted variation in practice and building on best practice examples from our deep-dive visits.

Our vision for change

Importantly, our goal has not simply been to free up capacity; ultimately, that is where the additional investment can have its biggest impact. Instead, we have identified a positive vision for change, of making radiology more patient-centric. That includes faster access to imaging, but also seeking to make services more convenient and accessible, and improving the physical environment of radiology departments.

Our recommendations focus on this vision, while also addressing specific areas of unwarranted variation in local service delivery.

The national strategy for imaging networks

In November 2019, towards the end of our deep-dive visits, NHS England and NHS Improvement published *Transforming imaging services in England: a national strategy for imaging networks*. This represents an important reconfiguration of radiology services and a major opportunity for change. Networks – where trust resources are pooled and ways of working standardised – offer a more effective way to deliver many of the recommendations we make.

However, there are also recommendations that trusts can start to implement, in advance of the roll-out of the network model. In addition, several of our recommendations are for national bodies.

QSI

QSI, jointly developed by the RCR and SCoR, provides a framework on which to base many of the improvements described. See p20

Making radiology more patient-centric

Our first set of recommendations relate directly to our vision. They focus on improvements to processes and facilities within individual departments.

On a recurring basis throughout our visits, we found radiology teams providing a high-quality service in a low-quality environment. Too often, inpatients and outpatients are in the same waiting area, often resulting in a distressing experience, particularly for children and more vulnerable patients. There is a lack of space for private or sensitive conversations, while staff facilities, including reporting rooms, are too small.

We identify a range of possible improvements that trusts could make to their facilities, but arguably some of the most effective changes would result from dividing services into "hot" and "cold" sites. This would immediately separate those attending for a pre-arranged imaging appointment from those who are referred for imaging from within the hospital.

During the COVID-19 pandemic, trusts have been forced to rapidly implement this, with some facilities reserved for patients with proven or suspected coronavirus infection. Further development of COVID-free facilities will be essential moving forward.

Moving to such a model would also facilitate other changes, such as giving patients greater choice about appointment times and locations. It should also reduce the number of appointments being cancelled or delayed, because the equipment is required for a more urgent examination or because the area needs deep cleaning to avoid cross infection.

Undoubtedly, within a network there will be opportunities for such changes. However, we also believe that there are steps providers can take today – particularly in terms of making services more child-friendly. For instance, by introducing play specialists, some trusts have successfully reduced the proportion of children undergoing an MRI who receive a general anaesthetic.

Reporting targets

Another crucial step in making radiology patient-centric is reducing the waiting time for imaging. We examined the variation in the "request to test" and "test to report" times between trusts and found that the greatest variation was in access to MRI.

However, more significant than the variation was the simple fact that too many patients are having to wait too long for their tests and for the resulting reports. The majority of patients at all trusts will wait at least 14 days from request for an MRI, and then wait again for the report.

Our analysis found that, across all modalities, providers in the top quartile completed at least 75% of reports by day 3 after the test was conducted, with some achieving over 80%. In the bottom quartile, there are some providers who have reported less than 70% by day 3.

These delays have been highlighted previously. In its 2018 review of radiology, the Care Quality Commission (CQC) called for *"agreed national standards to ensure consistent, timely reporting of radiological examinations"*, against which trusts could measure their performance. Having discussed this with trusts in our deep dive visits, we support the principle of standards for reporting; however, given the challenges facing trusts, we would propose that – at present – these should be phased in, and introduced without penalties. Instead, they would serve as targets for trusts to benchmark their own performance.

The sudden decrease in planned activity during the pandemic has led to the vast majority of trusts eliminating their reporting backlog. This would be an ideal time to introduce national standards to maintain the benefits of timely reporting during the restoration and recovery period.

Maximising capacity

Our next set of recommendations focus on identifying opportunities, based on existing practice, to maximise capacity in the service. At the heart of this is ensuring that all trusts make the most effective use of the skills of their teams.

For example, it is clear that the development of radiographer reporting for certain modalities has a range of benefits; faster

reporting times overall, greater job satisfaction for radiographers and releasing radiologists to focus on other aspects of their roles. This is by no means a recent revelation; the development of radiographer reporting has been recommended for several years and at 30 trusts more than 50% of X-rays are reported by radiographers. However, at several trusts, fewer than 5% of X-rays are reported by radiographers and 15 trusts do not use radiographer reporting at all.

We asked trusts why; a recurring theme was that, while they would like to support advanced practice , they are not able to do so because their radiography team has to focus on image acquisition. Clearly, to enable radiographers to take on this additional responsibility, trusts need to change the way they undertake some of their image acquisition workload. As well as recruiting more radiographers, the answer lies in upskilling the whole radiology team, enabling different members of the team to take on some aspects of image acquisition.

While reporting and image acquisition is perhaps the clearest example of how trusts can rethink their working processes to increase capacity, during our deep dives, we saw a range of other approaches to using advanced and extended practice to deliver crucial elements of this workload – such as clinical support workers or imaging assistants performing cannulation and preparing patients for imaging, to using radiology nurses to conduct interventional procedures such as arteriography, venography and venous access.

With the right supervision and a strong of ethos of teamwork, these approaches are being used successfully in numerous trusts, but there is a marked lack of consistency in what is expected, or permitted, of different roles. This can vary even between neighbouring trusts. As we move towards a network model, where partner trusts will need to adopt shared practices and ways of working, these differences in approach will become unsustainable.

We found that these differences were the result of multiple factors: sometimes lack of funding, frequently a lack of clarity about how best to support training and in many cases the tension between releasing staff to participate in training and maintaining day-to-day workloads. Whatever the cause, this is a missed opportunity; we urge all trusts to seek ways to enable their staff to operate at the top of their licence. We believe the first crucial step is to build a culture of team working, so that more junior staff are given the opportunity and confidence to take on additional responsibilities, with the full support and appropriate supervision and advice of more senior staff.

Such an approach, and outlook, will help with staff satisfaction and retention, but more importantly still, it will enable radiology services to increase their capacity for their core activities.

Standardising activities and expectations

We recognise that there is a lack of consistency too in trusts' understanding of what a radiologist's core activities are – and how much time should be dedicated to each of those tasks. We asked trusts how much of a consultant's time they allocate in job plans to reporting; there are large numbers of trusts where it is assumed it will account for at least 60% of a consultant's programmed activities, as well as several where a consultant is expected to spend less than 20% of their time reporting. There are clearly also huge differences in what trusts consider constitutes a reporting session.

This inconsistency makes it hard to plan and roster teams appropriately in the short term and affects long-term workforce planning. We have therefore recommended the introduction of standardised descriptions of activities, for use in job plans, and standard expectations for the volume of reporting that could be expected in a four-hour session, based on the definitions above.

One major demand on radiologist time is attendance at multidisciplinary team (MDT) meetings. Because imaging is invariably required to support the MDT plan for each patient, radiologists have to attend large numbers of these meetings. As the use of MDTs has increased, this has had a substantial effect on radiologist time. We therefore welcome the recent proposals for streamlining MDT meetings and urge trusts to follow the recommendations, to make MDTs as effective as possible for the patients that need this care model.

Improving IT and equipment

Radiology capacity can also be increased by improving the use of IT within everyday tasks. In particular, there are still too many challenges with sharing images and reports between trusts, and with any private sector providers. Trusts' Picture Archiving and Communication Systems (PACS) are often incompatible with one another – not least because so many are outdated. There are similar issues with radiology information systems (RIS). Yet while these systems are essential to the way radiology services function, fewer than 30% of trusts have 24x7 support for them.

Referral processes also do not make most effective use of IT; we found that only 60.5% of trusts use electronic referral systems for requests from GPs.

In short, we found that all too many departments currently struggle to meet what might be deemed the minimum IT requirements for a modern radiology service. It is vital that steps are taken to address this, with all trusts meeting the recommended standards set by the RCR. Until that happens, services cannot hope – or be expected – to capitalise on opportunities such as using Artificial Intelligence (AI) within radiology, or to introduce changes to the patient experience, such as online booking.

It seems certain that moving to networks will assist in this, as the barriers to collaborative working will become increasingly apparent. However, there remains a shortage of capital funding for IT investment, just as there is for radiology equipment.

We asked trusts about the average age of their existing equipment. On average, NHS CT scanners are over six years old, MRI machines over seven and a half years old and X-ray machines almost 10 years old. However, within some trusts the average ages are much higher.

These older machines are invariably less efficient, more liable to breakdown, slower and – in the case of CT scanners – use more radiation. They are, in themselves, a barrier to increasing capacity. We know that some trusts have opted to move to a managed equipment services model to ensure more timely replacement, but we believe there is a need for greater planning, across all trusts, to avoid the risks associated with ageing equipment. Again, a network may be better able to make the case for capital investment.

Making data work harder

The GIRFT methodology is rooted in data analysis and radiology appears to offer a vast amount of data for this purpose. There are several national datasets, the most established of which is the Digital Imaging Dataset (DID), managed by NHS Digital. The same underlying data – drawn from trusts' RIS – is also used by NHS England, then aggregated and published as the DID1. In addition, there is the National Imaging Data Collection (NIDC), information from which is visible on the Model Hospital website.

While all are valuable, none are comprehensive – and having multiple collections creates an unnecessary degree of complexity. We believe it would be beneficial to conduct a full review of all the collections and data associated with imaging, to confirm what is being collected, identify where information is being duplicated and pinpoint any gaps. This could then allow processes to be streamlined and ideally a single dataset established – which also links to Hospital Episode Statistics.

This data challenge applies not only to diagnostic radiology but also interventional radiology where the available data does not offer an accurate picture of the work undertaken or patient outcomes.

Once collections are standardised, we then believe trusts should be supported to ensure they are providing accurate and comprehensive data submissions – the next step in improving data quality.

With such improvements in place, it will be easier for trusts to put the data to work, particularly for accurate capacity planning. We met numerous trusts taking a positive approach to this, but standardisation will help more trusts do so.

Managing demand

Our final theme looked at how radiology as a service can manage demand.

One recurring issue is that referring clinicians often request more imaging than is needed for diagnosis, or imaging that may not be appropriate for a suspected condition. Sometimes clinicians request a full set of imaging modalities because they are unsure what will actually be provided swiftly to enable their diagnosis.

Clearly, the goal should be that patients are referred for the most effective imaging modality for their condition – and that this modality is then provided promptly. This requires collaborative working between radiology services and other specialties to clarify optimal pathways and provide that information to referring clinicians (including GPs). Of course, it also requires increased capacity within radiology.

We recommend that the iRefer online tool is used more widely to support radiology referrals, and that trusts follow the best practice examples we identified to help reduce the volume of investigations of low clinical value they undertake. These approaches should help to reduce the demand for such imaging, freeing up resource for the higher value tasks.

One factor that has affected demand in recent years has been the introduction of target times for diagnosis in different conditions and specialties. Invariably, these place extra expectations on imaging turnaround times. Trusts told us that these multiple targets can be difficult to meet – requiring them to prioritise one set of patients over another and placing significant demands on particular modalities or skillsets. To minimise the potential conflict that results from this, we would strongly encourage that any such new demands are discussed with radiology services before they are introduced.

To cope with the growth in demand, there has been a major growth in the use of outsourcing in the speciality. Radiology services in England now spend over £120 million a year on outsourcing – an increase of £20 million compared to just two years ago. The largest share of this is spent on image acquisition, but there is growing expenditure on reporting.

When we examined this, we found that there is a significant lack of governance and control around outsourcing. While most trusts know how much they spend, many are not able to confirm what they get in return – meaning it is entirely possible that different trusts are paying similar amounts for vastly different volumes of output.

We have therefore recommended greater controls over this area, and better information sharing between trusts about what their costs and expectations are. That will assist all providers to procure outsourced services more effectively and strategically. Once again, we see a role for networks here.

Procurement and litigation

As in all GIRFT workstreams, we also looked at opportunities to reduce variation in procurement – driving savings and improving quality – and to cut levels of litigation.

Like most of our GIRFT colleagues, we found that different trusts appear to be paying different prices for the same or similar items, with no apparent correlation with volumes purchased. As with outsourcing, this suggests there may be opportunities to standardise procurement and learn from best practice.

In terms of litigation, there is – as found by other workstreams – an underlying increase in both the volume and estimated costs of claims. However, the estimated cost of litigation per radiological diagnostic test is very low. We recognise that the costs of litigation are often not attributed to radiology but rather the specialty that ultimately treats the patient. Nonetheless, we believe there are opportunities to reduce litigation costs by following best practice in managing and learning from claims. We welcome the initiative led by the RCR to introduce Radiology Events And Learning Meetings (REALMs), which provides a standard framework for this kind of reflection and learning.

Mid Yorkshire Hospitals NHS Trust

List of Recommendations

Delivering a patient-centred service

1. Trusts should review facilities and processes to ensure that patients are safe and are treated with dignity and respect at all times.
2. Imaging should be arranged at a time and place to suit patients and ensure their safety.
3. Reporting should be carried out expeditiously and at the point at which it will have maximum impact on the patient's care.

Maximising capacity

4. All radiology services should review their workforce requirements to ensure their establishment is correct. All services should maximise recruitment and retention and all staff should be supported to work to the top of their licence.
5. The RCR should produce standardised definitions for radiologist activities for job planning. This should also include expected volumes of activity.
6. The RCR and SoR should produce standardised competencies for reporting, so that once a trainee/radiographer has proved their skills, they are permitted to report independently, wherever they work.
7. Trusts should review the efficiency and management of MDTs in line with national guidance.
8. Standardised protocols should be introduced for imaging of common conditions for trusts and independent sector providers to adopt.
9. All trusts must meet the RCR standards for the use of IT.
10. Every trust or imaging network must have a sustainable plan for the purchase and/or replacement of capital equipment, PACS and RIS, to meet anticipated patient needs and increase capacity.
11. All radiology services should have access to dedicated facilities to admit and discharge day case patients for interventional procedures.

Making data work harder

12. National bodies should review coding in radiology.
13. All trusts should be supported to standardise the submission of data to national data collections and access radiology data, linked to HES, whenever they wish to, for benchmarking and planning.
14. All trusts should anticipate and proactively manage their demand and capacity for both image acquisition and reporting, and for interventional radiology.

Managing increasing demand

15. All referrers should adopt robust clinical pathways supported by clinical decision-making tools such as the RCR's CDS-enabled iRefer.
16. National bodies that produce clinical guidelines with a clinical interdependency with radiology must assess, prior to implementation, the impact on the speciality.
17. All trusts and networks should have policies around the management and governance of reporting capacity and costs of insourcing and outsourcing which are transparent.
18. All trusts should move to a network model of service delivery in line with the NHSE/I strategy.

Procurement

19. Trusts should work with NHS partners to enable improved procurement of services, devices and consumables through cost and pricing transparency, aggregation and consolidation, and by sharing best practice.

Litigation

20. Trusts should seek to reduce litigation costs by application of the GIRFT Programme's five-point plan.

About radiology

Radiology refers to the use of medical imaging to diagnose and treat injuries and diseases. It includes X-rays, ultrasound, magnetic resonance imaging (MRI), fluoroscopy, computed axial tomography (CT) and interventional procedures.

The imaging and interventions provided are fundamental to the delivery of acute and elective clinical services across almost every speciality within primary, secondary and tertiary care. As a result, radiology has a pivotal role in meeting the majority of NHS service standards and targets, from cancer diagnosis to emergency department waiting times.

Radiology services are provided to patients of all ages and demographics. Many of those who undergo imaging are otherwise in good health – such as pregnant women having fetal ultrasound or people of all ages who have a suspected broken bone. However, radiology departments also treat patients with cancer, stroke, infection, heart disease and other long-term conditions.

Radiology today

Because of this pivotal role, there are radiology services in every NHS trust; indeed, many trusts have several units, with radiology of some form provided on each hospital site. Services are delivered by a team of professionals with different skills and expertise.

Radiologists are qualified doctors who often do not conduct the imaging and operate the equipment, but are trained to interpret the images. They then produce a report about what the images show. These reports are used to inform the treatment options for the patient's ongoing care and are an essential part of the overall health record.

Many radiologists are also involved in interventional radiology where imaging is used to guide surgical procedures. Other key aspects of the radiologist's role include being part of multidisciplinary teams (MDTs) making care and treatment recommendations for patients with cancer and other diseases, and advising GPs and clinicians from other specialties and other healthcare professionals about what form of imaging might be most appropriate to their aims.

There are currently around 3,300 consultant radiologists working in NHS trusts in England, plus 1,200 trainees.[1]

They work as part of a highly skilled team that typically includes:

- diagnostic radiographers, a graduate profession within the workforce group of Allied Health Professionals. They use a range of complex imaging equipment such as general radiographic equipment, CT, MRI, and ultrasound scanners to provide high-quality diagnostic images and in some cases interpret the images and provide a formal report. Radiographers must be registered to practise with the Health and Care Professions Council (HCPC) and can develop their practice to advanced and consultant roles;
- sonographers, healthcare professionals who specialise in the use of ultrasound to produce diagnostic images, scans, videos or three-dimensional volumes of anatomy and diagnostic data. They usually issue their own reports. Some radiographers also work as sonographers. Again, they are highly trained and, in many cases, professionally registered. However, there is at present no statutory requirement for sonographers to be registered;
- medical physicists, who provide radiation and safety advice, among other roles;
- registered nurses, who work alongside interventional radiologists before, during and after procedures and provide patient care;
- assistant practitioners, who support radiologists, radiographers and nurses, and perform imaging under the supervision of a radiographer;
- the PACS (Picture Archiving and Communication Systems) team and data managers, who ensure that images are made available and transferred within and between hospitals as necessary; and
- a wide range of additional clinical support workers, healthcare assistants (HCAs) and imaging assistants. These non-registered staff are often the 'face' of radiology to the patient; they prepare patients for imaging and support the delivery of the service.

Services are also highly reliant on administrative staff and, with sophisticated technology at its core, radiology depends on knowledgeable and specialist IT support.

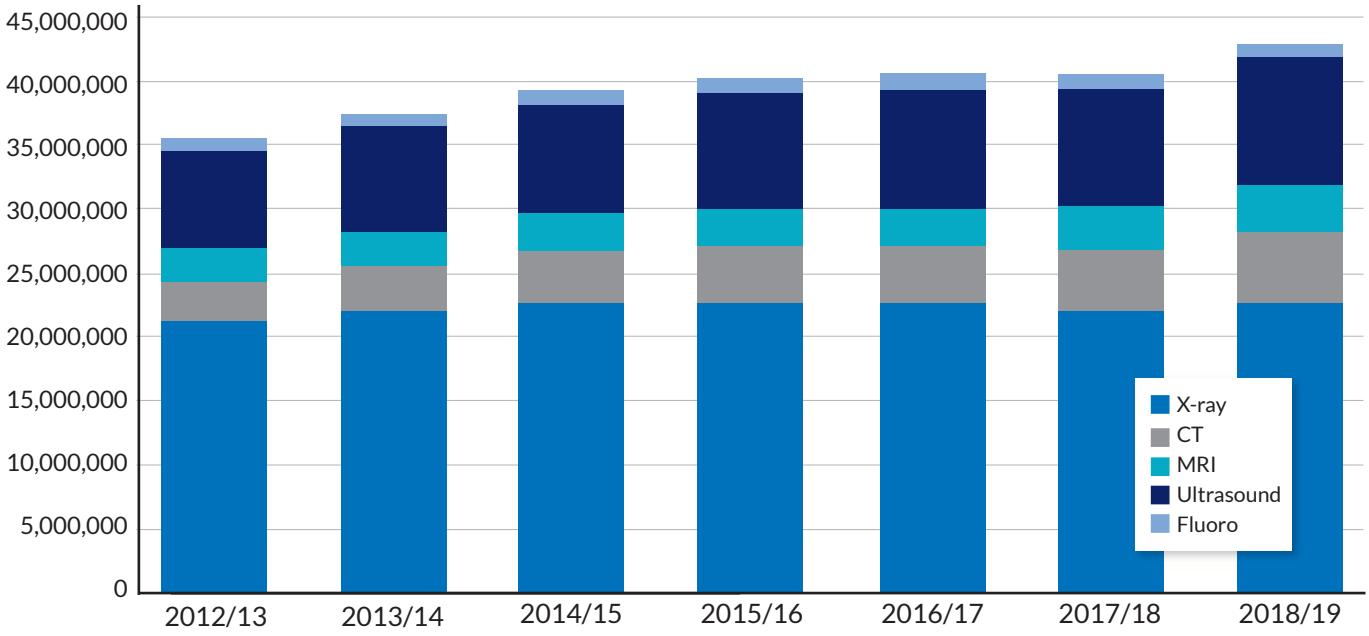
Most services also have dedicated radiology or imaging managers, whose responsibilities typically include some or all of people and budget management, resource planning (including overseeing bids for capital funding) and reporting and analysing the service's performance against key local and national targets.

[1] *See Royal College of Radiologists (2018) Clinical Radiology Workforce Census www.rcr.ac.uk/sites/default/files/key-findings-clinical-radiology-uk-workforce-census-report-2018.pdf*

Growth in demand

Advances in technology and changes in clinical practice have led to increases in demand for imaging across a wide range of different specialties. Over the last decade or more, there has been a consistent, ongoing growth in demand for radiology services. In 2018/19, over 43 million radiological examinations were performed across the NHS in England[2] - equivalent to over 119,000 examinations each day. This is 8 million more radiological examinations than were conducted in 2012/13.

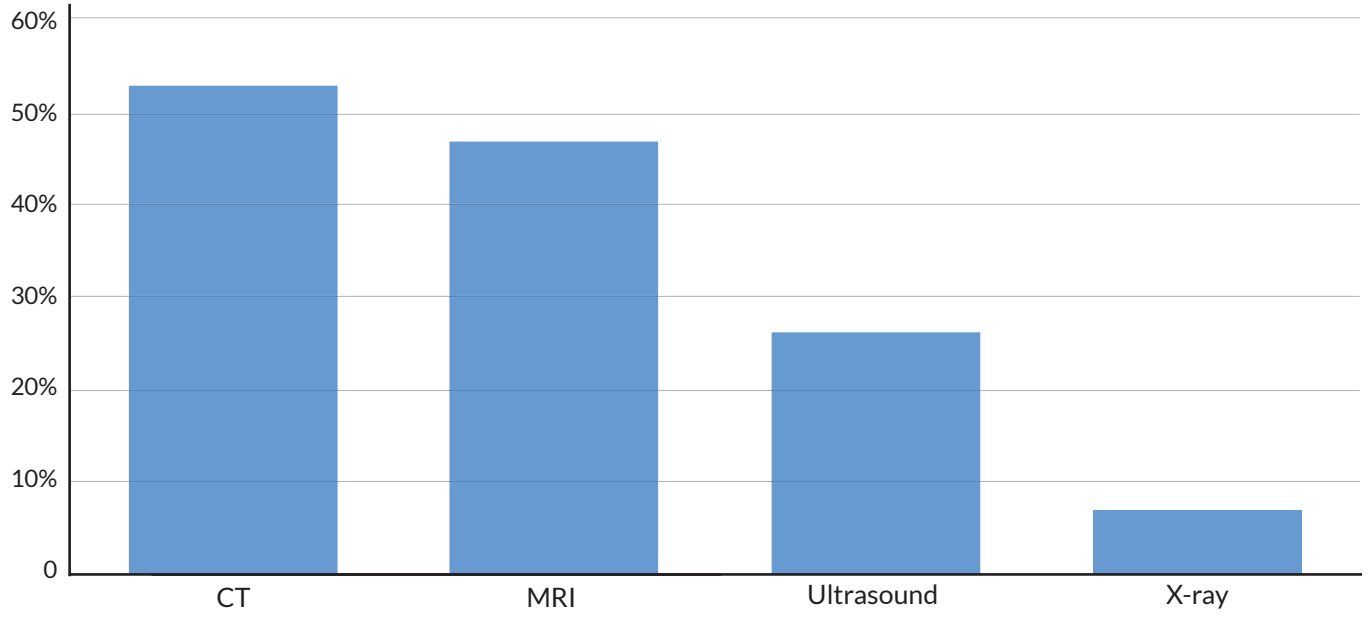
Figure 1: Total NHS radiology activity in England 2012/13 – 2018/19



Source: DID1. Ultrasound refers to non-obstetric ultrasound only.

But importantly, the fastest increase in demand is for more complex imaging modalities such as CT and MRI, as figure 2 shows.

Figure 2: Cumulative change in NHS radiology activity levels, by imaging modality, England only, April 2012 to March 2019



Data Source: DID1

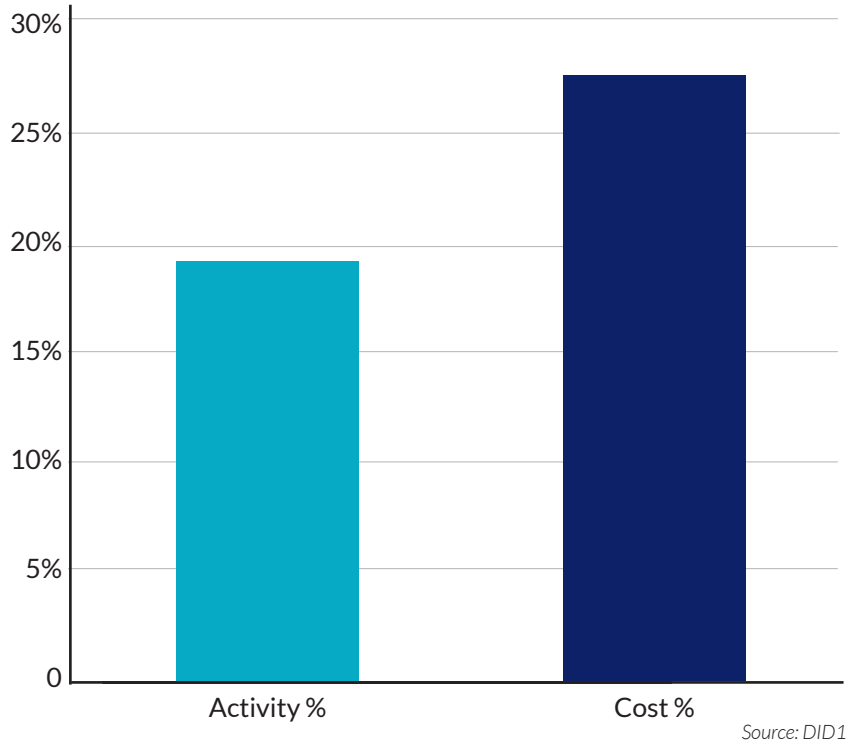
[2] *See www.england.nhs.uk/statistics/wp-content/uploads/sites/2/2019/07/Provisional-Monthly-Diagnostic-Imaging-Dataset-Statistics-2019-07-18.pdf*

In April 2012, there were 250,000 CT scans undertaken a month; by March 2019, there were around 500,000 a month. For MRI, the increase over the same period was from around 170,000 a month to 320,000.

These modalities are now used earlier and more routinely in diagnostic pathways. Both CT and MRI imaging takes longer to perform than X-rays and involve the acquisition of a much larger number of images: where an X-ray examination may result in just two or three images to review, both MRI and CT often generate hundreds or thousands of images for a single patient. The staffing demands are therefore far higher – not only in terms of using more advanced equipment, but also in reporting the resulting images and in the additional patient support required. There are also additional demands in terms of having sufficient digital storage capacity for the growing numbers of these large digital files.

These factors also mean that the overall costs of radiology have increased at even greater speed than activity levels, as figure 3 shows.

Figure 3: Change in total radiology activity and costs, April 2012-March 2019



Source: DID1

According to the NHS Long Term Plan, the number of patients referred for diagnostic imaging has risen by over 25% over the last five years.[3]

Increases in interventional radiology

A rise in the use of interventional techniques has also changed the face of radiological practice. These image-guided procedures can be incredibly precise and minimally invasive, so offer a range of benefits to patients and providers, such as faster recovery and shorter stays in hospital when compared with traditional surgical techniques. There is now an interventional radiology (IR) alternative to a growing number of traditional surgical procedures and in some areas, IR has become the preferred option.

Again, this has resulted in increased demand on radiology teams, with staff needed to participate in procedures which can last for some hours – reducing the resource available for other imaging work.

[3] *NHS (2019) The NHS Long Term Plan www.longtermplan.nhs.uk/wp-content/uploads/2019/08/nhs-long-term-plan-version-1.2.pdf paragraph 6.17*

Future projections

Future projections underline that radiology demand is expected to increase. In an ageing and growing population, the number of patients requiring imaging is projected to rise, and it is likely that most of the requested imaging will be more complex. The use of IR is also expected to continue to grow.

Further, changes in care pathways will also add requirements for greater and earlier radiology input. The number of MDTs is increasing, as they are introduced for patients with conditions other than cancer. As part of an increased emphasis on cancer prevention and early detection, more population-level screening programmes are being introduced; for example, CT is being used as part of the lung health check programme. Aside from the initial imaging these programmes involve, they inevitably lead to further interventions and investigations for incidental findings.

The radiology challenge and why it affects every part of the NHS

As a specialty, we fundamentally welcome this. We wholly endorse the underlying belief that early and more comprehensive imaging can and will enhance diagnosis, and that radiology should be a pivotal part of treatment pathways. In short, we believe that more imaging is emphatically the right direction of travel for the NHS.

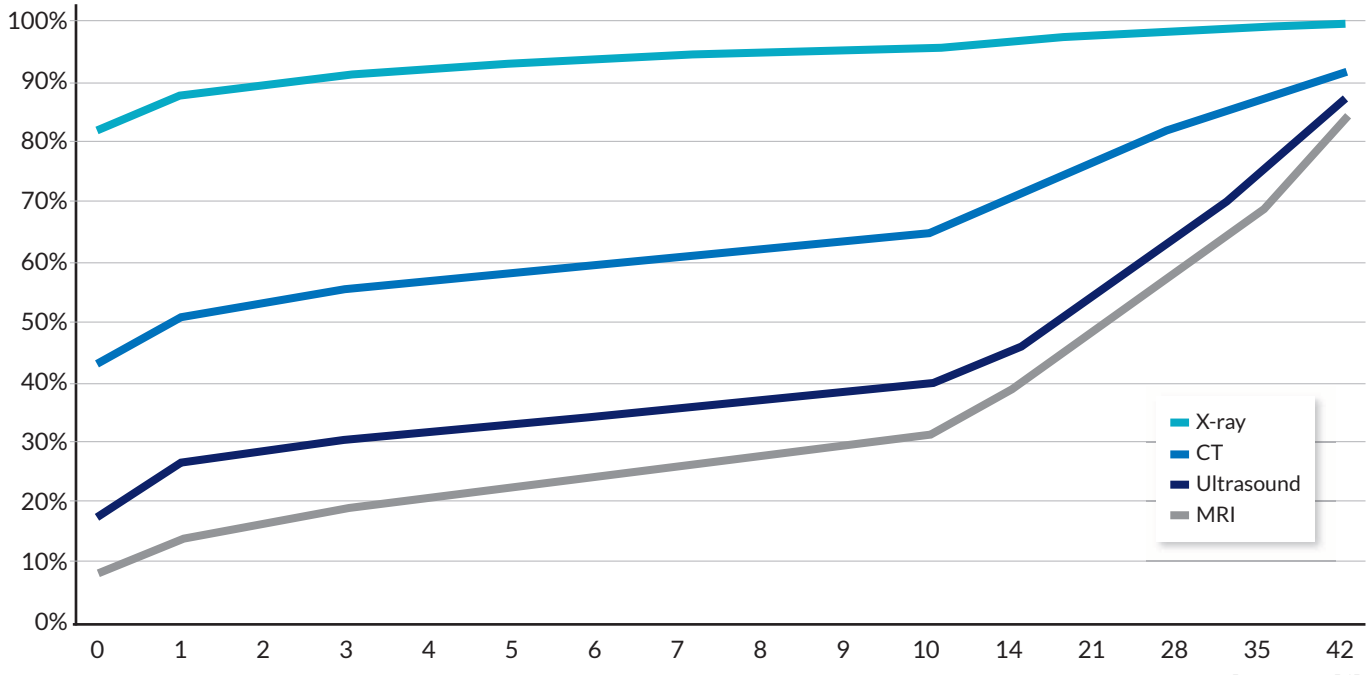
However, there is a major challenge. Already, this ongoing pattern of growth in demand has not been matched by a growth in NHS radiology capacity, either in terms of staffing numbers or equipment. Without changes in approach, this gap between capacity and demand is set to widen – and it already has a direct impact on patient care.

While millions of patients receive an excellent service, we know that too many patients experience long waits for imaging. With priority typically given to emergency patients, inpatients will often find their imaging delayed, as will those who need scans at intervals to monitor their treatment. Too many elective patients have to wait days or weeks for an imaging appointment, while patients on other pathways – particularly those with suspected cancer – are prioritised.

As figure 4 shows, over half of patients referred for MRI or ultrasound wait more than 14 days for the test to take place.

Since this data was collected, the cessation of non-urgent scanning for several weeks during the COVID crisis has led to a huge increase in the numbers of patients waiting. Going forwards, recovery will be severely curtailed by infection control measures and the need for social distancing.

Figure 4: Percentage of imaging requests fulfilled, by day from the request, by modality, April 2017 - March 2018[4]

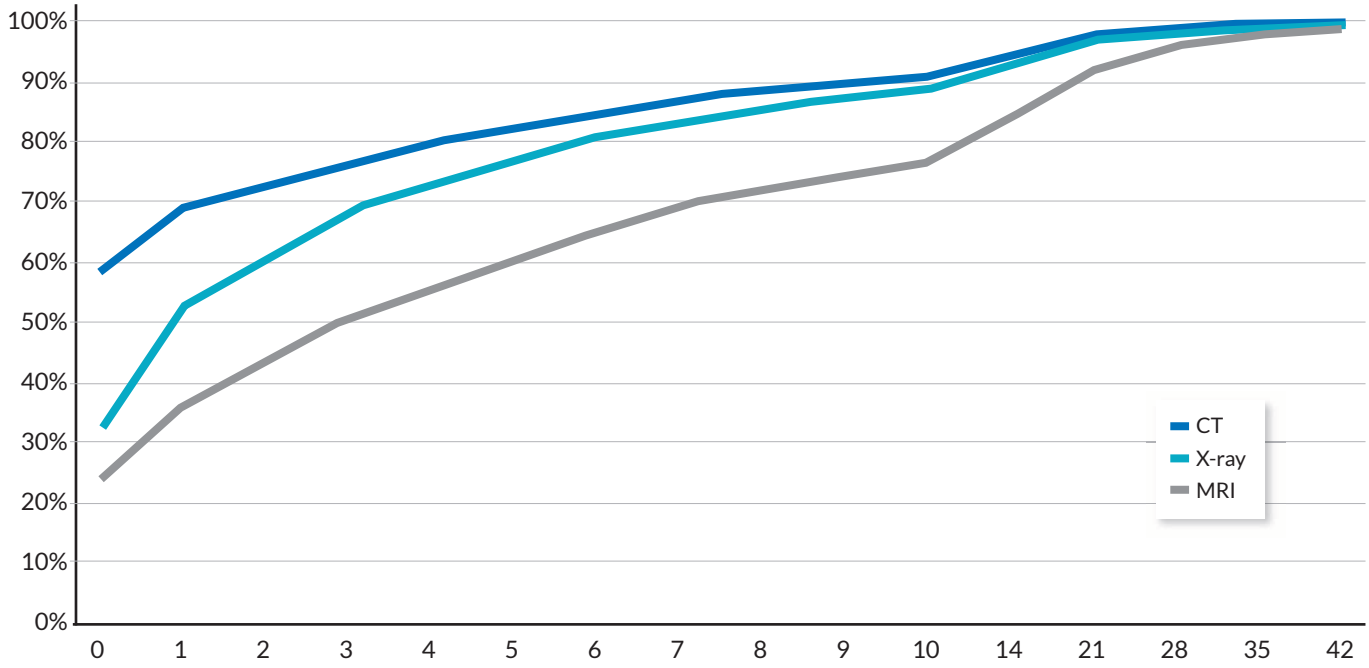


Data source: DID

[4] *This includes requests for planned tests i.e. where a clinician has recommended that imaging is conducted, or often repeated, at a future date (e.g. in three months' time). Available data would show this as a test fulfilled three months after the request; it would not be able to identify whether the planned test was conducted 'on time'.*

On other occasions, the imaging takes place but the patient then has to wait days or weeks for results. MRI patients again are liable to longer waits.

Figure 5: Percentage of tests reported, by day from the test being conducted, by modality, April 2017-March 2018



Data source: DID

Sometimes a patient requiring multiple scans has to attend on several occasions – and possibly at different places – to receive them all.

As well as providing a poor patient experience, where imaging is delayed, it can result in delayed diagnosis, sometimes affecting clinical outcomes. Cancer Research UK has estimated that as many as 115,000 patients a year are not diagnosed until their cancer reaches stage 3 or 4 – reducing their chances of survival.[5] While this is not purely a result of delays in radiology, there can be no doubt that they are a factor.

These are not new issues; the delays for patients with suspected cancer were cited in a 2015 report from Cancer Research UK[6] and in its 2018 Radiology review, the Care Quality Commission (CQC), triggered by evidence of large backlogs affecting patient wellbeing, identified considerable variation between trusts in their target reporting times. This led the CQC to recommend the adoption of national standards for reporting turnaround times.[7]

Importantly, this is not just an issue for cancer patients; because so many other departments rely on radiology, this affects patients across the entire hospital and in primary care, or indeed anywhere which refers patients for imaging. Radiology services often have to make difficult decisions about which patients to 'prioritise' in the queue for imaging.

However, with the forthcoming introduction of the Faster Diagnosis Standard, and a greater emphasis on screening programmes, radiology services will – inevitably – be under greater pressure to focus on initial diagnosis. Without changes in policy, or increased resource, this will mean that patients who are already diagnosed with cancer or other serious conditions may have to wait longer for further imaging and results.

Recognised shortfalls in the radiology workforce

This is emphatically not a question of lack of commitment. Due to the need to support the care of emergency patients in particular, most hospitals require 24/7 availability of radiology services. To provide sufficient cover, many – if not most – radiology professionals work beyond their core contracted hours.

[5] *www.cancerresearchuk.org/about-us/cancer-news/press-release/2019-09-02-lack-of-government-action-on-nhs-staffing-undermines-ambition-to-diagnose-cancer-early*

[6] *www.cancerresearchuk.org/sites/default/files/horizon_scanning_-_final.pdf*

[7] *CQC (2018) Radiology review www.cqc.org.uk/sites/default/files/20180718-radiology-reporting-review-report-final-for-web.pdf*

The key issues affecting radiology capacity are well-documented: shortfalls in staffing and access to the equipment needed. The RCR reports that, even though the WTE consultant clinical radiology workforce has grown by 4% a year over the last four years, there is currently a shortfall, compared to the demand, of over 1100 radiologists across the UK. Further, it estimates that by 2023, there will be a shortfall of 1,900 clinical radiologists (assuming demand continues to grow at similar rates and workforce issues are not addressed).

The results of this are affecting patients and providers. The survey found that three quarters of clinical directors of UK radiology departments feel there are insufficient clinical radiologists to deliver a safe and effective level of patient care and departments are increasingly reliant on insourcing or outsourcing[8] some of their reporting activity. In 2018, the total reported spend on insourced/outsourced reporting and locums was £165 million – a sum that RCR has calculated would fund nearly 1,900 whole time equivalent consultant radiologists, based on current pay scales.[9]

These concerns have been echoed by the CQC, which in its 2018 Radiology reporting review highlighted that "the average vacancy rate across all responding trusts was 14%."[10]

The RCR workforce census reported that in 2019, just over 150 clinical radiology trainees will enter the consultant workforce – filling less than half of the reported vacancies. Available data would suggest that there is a high level of interest among trainee doctors in specialising in radiology: in 2018, there were three applicants for each funded training post. However, there is a cap on the number of such funded training posts, which limits the supply of future radiologists.

There are equally acute shortfalls in the numbers of sonographers[11] and radiographers. The NHS Long Term Plan noted that in England "vacancy rates are 12.5% for radiologists and 15% for radiographers,"[12] while the 2018 radiography workforce census conducted by SOR found that 92% of responding services had radiography vacancies.[13]

These are pivotal roles in meeting the demands of a modern, effective radiology service. Most sonographers and radiographers not only conduct image acquisition but also reporting, and many support interventional procedures. In its 2019-20 Business Plan, Health Education England (HEE) committed to train 300 more reporting radiographers by March 2021.[14]

However, though it is welcomed by trusts, such an initiative on its own will not solve the challenge. Unless there is also investment in increasing the number of staff able to conduct image acquisition, then radiographers – even where trained to undertake reporting – will not have the time to report, as they will be required to focus on image acquisition.

The obvious solution here is to make more extensive and consistent use of assistant practitioners for image acquisition. The assistant practitioner role is now recognised as an entry point into a radiography career, and the SOR has developed a workforce model that shows how assistant practitioners can progress. However, this is not currently backed by a clear and consistent scope of practice that supports new opportunities for this area of the workforce.

Addressing the shortfalls therefore requires an integrated approach to the use of extended roles and advanced practice, which are now essential and complimentary parts of the overall system.

Further challenges exist in recruiting and training dedicated radiology nurses. While there are recognised shortages of nurses across the NHS, the lack of dedicated radiology nurses is particularly affecting capacity for IR – where as well as helping prepare and support patients, advanced nurse practitioners undertake some procedures.

As the demand for 24/7 radiology services increases, the impact of these shortfalls across the whole radiology workforce is likely to increase.

We know that some providers are taking aggressive steps to address shortfalls. One such approach is pay band inflation, where a role is offered in a higher pay band than would be the norm, simply to encourage applicants. The result is that staff in different trusts – and even, in one instance we encountered, on different sites in the same trust – are sometimes being paid different amounts to perform essentially the same role. There are also other incentives being offered. This helps these trusts to recruit and retain staff, but invariably at the expense of trusts (and patients) in less well-off areas.

[8] *Insourcing refers to using the department's staff to undertake additional reporting, outside their contracted hours; outsourcing refers to using staff outside the department, typically qualified radiologists contracted to a private sector company.*

[9] *See www.rcr.ac.uk/publication/clinical-radiology-uk-workforce-census-report-2018*

[10] *CQC (2018) Radiology review www.cqc.org.uk/sites/default/files/20180718-radiology-reporting-review-report-final-for-web.pdf*

[11] *Findings from the latest ultrasound workforce survey found that 75% of respondents have unfilled sonographer posts in their organisation, reflecting an overall vacancy rate of 12.6%. www.sor.org/news/sonography-vacancy-rate-higher-wider-workforce*

[12] *NHS (2019) The NHS Long Term Plan www.longtermplan.nhs.uk/wp-content/uploads/2019/08/nhs-long-term-plan-version-1.2.pdf paragraph 6.17*

[13] *SOR (2019) Diagnostic Radiography Workforce UK Census 2018 www.sor.org/sites/default/files/document-versions/diagnostic_workforce_census_2018.pdf*

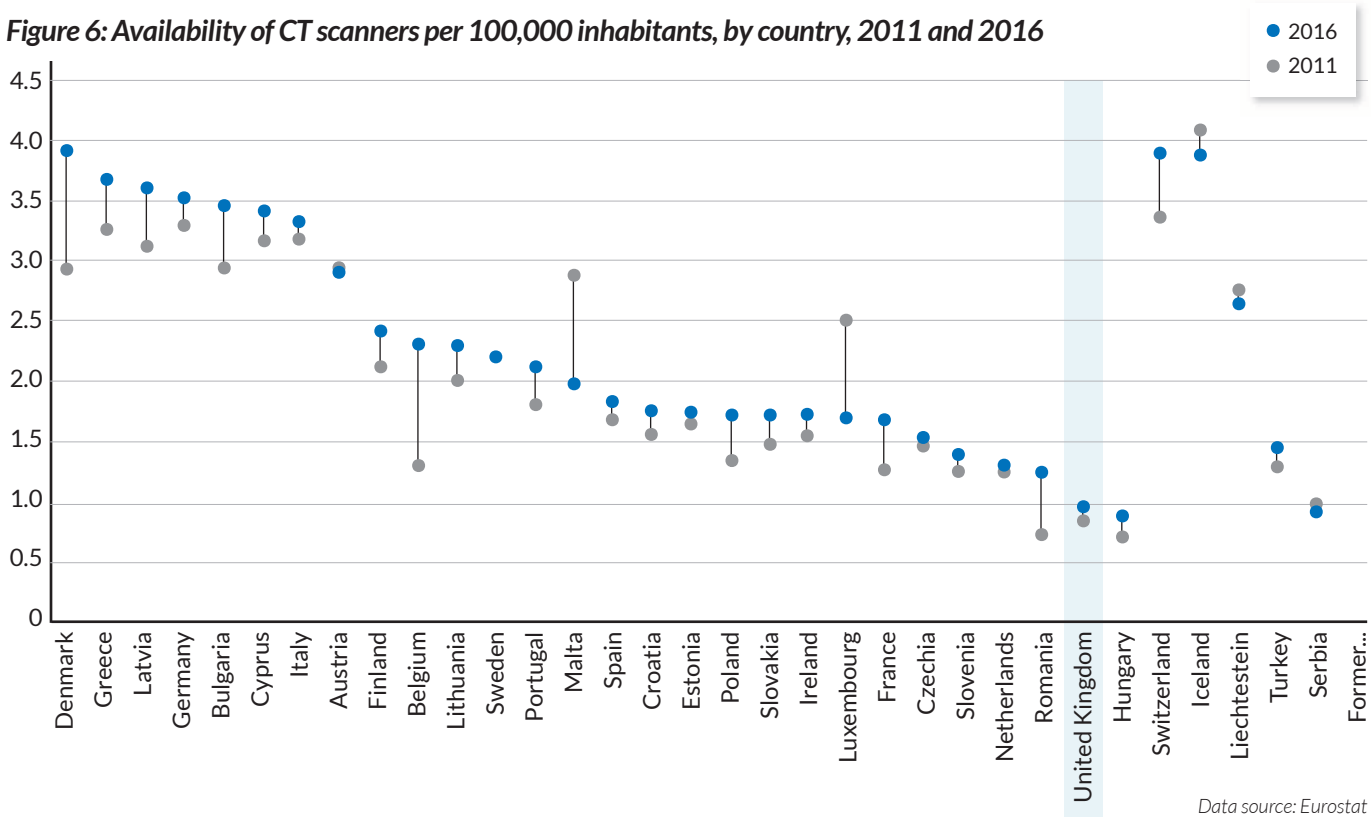
[14] *See www.hee.nhs.uk/sites/default/files/documents/HEE%20Business%20Plan%202019-20%20FINAL.pdf*

But it's not just a case of gaining staff; we also understand that some trusts arguably 'lose' their staff – or at least, fail to retain them – because they do not offer sufficient development opportunities, or don't give qualified advanced practitioners the chance to put their skills into practice. Staff then move to another trust where these opportunities are available.

Equipment and facilities

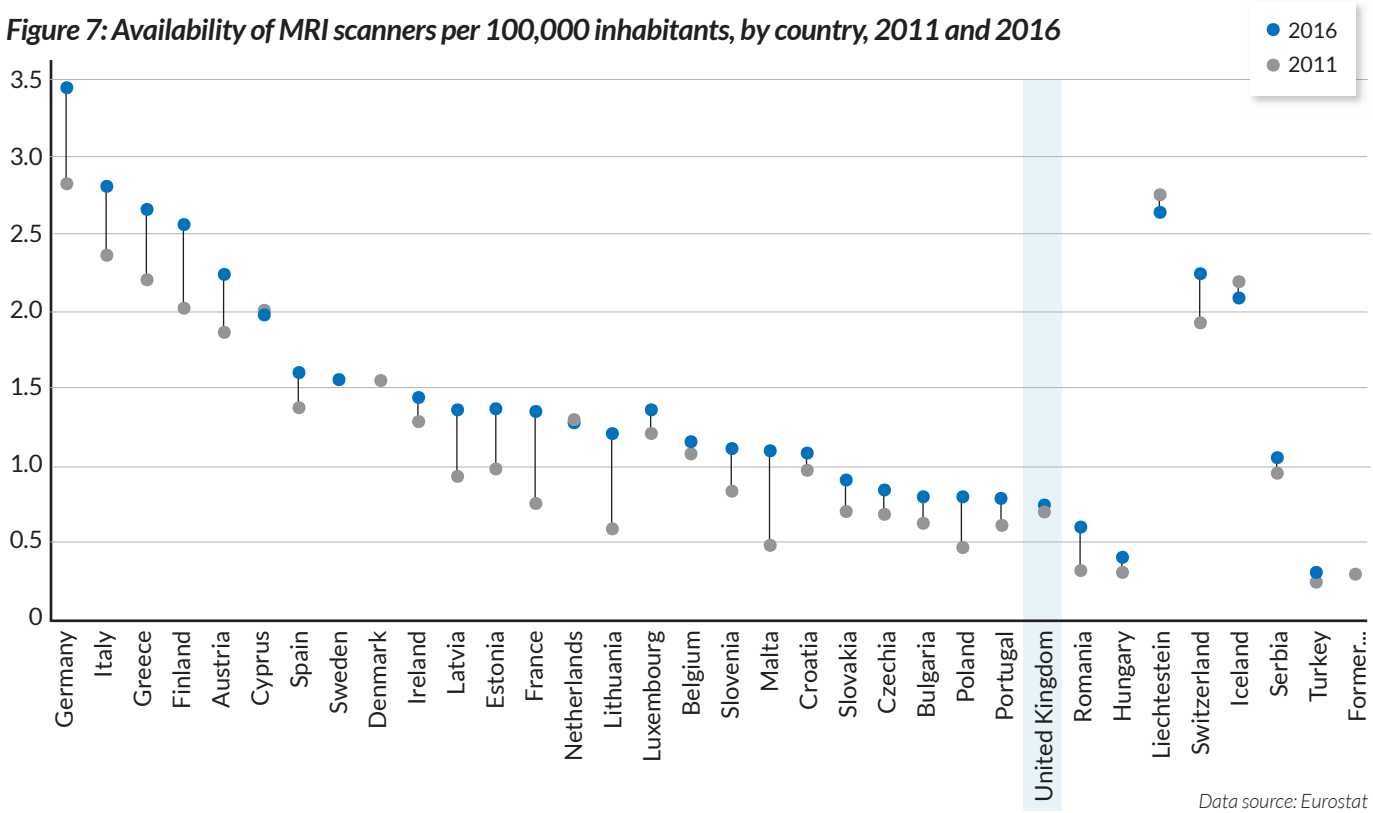
The Long Term Plan also pointed out that the NHS has "fewer MRI and CT scanners per capita than most OECD countries." This is supported by Eurostat data, which shows not only that the levels per capita are low, compared to other European countries, but also that the number of MRI and CT scanners per capita in the UK broadly did not increase between 2011 and 2016. (As noted above, this was a time when the total number of MRI and CT examinations undertaken across the NHS increased significantly).

Figure 6: Availability of CT scanners per 100,000 inhabitants, by country, 2011 and 2016



Data source: Eurostat

Figure 7: Availability of MRI scanners per 100,000 inhabitants, by country, 2011 and 2016



Data source: Eurostat

Almost all NHS MRI and CT scanners are based in acute hospitals, where inpatients and outpatients are effectively in competition for access to them. Further, many services are reliant on ageing equipment and have no clear plans for replacement, let alone expansion.

Older equipment is not always able to perform the precise imaging desired for some newer diagnostic or interventional methods, and sometimes it requires higher doses of radiation than newer machines to deliver the same results. Even where the output is the same, this older equipment is typically slower and less reliable than newer scanners – again affecting the service's ability to meet demand.

The physical environment of many radiology departments is also ageing. Placed, for sound logistical reasons, at the centre of many hospitals, there is typically little room for them to expand to accommodate the higher numbers of patients they are seeing (and higher numbers of staff they need). As departments have acquired additional equipment, the space available for waiting areas, consulting rooms and staff facilities has reduced.

This can result in a lack of privacy and dignity for patients and be highly distressing, particularly for more vulnerable patients. Inpatients in their gowns may be waiting among outpatients with varying degrees of injury; children waiting for X-ray on a suspected fracture may be in the same location as victims of a fight or road accident. There is often limited private space for potentially sensitive conversations. The need for social distancing during the COVID-19 pandemic has, of course, made this situation much worse and the lack of waiting space will decrease capacity by as much as 60% in some areas. For staff, one of the biggest issues is access to suitable space for reporting; at many hospitals, the only way to have dedicated reporting rooms is to use space away from the main radiology department, which then makes them less available for consultation.

Variation between trusts

While the issues at a national level have been well-documented, it should also be recognised that there is also substantial variation in access to radiology services between trusts. There are two key aspects of this:

- variation between trusts in how quickly patients are able to receive imaging – and then how quickly their results are reported; and
- the fact many trusts are not able to provide a full range of radiology services. This is a particular issue in relation to more specialist services – including paediatric radiology and interventional radiology.

Investment is only part of the solution

It seems clear that part of the solution to the growing gap between supply and demand must be more investment, to increase the workforce and fund additional equipment. Radiology services therefore welcomed the commitment in the NHS Long-Term Plan to use the "*capital settlement to be negotiated in the 2019 Spending Review in part to invest in new equipment, including CT and MRI scanners, which can deliver faster and safer tests.*" Further details have since been announced; £200m of funding has been committed to the replacement of MRI machines, CT scanners and breast screening equipment.[15]

While this is naturally welcome, it is important to underline that this is focused solely on replacing the oldest equipment and does not support the expansion of radiology services. Further, it is clearly ring-fenced, meaning trusts cannot use this funding for any other equipment – such as aging X-ray machines – or to assist with any construction or refurbishment costs associated with replacing the equipment. Capital investment also doesn't address the staffing challenge.

Given the demand pressures outlined above, we therefore unequivocally support the calls made by the RCR, the Society and College of Radiographers and others to increase the radiology workforce. Unless there is investment in increasing staff numbers overall, it will not be possible to provide the quality of service that patients expect, that other departments require and that radiology teams wish to deliver.

However, at a time when NHS budgets remain stretched and almost every specialty can make a strong case for increasing investment, it is also imperative that radiology services –like every other specialty – seek to identify opportunities for more efficient and effective use of staff and equipment within the existing resource envelope. That is where the GIRFT methodology fits in. In this report we have therefore focused on issues beyond staffing numbers and capital investment to consider what else can be done to release capacity and use existing resources more effectively, to improve service to patients and other departments.

Many of the approaches we discuss and recommendations we make are based on approaches that some radiology services are already taking, including to help achieve the Quality Standard for Imaging (QSI), which was jointly developed by the RCR and SoR.[16] However, we also found in our deep dive visits many examples of services seeking improvement that was outside the scope of the QSI, as well as trusts where the initiatives were not associated with a desire for accreditation and simply reflected their commitment, spirit and innovation.

Through these visits, available data and our own experiences, we have also identified some of the characteristics of an optimum patient-centred radiology service. These build on the excellent guiding principles for Patient Public and Practitioner Partnerships within Imaging and Radiotherapy, published by the SoR[17], but go beyond the actions of individual team members and the way they interact with patients, to look at other aspects of the overall service provision.

[15] *Insourcing refers to using the department's staff to undertake additional reporting, outside their contracted hours; outsourcing refers to using staff outside the department, typically qualified radiologists contracted to a private sector company.*

[16] *See www.rcr.ac.uk/clinical-radiology/service-delivery/quality-standard-imaging-qsi The QSI is designed to support quality improvement within radiology services. It is a progressive standard that allows services to apply for accreditation once they have sufficient quality processes in place. It is constructed as a series of five "domains" and has 29 standard statements, detailing the expectations of a high quality radiology service. We support the intent of the QSI and where appropriate, we make reference to it in this report.*

[17] *See www.sor.org/learning/document-library/patient-public-and-practitioner-partnerships-within-imaging-and-radiotherapy-guiding-principles*

Patient-centred radiology: what the service should look like

Patients should:

- **be able to receive all the imaging they need to enable diagnosis in a single visit – with results reported quickly and accurately, including overnight and at weekends.** To facilitate that, the process of acquiring and interpreting diagnostic images needs to be overhauled at many providers, to give proper emphasis to the needs of the patient, while recognising the constraints faced by radiology services.
- **remain safe and be treated with dignity and respect at all times.** Ideally, waiting areas would have separate spaces for children and for inpatients, so that – for instance – a child with a chest infection is not sitting next to bloodied and bruised patients referred from the emergency department. Adequate space and seating to maintain social distancing must be provided.
- **have a full understanding of what imaging they are undergoing and why.** Patients should know what to expect, and have a full understanding of the benefits, risks and limitations of the imaging being used. They should also know when to expect the results and how they will be delivered. Once the imaging is completed, the results and images themselves should be stored electronically in a format that allows them to be easily shared with other departments and other hospitals, meaning that there is no need for repeat scans.
- **be able to book pre-scheduled appointments online so that they can choose a time and place that is convenient to them.** This is likely to require services to be open for extended hours, beyond 9am to 5pm. The imaging should then take place at the appointed time – particularly in the optimal situation of the imaging appointment being scheduled to fit with the associated clinical consultation in a different department. Where patients "walk in", they again should not have to wait long for any necessary imaging.
- **experience a seamless process if referred for an interventional radiology procedure.** Again, the patient records should be shared electronically and any necessary physical transfers – whether between departments, sites or even (for more specialist intervention) between trusts – should be straightforward and require no effort from the patient.

The benefits to patients

For patients, the advantages of such a smooth, patient-centred way of working are considerable.

- If all required diagnostic imaging is done at the first opportunity[18] and readily shared, it should mean fewer trips to the hospital. Ideally, where a patient needs imaging before a clinical consultation for an ongoing condition, the two appointments can be synchronised – so it's not just fewer trips for radiology, but fewer trips overall.
- When patients do need to attend, they can do so at a time that fits around their work and family commitments.
- Delivering results faster will not only reduce stress and anxiety, but will also crucially allow faster diagnosis, meaning treatment can start earlier.
- With a full understanding of what's happening, patients will be able to make better informed decisions about their own care.

The benefits to providers

Crucially, a patient-centred radiology service would also benefit providers.

Shorter waits before scans and faster reporting of results would not only enable earlier diagnosis and treatment but also help reduce pressure on emergency departments: some patients could be discharged sooner, while others can be promptly referred on to relevant departments. Earlier diagnosis typically leads to better outcomes and shorter stays, as patients may be able to receive less intrusive and debilitating treatments. All of this improves the provider's overall capacity.

The electronic sharing of scans and reports would reduce duplication of effort across the hospital and between different hospitals or trusts. This includes where imaging is performed by an independent sector provider. Conducting all necessary scans at a single appointment would cut the administrative burden of multiple appointments – and potentially reduce the number of missed appointments. It also results in fewer journeys, so removing travel time and associated emissions.

For radiology services themselves, there would be a wealth of benefits in terms of performance: a better patient experience, greater job satisfaction for the radiology team and reduced risk of complaints.

[18] *Importantly, this is not to suggest that a patient would not require repeat imaging to help monitor outcomes of treatment; rather, that where multiple imaging is requested as part of an initial diagnosis, all the scans are conducted at the first opportunity and ideally on the same occasion.*

A shared vision

Our description of an ideal service is drawn from both our own experiences as radiology professionals and from what we have seen in our deep dive visits. Many of these optimal aspects of patient-centred care are already being adopted in radiology services across the country. Furthermore, it is closely aligned to the vision for 2030 that has been articulated by the RCR, which has succinctly summarised the ideal radiology service as follows:

"The ideal service is one that provides radiology capability and capacity to match the nation's healthcare requirement for safe and accurate, but cost-effective, diagnostic imaging.

Accurate, timely diagnostic and interventional radiology should facilitate healthcare pathways that now rely on it almost universally. Radiology should not be the rate limiting step it frequently is."[19]

Making it happen: the role of GIRFT

The need to expand the radiology workforce to achieve this vision is widely recognised – not only by the RCR and SOR, but by a range of other bodies. The requirement for more diagnostic radiographers, for instance, was explicitly mentioned in the Interim NHS People Plan.[20] As noted above too, the NHS Long Term Plan included a commitment to invest in equipment.

But investment alone is not enough; services also need to evolve, finding innovative ways to increase capacity and make more effective use of existing resources to manage demand. Doing so will help not only address the short-term challenges, but also provide the foundations to ensure that improvements to radiology services are sustainable, even as demand continues to grow.

This is where GIRFT can fit in, bringing the methodology of examining data and variation in practice and outcomes to help pinpoint opportunities to improve and to identify best practice.

Artificial intelligence in radiology

Across the whole NHS, there is a growing awareness of the potential of artificial intelligence (AI) to improve care, accelerate diagnosis and free up staff time. Radiology is seen by many as one of the specialties where AI can have the most impact, particularly through using AI for automated image interpretation. The Topol Review[21] predicted that within a decade, around 50% of radiology reporting could be supported by AI.

We anticipate that AI will bring big changes to the processes and practice of radiology, hopefully improving efficiency and supporting faster and more accurate image interpretation.

However, at present, AI is not ready to play a role in everyday radiology; the systems are still under development and the image interpretation insufficiently tested. We are highly supportive of further investment in AI research but have not made it a central part of our report.

Currently our focus should be on updating IT systems and infrastructure to ensure that we are ready to maximise the impact of AI solutions when they are ready for clinical use.

[19] *RCR (2019) Clinical and interventional radiology vision for 2030: Current position and risks (currently unpublished)*
[20] *See https://improvement.nhs.uk/resources/interim-nhs-people-plan/*
[21] *See https://topol.hee.nhs.uk*

About our analysis

Diagnostic radiology is unusual amongst NHS services in that records of the majority of tests conducted are collected and nationally reported through the Diagnostic Imaging Dataset (DID). This uses data fed in from the radiology information systems (RIS) used by providers. The DID is managed by NHS Digital and includes data at patient level – so allows analysis of wait times and (subject to coding being complete/ consistent) the nature and purpose of the imaging. However, this detailed data is only available from 2016/17 onwards.

The same underlying data is also used by NHS England as the basis for official statistics on radiology. These are published monthly, once NHS England has aggregated the data it receives from NHS Digital. It provides aggregated information about overall imaging activity and modality. This dataset is known as DID1 and information is available back to 2012/13. In our analysis we have therefore used it to examine growth and trends over a longer period of time.

As we will examine later, there are opportunities to make better use of the DID – particularly by encouraging providers to improve the consistency, completeness and accuracy of their data entry, and updating the range of codes available to reflect current practice. Nonetheless, the wealth of data available in the DID provided an excellent foundation for our analysis. It allows us to compare activity levels by trust, by method and over time.

In addition, we have made use of Hospital Episode Statistics (HES), several other radiology databases including the National Imaging Data Collection (NIDC), plus our own questionnaire.

By contrast, there are some areas of current practice that are not as well served by existing data collection methods. These include outsourcing, where most providers record the amount they spend but do not necessarily record the activity consistently, and interventional radiology. There are considerable inconsistencies in the way IR procedures are coded both in the DID and HES; for example, it is not always possible to establish whether a procedure has been conducted using IR techniques or traditional open surgery. We have therefore focused in this report on IR information collected through the GIRFT questionnaire.

At the outset of the GIRFT radiology workstream, it was agreed to exclude some radiological activity from our analysis. This was because these activities and modalities are not always provided under the aegis of radiology.

- Investigations out of scope: Obstetric ultrasound, breast screening X-rays / mammography, interventional cardiology, dual-energy X-ray absorptiometry (DEXA).
- Modalities out of scope: Cath Lab, Cone Beam CT and Nuclear Medicine including PET-CT.

[22] *See www.england.nhs.uk/statistics/statistical-work-areas/diagnostic-imaging-dataset*

1. Delivering a patient-centred service

Radiology is often seen as a service to other departments/specialties, who almost by default become the main 'customers'. As set out above, we want to make radiology services more patient-centred, with pathways and facilities designed around patient needs. Clearly, increasing capacity within the service is integral to that, as it will allow imaging to be provided sooner and results reported faster. But there are also opportunities, drawing on existing good practice, to improve facilities for patients in hospitals, to enhance the support given at all stages of the patient journey and to make more effective use of technology to enhance the patient experience.

Ensuring patients are treated with dignity and respect

Radiology examinations can be highly stressful to patients for many reasons, from anxiety about a potential diagnosis to feeling vulnerable after a fall or injury, to discomfort and uncertainty about the process. While radiology staff do what they can to reassure patients and treat them with as much dignity as possible, during our visits we found numerous services where the patient experience is negatively affected by the clinical environment, and in particular a lack of space.

Radiology units are typically, and logically, located at the centre of a hospital. While this offers easy access from other departments, it makes it difficult to expand. Today, radiology services are having to accommodate far more patients (and equipment) than they were initially designed for.

As a result, the space available for patients is becoming increasingly constricted. Waiting areas and consulting rooms can be small; patients are often required to sit or stand in corridors as they wait for imaging. This can be an uncomfortable and distressing experience for many reasons – not the least of which is that inpatients and outpatients often wait alongside each other. In particular, it can mean vulnerable people including children waiting in a frightening environment, surrounded by other patients with severe injuries or illness, or who may be behaving in an aggressive or disruptive fashion. Aside from potential distress and lack of dignity, these kinds of situation increase the risk of spread of infection.

It's not just waiting areas that are restricted; many services highlighted that they do not have the facilities to offer patients privacy they might like for sensitive discussions. The imaging rooms themselves are often the only private space – but clearly need to be vacated quickly so that the image acquisition work can continue.

Our long-term goal is that radiology services have sufficient space to meet their working requirements and the needs of their patients. Ideally, that would include:

- separate waiting areas for inpatients and outpatients – or at the very least, a curtain or screen dividing the waiting areas, so that inpatients in gowns have some privacy;
- a separate paediatric space, with dedicated waiting facilities;
- some form of private space for sensitive personal conversations, whether before the imaging examination (e.g. asking specific details about a patient's health and wellbeing) or to discuss potentially distressing results; and
- better facilities for staff, particularly for reporting. Several trusts we visited have introduced shared reporting rooms, with appropriate lighting and workstations, to make it easier to view images. These facilities also serve to encourage collaborative working between members of the radiology team – particularly important for trainees as they begin to take on more responsibility and reporting radiographers. Alongside these core reporting stations, these facilities should also have separate spaces for group discussion, so that the whole team is not disturbed by that conversation. Ideally, reporting rooms would be within the department, but if this is not possible, the closer they are physically located, the better – so ensuring that staff remain close at hand.

Where new hospitals or departments are being planned, we urge trusts to consider these kinds of requirements. These will be set out in greater detail in a forthcoming Health Building Note on Facilities for diagnostic imaging and interventional radiology. We have been closely involved in the development of this and believe it will represent best practice for radiology facilities.

In the shorter term, we would encourage trusts and radiology services to seek opportunities to introduce any of these changes listed above. It may be that the introduction of imaging networks also offers opportunities to improve facilities, with network partners able to work together to invest in specific improvements at one or more sites. We recognise that there will be major challenges, with funding at a premium and most capital investment focused on equipment. We are also aware that any change to the physical fabric of any department causes some disruption; in a 24x7 radiology service, this has to be managed closely.

Nonetheless, in terms of the patient experience, these changes are long overdue. Some too will potentially have a direct benefit to providers in terms of throughput, managing capacity and – by providing a better working environment – improved workforce retention.

Ensuring patients understand the imaging they are undergoing and receive appropriate support

As well as focusing on the patient environment, effective communication and support are also essential parts of treating patients with respect. The core of this is ensuring that patients understand what imaging is being recommended and why – explaining what the images may or may not show and what will happen to the patient during the examination. It is also recognised as vital that patients understand the potential risks of any imaging, include the level of radiation exposure. Ideally, this information will be available both in writing – including online – and delivered verbally, and patients should be able to access it after their scans as well as before.

One of the standard statements in the QSI is focused on precisely this issue. It reads: *"The service implements and monitors systems to ensure that patients are able to access patient-friendly information about what happens before, during and after specific examinations/procedures."*

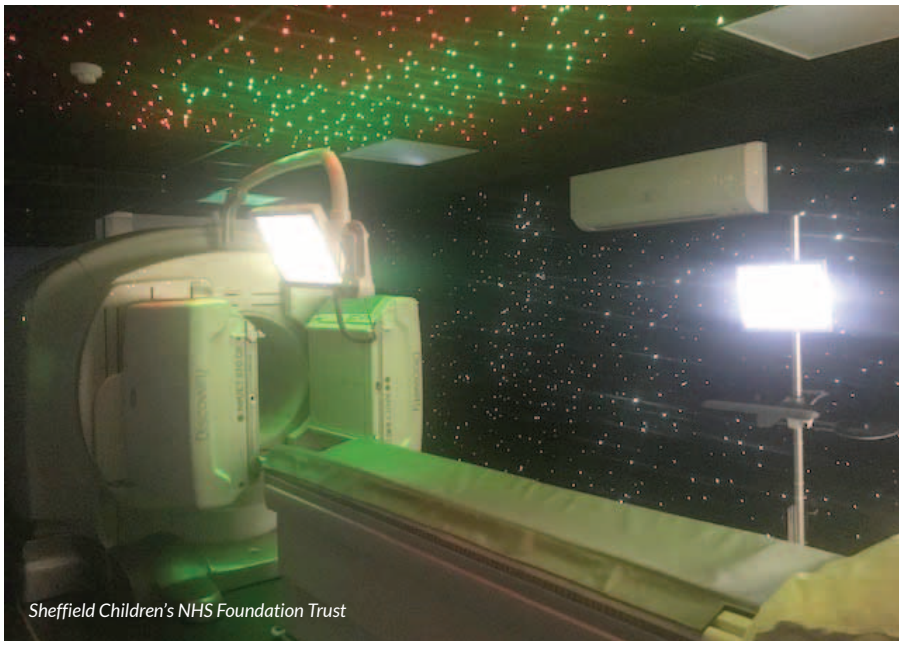
It is perhaps no surprise that many providers appear to do this well, and there are numerous positive examples. The Mid Yorkshire Hospitals NHS Trust has introduced a Radiology Ready Initiative, where trained clinical support workers engage with patients early on, providing them with support and information about their inpatient radiology investigations to ensure that the patients are appropriately prepared and understand what is going to happen. This has increased efficiency overall – patients are ready for the examination – and reduced the number of wasted slots, where patients opt out at the last minute.

Like many of the best examples, Mid Yorkshire has ensured that the responsibility for engaging with patients is shared across the whole team. This is important for patients, who may feel more comfortable talking to certain professionals than others – or may simply want to ask questions at different times and in contact with different team members.

On this basis, it is important that patient communication is part of the whole team's training, so that any member of the team can answer some questions about the processes and examinations – and where they can't answer a question themselves, they can point the patient in the right direction.

Paediatric radiology

A different communication approach is required for paediatric radiology, incorporating support and information for parents and their children. Aside from having consultant radiologists and other team members that specialise in paediatrics, and so can explain things to children in an appropriate way, there are numerous examples demonstrating the benefit of having team members with a specific responsibility for ensuring that the department is as child-friendly as possible. Getting the environment and procedures right for children can reduce their stress and anxiety and can often mean that imaging can be completed faster.



Sheffield Children's NHS Foundation Trust

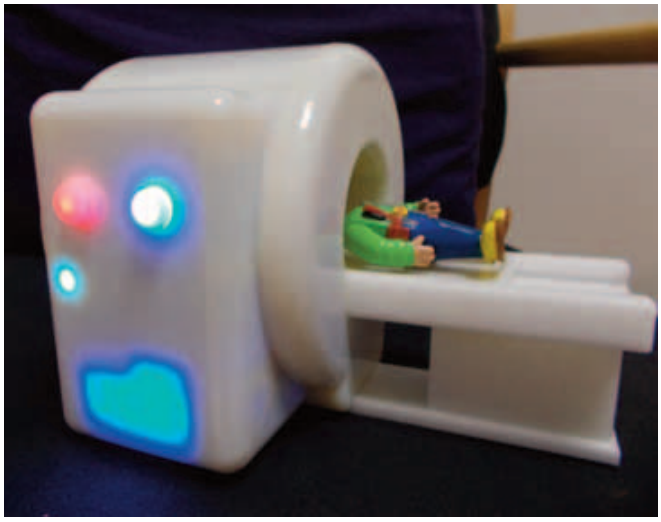
We came across numerous examples of departments with dedicated areas for children – in some cases as simple as a corner of the waiting room equipped with toys and games, where a team member can sit with the child before imaging to help explain what will happen.

In practice: child-friendly MRIs to reduce the need for general anaesthetic

For patient safety reasons and to reduce the time spent in hospital, many providers aim to reduce the need for children to receive a general anaesthetic while undergoing an MRI scan. At Norfolk and Norwich University Hospitals NHS Foundation Trust, a paediatric RDA leads a process of play therapy for children needing an MRI. This includes making the MRI scanner room more child-friendly, using a model scanner to demonstrate exactly what will happen and giving the child a certificate after the imaging. The approach has led a significant reduction in the proportion of children who require a general anaesthetic before an MRI, from 6.2% in 2011 to 4.3% in 2019, while the total number of paediatric MRIs has increased from under 900 a year to over 1500.

University College London Hospitals NHS Foundation Trust has adopted a similar approach, appointing a Band 6 Health Play Specialist who now works with 95% of children needing an MRI. It has found that around nine children a week, who would previously have required a general anaesthetic for MRI, now receive an MRI without one. As well as benefiting the individual children, this also means that the time needed for these MRIs is reduced – freeing up additional imaging sessions.

Norfolk and Norwich University Hospitals NHS Foundation



University College London Hospitals NHS Foundation Trust

Providing services at a time and place that is convenient to the patient

Like most other specialties, radiology is seeking to give patients more choice about outpatient appointments. We were surprised not to find any providers that offer patients the ability to book appointments online, so that they can pick a time and date that suits them. It would be expected that this would reduce non-attendance – a major frustration for some services. We recognise that there would practical challenges around this for radiology services: during deep dives, trusts highlighted that scheduled elective appointments are frequently delayed because a patient has come in who needs the test more urgently.

With equipment already being used to its full capacity at most trusts, and every available slot booked, there is no slack in the system to accommodate these additional requests. Instead of being able to give patients true choice, services and patients are forced to make do with whatever is available. It is one of the more frustrating parts of the radiology team's job to prioritise requests appropriately, pushing some patients down the list out of necessity.

Nonetheless, other specialties have found that online booking can reduce the pressure on waiting areas that often occurs when patients are simply asked to attend a morning clinic and wait their turn. This not only improves the patient experience but can also help services with resourcing and capacity planning. It also avoids overcrowding of waiting areas which is unacceptable in the post-COVID climate.

There are various other ways technology can be used to improve the outpatient experience that are in use in radiology. Electronic check-in is relatively simple to introduce and can free up staff. Instead of needing multiple receptionists, patients can enter their name on a computer on arrival; the necessary digital records can then be found.

Sending patients appointment reminders by SMS or other digital channels, in the days before the appointment, is proven to help reduce non-attendance. The Elective Care Transformation Programme radiology handbook includes practical guidance on introducing this kind of reminder service.[23]

These approaches are often introduced at a trust level, or hospital-wide, rather than for radiology only.

Moving to a hot and cold site model

One way to reduce the risk of cancelling or delaying outpatient imaging is by separating the radiology workload into 'hot' and 'cold' – and then using separate facilities for each stream. The hot scanners are primarily available at short notice for urgent requirements – such as those generated through the emergency department; the cold scanners are left, as far as possible, for the scheduled activity, primarily pre-booked outpatient appointments. On these cold scanners, it can be beneficial to plan for a scheduled usage rate of perhaps 75-80% of all available slots – thus also helping provide some flexibility in the trust's overall imaging capacity.

This could involve having two (or more) separate CT or MRI scanners on the same site, but with different workloads; it could equally operate across different sites, with the equipment on the same site as the emergency department clearly 'hot' but that on other sites, such as community facilities, designated as cold and used primarily for more elective or planned work.

Such a separation would make it far easier to adhere to the scheduled appointments and thus deliver a more patient-centred service. However, it obviously requires trusts to have access to more than one CT or MRI scanner – something not all trusts do. At present, the majority of these highly specialised machines are at the largest and busiest hospitals; it may be of benefit to designate these as hot sites and look to equip smaller hospitals or outpatient units to be cold sites, where it may be easier to adhere to schedules.

There are already plenty of examples of smaller hospitals which offer X-ray and ultrasound; these offer a range of benefits for patients, such as increased accessibility and a less stressful environment. A hot and cold site model would extend these benefits to other radiology modalities; it could also be used to support a move to community-based provision. This is a particularly attractive alternative while there is public concern about the risk of infection in acute hospitals.

Hot sites would naturally operate 24/7 to support the emergency workload, but cold sites may also need to be available for extended hours, to give patients greater flexibility about appointment times.

This approach would also be in line with the challenge set out in the NHS Long Term Plan, to rethink outpatient services and reduce the number of appointments required.

In practice: hot and cold sites

Northumbria Healthcare NHS Foundation Trust is the largest geographical trust in England and includes eight imaging departments. In 2015, it opened a new specialist emergency hospital (The Northumbria), with its own imaging suite. This has transformed the speed at which it is able to conduct imaging on emergency patients as they are no longer 'competing' with outpatient lists. Before The Northumbria opened, it took on average over three days for emergency admissions to receive a CT, MRI or ultrasound; now, the average is under 1.5 days in each modality. That in turn has been a direct factor in a trust-wide reduction in the non-elective length of stay for all spells, from 5.1 days in 2014/15 to 3.5 days in 2019/20.

As well as benefiting emergency patients, the opening of this dedicated 'hot' site has also led to a more reliable service for outpatients at the trust's other 'cold' sites.

Enabling patients to receive all the imaging they need in a single visit

Moving to a hot and cold model could also assist with another crucial aspect of making radiology more patient-centred: enabling patients to receive all the imaging they need in a single visit. There are many occasions when a single imaging method and single set of scans – e.g. X-rays – are sufficient to support a diagnosis. But for more complex situations, it is often recommended that patients receive multiple types of imaging (and other diagnostic methods) to support diagnosis.

Where patients are referred for this kind of multi-method diagnostic imaging, it makes sense for all parties – the patient, their family, the radiology department and the referring clinician – that it all takes place in a single visit. That way, not only

[23] *See www.england.nhs.uk/wp-content/uploads/2019/07/radiology-elective-care-handbook.pdf*

is it less disruptive for the patient, but all the information is available sooner for a diagnosis. Multiple visits also increase the administrative workload.

The challenge for providers is having the resources available to support this optimal approach. As noted earlier, almost all MRI and CT equipment is located at major acute hospitals. If a patient is referred, for example, for both a CT or MRI scan and another form of imaging, are there both facilities at their nearest hospital? If not, should the patient be offered the option to travel to a more distant location where both sets of imaging conducted in the same appointment, even if this means waiting longer for an appointment?

The further complicating factor is that imaging is of course only part of the patient pathway. Ideally, the multimodal imaging appointments would be scheduled to fit neatly alongside the relevant clinical consultation, to try to minimise the number of visits the patient has to make to hospital. But in practice, many departments are reluctant to accommodate this because of the potential for delays. If the imaging was scheduled for 8am, to be ready for a clinical consultation at 11am, but the imaging is delayed, should the clinical consultation be cancelled until the imaging report is ready? This creates frustration not only for the referring department, who may then end up having to see the patient twice – the first appointment with no imaging to work from – but is also deeply frustrating for the patient.

Introducing Rapid Diagnostic Centres

In summer 2019, NHS England and NHS Improvement set out a vision for the introduction of Rapid Diagnostic Centres (RDCs).[24] These will in many ways offer a similar approach to the hot and cold site model outlined above, with diagnostic equipment and expertise brought together at a single location to support faster diagnosis of suspected cancer. There are important differences between RDCs and the hot and cold site approach; firstly, RDCs combine imaging with other diagnostic methods, outside of radiology, and clinical assessment. Secondly, RDCs will at least for now focus on people with suspected cancer only – though by definition, will end up diagnosing a range of conditions other than cancer, including serious conditions, which explain the patient's symptoms.

As a result, while the RDC approach will benefit patients with suspected cancer, it does not negate the need for a hot and cold site model – or similar – to enhance the experience for all patients. As the RDC model matures, it is possible that it will be expanded to other conditions.

The ideal solution would be the creation of community diagnostic centres, incorporating a range of diagnostic services for elective patients. This approach would need to be developed in partnership with primary and community care, but potentially offers a means of expanding diagnosis and providing a more patient-centred service, while reducing pressure on the main hospital sites.

Recognising the resource challenges

Both the hot and cold model and the RDC approach will involve resource considerations. Any new radiology unit will need to acquire equipment and – particularly for CT and MRI – have sufficient space and facilities to house that equipment.

More significantly still, with departments already stretched in terms of staffing numbers, there are considerable practical challenges in staffing multiple sites. As a minimum, additional facilities would need the appropriate radiography / sonography expertise to operate the equipment: reporting could potentially be undertaken at a different location, though particularly in the RDC approach there would be advantages in having a consultant radiologist on-site.

This does not **necessarily** mean that more staff are required (especially if the trust is simply moving or re-designating existing equipment); just that they are deployed differently. Based on our deep-dive discussions, we would envisage working patterns that saw all staff working on both hot and cold sites, to provide a more varied role but also to limit their exposure to the stress of the high-pressure hot environment.

Patient-centred care: the patient perspective

In any discussion of patient-centred care, it is clearly crucial that patients' views are taken into account. It is often difficult for services to gather radiology-specific feedback; while the Friends and Family Test is used, patients may well provide comments on their whole hospital experience rather than just radiology. Where a patient is swiftly transferred to another department, there is then little opportunity to ask about the radiology elements.

Nonetheless, we encourage services to actively seek radiology-specific feedback, whether via the Friends and Family Test or other means. We visited departments that had feedback forms, and a box for collecting forms, available in waiting areas.

Crucially too, services must review and where appropriate act on feedback received from patients.

[24] *NHS (2019) Rapid Diagnostic Centres Vision and 2019/20 Implementation Specification www.england.nhs.uk/wp-content/uploads/2019/07/rdc-vision-and-1920-implementation-specification.pdf*

In practice: learning from patient experiences

When the team at the Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust spotted some highly specific negative feedback in a Friends and Family Test form, they took action swiftly. One of the senior clinical team managers contacted the patient and asked for more details; based on what they heard, they then invited the patient to come in and talk to staff about the issue. Two sessions were arranged and over 50 radiology staff attended; the patient's powerful account was very well-received, and led to an open and honest discussion among staff about how such issues could be prevented in the future.

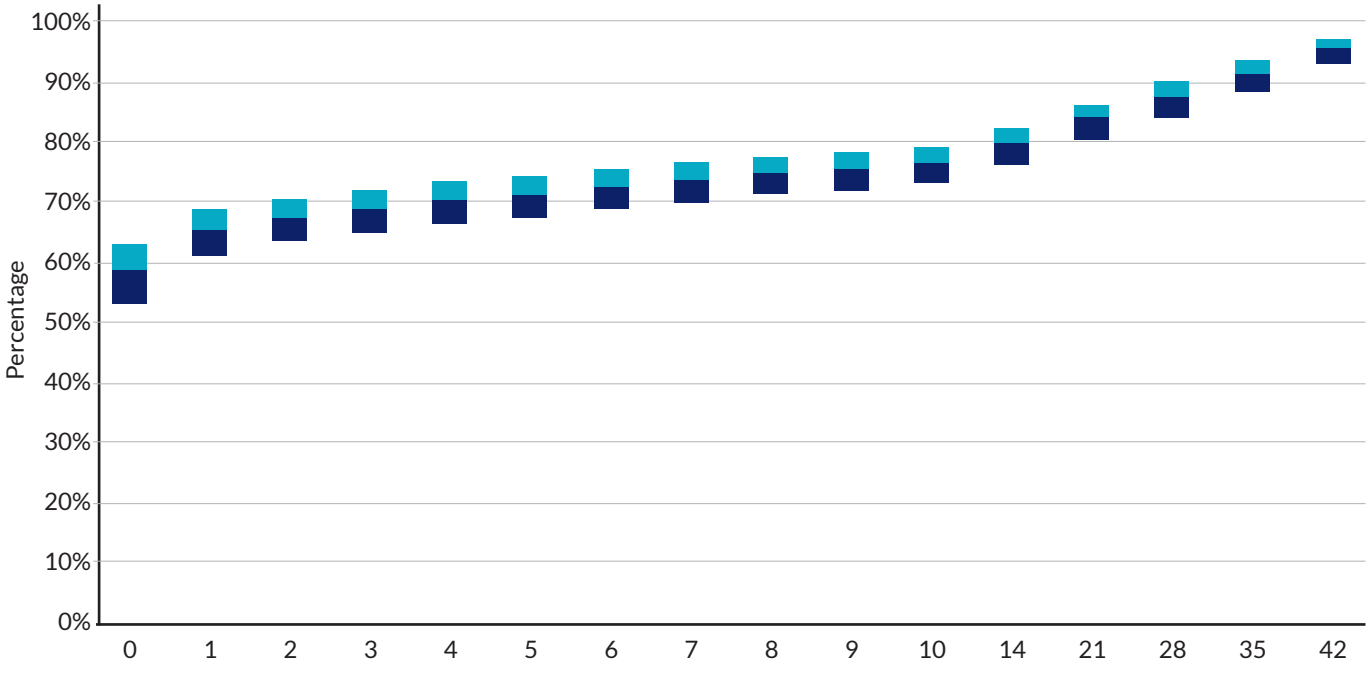
Considering reporting targets

Being patient-centred also means providing reports on imaging sooner. It's entirely natural and reasonable that patients undergoing imaging of any sort want to know the outcome as soon as possible. Swift reporting is also crucial to faster diagnosis and means treatment can begin sooner.

In an ideal environment, patients would receive the report on their scans before they leave hospital, immediately after the images have been acquired with instant reporting. However, because of system pressures, image acquisition and reporting have been typically separated: it has become commonplace for providers to have a backlog of scans awaiting reporting. Just as they have to make decisions about which patients are prioritised for imaging, radiology services have to prioritise reporting – typically examining first the images of patients where an urgent answer is required for clinical reasons. This can mean that some patients wait for several weeks for results. PACS solutions, with built-in electronic workflow, can assist with this process, automatically promoting reporting requests that meet certain criteria; there may also be a role here, in future, for artificial intelligence (AI).

At present, the only national standard that applies directly to radiology is that *"patients waiting for a diagnostic test should have been waiting less than 6 weeks from referral."*[25] We looked at how long it took, on average, from a radiology department receiving a request for imaging to the point that imaging was carried out (this is known as 'request to test').

Figure 8: Variation in request to test times, using proportion of all radiology imaging completed by day after the request was made, April 2017 - March 2018



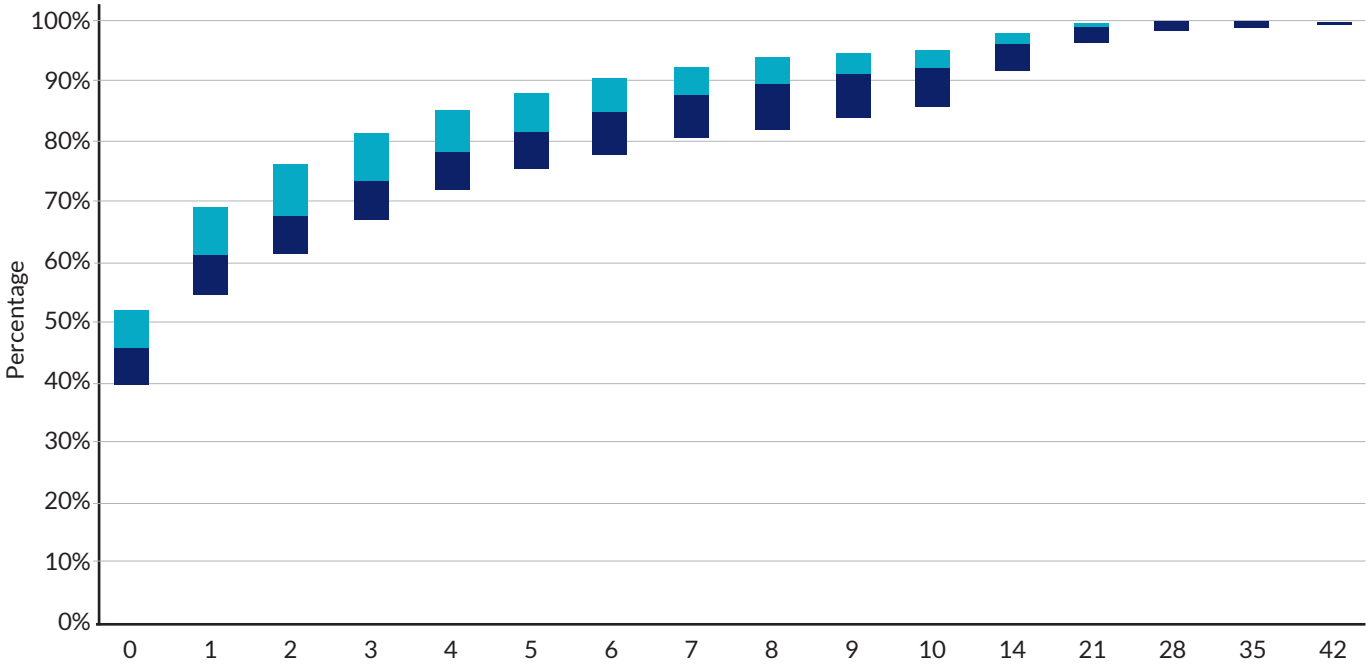
Data source: DID

[25] *Handbook to the NHS Constitution for England www.gov.uk/government/publications/supplements-to-the-nhs-constitution-for-england/the-handbook-to-the-nhs-constitution-for-england#patients-and-the-public-your-rights-and-the-nhs-pledges-to-you*

In figure 8, the bottom quartile is represented in dark blue and the top quartile in light blue. As can be seen, performance is fairly consistent between these two groups: by day 2 after the request, almost all providers have completed at least 65% of the requested tests but none have completed 70%.

We then examined how long it took, once the test was carried out, to the point that results were reported. There is no national standard for this.

Figure 9: Variation in proportion of all radiology imaging reported, by day after the test was conducted, April 2017 - March 2018



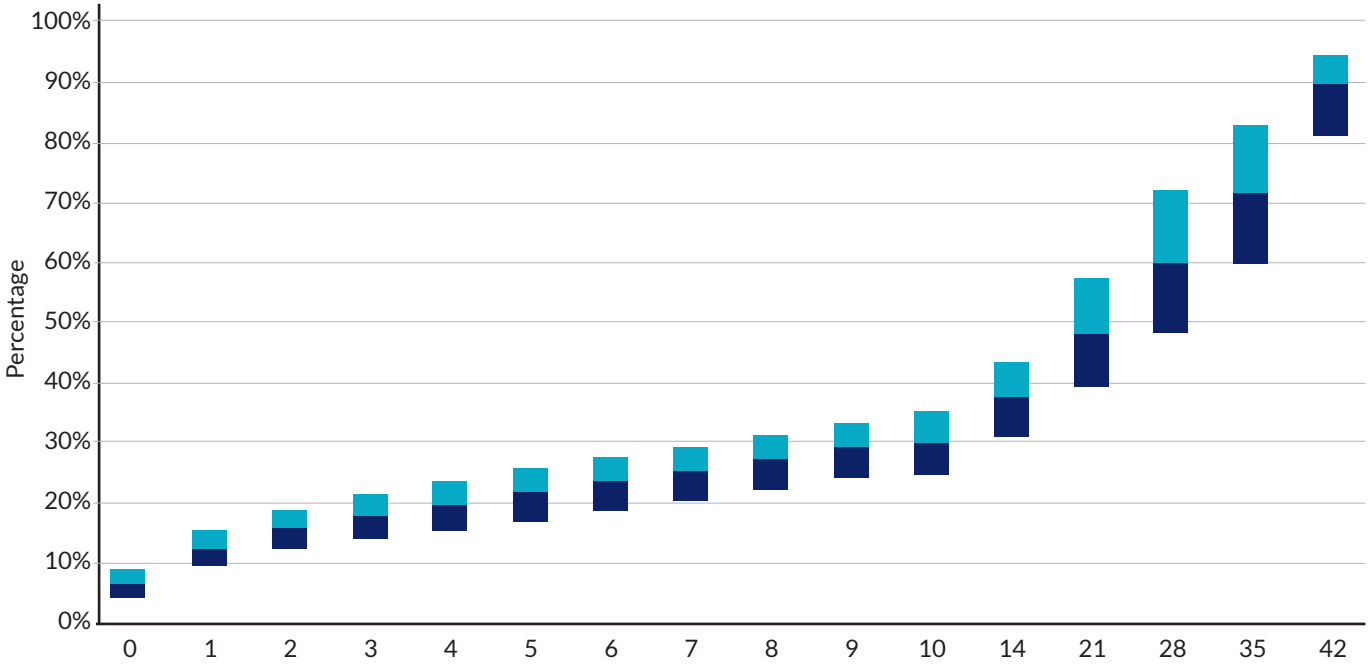
Data source: DID

The variation here is more apparent. Providers in the top quartile complete at least 75% of reports by day three after the test was conducted, with some achieving over 80%. In the bottom quartile, there are some providers who have reported less than 70% by day three. By day nine after the test, all providers in the top quartile have completed at least 90% of their reports.

As an overall picture, these charts indicate that the majority of imaging is conducted and reported within a reasonable time period. While there is clearly room for improvement in both request to test and test to report, the variation between providers is not extensive or excessive.

However, when we looked at different modalities, the picture changed. Figures 10 and 11 show the variation in request to test and test to report times for MRI.

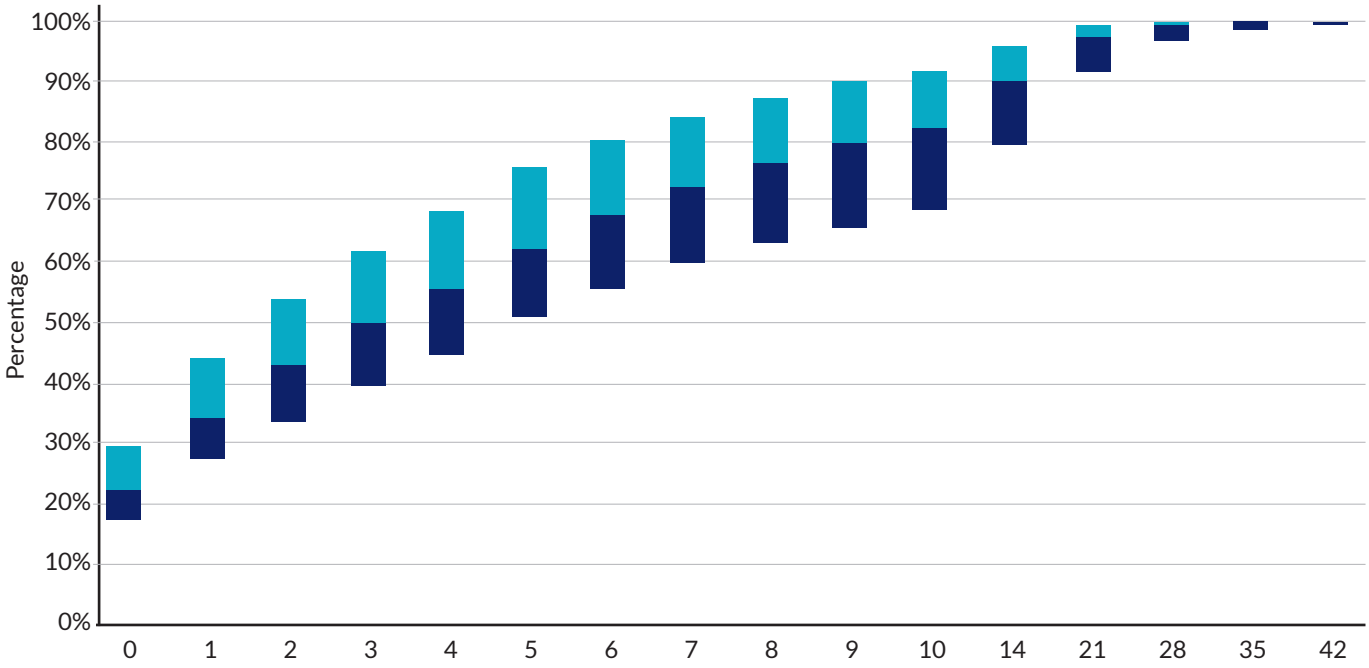
Figure 10: Variation in request to test times, using proportion of all MRIs completed by day after the request was made, April 2017 - March 2018



Data source: DID

Most MRIs are not for urgent indications and, because of the time the scan takes to conduct, typically need to be booked in. As figure 10 shows, the majority of patients at all trusts will wait at least 14 days from request for an MRI. However, the variation then increases between top and bottom quartile providers. At 28 days after the request, 60-70% of patients at top quartile providers will have had their imaging; by contrast, there are some bottom quartile providers where fewer than 50% have had the requested scan.

Figure 11: Variation in proportion of MRIs reported, by day after the test was conducted, April 2017-March 2018



Data source: DID

When it comes to reporting, there is then a clear difference between providers in the top quartile and bottom quartile. The gap noticeably reduces 21 days after the test was conducted.

Taken as a whole, this data suggests that a significant proportion of patients at all trusts are waiting several weeks for an MRI scan and then potentially waiting again for the report.

These differences in request to test and test to report times were examined in more detail at each trust through the deep dives. In part, they are driven by case-mix and patient requirements. However, our deep dive discussions indicated that the key factors influencing the speed at which trusts can conduct imaging and reporting are access to equipment and people.

As with other consequences of the soaring demand for radiology, this is not a new issue: for some years, there has been discussion about introducing targets or standards for radiology reporting turnaround times. The aim of such targets would be to drive improvements in performance and to accelerate reporting, as trusts began to focus on meeting a national standard. This was a central thrust of the CQC's radiology review, published in 2018. It called for *"agreed national standards to ensure consistent, timely reporting of radiological examinations"*, against which trusts could measure their performance.

In response to this, the RCR conducted a survey of radiology service performance across England, Scotland and Wales against two key standards:

- four-hour turnaround times for emergency department patients (in line with NHS England's four-hour emergency department wait time standard); and
- a 24-hour reporting turnaround time for inpatient images (meeting NHS England's clinical standards for non-urgent inpatients.)

While acknowledging various gaps and issues with the data, the RCR found that just 32% of emergency department patient images were reported within four hours and around six out of ten inpatient imaging investigations were reported within 24 hours.[26] It also found significant regional variation in reporting performance.

This mirrored what we found in our deep dive discussions. Most providers told us that they would not be able to achieve any likely reporting turnaround time standards, simply due to lack of capacity. However, many indicated their support for the introduction of standards, as they would provide a basis for an informed, data-driven discussion on increasing reporting resources.

Since our visits, the rapid cessation of all but the most urgent imaging during the COVID-19 pandemic led to a dramatic decrease in the number of studies requiring reporting and the majority of trusts eliminated their reporting backlog. In the restoration and recovery phase of the pandemic it would seem to be an ideal time to introduce reporting standards and closely monitor performance so that reporting delays can be anticipated and prevented.

We are aware that NHS Improvement has been examining this in detail, but as yet no recommended turnaround time standards have been published.

In line with the feedback from providers, we would welcome the introduction of targets, which we feel would benefit capacity discussions. Targets set at trust level would provide a valuable marker for ongoing performance management. However, we also recognise the concern raised by the RCR, that *"the quality of reporting must be weighted equally to turnaround times"*. Put another way, there is no benefit in accelerating reporting if it results in poorer outcomes, such as less accurate diagnosis.

There is a further element to consider: no-one in a reporting role is purely dedicated to reporting. All roles involve a range of other responsibilities, which are harder to enshrine in a standard: these include the different interactions with fellow professionals (attending MDTs, offering input and advice on imaging decisions, etc) and with patients. In this context, it is important that reporting turnaround time standards do not become the sole measure of radiology service performance.

Finally, we would propose that the introduction of targets should take account of the reality of service provision today. Imposing ambitious targets for reporting times, with heavy penalties for delay, could prove counter-productive. If trusts faced heavy penalties for delayed reporting, this could encourage them to delay conducting imaging until they were certain it could be reported in a timely fashion; it could also lead to a surge in outsourcing reporting, at considerable cost. A more pragmatic approach would be to phase in the introduction of targets for the whole process of request to report.

Prioritisation based solely on clinical need

In its progress update following the CQC report, the RCR recommended that *"targets must prioritise patients who are at a higher risk and should be based around specific patient pathways."*

[26] *RCR (2019) CQC Radiology review: where are we now? www.rcr.ac.uk/sites/default/files/rcr-cqc-radiology-review-where-are-we-now.pdf*

We fully understand the rationale for such a recommendation; at present, there are several related standards and targets that mean radiology services are obliged to prioritise e.g. diagnostic imaging for suspected cancer. A service with a high volume of such imaging will therefore face different challenges in meeting reporting targets than one with a very high emergency workload.

However, our view is that the ideal scenario would not require targets to be set for different pathways or different groups. Instead, the goal should be that we meet the basic target for all patients, while granting radiology services the freedom to prioritise patients on a clinical basis, rather than to fulfil different targets. It should be noted that only a minority of cancers detected on imaging are found in patients on dedicated 'suspected cancer' pathways.

We recognise that such a scenario would require changes to practice and procedure, but we believe this would represent a more equitable approach for all patients.

Recommendation	Actions	Owners	Timescale
1. Trusts should review facilities and processes to ensure that patients are safe and are treated with dignity and respect at all times.	**a** All trusts to provide separated waiting areas for inpatients and outpatients, to protect the dignity of inpatients.	Individual trusts supported by GIRFT and imaging networks	Progress to be made two years after publication
	b Trusts to introduce dedicated waiting areas for paediatric radiology patients.	Individual trusts supported by GIRFT and imaging networks	Progress to be made two years after publication
	c When building or refurbishing radiology departments, trusts to take into account the guidance set out in the Building Note on Facilities for diagnostic imaging and interventional radiology.	Individual trusts supported by GIRFT and imaging networks	Ongoing
	d All trusts to gather radiology-specific feedback from patients, service users and their families.	Individual trusts	From six months after publication
2. Imaging should be arranged at a time and place to suit patients and ensure their safety.	**a** All trusts to offer online booking for outpatient appointments.	Individual trusts supported by GIRFT and imaging networks	Within two years of publication
	b Trusts to offer extended access for imaging appointments, with hours to reflect local demand.	Individual trusts supported by GIRFT and imaging networks	Within two years of publication
	c NHS England/ NHS Improvement to work with trusts to explore ways to maximise use of community diagnostic services, so that imaging can be provided closer to patients' homes.	NHSE/I, individual trusts, imaging networks	To align with roll out of Rapid Diagnostic Centres (RDCs)
3. Reporting should be carried out expeditiously and at the point at which it will have maximum impact on the patient's care.	**a** NHSE/I to agree targets for time from image request to report, to help radiology services benchmark and monitor their performance, with no penalties at present for failing to meet targets.	Individual trusts supported by NHSE/I and imaging networks	For progress within 6 months of publication
	b Trusts to align the reporting process with the optimal end-to-end patient pathway, to provide a more joined-up service for patients and reduce the number of hospital visits required.	Individual trusts with GIRFT to support.	For progress within a year of publication
	c Radiology departments to prioritise reporting workflow to reflect and facilitate patient pathways and maximise the clinical impact.	GIRFT to support individual trusts	For progress within 6 months of publication

2. Maximising capacity

The fundamental challenge facing radiology departments today is how to increase capacity to meet the demand changes being seen by the service.

The first crucial step in doing this is of course to increase the workforce and invest in new equipment; the need for both is widely recognised, but existing commitments – including the £200m of funding for replacing aging equipment – are not sufficient to address the gap between demand and capacity. We therefore fully support the ongoing cases being presented for additional resource and look forward to seeing firm commitments being made.

However, while this is the essential long-term requirement, our focus in the GIRFT process has been to look at how we can increase capacity from within the existing resource envelope – drawing on innovative and effective approaches used by trusts we have visited.

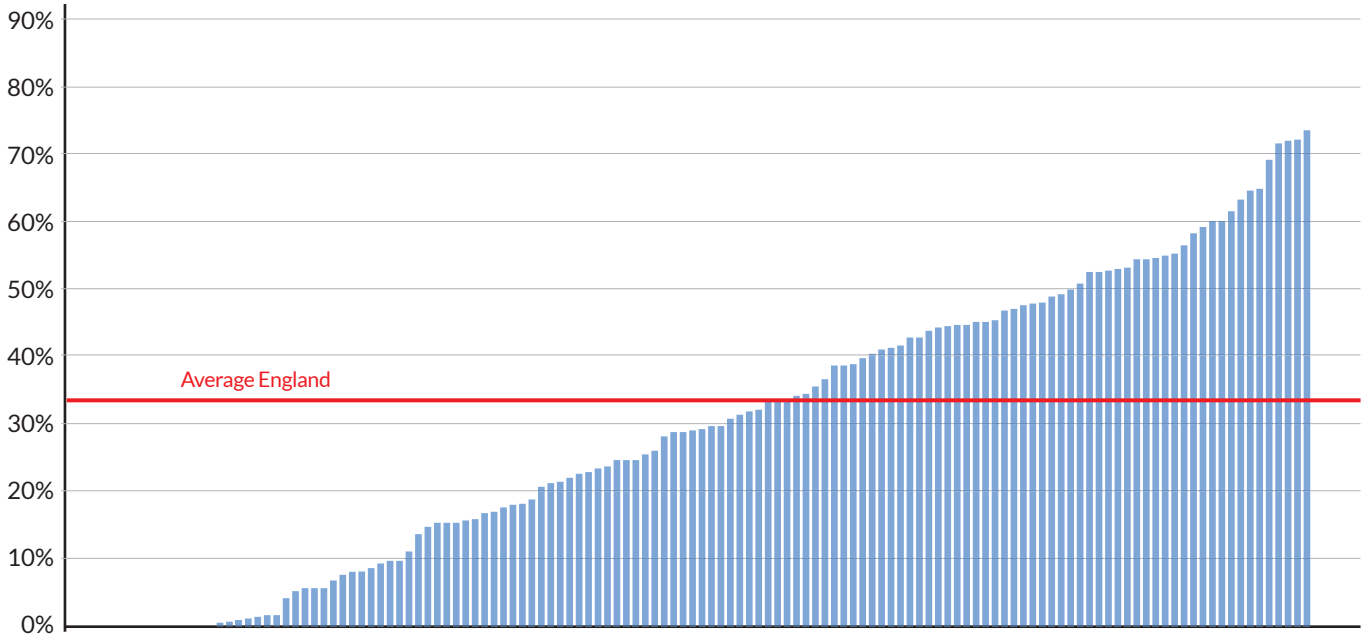
Extending roles and responsibilities

Radiology services have long been associated with making innovative and effective use of the skills of the whole team, starting with encouraging and supporting non-medical staff to take on additional roles that then free up others in the team to spend more time on their 'specialist' tasks. Across our visits, we found many examples of departments which are increasing capacity by making smarter use of all members of their team, all of whom are adding value to patients.

Perhaps the best-known example is reporting radiographers. A growing proportion of radiographers now perform reporting, particularly of X-rays. This can help get results to patients faster, maintaining the quality of reporting while enabling the patients to be treated promptly. At the same time, because radiologists spend less of their time reporting X-rays, they should have more time available to focus on reporting the more complex CT and MRI scans – where the growth in demand has been highest. This kind of team working, with reporting intelligently allocated, and senior team members on hand to advise as necessary, provides the time savings.

Radiographers now perform some reporting at the overwhelming majority of trusts. However, as figure 12 below shows, there is considerable variation in this, with 15 respondents saying there is no radiographer reporting at all. There remain several trusts where fewer than 5% of X-rays are reported by radiographers; there are also 30 trusts where more than 50% of X-rays are reported by radiographers.[27]

Figure 12: Percentage of X-rays reported by radiographers, by trust, April 2018 - March 2019



Data source: NIDC

[27] *In some cases, this included some outsourced reporting, which was undertaken by radiographers.*

This is the result of several years of growth in the amount of radiographer reporting: in 2017/18, just over 5 million X-rays were reported by radiographers (32% of all X-ray reporting, excluding auto-reporting). That went up to over 6 million in 2018/19 (38%).

Though we have not obtained data to show this, there was a strong feeling among trusts with higher levels of radiographer reporting that this has been a hugely positive change: it benefits patients and can help with the recruitment and retention of radiographers.

Role extension for radiographers can involve more than reporting. We also met trusts where radiographers are:

- taking on increased responsibility for guiding vascular access in IR procedures, working closely with the interventional radiologist;
- becoming consultant radiographers, and taking a lead role in research, innovation and training for the department;[28]
- conducting and reporting fluoroscopy; and
- able to discharge patients. This is typically where radiographers work closely with emergency departments to report X-rays immediately. If no fracture is seen, patients can be discharged by the radiographer. Such an approach does require the radiographer to be trained in the management of soft tissue injuries – typically by emergency department nurses – so that they can provide appropriate advice to patients. However, when implemented, it saves time for the patient, who doesn't have to return to the emergency department and wait for the X-ray to be reviewed by a clinician who simply confirms what was readily apparent from the imaging. It also reduces pressure on emergency departments. At Walsall Healthcare NHS Trust, the introduction of radiographer-led discharge has led to a 47-minute reduction in average emergency department journey time for patients that meet specific inclusion criteria.

In practice: using radiographers to perform CT drainage

CT drainage is recognised as a highly effective method of removing collections, obtaining samples and treating sepsis. At West Hertfordshire Hospitals NHS Trust, waiting times for CT drainage have been cut significantly by allowing a suitably experienced radiographer to perform the procedure instead of relying on interventional radiologists. Since developing a full protocol in 2015, this radiographer has conducted more than 400 CT drainage procedures and the protocol is now also used to define how other radiographers can do the same. In 2014, the average wait for a CT drainage at the trust was over 20 hours; today, it is under four hours. In the case of patients with sepsis, this can be life-saving.

It should be noted too that sonographers are also trained to report, as well as perform image acquisition – and ultrasound reporting turnaround times are generally swift. Some sonographers are also trained to conduct some interventions and support procedures, such as image-guided drainage. However, there are many trusts that do not use their sonographers in this way, which is a missed opportunity. We believe it would be beneficial for trusts to adopt a more consistent scope of practice for sonographers, drawing on established guidance from the SOR.

Extending the roles of the whole team

We asked providers with lower levels of radiographer reporting the reasons for this. At a small number of trusts, teams told us that they are able to use trainee radiologists to conduct a greater share of reporting – therefore do not need radiographers to do that. However, we also came across trusts who would ideally like to use radiographers to report more frequently, but are not able to do so because their radiography team is required to focus on image acquisition.

It is therefore crucial that, to enable radiographers take on this additional responsibility, some of the image acquisition workload is undertaken differently. That might mean simply recruiting more radiographers, who focus on image acquisition. But an equally important route is by looking at ways to upskill the whole radiology team, enabling different members of the

[28] *See www.sor.org/learning/document-library/education-and-professional-development-strategy-new-directions/consultant-practitioner for more details on this role and the four-tier career progression model the SOR has developed for radiographers.*

team to take on some aspects of image acquisition. As well as maximising imaging (and ultimately, reporting) capacity, this offers more varied and rewarding roles and a route to career progression, through the bands.

During our deep dives, we saw a range of different approaches to using the non-registered workforce to deliver crucial elements of this workload. These included:

- using assistant practitioners to conduct image acquisition, releasing radiographer time to focus on reporting or on more complex modalities;
- training clinical support workers or imaging assistants to perform cannulation and help radiographers and radiology nurses prepare patients for a CT or MRI scan. This approach minimises turnaround time between scanning and ensures there are no delays when the scanner is available;
- allowing trained clinical support workers or imaging assistants to vet patients for ultrasound, so that the sonographer doesn't have to. This then reduces the amount of time the sonographer has to dedicate to this 'administrative' task;
- training registered nurses working in interventional radiology to undertake additional responsibilities outside the theatre – from pre-assessment to consent to discharge and follow-up. Some are also trained to conduct procedures such as arteriography, venography and venous access. This is a highly specialised area of practice that delivers enormous benefits to the radiology service as a whole. However, as highlighted earlier in this report, there is a notable shortfall in the number of radiology nurses available.

All of these approaches not only serve to maximise capacity; they also improve the patient experience and, crucially, provide fantastic opportunities for development. Where services adopt these ways of working, it should be possible staff who enter at band 2 to acquire the skills and experience to enable them to progress to advanced practitioner or other roles.

There are also significant benefits to patients: typically, where staff are used in extended roles, patients are seen faster than if the trust had to rely purely on the traditional role distribution. There is often more continuity of care, with specific members of the team more involved throughout the patient journey. Results can be provided faster, as the services is not reliant solely on consultants for reporting (where there may be a lengthy backlog) and more senior members of the team are freed up to focus on more specialist tasks.

From the workforce perspective, this kind of role extension offers greater job satisfaction and can help with staff retention.

In practice: using RDAs to assist in ultrasound vetting and interventional procedures

At the Queen Victoria Hospital NHS Foundation Trust, radiology department assistants (RDAs) play a pivotal role in vetting adult patients for ultrasound and assisting radiologists in performing aseptic procedures such as biopsy and sialography. The trust has introduced a standard induction and mentoring process, to help new RDAs develop the skills they need. The approach has helped improve departmental productivity and effectiveness, freeing up radiologists and sonographers to focus on the procedures only. RDA retention levels are high.

Role extension today: a lack of consistency

However, though we found numerous highly successful examples of role extension, we also found a lack of consistency and standards around this.

As noted above, radiographer reporting is used differently between trusts. It is possible that two reporting radiographers, trained on the same course but working in neighbouring trusts, may have completely different sets of responsibilities. We know of examples where trust policy dictates that a radiographer may not be allowed to report on patients referred by GPs; the neighbouring trust has no such restriction. An inevitable consequence of this is that trained and ambitious radiographers will gravitate towards those trusts which allow them to take on greater responsibility or offer training opportunities.

Assistant practitioners are also utilised in different ways. Only around half of services use them, and the responsibilities they are given varies. In many areas, they are used purely for image acquisition – and only for certain modalities. This can mean that, at times, they are under-used, even when the rest of the team are extremely busy. A more logical approach would be to train assistant practitioners to assist in other ways – for example, to operate image intensifiers in theatre. This would not only benefit the wider team as it seeks to increase capacity but also offer additional learning and development opportunities for the assistant practitioner.

We also met trusts where assistant practitioners are not used to provide on-call/out-of-hours support, because of the requirement set out in their scope of practice that assistant practitioners must work under supervision. The way this is interpreted in some radiology services means that, even though the actual tasks they perform will be required during on-call periods, assistant practitioners are not considered as part of the on-call team.

These inconsistencies in what is expected, or permitted, at different trusts restrict the possibilities of role extension. They mean that few trusts benefit from the full opportunities to increase capacity. As we move towards a network model, where neighbouring trusts will need to adopt shared practices and ways of working, these differences in approach will become unsustainable.

The need for a more consistent approach to the use of extended roles

Over recent years, there have been positive moves to address inconsistencies in the use of extended roles and advanced practice. The SOR set out a four-tier career progression model for radiographers, from assistant practitioner to consultant practitioner.[29] Skills for Health has defined National Occupational Standards for a range of tasks related to clinical imaging and reporting[30] and Health Education England (HEE) has published a framework for advanced clinical practice.[31] HEE's career framework for radiography is also due for publication in the near future.

Alongside these definitions, there are also a growing number of options for training and development, including apprenticeships and advanced practice courses, often supported by universities. (An exception to this increase in training options relates to radiology nursing, where the number of specialised courses remains frustratingly limited.) NHS Improvement's best practice guide for job planning for allied health professionals recommends incorporating development time within job plans.

These are all positive steps, but in our deep dives it was abundantly clear that there remain vast differences between trusts in the way they are adopting these various measures. These appear to be the result of multiple factors: sometimes lack of funding, frequently a lack of clarity about how best to support training and in many cases the tension between releasing staff to participate in training and maintaining day-to-day workloads. While they recognise the potential benefit of their people acquiring new skills, trusts may be unable to source adequate cover for their staff to allow them to attend the training course. This can even be an issue where funding has been secured.

One factor was that some trusts have not embraced the SOR's four-tier model. Frequently, such trusts actually have some advanced practitioners working for them; however, they either lack buy-in at senior level to the concept of routinely using advanced practice, or they do not have the formal structure and governance to support development and progression for the whole team. Without such governance, it is also harder to demonstrate the positive impact that advanced practice has on capacity and the patient experience.

Importantly, these inconsistencies don't just relate to the allied health professions. We were surprised to hear during deep-dive visits that, at some providers, trainee radiologists are not permitted to sign off reports until they have completed training. By contrast, at other providers, they may have a greater degree of independence earlier on. This can vary between trusts on the same training scheme, so effectively a registrar may be working at a provider where he or she is allowed to sign off reports without asking a consultant – then in their next rotation, have to submit every report for checking.

We believe there is an opportunity for a clearer and more consistent approach here, that would also assist in terms of maximising capacity. There should be a set of standard, transferrable competencies for reporters – whether radiographers or trainee radiologists. Once the individual has demonstrated that competency, they should then be able to report, independently, in any trust.

We note too that the CQC is increasingly expecting providers to provide rigour and robust governance arrangements around advanced practice; this is something that should assist in standardising approaches. However, it is crucial that it is used as an opportunity to maximise skills – so putting in place governance that enables greater use of advanced practice – rather than trusts viewing it as a reason to limit their use of advanced practice.

[29] *See www.sor.org/about-radiography/career-radiography*

[30] *See https://www.skillsforhealth.org.uk/images/standards/nos/CI%20NOS%20signposting%20document%20final%20110219.pdf*

[31] *See https://www.hee.nhs.uk/sites/default/files/documents/Multi-professional%20framework%20for%20advanced%20clinical%20practice%20in%20England.pdf*

Access to training

Another common barrier to role extension is access to training. While a growing number of courses exist, there may be insufficient spaces – particularly funded spaces. Funding is often associated with a particular national priority, which can then make it hard for those in other roles to access the training they want.

Training is also not necessarily available in the most convenient way. Many of the current courses take place in larger cities or around major teaching hospitals; this immediately disadvantages those living and working in more rural areas. While there is some distance learning and e-learning available, not all courses are offered this way.

Many staff do not want to (or cannot afford to) stop earning for a prolonged period. We would therefore encourage training providers to ensure that courses are modular, allowing participants to select or prioritise the modules that are of most relevance to them. This can assist with getting trust support, if the participant can select training in a specific area of local need. Once a participant has completed the relevant modules, they can then immediately transfer their skills into practice and make a difference to the team's capacity. At the same time, it helps the learner if they can flex their training around their personal and professional commitments, with no 'penalty' for taking a phased approach which might see a gap of some months between modules.

Further, while the guidance for job planning recommends that time should be set aside for learning and development, the reality is that many trusts have not yet introduced job planning beyond medical level. The only training available to staff at lower levels may be mandatory training.

We believe that, in addition to support for training that might enable them to take on extended roles or additional responsibilities, all staff should have protected time for continuous professional development (CPD) that is directly relevant to that role. This will not only help drive best practice in the department, but also encourage retention.

In practice: standardising radiographer training

The Bolton NHS Foundation Trust identified that providing staff with training opportunities was essential to retention. It has introduced a standard programme for training of graduate recruits, focused on building their skills in all areas of clinical practice till they feel confident to join the out-of-hours rota. Each recruit has a designated Band 6 mentor and Band 5 buddy to support the process. Once past this initial stage, radiographers are encouraged to continue to develop their skills and knowledge. The trust has introduced a defined set of competencies and assessment techniques for all band 5 radiographers wishing to progress to band 6, with further progression increasingly specialised.

Enabling staff to work at the top of their licence

To maximise capacity within radiology services, reduce staff attrition and deliver the best possible service to patients, we would encourage all trusts to adopt the following guiding principle: that radiology professionals at all levels of the workforce should be encouraged and enabled to work at the top of their licence.

That means adopting a consistent approach to the use of extended roles – not only in terms of equitable access to training but also ensuring that internal policies and practices are updated to make best use of skilled staff. There should be no barriers to staff joining as Band 2 and progressing up to Band 8.

It also means ensuring there is sufficient time and budget available for training, and that funding is shared across all staff. While trusts may understandably wish to prioritise the acquisition of specific skills to reflect local demand, it is also important to understand the individual ambitions of team members and support them wherever possible.

The move to imaging networks provides a clear opportunity to support staff to work at the top of their licence. It should offer increased opportunities for training and to apply newly acquired skills in practice, as well as to standardise policies and procedures to encourage skill development.

Finally, it is important to underline that a culture supporting role extension should also recognise that not all team members will have the ability or ambition to take on additional responsibilities – and so should not be pressurised into doing so.

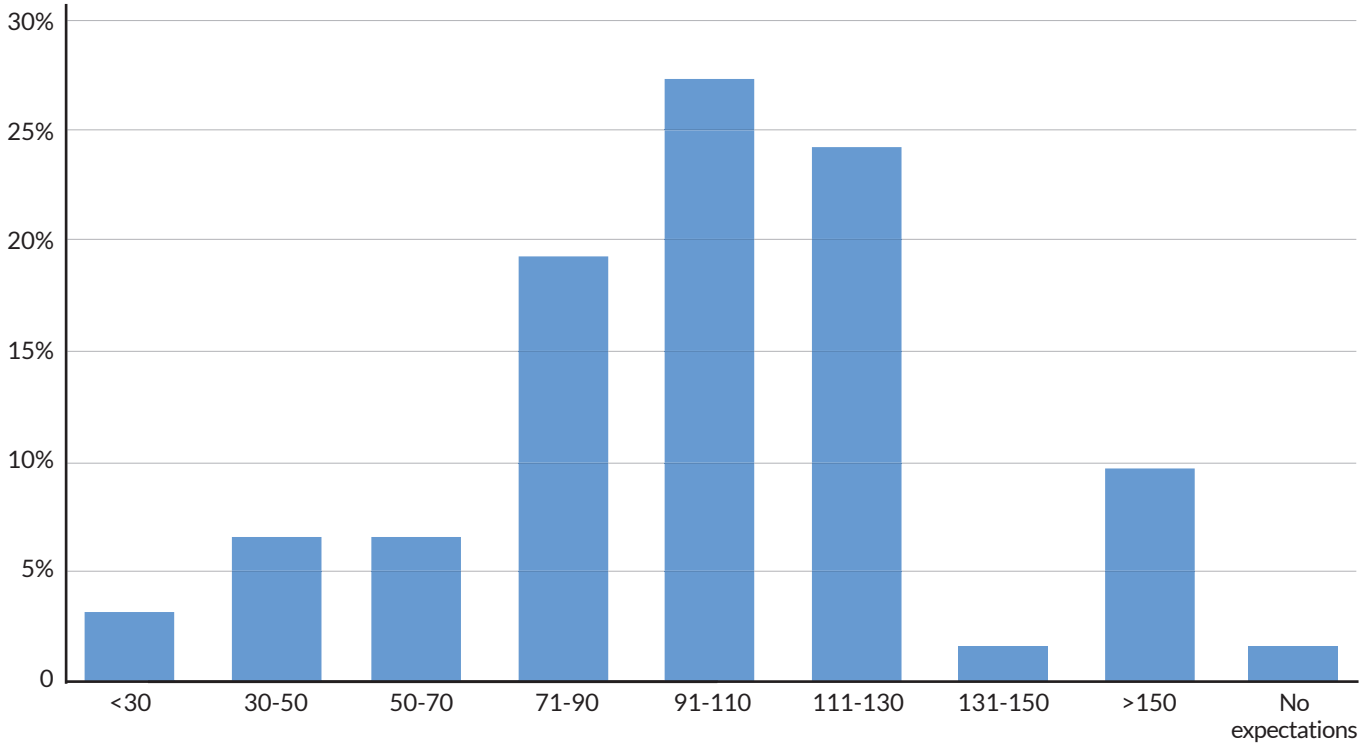
Adopting a more consistent approach to workforce planning

When looking to increase capacity, it's important to have realistic expectations about how much work the existing team can (and should) do and what the likely impact of additional recruitment or training would be.

The answer will vary from trust to trust, depending on workload, processes and the strength of the existing team. However, it should be possible for trusts to gain a realistic expectation of what amount of activity each member of the team can undertake. At present, expectations seem highly inconsistent.

In our questionnaire, we asked trusts whether they have published expectations about how much reporting a consultant should do in a four-hour session. About a third of trusts responded to this question: as figure 13 below shows, even amongst those that do set expectations, there are substantial differences in the volumes of reporting expected.

Figure 13: Responses to question "How many X-ray reports do you expect a consultant to complete in a four-hour session?"



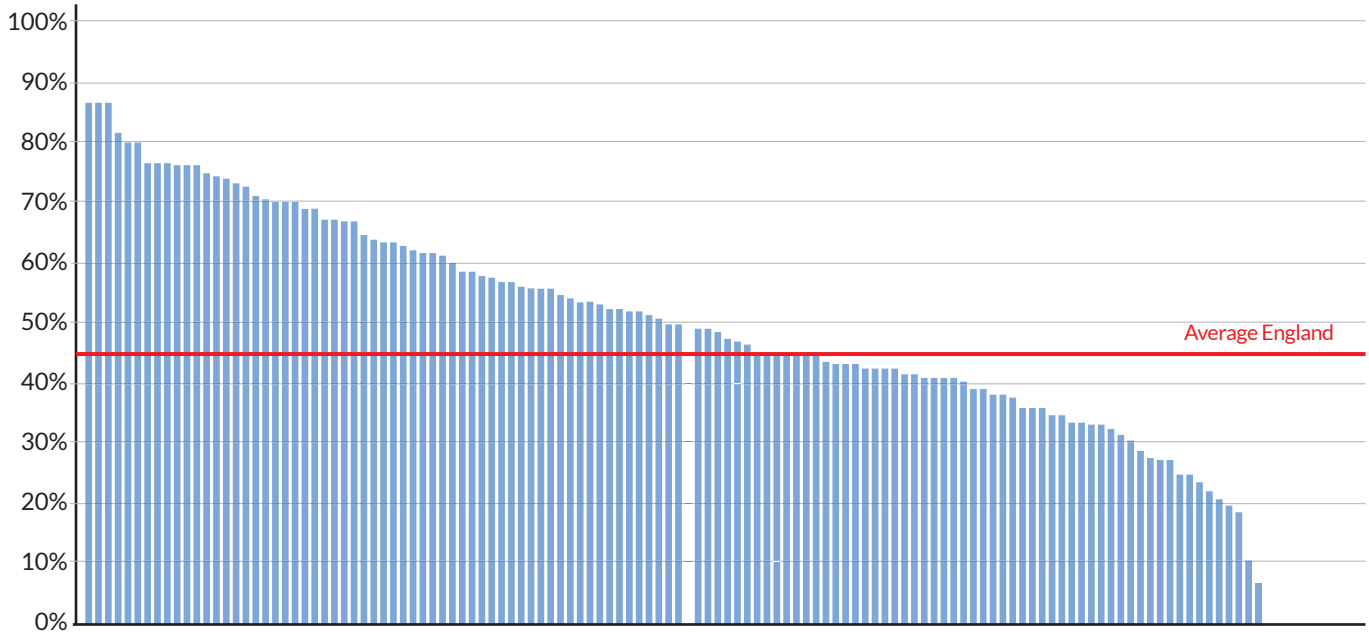
Data Source: GIRFT questionnaire

The responses we received revealed substantial differences in expectations; just under 10% of responding trusts would expect consultants to complete at least 150 X-ray reports in a four-hour session, but a similar proportion would expect a consultant to complete 50 or fewer.

When we explored this further, we found that trusts do not all count activity (or responded to our question) in the same way; we have therefore not examined whether the trusts with higher expectations have faster turnaround times. Nonetheless, it seems likely that trusts with lower expectations could raise their expectations to match the most common expectations, without negatively affecting the quality of reporting.

There also appears to be wide variation in the amount of time trusts currently assume consultants will spend reporting (according to job plans). There are large numbers of trusts where it is assumed it will account for at least 60% of a consultant's programmed activities, as well as several where a consultant is expected to spend less than 20% of their time reporting.

Figure 14: Proportion of consultant programmed activities allocated to reporting according to job plans, by trust, April 2017-March 2018



Data source: NIDC

This lack of consistency makes it hard to compare productivity levels between providers and identify best practice. More significantly, it suggests that trusts are using their team in very different ways, but it's not possible to understand the benefits of different approaches.

There appears to be scope here to adopt a more consistent approach – not only to consultant activity, but for all members of the team. For example, how many reports would a reporting radiographer be expected to do in a four-hour session – and how many such sessions should they do a week? Where that radiographer is helping to train a junior radiographer, an assistant practitioner or an apprentice, this will inevitably reduce their reporting output in that session – though contribute to increasing overall team productivity in the longer term. Expectations of their reporting output expectations should therefore be adjusted to reflect this difference.

If the trust decides that a reporting radiographer should spend 50% of their time reporting, that then means it needs to fill a gap in image acquisition, whether by recruiting another radiographer or training other members of the team.

To assist with such planning, trusts need to improve their recording of current activity, so they have a clear picture of how the different team members contribute to current activity. But there is also an opportunity for a more standardised approach.

We believe there are two areas where standardisation would be beneficial:

- the definition and description of activities, for use in job plans. This would have various benefits; firstly, it would help ensure that there is a consistent understanding of what is expected in a programmed activity such as MDT, clinical advice or reporting. The latter of these could in fact be more usefully divided into sub-categories, such as reporting with a trainee, reporting at home and reporting in an acute team setting – each of which places different requirements on the consultant. By agreeing a standard definition of the task, it then becomes easier to set expectations for the workload that can be carried out in that programmed activity – which in turn helps with day-to-day capacity planning and long-term workforce planning, as it would assist services in identifying what activities it needs more resource for;
- the volume of activity that could be expected in a four-hour session, based on the definitions above.

We understand the RCR is working towards providing a set of standard expectations for reporting activity levels – thus providing a broad national figure that trusts can benchmark against. This will be welcomed by services and managers. However, at present, we are not aware of any plans to standardise activity descriptions; we would like to ask the RCR to take this on, in addition, as we believe that it will provide the essential context for the standard volumes.

In the meantime, there are steps that can be taken to improve the consistency and quality of workforce planning; a simple one, at a network level, would be for all services within a network to review their current expectations against each other and the charts above, and agree activity descriptions and shared expectations.

Mid Yorkshire Hospitals NHS Trust

Examining the impact of MDTs on radiology workloads

As an example of the lack of consistency in job planning, we looked in more detail at MDTs, which are becoming a growing part of radiologist activity. All cancer patients are now discussed in an MDT, as per NICE guidelines; the approach is now being extended to many other conditions.

The overwhelming majority of trusts told us that consultants spend about 10% of their time – or one programmed activity a week – on MDTs. However, there were a small number of trusts which said that consultants are spending over a sixth of their programmed time in MDTs. This reflects a rapid growth in MDT working over recent years – both in the number of MDT meetings and the number of patients discussed in each. It should be noted, however, that when we asked about this during deep-dive visits, it was clear that the recording of MDT time was inconsistent and a large number of trusts told us they were not confident that they recorded time spent on MDTs accurately. In particular, many trusts told us that they only reported the time spent in meetings, rather than time spent preparing for meetings. The available data may therefore not represent the full reality of MDT activity.

Radiology services are required to participate in most MDTs, informing the team about what any imaging shows and advising on the feasibility and suitability of other diagnostic imaging. To fulfil this responsibility, radiologists must generally view and report on the relevant imaging before the meetings; they may also have some follow-up tasks to complete, even if these are simply administrative.

This staffing commitment becomes more frustrating when the MDT meetings run out of time to discuss all listed patients, so some are delayed till the next MDT. Due to working patterns this may be attended by a different radiologist – who must then prepare by familiarising themselves with the patient and the latest imaging. This effectively doubles the preparatory work. We were also told during deep-dive visits of situations where some patients are reviewed in multiple MDTs (e.g. separate MDTs led by different specialties, or regional level MDTs in addition to a trust level one). Radiology invariably is required to be represented at each of them.

While fully supporting the aims of MDTs, we are concerned about the impact MDT involvement is having on the radiology workload. We note that similar concerns have been raised by other GIRFT workstreams, leading NHS England to review the use of MDTs and produce new guidance on Streamlining MDT meetings. We welcome this guidance, and hope it will result in a more focused and effective approach, which ensures that patients who need the support of the MDT receive it.

A central issue for radiology is ensuring there is adequate image and report sharing within and between MDTs. This is particularly the case where a patient with a complex cancer pathway that involves more than one trust may be discussed in MDTs in each of those trusts. Providing the imaging and associated reports in a timely way to all that need them, including to fellow clinicians in other trusts, is essential to making the most of each of these meetings.

During the COVID-19 pandemic, in an effort to facilitate working from home, there was a rapid roll out of remote conferencing in many hospitals. The effect on MDTs has been largely beneficial, promoting efficient working and facilitating cross trust meetings. We should capitalise on these developments.

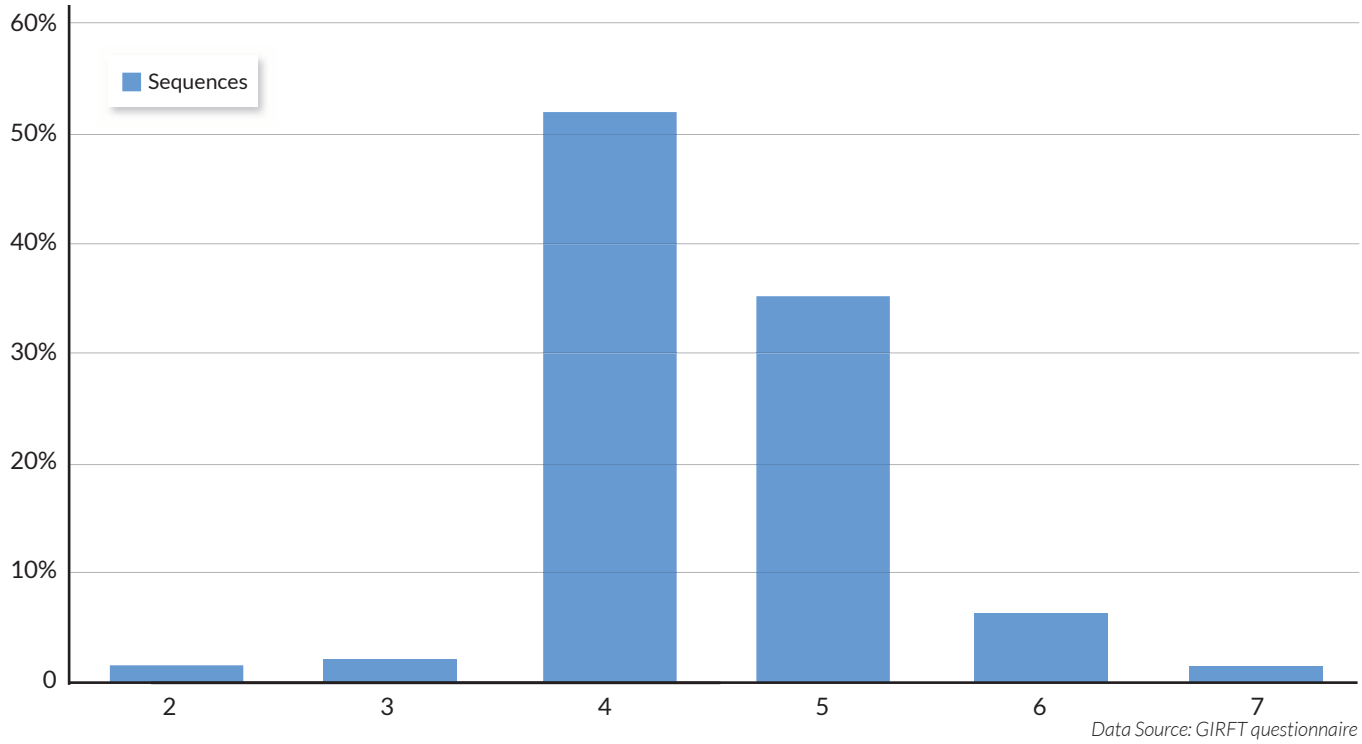
Secondly, there needs to be better administrative support, with patient details shared sufficiently in advance that radiology teams can collate the images and reports in a single place; this then makes it easier for the radiologist attending the meeting to review the necessary information ahead of the meeting. Finally, it is important that electronic job planning within radiology fully captures all staff activity in relation to MDTs, including preparation, attendance and any follow-up work. This can then enable more accurate demand and capacity planning.

[32] *See NHS England (2020) Streamlining Multi-Disciplinary Team Meetings – Guidance for Cancer Alliances www.england.nhs.uk/publication/streamlining-mdt-meetings-guidance-cancer-alliances/*

Standardising protocols for required imaging

Another way to manage demand is to streamline the way imaging is conducted within approved pathways. We discovered wide variation between providers in the way they conduct a number of common investigations: for example, in our questionnaire, we asked how many sequences trusts typically undertook for a standard MRI of the knee.

Figure 15: Responses to question "how many sequences do you perform on a standard MRI of the knee?"



Data Source: GIRFT questionnaire

While over half said four, 44% do more than that – and five providers do just two or three. (We understand too that there may be variation within a trust, with some consultants preferring more sequences than others for the same investigation.)

More sequences not only take up more time and effort in terms of the image acquisition but also reporting. The variation in activity, without a demonstrable variation in outcomes, suggests that the extra sequences may be unnecessary. When moving to a network model, such difference in practice between trusts could also cause unnecessary complexities.

We would therefore welcome the introduction of national guidance on the appropriate protocols for the most common investigations, which trusts could then adopt. For patients, this would reduce the amount of time they spend being scanned – and in the case of CT, reduce the amount of radiation to which they were exposed. For providers, it would potentially improve efficiency and speed up the patient pathway, not least through allowing radiographers or other suitable team members to vet and protocol patients. The move towards imaging networks offers an opportunity to address this inconsistency.

In practice: streamlining protocols to free up capacity

With MRI referrals and wait times both increasing, Doncaster & Bassetlaw Teaching Hospitals NHS Foundation Trust decided to review its practice. Having benchmarked against neighbouring trusts, it found that its MRI protocols were more complicated and extensive than its neighbours. The clinical director for radiology and lead MRI radiographer undertook a review of MRI protocols to see if additional capacity could be created by streamlining the number of sequences adopted. They identified opportunities to reduce scan time for certain examinations by 10 minutes.

With these changes successfully rolled out, the team has begun review other types of MR examinations to seek similar opportunities. The most recent of these was for stroke/TIA brain protocols performed in MRI, where the review has reduced the scan time by ten minutes. This has resulted in the trust being able to double the number of patients scanned in dedicated TIA slots.

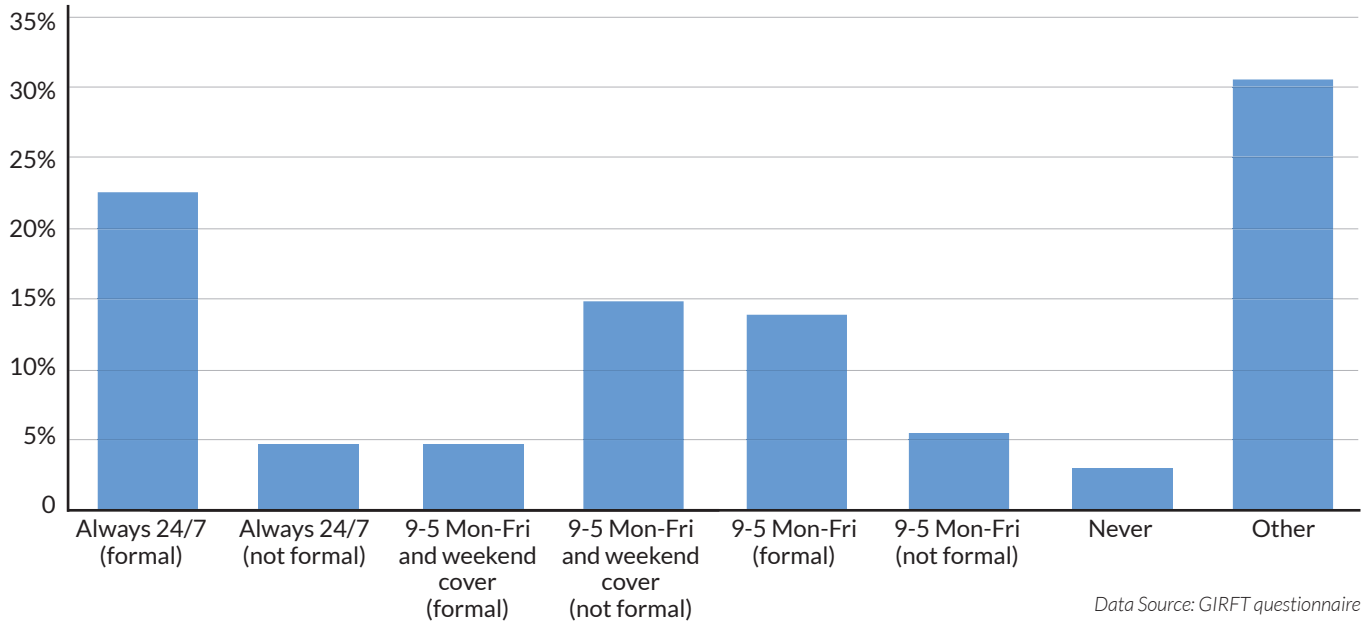
Improving IT

The call for better IT echoes from every department across most hospitals, but for radiology it's louder than most. Improving IT systems to facilitate and accelerate the sharing of images and reports both within hospitals and between centres will have a direct impact on capacity, by avoiding duplication of effort and introducing more flexibility for reporting. An increase in the use of tools to request imaging – predominantly Order Comms – can save time and effort at both the radiology department and the referring clinician, whether in primary or secondary care, as well as improving workflow and planning.

But at present, even though these issues are widely recognised, they are not being consistently addressed. While we found numerous examples of highly effective systems and smarter working, few radiology departments are fully paperless, resulting in unnecessary inefficiency, plus the possibility of requests for imaging being lost and reporting delayed. The core radiology systems – such as picture archiving and communication systems (PACS) – are often not well integrated with electronic patient records (EPR) or other patient administration systems. However, due to a combination of resistance to change and the costs of IT projects (with radiology budgets focused more on diagnostic equipment), these issues are typically dealt with via workarounds and organic evolution.

We met too many providers that are struggling to get even the basic IT support they need. As part of our questionnaire, we asked departments whether their specialist IT systems – RIS and PACS – are supported by the hospital's core IT teams.

Figure 16: Responses to question "when is IT support available for your radiology systems?"



Data Source: GIRFT questionnaire

Fewer than 30% of trusts have 24/7 support for systems that are necessarily in use around the clock. There was also a notable lack of formal cover – a concern, given the specialist nature of these systems. This is something that we would hope could be adequately addressed within a network model.

In short, we found that all too many departments currently struggle to meet what might be deemed the minimum IT requirements for a modern radiology service. Unless these issues are addressed adequately, these departments will be in no position to capitalise on opportunities such as using AI within radiology.

Sharing images and reports within and between trusts

Swift and reliable sharing of images and reports is essential to effective working within radiology, and between radiology and other departments. It means that radiologists can easily communicate with the referring departments and clinicians, rather than requiring face-to-face discussion. It facilitates transfers of patients between sites, between trusts – for example, on a network basis – and between the public and independent sector (e.g. when an NHS trust contracts an independent sector provider to conduct some image acquisition, or for reporting).

When sharing is effective, the receiving radiology department doesn't need to duplicate imaging and reporting that has already been done. The information contained in the images and reports also often provides the context for a referral for more specialist imaging.

But again, at all too many radiology services, the systems for sharing are not good enough. A common issue we encountered was where radiology services received a referral based on imaging that was conducted by an independent sector provider – but not the actual images or reports. The imaging then has to be undertaken again, at the hospital, to enable the patient to be examined and treated. This is a particular issue with ultrasound services.

One barrier to effective sharing of information and images is the use of older PACS platforms, which do not necessarily communicate with each other. One of the key criteria for purchasing any new system should be that it uses standardised approaches to image and report sharing. The RCR clearly articulated these in guidance published in 2011 for the implementation of new PACS/RIS solutions.[33] It then provided further guidance on the need for effective image and report sharing in 2016.[34] However, perhaps reflecting the difficulties trusts face in delivering IT change, there are still many trusts where the PACS solution does not adhere to these standards. This will be an important issue for imaging networks to address.

In practice: integrating technology to support networks

Anticipating that a future move to imaging networks was likely, in 2018 radiology services at three trusts in Essex began to work together under a networked services model. The services retained independence, but collaborated on shared challenges including recruitment and weekend cover for IR. They also looked to share the workload for CT and MRI across the three trusts to provide patients with a faster service. The trusts recognised that to enable these changes, they needed to align their technology. As a result, the same PACS system has been implemented across all three ensuring images and reports are available on all sites, promoting continuity of patient care regardless of the site at which the patient is seen. A single Radiology Information System (RIS) is also being implemented, which will enable patient information such as notes, previous care details and activity, and appointment dates to be shared across the three trusts.

Similarly, we are concerned that there is a lack of standardisation in the way that critical alerts about unexpected findings are provided and shared. This creates the risk that such findings are not acted upon – an issue examined by the Healthcare Safety Investigation Branch in a report published in July 2019. The report included specific recommendations to the RCR, SOR, NHS England/Improvement and NHS X to improve the system for critical alerts.[35]

[33] *See RCR (2011) Guidelines and standards for implementation of new PACS/RIS solutions in the UK www.rcr.ac.uk/publication/guidelines-and-standards-implementation-new-pacsris-solutions-uk*

[34] *See RCR (2016) Who shares wins: www.rcr.ac.uk/system/files/publication/field_publication_files/rcr164_who-shares-wins.pdf*

[35] *See HSIB (2019) Failures in communication or follow-up of unexpected significant radiological findings www.hsib.org.uk/investigations-cases/communication-and-follow-unexpected-significant-radiological-findings/*

These recommendations emphasised that this is not simply a case of using a shared feature within IT systems, it is also an issue of working processes. As part of the move to imaging networks, it will be essential that all providers in a network agree protocols and processes for sharing such critical alerts. These protocols should then be extended to any outsourcing providers used, so that there is a consistent, reliable and trusted method of sharing this vital information promptly.

Home reporting

One approach that services have taken to reducing reporting backlogs is to introduce home reporting – where radiologists and reporting radiographers have access to reporting systems via the internet, so they can report from home or from any connected location.

Our deep dives demonstrated that home reporting is gaining in popularity, and most trusts permit it to some degree. It means that radiologists and radiographers are able to focus on the task, without the many possible distractions that inevitably occur when working in the department. It also offers greater flexibility and a better work/life balance for reporters. This is important, given the fact that some radiologists and radiographers are leaving NHS employment to work for independent sector providers, often to provide outsourced reporting capacity: a common reason cited for doing so is to improve the work/life balance, with more consistent hours and home working.

Importantly, home reporting doesn't require staff to work outside their job planned hours; it can be scheduled, as the example below shows. It also facilitates "insourcing", using existing staff to conduct additional reporting outside their contracted hours.

In practice: home reporting

The East Midlands Radiology (EMRAD) consortium introduced home reporting on a trial basis in 2016. Six neuroradiologists from one of the trusts in the network were given suitable workstations at home. EMRAD quickly found that this improved reporting turnaround times and reduced the need for outsourcing – while also proving popular with the neuroradiologists undertaking the reporting. The approach has now been rolled out to 29 radiologists and 11 reporting radiographers across the network. It has saved an estimated £1.3 million to date by avoiding outsourcing costs, but also delivered benefits such as giving consultants the ability to review reports by junior members of the team from home – meaning they can provide better support. Consultants also state it helps with MDT preparation, as they can do this in a quiet environment.

During the COVID pandemic those trusts with home reporting were in a much stronger position to protect staff and maintain services than those who required all staff to work on site.

While there are many benefits to home reporting in terms of throughput and work/life balance, it is important to recognise that it needs to be managed effectively across the team, to ensure that there are sufficient radiologists and radiographers on site at all times for consultation, training and other responsibilities.

Order Comms

Order Comms is an umbrella term for an online imaging request system that is designed to simplify the process of requesting imaging. It is far more efficient than paper-based methods: radiology departments receive relevant details of the requested imaging in a standard format, using a set of common fields to enter data. This means there are far fewer queries and discussions between the department and the referrer – so the request can be fulfilled sooner.

Importantly, Order Comms can also be integrated with clinical decision-making support tools; these allow referrers to enter details of patient symptoms to identify the optimal pathway, including what (if any) imaging is required. Where imaging is recommended, the referrer can then simply click through from the clinical decision-making support tool to the Order Comms platform and request the relevant imaging.

Nearly every trust now makes some use of Order Comms but, as our questionnaire found, this is highly inconsistent. Many trusts do not use Order Comms for all their requests for inpatient imaging; only 60.5% of trusts have Order Comms in place for requests from GPs.

The systems are now well-established and their benefits proven. It's time for all trusts to improve their use of Order Comms, making it the standard method for all imaging requests, as a major next step to a truly paperless operation. This will require a greater consistency in how Order Comms is used, and what information referrers must include before a request is accepted.

Voice recognition / speech to text

One way in which IT can accelerate the reporting process is through the use of voice recognition, or speech to text software. This allows the reporter – whether a radiologist, sonographer or radiographer – to dictate their report; the software then automatically turns their dictated report into text. Accuracy of the tools has improved considerably over recent years and using them saves the reporter from typing the report themselves or, as is still the case in some trusts, relying on typists or administrative staff to produce the typed version.

Most trusts now support the use of some kind of voice recognition software, for clinicians in all departments. However, we are aware from deep dives that the software is sometimes not made available to the whole team; in particular, we heard that in some trusts sonographers are discouraged or prevented from using voice recognition due to licensing issues. Such restrictions are wholly counter-productive and need to be lifted.

Applying IT to the patient experience

Improving use of Order Comms, enabling home reporting and facilitating image and report sharing are all of benefit to patients, particularly if they enable examinations to be conducted sooner and results reported faster. However, as already identified, there are also opportunities to apply IT within the patient experience:

- for online booking, giving patients greater choice and control
- to generate automated appointment reminders that help reduce missed appointments, and
- to streamline check-in processes at the hospital.

These are sound objectives, but for them to succeed, we first need solid IT foundations in everyday working. Even if these are trust-level systems, they need to be integrated with radiology systems and processes to maximise the benefits in terms of workflow and patient experience. The changes recommended here will help ensure those foundations are in place.

Optimising use of equipment and planning for the future

As noted earlier, the UK has lower numbers of CT and MRI scanners per capita than other European countries – a position that does not broadly seem to have changed over the last decade. It was highlighted in Cancer Research UK's 2015 Horizon Scanning report[36] and again in the NHS Long Term Plan in 2019.

There are also substantial variations between trusts in the amount of equipment they own. Drawing on data in the NIDC, we found that:

- the average (mean) number of X-ray machines per trust is 20 – but more than 20 trusts had fewer than ten. The highest number of X-ray machines is 70;
- the average number of CT scanners is 3.4, but a small number of trusts have just one. One trust has 26: this was the same trust as has the most X-ray machines;
- the average number of MRI scanners is 2.8. More than 25 trusts have only one and some have none; the highest number is nine. The median is two.

While some of this variation reflects workload, the size of the trust, the number of sites on which it is required to provide services and the number of patients it serves, there is no clear correlation between the amount of equipment a trust owns and its performance in terms of radiology waiting times or number of patients served. That makes it difficult to recommend precisely how many machines are required.

However, in an acute hospital with an emergency department, rapid access to CT is essential. A single machine offers no resilience; if it is out of action for any reason, including planned servicing, the hospital would not be able to provide this vital imaging service. Indeed, the requirement for several hours of deep cleaning after scanning patients with suspected coronavirus infection has been disastrous for these units. Therefore it is essential that such hospitals have at least two CT machines, readily accessible from the emergency department.

[36] *www.cancerresearchuk.org/sites/default/files/horizon_scanning_-_final.pdf*

Procurement challenges

Even with the additional funding commitments made in the Long Term Plan, many providers do not and will not have the capital available to buy all the equipment they would ideally like. They are further constrained by a lack of physical space in the department; even if space is available, the need for additional building or refurbishment work to house new equipment often increases the total costs to the department.

We are also aware that the process of securing funding itself can be hugely time-consuming. During deep dives, many clinicians and/or radiology managers noted that they not only need to produce a written business case, but then often have to present to multiple boards and committees, in direct competition with other departments for funding.

To assist in the bidding process and reduce the amount of time that departments have to spend, we are proposing the development of business case templates that radiology managers can then customise with local data and requirements.

Risks of reliance on old equipment

In such circumstances, replacing ageing but still functioning equipment is rarely the priority. We found that, on average, NHS CT scanners are over six years old, MRI machines over seven and a half years old and X-ray machines almost ten years old. However, within some trusts the average ages are much higher. At 11 trusts, the average age of CT scanners is more than ten years; at 12 trusts, the average age of X-ray machines is over 14 years. (Only one trust appears in this upper bracket for both CT and X-ray).

This reliance on older equipment brings numerous risks with it. While there are inevitably exceptions, newer equipment is more reliable and less likely to break down – meaning there are fewer unplanned pauses in the imaging schedule. Newer equipment can typically produce the necessary imaging output faster than older machines; it will generally use lower doses of radiation than previous models to achieve the same quality output and will be designed to integrate easily into the department's IT systems. Crucially too, there are some imaging requests that simply cannot be fulfilled using some older equipment, which doesn't work to the resolution or quality required to show small changes or support certain techniques.

In short, the use of newer equipment will invariably increase a radiology department's capacity, even if the total number of machines in use is the same.

The need for planning

More broadly, it is clear from our deep dive discussions that not all departments have agreed a coherent and evidence-based future plan for equipment purchase and replacement.

Such a plan can help reduce the effort required in each bidding cycle; it means that as well as seeking to secure the timely replacement of ageing systems, trusts can also make a stronger case for expansion – acquiring additional equipment to reflect changing demand. It also gives time to secure the support of other departments, to make provision for recruitment and staff training so that there is no gap between the purchase of new equipment and its usage, and align purchases with forthcoming changes in practice.

Crucially, any such long-term plan must also include provision for equipment maintenance; allowing for the costs of maintenance and support contracts and scheduling maintenance windows to avoid times of likely peak demand.

As we move to a networked model of radiology service provision, logically such plans should be at the network level, making optimal use of resources to meet the needs of the network.

Considering managed equipment services

An alternative to this complex cycle of capital investment is to move to a managed equipment services (MES) model. These go beyond simply leasing equipment (a further alternative) to include all maintenance and support, provided as part of a fixed-term contract. Instead of requiring capital outlay, this becomes an ongoing operational expense; a standard monthly fee. In exchange for that, providers are able to benefit from new equipment and the associated capacity gains. Typically, MES contracts allow for equipment to be replaced after a set period, within the contract terms – though if there are recurring issues with any of the equipment, it may be replaced earlier.

More than 50 providers now have a MES contract of some form – sometimes alongside a purchasing model – and we understand that around 50 more are considering one. Some have adopted an MES contract for a particular type of

equipment, but continue to purchase other types; others use MES for any new additions, or have simply opted for leasing/MES when bids for capital funding have been delayed. Only a small number of trusts have a comprehensive MES contract.

While many trusts with an MES report tangible benefits from the clinical and capacity perspective, it is important to note that the financial case for MES is not clear-cut. Based on a simple calculation of total MES payments over the life of a contract against the corresponding purchase costs, MES contracts are typically more expensive; there are very few studies which suggest that MES offers better value for money in these terms. However, such calculations make no allowance for depreciation or the costs of downtime; a fairer cost comparison would also take account of servicing and maintenance costs for capital purchases. Though it may be hard to put an estimated cost on, the MES approach also means that clinicians and managers do not have to dedicate time to writing and presenting business cases for equipment.

It should also be underlined that MES contracts are extremely complex to design, procure and deliver; at one trust, it took some three years to move to the new model. While this is now a highly effective model, we are also aware of MES contracts that were poorly designed and are not being managed well, leading to additional costs and fractious relationships with the service provider. It is therefore important that any department considering an MES model has the support of its procurement team and ideally experts in tendering for services. We note that under the new NHS Supply Chain procurement model, category 7 of the category towers will include managed services within its procurement offerings – theoretically providing additional procurement expertise in this complex area.

We understand that this complexity is likely to increase with forthcoming changes to accountancy processes and standards; it is possible that these will mean managed services contracts become less attractive, from the financial perspective. As far as we aware, this impact has not been fully assessed.

Finally, moving to MES also requires a cultural change. Many healthcare organisations and professionals are accustomed to thinking in terms of buying and owning equipment, rather than leasing it under a managed service contract. In addressing this, there are plenty of parallels with other industries that have already overcome cultural resistance to embrace MES approaches; trusts can look to these when applying the model in the NHS.

It is clear that as demand for radiology services continues to grow, so will the demand for new radiology equipment. With capital funding likely to be limited, MES contracts appear to be an option worthy of consideration, but we recognise that as yet there is little independent evaluation of their effectiveness. We would welcome further research into this area, that could help shape radiology departments' access to equipment – and thus their ability to meet demand – in the coming years.

Increasing capacity for IR

One issue that was repeatedly raised during deep dive visits was that IR procedures can often be delayed for reasons that are out of the radiology department's hands. At most trusts, IR is provided through the main hospital facilities, meaning patients need to be admitted and prepared on general wards and the procedures take place in theatres shared by multiple departments.

In this situation, delays elsewhere in the hospital can lead to the IR procedure being put back; for example, a lack of available beds means that patients cannot be admitted for their IR procedure. Cleary, that's frustrating for patients; it's also frustrating for providers, where an entire IR team is effectively on standby, waiting for a bed to be free.

The ideal scenario would be to have a dedicated day case unit for IR – and at some hospitals, these exist. They are obvious points to serve as hubs for IR networks and will often also be associated with e.g. a vascular network. However, there are opportunities to streamline provision and avoid IR being delayed as a result of other bottlenecks.

For example, rather than requiring a ward bed – and the associated admission – there may be opportunities to use day case beds or recliners within the radiology department. This has the added advantage of reducing the risk of hospital-acquired infection. The department should then have the ability, and authority, to admit and discharge day case patients for their IR procedures. The majority will be day surgery; where an overnight admission is required, this can still be dealt with using the existing processes.

We believe that adapting the admission process and acquiring a small number of day case beds could make a substantial difference to IR throughput – with many more procedures taking place at the appointed time. This would be of benefit to patients and providers.

In practice: dedicated IR facilities

At Royal United Hospitals Bath NHS Foundation Trust, the radiology team was struggling to meet growing demand for IR because of a lack of day case beds. It successfully bid for trust funding to convert a room that had been used for teaching into a two-bed recovery room for day case patients. Consultants helped define the procedures it should be used for and standard operating procedures were put in place. The trust also recruited an extra IR nurse to manage admission and supervise patients. The recovery room opened in December 2016, and is used for a range of IR procedures such as day-case angioplasty, oesophageal dilatation, ureteric stenting as well as ultrasound or CT guided biopsies. It has transformed the trust's ability to conduct IR procedures in a timely way, leading to a significant reduction in cancellations and delays.

Recommendation	Actions	Owners	Timescale
4. All radiology services should review their workforce requirements to ensure their establishment is correct. All services should maximise recruitment and retention and all staff should be supported to work to the top of their licence.	**a** GIRFT to work with training providers including radiology academies, HEE, NHSE/I and professional bodies to widen access to learning, with a particular focus on distance learning and modular programmes, enabling work-based learning and progression.	GIRFT, HEE, NHSE/I, RCR, SoR	For progress within a year of publication
	b Trusts to include dedicated time for learning and CPD in job plans for all staff.	Individual trusts	In place within two years of publication
	c GIRFT to work with HCPC, NMC and other regulators to review registration requirements for all staff.	GIRFT, HCPC, NMC, GMC	For progress within 18 months of publication
5. The RCR should produce standardised definitions for radiologist activities for job planning. This should also include expected volumes of activity.	**a** GIRFT to support RCR in development.	GIRFT, RCR	For progress within 18 months of publication
	b National data collections to reflect standardised activity descriptions for benchmarking purposes.		
6. The RCR and SoR should produce standardised competencies for reporting, so that once a trainee/radiographer has proved their skills, they are permitted to report independently, wherever they work.	**a** GIRFT to support RCR and SoR in competency development.	GIRFT, RCR, SoR	For progress within 18 months of publication

Recommendation	Actions	Owners	Timescale
7. Trusts should review the efficiency and management of MDTs in line with national guidance.	**a** All trusts to introduce a defined triaging process for adding patients to an MDT.	Individual trusts	For completion within 18 months of publication
	b Trusts to provide radiology-specific administrative support for MDTs.		
8. Standardised protocols should be introduced for imaging of common conditions for trusts and independent sector providers to adopt.	**a** RCR, in consultation with specialist societies, to develop standardised protocols.	GIRFT, RCR. SoR	Progress within 18 months of publication
	b GIRFT implementation team to monitor trust uptake of standardised protocols, identifying trusts that need further support to do this.		On completion of 8a
9. All trusts must meet the RCR standards for the use of IT.	**a** All trusts/networks to provide 24/7 IT support for PACS and RIS.	Individual trusts, imaging networks, NHSE/I, NHS Digital, NHSX	For significant progress within one year of publication
	b All trusts to make Order Comms the standard method for imaging requests from primary care and within the hospital.		For progress within one year of publication
	c All new PACS/RIS solutions to adhere to RCR standards for image and report sharing.		Ongoing
	d Trusts to ensure that voice recognition systems are available to all reporting staff, including sonographers.		Completion within a year of publication
10. Every trust or imaging network must have a sustainable plan for the purchase and/or replacement of capital equipment, PACS and RIS, to meet anticipated patient needs and increase capacity.	**a** GIRFT to work with NHSE/I to provide guidance and support for trusts/networks to establish their capital equipment needs, based on current and projected demand.	GIRFT, NHSE/I	For progress within two years of publication
	b GIRFT to work with NHSE/I to support business cases for trusts/networks for replacement and new equipment and develop standardised contracts for capital or MES equipment purchases/leases.	GIRFT, NHSE/I	For completion a year after report publication
	c GIRFT to support with NHSE/I on research to understand the cost benefits of MES in comparison to capital outlay.	GIRFT, NHSE/I	For progress within two years of report publication.
11. All radiology services should have access to dedicated facilities to admit and discharge day case patients for interventional procedures.	**a** GIRFT to gather evidence and examples of the most effective models for delivering day surgery IR on a timely basis, including: • dedicated radiology day case units; • dedicated radiology day case beds; • dedicated trolleys or recliners; and • any other models.	GIRFT	Within a year of report publication

3. Making data work harder

As noted at the start of this report, there is a huge amount of data recorded about radiology, predominantly through the DID. This is widely recognised as being the main national collection of radiology data, with information fed in directly to NHS Digital from trusts' RIS. The same underlying data is also used by NHS England, then aggregated and published as the DID1. NHS Improvement meanwhile has established the National Imaging Data Collection (NIDC), information from which is visible on the Model Hospital website.

These multiple collections create a degree of complexity that may be counter-productive. We believe it would be beneficial to conduct a comprehensive review of all the collections and data associated with imaging, to confirm what is being collected, identify where information is being duplicated and pinpoint any gaps. This could then allow processes to be streamlined.

Further, we note that while lots of data is collected at present, it is not being used effectively to drive performance improvement and support business and capacity planning. We think this is a missed opportunity.

Improving the quality and consistency of data

The first issue that needs to be addressed in relation to data is improving the quality and consistency of what is collected.

The DID relies on the information recorded in services' RIS, and it is clear both from DID returns and from our deep-dive discussions, that there are huge differences in the way that providers record data. Different members of the team are responsible for recording data – often in the same trust – and many do not complete all the possible fields.

From examining the DID, it is also clear that many imaging records are incomplete, with codes or other data missing. In particular, though all records include the date when an imaging test was completed, there are often gaps in data when the test was requested and when it was reported.

Table 1: Proportion of DID imaging records where date fields are left blank, April 2015-March 2019

Cost (£)	Number of records in DID	% where "Request sent" date is blank	% where "Request received" date is blank	% where "Test" date is blank	% where "Report issued" date is blank
2015/16	40,714,140	14%	12%	0%	13%
2016/17	42,177,535	11%	10%	0%	10%
2017/18	42,744,920	9%	9%	0%	8%
2018/19	42,256,031	9%	9%	0%	8%

Data Source: DID

While this has clearly improved over recent years, the failure to record dates for these steps in the imaging process is significant. Where providers do not record these other dates, they are unable to see where any delays may be in their processes: for instance, is there a swift progression from receiving a request to performing the test?

This is largely an issue of coding practice, rather than an issue with the DID itself; if providers recorded these important pieces of information, then the system would collate them. However, unlike some data collections, there are no checks on departments' RIS data before it is uploaded to the DID and many systems are not configured to "enforce" the recording of all data (e.g. by alerting providers when a record is incomplete).

There are further issues related to recording of information – such as the way that activity itself is coded. New codes have been added over the years to reflect changes in practice, but this has been done inconsistently; some studies are defined by body part, others by clinical indication and others still by aspects of the technique used: for instance, there are different codes for the same basic imaging method when contrast media is used and when it isn't. In 2015/16, there were 2,539 different SNOMED-CT[37] codes used in the DID; by 2018/19, this had increased to 2,995.

[37] *SNOMED CT is a structured clinical vocabulary for use in an electronic health record. It is the most comprehensive and precise clinical health terminology product in the world. www.england.nhs.uk/digitaltechnology/digital-primary-care/snomed-ct/*

This huge range of codes means that different providers may well record the same activity in completely different ways – in turn, making comparisons between trusts harder. We believe there are opportunities to review the available codes and 'retire' some of them, so effectively requiring trusts to code their activity more consistently. This will help with analysis of activity, and ultimately of costs.

It is important too that data recording is not just the responsibility of the radiology service. If all referral data included the clinical indication or reason for the requested test, this would enable a more sophisticated understanding of why and where imaging demand is generated. This in turn could inform demand management and capacity planning.

No incentive to improve

While there is existing guidance that defines how trusts should code activity in their RIS, it is apparent that this is rarely consulted. Training could assist but, based on what we were told in deep dives, there is a more fundamental issue: at present, most trusts feel that they gain little or no value from the DID. They typically don't see any comparative data, with only the DID1 dataset – aggregated from all providers – being published. In short, they are required to submit the data, but in the face of the many competing pressures on their time, admitted to us that there is little incentive for them to improve the accuracy or depth of data they capture.

Making comparative data accessible

Fundamentally, better quality data would facilitate provider level comparison and benchmarking and provide a more accurate national picture of activity. That in turn would help providers present more compelling business cases for equipment and staff.

Of course, this would require the comparative data to be accessible; it is in this context we would like to see more radiology data presented via the Model Hospital portal. This is a well-known and well-used means of viewing performance data and is designed to make comparisons and analysis easy. By contrast, the current situation where radiology data is submitted to different NHS bodies and presented differently seems at best inconsistent.

In our deep dive visits, we met various trusts that do appear to have a more effective approach to data collection and submission. A common theme among these trusts was that they had someone with a specific responsibility in their job description for departmental data. We think this is a positive approach, but recognise that it is one of many of tasks and responsibilities that trusts are expected to juggle. A more appropriate approach may therefore be to make this a network-wide responsibility, with the individual concerned having access to the training and support they need to meet the various requirements and then drive improvements across their network.

Increasing the accuracy and robustness of data about IR

While there are coding and data issues in relation to diagnostic radiology, there are arguably even more significant issues when it comes to IR. The rapid expansion in the use of IR has been followed by an expansion of coding; there are now a range of ways to code and record IR procedures within HES. However, at present these are not well used. Many procedures are complex, with multiple steps involved – all of which could and arguably should be coded.

However, those responsible for coding often do not have the clinical knowledge to accurately code all of the individual steps. In deep dives, it was also noted that there is less incentive to code IR accurately, as most costs are bundled; listing additional codes will not generate additional income for the trust. This overlooks the fact that accurate coding helps also monitor activity by specialty, potentially indicating which members of the team were involved so influencing workforce planning.

Perhaps more importantly, at present it is extremely difficult to examine patient outcomes for IR. Because IR procedures are not readily identifiable in HES, we cannot get a consistent picture of length of stay for IR, or infection or readmission rates. These are crucial to quantifying the efficacy of IR: it is generally assumed that IR will lead to shorter stays and have no negative impact on readmission rates, but we cannot currently prove this. Similarly, we cannot compare the IR performance of different hospitals or trusts, so cannot identify the providers which demonstrate best practice.

We believe there is significant scope to improve the coding of IR, leading to more relevant and robust data collection. The first step to this is to ensure IR procedures are coded accurately in the DID, through having appropriate SNOMED CT codes for the procedures so that departments record them accurately in their RIS.

Then the DID data can be linked to HES – so identifying more clearly where an IR procedure has been conducted.

Making use of data for capacity planning

There are a wide range of opportunities that come with having access to richer data, but for many trusts, the most important immediate use would be around improving capacity planning, so that they are better able to cope with likely peaks in demand, both in the short term (i.e. the next week or fortnight) and the long term. That can result in a range of benefits, from more informed rostering and a clearer strategy for recruitment, to enabling the use of insourcing and outsourcing to be better planned. It also allows them to provide more accurate information to GPs and patients about likely wait times for examinations and for results.

Business intelligence tools can help turn historic data about activity and demand into valuable insights for capacity planning. For instance, they can help identify peak times for particular modalities – so the department can plan staffing levels accordingly – and the likely impact of increased image acquisition on reporting backlogs, thus enabling informed decisions to be made about outsourcing some of the reporting work.

During deep dives, we met a number of trusts that have introduced tools such as bespoke dashboards to help monitor their own workload.

- At Bedfordshire Hospitals NHS Foundation Trust, the radiology service uses a bespoke dashboard for demand and capacity planning. This incorporates a complexity score for scheduled examinations, and so provides a strong estimate of the available capacity. It also allows proactive management of waiting lists.
- Norfolk and Norwich University Hospitals NHS Foundation Trust has introduced a robust daily process to monitor outstanding reports. At 7am, a comprehensive management report is generated, stating the number of reports waiting by days 1-28 (as well as weeks 1-8) by modality, referral source and priority. It can then drill down by modality and referral source to see if there are specific bottlenecks. Where there are, the radiology manager can take action, including outsourcing if necessary. The information can also be used by radiographers to provide patients with realistic expectations of when they should receive results.

Both of these appear to be very good examples of ways to improve workload monitoring, which in turn can inform capacity planning. However, each is unique to the trust; workload monitoring and capacity planning is currently undertaken done differently in each provider. This makes it very difficult to compare approaches or recommend specific models.

It should be underlined that any approach to capacity planning is also limited by what capacity a service has: its people and its equipment. An essential part of capacity planning should therefore be to look to the long term and identify what resources are required to meet the demand – and then build a business case for acquiring those resources.

However, there are at present few shared expectations and standards around measuring demand or about the resource needed to meet demand. As examined earlier, there is considerable variation between trusts in the amount of reporting that consultants are expected to do in a single session. There is also a lack of standardisation in the way that activity is counted. Some trusts appear to count the number of patients that require imaging, regardless of how much imaging is required; others count the total number of examinations conducted. The result is that the same imaging examination is captured in one trust as a single event, but in another trust as three or four events.

Improving the recording of activity – in particular, removing inconsistencies – would enable a more accurate activity count, which in turn could allow a more robust cost analysis. This would then also assist with capacity planning.

Recommendation	Actions	Owners	Timescale
12. National bodies should review coding in radiology.	**a** GIRFT to work with relevant stakeholders for diagnostics and imaging and 'radiology data group' on agreed system for counting for DID and NIDC, ensuring no duplication between both collections.	GIRFT, NHSE/I, NHS Digital, RCR, NHSE/I, Model Hospital	Ongoing
	b NHSE/I and NHS Digital to work together to ensure that there is effective linkage between HES and DID to ensure all data is only collected once, to improve the assessment of patient outcomes	NHSE/I, NHS Digital	For progress within a year from publication
13. All trusts should be supported to standardise the submission of data to national data collections and access radiology data, linked to HES, whenever they wish to, for benchmarking and planning.	**a** GIRFT to contribute to a review of national data collections related to imaging, then work with national bodies to eliminate duplication of submissions to data collections and identify how to incentivise trusts to collect data more accurately for DID submission as well as IR procedures.	GIRFT, NHSE/I, NHS Digital, RCR	Ongoing
	b GIRFT to work with NHSE/I to identity and promote appropriate training to support trusts to standardise submissions and upload trust-level imaging data.	GIRFT, NHSE/I	For completion a year of publication
	c Trusts to be supported by relevant bodies to merge datasets and manage the link to HES, once it is developed.	NHSE/I, NHS Digital	On completion of 13B
	d GIRFT Business Intelligence team to make radiology specific metrics, with associated definitions and data items, available via the Model Hospital so trusts can monitor and benchmark their performance.	GIRFT	For completion within 6 months of report publication
14. All trusts should anticipate and proactively manage their demand and capacity for both image acquisition and reporting, and for interventional radiology.	**a** NHSE/I to introduce template live dashboards or similar tools to enable daily management of capacity and demand.	NHSE/I to support individual trusts	For progress two years after report publication

4. Managing increasing demand

As well as looking at opportunities to create more capacity in radiology, it is important to consider whether there are ways to manage demand more effectively. We know that demand will continue to grow – not just in terms of the number and complexity of scans (demographic growth alone will result in that), but also in terms of demand for radiologists' time, particularly for clinical advice, participation in MDTs and interventional procedures.

Understanding demand

Any attempt to manage demand must start by understanding it. We looked at total radiology activity by referral source, dividing referrals into four key groups: referrals from emergency departments, referrals of inpatients, referrals from GPs (direct access) and referrals from outpatients.

The highest number of referrals come from outpatients – and that number is growing. By contrast, there has been a slight decrease in the number of patients referred via GP direct access. This may be as a result of a couple of factors. Firstly, in some areas GPs have directly commissioned imaging services from independent sector providers, in particular for ultrasound. Secondly, we know that in some clinical commissioning groups (CCGs), a decision has been made to restrict GP direct access, on the basis that this should help cut inappropriate referrals; however, this may often simply lead to patients being referred to outpatient departments, who then request the same imaging as the GP would have done.

This is counter-productive, as it essentially means the patient has two appointments (GP and outpatient) before they receive imaging. In the context of the NHS Long-Term Plan's aim to rethink outpatient services, we support a move towards the increased use of upfront scanning, where patients receive appropriate imaging before their outpatient appointment. If the imaging shows there is no need for the patient to see the outpatient team, they can be simply discharged on the basis of the radiology report.

We therefore support the principle of GP direct access – but with the important caveat, discussed further below, that imaging is used appropriately within patient pathways. It is also essential for upfront scanning that where imaging is undertaken by an independent sector provider, those images and reports are shared with the hospital radiology service in time for the appointment.

Recognising the impact of emergency department pressures on radiology referrals

Referrals from emergency departments have also increased over the past four years – at a faster rate than the total number of emergency department attendances has increased. This data needs to be viewed with some caution; we are aware that referrals for patients moving from emergency departments into acute wards may still be recorded as emergency department referrals.

Nonetheless, emergency departments are major users of radiology services, and during deep dive visits, some radiology teams raised the concern that they often receive emergency department referrals for imaging that may not be suitable for the required diagnosis.

This issue was recognised by the GIRFT emergency medicine team. Their view was that sometimes emergency clinicians recommend a full set of imaging modalities because they are unsure what will actually be provided swiftly to enable their diagnosis. However, they also underlined that where more imaging is conducted during the initial emergency admission, this often has benefits in terms of shorter length of stay overall and reduced mortality. They would welcome working more closely with radiology services to clarify optimal pathways, particularly for access to CT, while recognising that radiology resources are finite.

Optimising pathways and using imaging at the appropriate time

As demand grows, it is crucial that radiology is used appropriately within care pathways. That means patients getting the right imaging, at the right time – whether to facilitate accurate diagnosis or monitor progress. Sometimes, it may mean a longer wait before diagnosis, so the patient can receive the imaging modality that will be of most use; they do not have to waste their time and potentially undergo the stress of receiving imaging that will be of less value. At other times, best practice guidance is clear that alternative management strategies should be considered before resorting to imaging.

The Elective Care Transformation Programme examined this issue and made practical suggestions for improving and standardising referral pathways and adhering to NICE guidance on the use of X-ray for osteoarthritis.[38] We wholly support these suggestions.

During deep dives, radiology services described two common issues with imaging requests:

- receiving referrals for multiple types of imaging for the same patient as part of initial diagnosis – potentially because the optimal pathway to diagnosis is not clear;
- receiving requests for imaging that are outside the best practice guidance.

We looked at examples of both of these to understand how frequently they occur.

Investigations of limited clinical value: abdominal X-ray

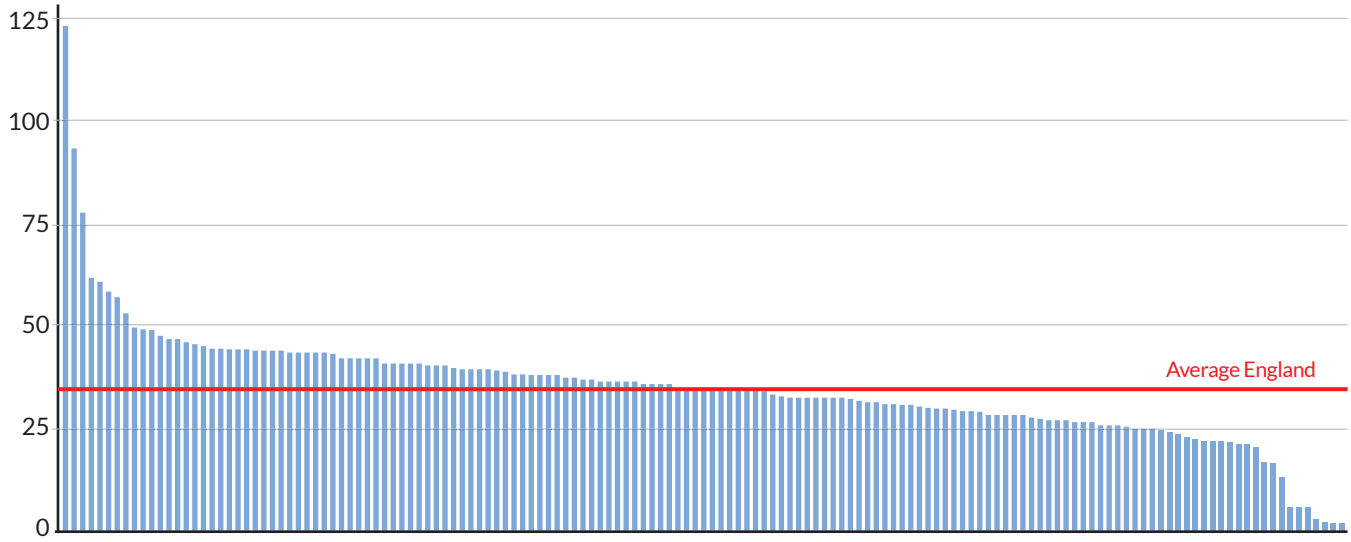
As an example of a referral for multiple types of imaging, we looked at imaging for abdominal pain. Because there are many potential causes of abdominal pain, clinicians understandably want as much information as they can to enable accurate diagnosis. However, from the radiology perspective, this can be problematic when a patient is referred for a CT, an ultrasound, and an X-ray. This 'basket' approach may seem to cover all bases, but in reality, the X-ray is likely to be of far less use in diagnosing many abdominal conditions than CT or ultrasound which provide far more detailed images. Indeed, a recent study found that over 40% of patients who had an abdominal X-ray with normal results were then referred for further imaging; over half of these then had abnormal results. Compared to most X-ray examinations, abdominal X-ray also involves higher radiation exposure: a further reason to avoid unnecessary investigations.

However, at many trusts, X-ray can be arranged and conducted far sooner than a CT or ultrasound, so to reassure the patient that something is being done towards their diagnosis while they wait for the optimal modality, clinicians request an X-ray as well.

In 2017-18, more than 730,000 abdominal X-rays were carried out across England. While some were undoubtedly appropriate, our concern is that, at some providers in particular, there are many more being carried out than are clinically necessary – simply because the test can be conducted. This then adds to the overall department workload without offering any benefits in terms of patient outcomes.

We therefore looked to find out how many abdominal X-rays trusts were performing, as a proportion of their total X-ray workload.

Figure 17: Abdominal X-rays per 1000 X-rays, by trust, April 2017 - March 2018



Data source: NIDC

[38] *See www.england.nhs.uk/wp-content/uploads/2019/07/radiology-elective-care-handbook.pdf*

[39] *Mowlem et al. (2019) - The evaluation of compliance with iRefer guidelines for abdominal imaging and the impact of the normal abdominal radiograph on the clinical confidence and decision making of emergency clinicians Radiography Online volume 25, issue 1 www.radiographyonline.com/article/S1078-8174(18)30131-7/fulltext*

As can be seen, while the majority of trusts were close to the national average (34.7 per 1000), with the extreme outliers typically conducting small volumes of X-rays overall. However, given that existing professional guidance – including the RCR's iRefer guidelines[40] – specifically indicates the small number of abdominal pain indications for which X-ray is recommended, this average itself is too high. It should be possible for almost all providers to reduce the number of abdominal X-rays they conduct, especially for patients who will then receive further imaging.

This requires providers to clarify the optimal pathway, reiterating to referring departments and clinicians the indications for which abdominal X-ray is suitable. However, given the human factors understood to be involved in many referrals – predominantly, the desire to reassure the patient that their condition is being investigated – it also ultimately requires radiology services to be able to offer the preferred modality sooner.

The Evidence-Based Interventions programme

The aim of the Evidence-Based Interventions (EBI) programme is to prevent avoidable harm to patients, to avoid unnecessary operations, and to free up clinical time by only offering interventions on the NHS that are evidence-based and appropriate. The first phase of the programme identified 17 interventions which should either not be performed under any circumstances or should only be performed when specific criteria are met: it has since developed guidance for those 17 interventions. Work to develop the second phase of the programme is underway: consultation on the new list of interventions for review is likely to begin early in 2020 and will include some radiology interventions. More detail on the programme is available at www.england.nhs.uk/evidence-based-interventions/.

Investigations of limited clinical value: lumbar spine X-ray

For some years, NICE guidance has been clear that imaging should not be routinely offered for low back pain, unless the result is likely to change the way the patient is managed.[41] Instead, physiotherapy should be the first step.

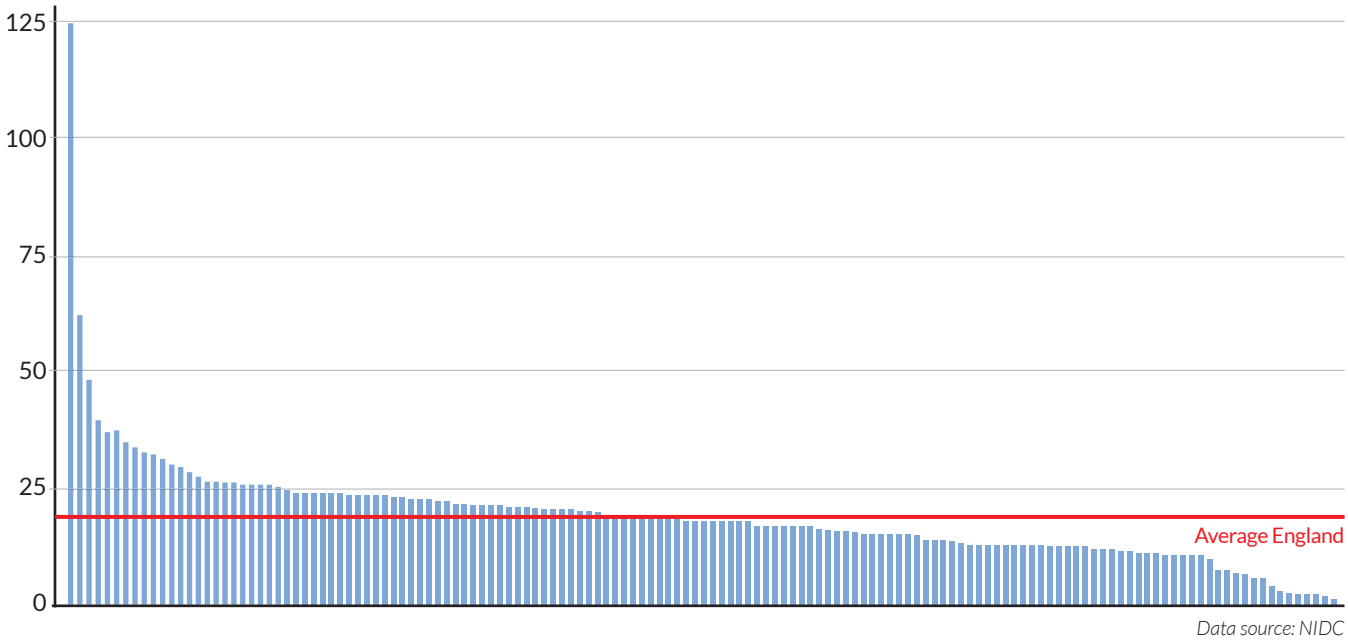
However, in 2017-18, more than 400,000 lumbar spine X-rays were undertaken across England. Just over half of these resulted from GP referrals. There are several concerns here: firstly, this appears to be a high volume of work for radiology services, given that imaging should not be routinely offered as a first step. Secondly, in the minority of cases where imaging is genuinely required, MRI is the modality that can provide the most valuable diagnostic images. Thirdly, every X-ray has some radiation associated with it; this is a potentially unnecessary burden.

We examined the variation between providers in the frequency with which they conducted lumbar spine X-rays, as a share of their total X-ray workload.

[40] *www.irefer.org.uk*

[41] *See NICE (2016) CG 59 Low back pain and sciatica in over 16s: assessment and management (section 1.1) www.nice.org.uk/guidance/NG59/chapter/Recommendations#assessment-of-low-back-pain-and-sciatica*

Figure 18: Lumbar spine X-rays per 1000 X-rays, by trust, April 2017-March 2018



Data source: NIDC

Again, most of the more extreme variation was seen at providers conducting fewer X-rays overall. However, there were some high-volume providers that had substantially lower lumbar spine X-ray rates.

Our understanding from deep dive visits is that the factor that most affects the number of lumbar spine X-rays they undertake is the availability of physiotherapy locally. Though this is the recommended first step, all too often the pathways are unclear at a local level and access to physiotherapy is limited. That leaves clinicians – particularly in primary care – with few options: referring to radiology means they are offering a next step of sorts, rather than leaving the patient with the perception that their GP is not doing anything.

To address this, radiology services may need to work with CCGs and trusts to ensure local pathways are clear and have capacity for the patients. There is also a requirement for better information to primary care, reinforcing the point that imaging may be of limited value for certain conditions.

The need for improved clinical decision-making tools

This need for better information extends beyond the specific imaging discussed above. There are frequent instances where referrals for imaging are requested by clinicians who do not have a full understanding of the efficacy of different modalities or their suitability for the particular diagnosis; these can then lead to unnecessary or inappropriate requests.

The RCR's iRefer[42] guidelines, mentioned above, are evidence-based guidelines for use by referring clinicians for approximately 280 imaging related clinical scenarios. iRefer is also now available in a clinical decision support (CDS)-enabled version that integrates with referral systems in primary and secondary care. We would welcome the use of this version across England as this would allow consistent access to clear and standardised imaging referral guidelines.

Before the CDS-enabled version was available, iRefer was supported by a nationwide licence to the NHS and was well used by referring clinicians leading to a direct, positive impact on radiology referrals. The guidelines are being continuously reviewed and updated and have already been piloted in the CDS version in the NHS in England.

The right to refuse – and why it is rarely exercised

We have looked here at various ways in which demand for radiology can be managed – with a view not to cutting the amount of imaging undertaken, but rather using imaging appropriately within pathways. But one means of managing demand is more straightforward: simply rejecting imaging requests which seem inappropriate.

[42] *See www.irefer.org.uk*

Radiologists already have a right to do this. However, it is not clear how often this right is exercised. There is no data available for rejection rates; during deep dives, radiologists and radiology managers told us that it is often quicker and easier to fulfil the request – so conducting imaging that appears to the radiologist to be unnecessary and then reporting on it – than it is to reject it and enter into potentially prolonged dialogue with the referring clinician, as well as confusing or upsetting the patient.

This then becomes a further issue for the radiographer, who has a professional responsibility not to perform unnecessary imaging, and is required to be able to justify all examinations. They may feel they should be rejecting the imaging request on clinical grounds, but are obliged to defer to their colleagues' wishes.

During discussions with stakeholders, it was also noted that the most recent release of iRefer will retain details of the clinician that requests imaging. This has the potential to help address low-value referrals on a more systematic level, rather than on a one-to-one basis. It will be possible to identify if a clinician repeatedly requests imaging that is of low value, or does not follow the recommended diagnostic pathway as set out in the decision support element of iRefer. This information can then be used as the foundation for more targeted training for the referring clinicians.

In practice: reducing low value imaging

In 2015/16, the radiology team at Royal United Hospitals Bath NHS Foundation Trust found that direct access referrals for both musculoskeletal MRI and ultrasound had risen significantly, with widespread lack of adherence to the local referral guidelines. In the latter case, the department had resorted to running ten additional evening ultrasound lists a week to try and keep up with demand – with many of the examinations conducted deemed to be of low clinical value. In consultation with relevant departments, a team of radiologists worked on revised guidelines for direct access referrals. Once these were drafted, feedback was sought from the local CCGs. There was an instant impact: MRI referrals reduced by approximately 140 per month.

For ultrasound, the guidance was designed to provide helpful advice to GPs about alternative modes of investigation where ultrasound was not recommended. Importantly, this aligned with already established clinical pathways. A "return to referrer" form was also developed to explain to GPs why their referral was being returned. The implementation of these guidelines led to an immediate and sustained reduction in non-obstetric ultrasound referrals.

Facilitating the introduction of pathway changes in other specialties

In 2015, a Cancer Research UK report found that one of the key factors driving growth in demand for radiology was the introduction of new clinical guidelines that set specific requirements for imaging.[43] These guidelines included requirements for cross-sectional imaging rather than simple imaging, and lower thresholds for when imaging should be conducted.

Since then, more guidelines have been introduced which also stipulate that complex imaging should be provided earlier in the pathway and more frequently, as part of ongoing treatment and monitoring.

While radiology teams are keen to meet these requirements, and wholly endorse the view that imaging can be used effectively in these ways, the reality is that the speciality is not currently resourced to deliver the total volume of activity that all of this guidance would require.

For example, in 2016 NICE published its guideline CG95 Chest pain of recent onset: assessment and diagnosis. This advises the use of 64 slice (or above) CT coronary angiography, instead of other non-invasive tests, to provide an imaging-based diagnosis if clinical assessment indicates epicardial coronary disease, or if the initial assessment indicates *"non-anginal chest pain but 12 lead resting ECG has been done and indicates ST T changes or Q waves".*[44]

There is no doubt that CT could play a valuable role in this diagnostic process: the approach has been shown both to reduce the number of repeated non-invasive tests and to decrease the proportion of invasive angiograms that demonstrate no significant coronary narrowing. There is also evidence that it improves outcomes, as it allows the identification of non-obstructive atherosclerotic plaque, that is amenable to medical treatment.

[43] *Cancer Research UK (2015) Horizon Scanning pg 9 www.cancerresearchuk.org/sites/default/files/horizon_scanning_-_final.pdf*

[44] *NICE (2016) CG95 Chest pain of recent onset: assessment and diagnosis www.nice.org.uk/guidance/cg95/chapter/Recommendations*

However, the British Society of Cardiovascular Imaging has calculated that *"up to an additional 200,000 patients may require CTCA [CT coronary angiography] under the new NICE stable chest pain guidelines. This represents a 700% increase in cardiovascular CT delivery."*[45]

This is clearly a significant challenge for both radiology and cardiology services. We understand from our colleagues on the GIRFT cardiology workstream that the NICE guidance is leading to a change in the management of stable chest pain, as many cardiology units are working with radiology services to increase their access to CTCA. We also are aware that cardiologists would welcome being able to use CT (and MRI) more frequently for a range of cardiological diagnoses.

However, unless there is a rapid increase in the availability of CT scanners – and in the availability of staff (in radiology and cardiology) trained to conduct and report this kind of specialist CT imaging – adhering strictly to NICE guidance here would mean that other patients waiting for CT, whose condition could not be adequately assessed using other imaging modalities, will wait longer.

In short, at present there is a substantial gap between what national guidance recommends for this group of patients and what NHS radiology services are equipped to deliver.

NICE has fully acknowledged this and consultation has begun on updating the guidance; however, it should be reiterated that the role of NICE is to identify and recommend the optimum solutions based on evidence, and not be constricted by the practical challenges of implementation (even though its guidance acknowledges what these are).

This is far from the only example. The introduction of the new national lung health check programme, although admirable in goal, requires a very specialised skill set to report. At present, there is an insufficient number of suitably skilled radiologists able to report these scans; the unintended consequences of this could cause delays in other areas of core work.

Reports have proposed the use of complex imaging earlier and for a greater number of suspected conditions, including spinal injury. There is also robust evidence that shows the advantages, in terms of patient outcomes, in carrying out multiparametric MRI before biopsy in patients with prostate cancer. At present, these have not yet become national policy but there is a strong argument, in both cases, for using imaging earlier.

Local policies to meet core standards and targets can also disproportionately affect radiology demand. For example, to meet the two-week referral target for suspected cancer, many trusts required any imaging to be completed within the first week. Several radiology departments told us that they must therefore prioritise these imaging requests, potentially above imaging for patients whose cancer is already confirmed or who need a diagnosis for other conditions.

To help them meet these multiple targets, some radiology services employ managers – or make it a major part of a radiologist's role – to ensure that the right groups of patients are prioritised. However, the prioritisation is based not on clinical urgency, but simply to meet the target(s). This is surely not the way that services should be required to function.

The common thread with many of these proposed changes is that the recommendations are made without examining the likely impact on radiology. Radiology services are not adequately consulted; the assumption appears that the additional workload can simply be accommodated.

As was repeatedly highlighted in our deep dive discussions, any requirement to prioritise one group of patients inevitably means other patients have to wait longer for imaging. This knock-on effect appears to be rarely considered within specialty-led recommendations for change; radiology teams, serving and supporting all other specialties, are often in a better position to identify this potential negative impact before a change is introduced.

We believe these issues could be addressed through ensuring that radiology representatives are consulted on any proposed change to pathways or practice that may have an impact on the radiology workload. There are predictive capacity and demand models that could be used to help forecast the likely impact and quantify the resource that would be needed to meet anticipated demand; that can then inform discussions about whether to increase resource or adapt the recommendation.

[45] *See https://bsci.org.uk/standards-and-guidelines/nice-cg95-update-2016/*

Making more strategic use of outsourcing and insourcing

As alluded to earlier, outsourcing is now a standard practice in radiology. It can be for image acquisition – using a third party, typically from the private sector, to conduct some of the required examinations – or for reporting, where batches of images are sent to a third party to report on them. Again, this is often a private sector company, which contracts trained radiographers and radiologists to acquire the images and report on them, usually with agreed targets for volume and turnaround time. Many trusts also outsource reporting of overnight studies, including in some cases to radiologists working in other time zones.

Outsourcing frees the hospital's own team to focus on other tasks – typically those that require direct interaction with the patient or with colleagues. The use of overnight outsourcing also helps avoid the in-house team working for excessively long hours, and thus restricting their availability the following day.

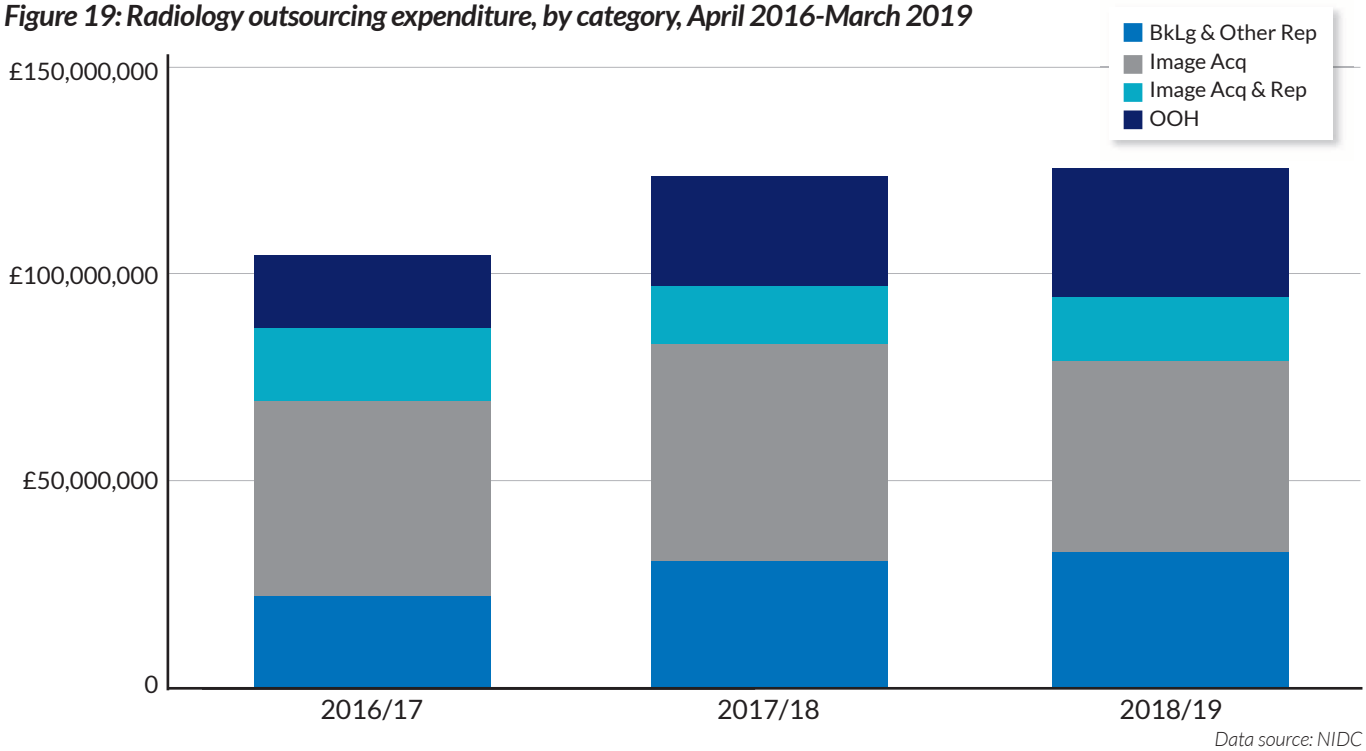
Almost every trust we visited outsources some of its workload. For some, it's a routine part of capacity management, using a third party provider for a particular type of image acquisition or sending a standard volume of images to the contracted provider on a regular basis. For others, outsourcing is more reactive, as a means of clearing backlogs or assisting at times of high demand.

In practice: outsourced reporting

The Isle of Wight NHS Trust has been making extensive use of outsourcing for several years. It uses multiple outsourcing providers so can assign work appropriately. Its total expenditure is higher than many other trusts, but through outsourcing, it is now in the top 10% for low turnaround times.

Overall, radiology services in England now spend over £120 million a year on outsourcing – an increase of £20 million compared to just two years ago. As figure 19 demonstrates, the largest share of this is spent on image acquisition, but there is growing expenditure on dealing with reporting backlogs and out-of-hours reporting.

Figure 19: Radiology outsourcing expenditure, by category, April 2016-March 2019



Data source: NIDC

In theory, outsourcing offers a cost-effective and flexible approach to increasing capacity. It means providers pay only for the image acquisition or the reports, rather than having to pay for additional staff for whom reporting would only be part of their role.

However, at present it is not possible to quantify any cost benefits, because of a lack of transparency around the costs associated with the use of outsourcing. While most trusts are able to provide a figure for how much they spend on outsourcing, not all have provided data for the amount of imaging or reporting that is returned for that cost. There also appear to be differences in the way that activity is counted.

Given these uncertainties, it is entirely possible that different trusts are paying similar amounts for vastly different volumes of output. We also understand from our discussions in deep dives that contracts differ widely. This is an area where a move to networks should deliver value, increasing standardisation in contracts and expectations, as well as benefiting from greater buying power.

Crucially too, it's not clear what the impact of outsourcing is on departmental workload. While most outsourcing providers have rigorous quality standards, there is understandably often a need for local radiologists to formally review outsourced reports and answer further questions from the referring clinician. When a patient is to be discussed in a multidisciplinary team meeting, the radiology team member at the meeting (normally a consultant radiologist) will still have to review the images and familiarise themselves with them to be able to input appropriately.

A further complication can arise when an image is sent to an outsourcing provider to report, without any previous reports or patient context. The image itself might be the latest in a series, monitoring a patient's progress but the outsourced reporter may have no way of knowing this; the report that is returned from the outsourcing provider is then of less value.

Even when the outsourcing provider has the right information, working processes can be hampered by a lack of IT integration. This results in PACS teams spending a considerable amount of time transferring images and reports to and from the outsourcing provider – a labour-intensive process that could be eliminated with more compatible systems.

Providers of outsourcing services themselves have finite capacity; at times of greatest demand, such as when large numbers of hospital staff are on leave over holiday periods, the outsourcing companies are often similarly stretched. In its strategy for imaging networks, NHS Improvement also noted: *"We also know from speaking to front line managers and clinicians that they are finding it increasingly difficult to find independent sector companies to report certain types of examinations and this will drive up the cost of outsourcing due to market forces."*[46]

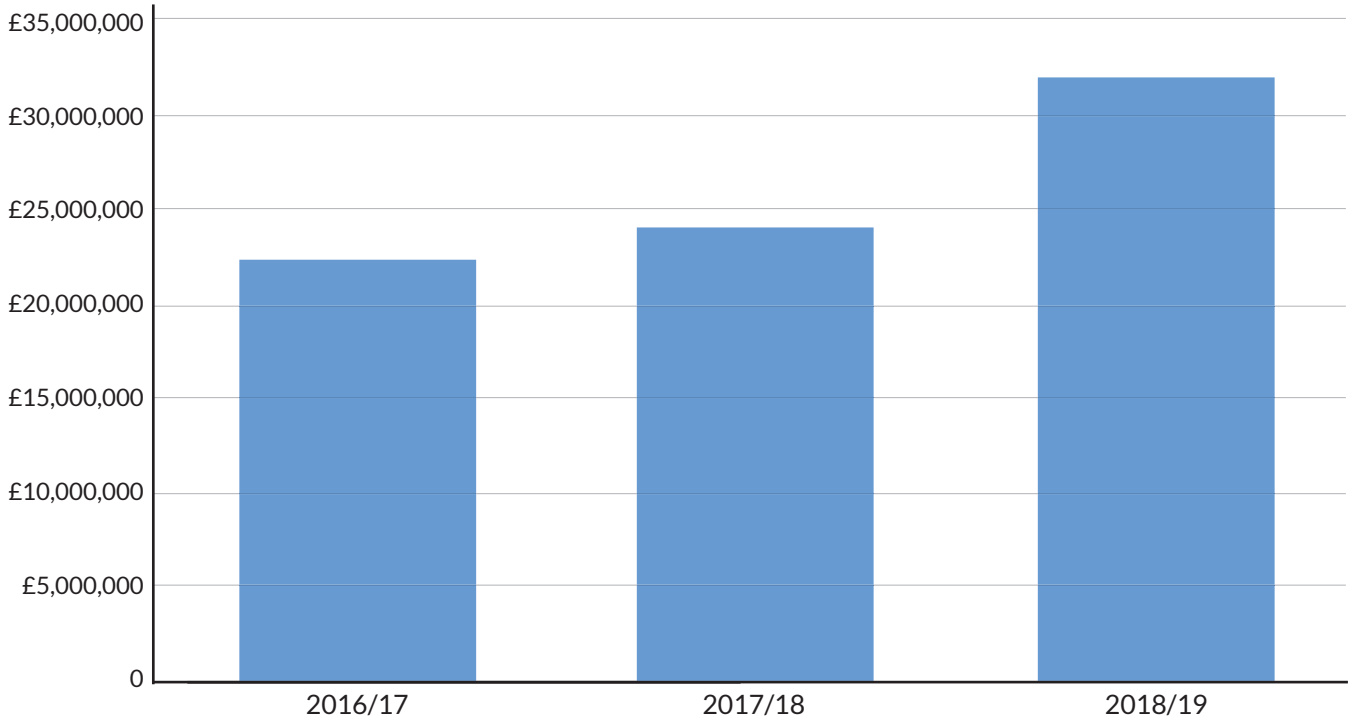
In short, while outsourcing is – and seems likely to remain – an important tool for radiology services, there needs to be more transparency and governance around its usage, plus better planning so that outsourcing is used consistently.

Insourcing: a viable alternative?

An alternative approach to outsourcing is 'insourcing' – effectively paying the existing team to conduct additional reporting work, outside of their contracted hours, rather than paying a third party. As figure 20 shows, the amount trusts spend on insourcing grew rapidly in recent years.

[46] *NHS England / NHS Improvement (2019) Transforming imaging services in England: a national strategy for imaging networks https://improvement.nhs.uk/resources/transforming-imaging-services-in-england-a-national-strategy-for-imaging-networks/*

Figure 20: Radiology insourcing expenditure April 2016-March 2019



Data source: NIDC

Insourcing potentially offers some important advantages over outsourcing: it can often be more easily integrated into departmental workflows – the radiologist or radiographer simply reports in the normal way and there is no need for additional data entry. When queries are raised from referring departments, the reporting radiologist or radiographer is on hand to answer them.

It also appears that it may be more cost-effective. However, this finding needs to be treated with caution; as highlighted earlier, data around outsourcing and insourcing activity is poor and inconsistent so it is not certain what trusts are receiving for their money.

In practice: Insourcing

The United Lincolnshire Hospitals NHS Trust has embraced insourcing for CT, MRI and X-ray. Work is formally assigned to each reporter, and there is robust policy to ensure they are not doing this in job planned time. The approach has increased capacity and reduced costs, with the department paying less through the insourcing model than they would for the equivalent workload if outsourced.

Set against these benefits, it should be noted that insourcing effectively means paying staff to work extra hours. At present, the readiness of many staff to work extra hours outside of their contracted hours has dropped as a result of a dispute over NHS pensions; we would expect insourcing volumes to drop considerably – potentially resulting in a further increase in outsourcing activity.

Even if the situation changes and staff agree to this additional work again, insourcing is dependent on co-operation; as this cannot be fully guaranteed, it can be treated as a secure long-term option. There are also further issues to address.

The long-term impact of working more hours on staff wellbeing has not been fully assessed. Further, as staff work longer hours and become increasingly tired, the risks of reporting error may increase. This should be a consideration for radiology services in any discussion of making more use of insourcing.

The RCR has stated that the total amount being spent on outsourcing each year would be more than enough to employ staff to do the work.[47] As it is also uncontrolled, there needs to be a rethink: we expect both outsourcing and insourcing to continue to have a role, but they need to be managed more professionally and transparently. In particular, it is important that trusts – and the specialty as a whole – gains a clearer understanding of what represents good value, through sharing information between trusts about what their costs and expectations are. That will assist all providers to procure outsourced services more effectively and strategically.

Moving to a network model

The NHS Long Term Plan set out a commitment that *"By 2023, diagnostic imaging networks will enable the rapid transfer of clinical images from care settings close to the patient to the relevant specialist clinician to interpret."*

This was followed in November 2019 by the publication by NHS England and NHS Improvement of *Transforming imaging services in England: a national strategy for imaging networks*.[48] The strategy sets out a range of benefits of a networked model beyond easier access to specialist clinicians, including additional resource for image acquisition and reporting, procurement savings through combined purchasing power and greater opportunities for staff. It proposes that trusts are organised into 24 networks by 2022; this will then be consolidated to 18 by 2023. There are a range of factors considered in its recommendations for the distribution of these networks, including the need to take account of – and possibly align with – other clinical networks, such as trauma networks and cancer alliances.

We support this strategy and its aims, and also welcome its recognition that re-organisation of resource alone is insufficient to achieve those aims. As the strategy makes clear, there will also *"need to be a significant increase in the number of radiologists and radiographers in training, to make up for the current shortfall."*

The strategy recognises that there are already some networks within radiology. During deep dive visits, we asked trusts that are part of an existing network for their views on how effective the network had been. Most were positive, though recognised that their network arrangements were at different levels of maturity, with governance in particular an area highlighted for improvement. We also heard of practical challenges, flagged earlier in this report and reiterated in the NHS England/NHS Improvement strategy, related to image and report sharing between hospitals. Clearly, these must be addressed to capitalise on the full potential of a network model.

IR networks and patient-centred pathways

The new network strategy is focused on diagnostic imaging, but there are also opportunities to be gained from the creation of IR networks. As noted earlier, there are now many clinical conditions and circumstances where the optimal treatment for a patient would involve IR. These include potentially life-saving treatments such as nephrostomy (inserting a catheter into the kidney) and embolisation (blocking a blood vessel to stop bleeding).

Over recent years, there has therefore been a drive to make such procedures available to all patients 24/7. In 2017, NHS Improvement and the British Society of Interventional Radiology (BSIR) published *"Providing access to interventional radiology services, seven days a week"*, which showed the availability of these procedures by area in 2013.[49] In general, most trusts offered these procedures in-house during core working hours – or had a formal pathway of referral to another trust. However, the out-of-hours picture was more mixed.

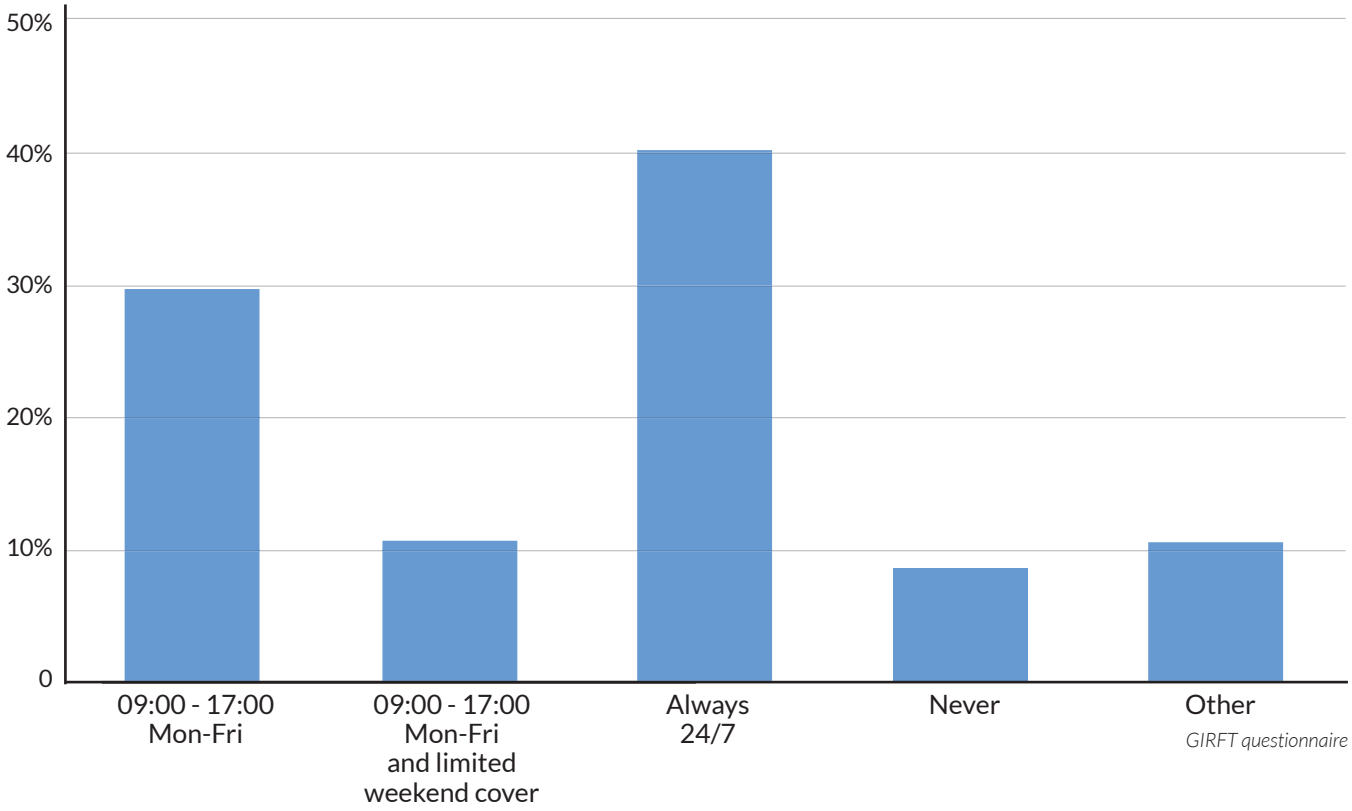
We revisited this issue in our pre deep dive questionnaire, asking trusts which of several common IR procedures they offered on site, and whether this was available 24/7. Though this was some years on from the previous study, we found that most trusts are still not able to offer a full range of these IR procedures 24/7. Looking at nephrostomy and embolisation, we found that only around 40% of trusts provide both procedures in-house 24/7; almost 20% said that they never provide embolisation in-house.

[47] *See www.rcr.ac.uk/publication/clinical-radiology-uk-workforce-census-report-2018*

[48] *https://improvement.nhs.uk/resources/transforming-imaging-services-in-england-a-national-strategy-for-imaging-networks/*

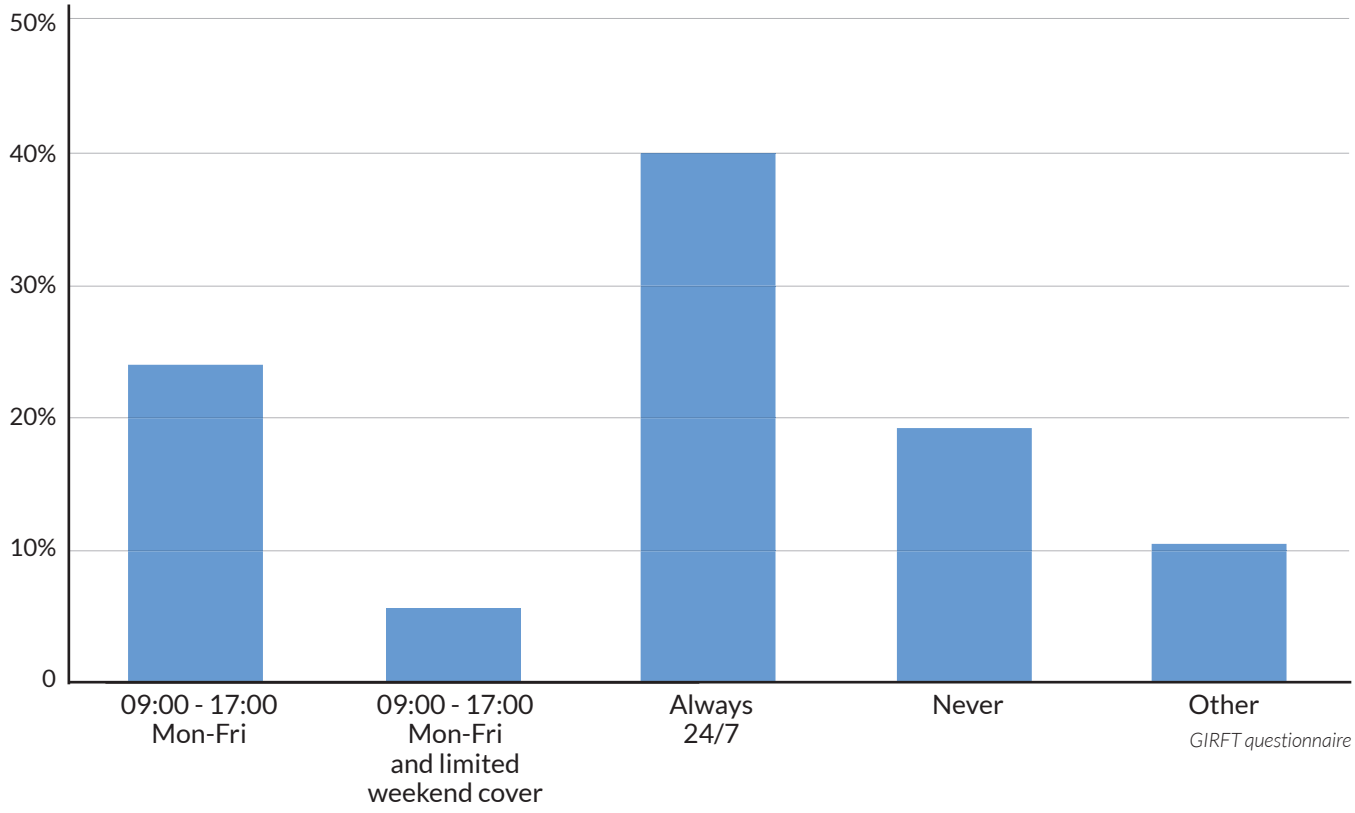
[49] *NHS Improvement and BSIR (2017) Providing access to interventional radiology services, seven days a week https://www.england.nhs.uk/improvement-hub/wp-content/uploads/sites/44/2017/11/Seven-Day-Access-to-Interventional-Radiology.pdf*

Figure 21: Trust responses to GIRFT question "Do you offer nephrostomy on site?"



GIRFT questionnaire

Figure 22: Trust responses to GIRFT question "Do you offer embolisation on site?"



GIRFT questionnaire

Given the urgency of these procedures, the ideal situation would be that they are available 24/7 in all trusts. However, IR is highly specialised and can be high risk; where a department does do not have adequate skills or cover, it is better that patients are transferred to a trust that does. It was therefore of concern that many of the trusts that do not provide 24/7 access to these procedures in-house also do not have robust pathways for transferring patients needing them (as well as for transferring any relevant imaging to accelerate the process). This ad hoc way of working creates an unacceptable risk to patient safety.

This was also the situation with some of the more specialised/less common IR procedures, such as in neuroradiology or for endovascular aneurysm repair (EVAR). Here, we would not expect the majority of trusts to offer them in-house: however, we would expect all trusts to have established referral and transfer processes. This does not seem to be the case – and for the benefit of patients, needs to change. A networked way of working offers a practical approach.

We believe that all trusts should have clearly established pathways for these vital IR procedures. These pathways, which should be fully documented, would need to cover automatic acceptance of the transfer; post-operative repatriation and transfer of clinical supervision. We also believe it may be appropriate for regulators to assess the viability and robustness of referral and transfer processes.

Some trusts are working with network partners to provide 24/7 cover to the standards recommended by the RCR.[50] Unlike diagnostic radiology, where images can be transferred to wherever the expert clinician is, IR requires the patient and radiologist to be in the same location. Current networks therefore include those based on staff moving between locations to provide the required cover, and those based on the transfer of patients (see In Practice box below). This latter approach may lend itself to a hub and spoke model, with resources concentrated at the hubs; for example, hubs could be suitable locations for investment in a dedicated IR suite with its own waiting area, theatre and recovery beds.

In practice: networked approaches to providing 24/7 IR cover

The Black Country Provider Partnership is a means of ensuring that four acute trusts in the West Midlands can all offer 24/7 cover for IR. Where necessary, a patient needing IR can be transferred promptly to other hospitals. Aftercare is then provided at the patient's local hospital. The process works at a consultant-to-consultant level and the respective departments know who is on call at their neighbours at all times. Recent evaluation has shown that procedures are typically carried out faster than before, that treatments are less invasive as a result of improved access to IR and that the patient experience has improved. The partners also believe that the existence of the partnership has helped retain skilled staff in the area.

In Lancashire & South Cumbria, four trusts work together to make best use of each's specific skills and resources. Different sites act as centres for different categories of IR procedures – vascular, urology, trauma, gynaecology – and there are separate pathways to provide sufficient out of hours cover.

Recognising the impact of different specialty networks

As noted in the strategy, aside from imaging networks, different networks are also being developed for different specialties. For example, vascular networks are different from e.g. trauma networks. The principle is the same but different hospitals become centres for different areas of expertise, reflecting their existing staff, resource, experience and in some cases location.

This presents a particular challenge for radiology. It is a fundamental requirement for many of these networks to have access to specialist radiology skills and equipment; centres typically use more advanced imaging and conduct more interventional radiology. As a result, radiology resources may be stretched or split to meet the requirements of a vascular network (such as extensive support for IR) **and** a trauma network (which needs rapid access to diagnostic imaging); they could be different hubs in the same geographical area, neither of which necessarily has the largest radiology department or most equipment.

[50] *RCR (2017) Standards for providing a 24-hour interventional radiology service, second edition*
www.rcr.ac.uk/publication/standards-providing-24-hour-interventional-radiology-service-second-edition

The challenge therefore is to meet the requirements of these different specialty networks, while maintaining core radiology services. If a substantial share of IR expertise is allocated to a vascular network hub to meet the workload, this can affect (and in some cases, has affected) other users of IR in different locations – and a provider's ability to offer non-vascular IR services.

We would therefore urge that radiology services or representative bodies are consulted in decisions to establish networks in other specialties, especially those that are significant users of radiology services. That will allow the greatest possible alignment between the requirements of these different specialty networks and the requirements of radiology units and networks in the future.

Making smarter use of the skills and resources of specialist hospitals

Outside any specific networks, we also feel that there is an opportunity for more effective use to be made of the skills and resources of specialist hospitals. It was noted in some deep dives that specialist hospitals typically have more or newer equipment than their neighbouring trusts – often funded in part by public appeals or donations – and that they act as a magnet for staff.

This is, arguably, to be expected; it ensures the continually high standards and condition-specific expertise for which the specialist hospitals are renowned. However, given the pressures on NHS radiology services, it is important that this expertise is used more widely – whether to take in additional patients, to provide extra capacity at times of high demand or urgent need and to advise and assist on complex cases.

For example, rather than simply referring a patient to a specialist hospital for diagnosis, we believe a more beneficial approach would be for a consultant at the specialist hospital to review imaging undertaken locally and share or discuss reports with the referring hospital. This would potentially mean the patient could be diagnosed faster and not require imaging performed at their local hospital to be repeated at a specialist one. Of course, this does happen at times, but all too often this is based on personal connections or friendships between clinicians rather than through clear and consistent protocols. One reason for this is that staff at specialist hospitals do not have time allocated in their job plans for this activity; it is therefore reliant on individual goodwill. Another limiting factor may be IT, which can make it unnecessarily difficult to share images and reports with specialist hospitals.

More broadly, there could also be opportunities for specialist hospital teams to provide on-site training sessions for general hospitals – looking not only at clinical expertise but also optimising processes.

These are purely examples; we would envisage that different trusts would seek to work with specialist hospitals in different ways, reflecting their own workload and priorities. Our message is simply that there needs to be a slight cultural shift; at present, there are too many perceived barriers in the way of effective joint working with specialist hospitals, meaning that patients do not receive the best experience.

Recommendation	Actions	Owners	Timescale
15. All referrers should adopt robust clinical pathways supported by clinical decision-making tools such as the RCR's CDS-enabled iRefer.	**a** GIRFT to work with the RCR to help referrers introduce and enhance their use of tools such as iRefer to improve the appropriateness of referrals.	GIRFT, RCR, NHSE/I, Commissioners,	For significant progress within a year of publication
16. National bodies that produce clinical guidelines with a clinical interdependency with radiology must assess, prior to implementation, the impact on the speciality.	**a** GIRFT to work with NICE and professional bodies to explore mechanisms for calculating the impact of national guidelines on radiological practice.	GIRFT, RCR, NICE, NHSE/I	Ongoing

Recommendation	Actions	Owners	Timescale
17. All trusts and networks should have policies around the management and governance of reporting capacity and costs of insourcing and outsourcing which are transparent.	**a** GIRFT to work with trusts/networks to ensure that robust policies are in place for the insourcing and outsourcing of reporting, based on demand and capacity planning.	GIRFT, NHSE/I, imaging networks	For progress six months after publication
	b Trusts to consider procuring outsourcing services collaboratively with their NHS imaging network partners to drive best value for money.	GIRFT, NHSE/I, imaging networks	For progress one year after publication
18. All trusts should move to a network model of service delivery in line with the NHSE/I strategy.	**a** GIRFT to work with the NHSE/I team that are leading on imaging networks on their continued roll-out.	GIRFT, NHSE/I	To align with delivery timelines for NHSE/I imaging networks roll out.
	b GIRFT to work with the NHSE/I team to identify best practice in radiology networks and disseminate learnings to other trusts.		Ongoing.
	c Trusts and networks to develop robust and documented pathways for all interventional and other 'hands on' procedures, to cover: • arrangements for transfers to the relevant network partner or specialist provider; • automatic acceptance of patients; • transfer of clinical responsibility; • transfer of any relevant imaging and reports; and • repatriation post-procedure.		Progress within six months of publication.
	d Specialist hospitals to share their expertise widely; this may be beyond the confines of their immediate network.	GIRFT, specialist trusts, imaging networks	For significant progress to be made 18 months after report publication

5. Procurement

Delivery of radiology services involves the use of a wide range of products and services that are procured from the private sector. For this report, we chose to focus on three areas to examine procurement activity and costs:

- products and consumables used in imaging and interventional radiology;
- the growing market for outsourced and insourced image reporting; and
- the purchase, lease or use of managed equipment services (MES) for equipment.

Unwarranted variation – consumables

In 2016, NHS Improvement mandated all trusts to submit their monthly purchase order data to a central database: the Purchase Price Index & Benchmarking data tool (PPIB). This was the first time a single national dataset of procurement information had been established for the NHS. For the last 18 months, the GIRFT programme has been analysing this data to better understand the variation in products and brands used and prices paid across NHS trusts. This analysis has been a feature of previous GIRFT reports with examples of extreme variation in the number of brands used by clinicians.

What has become clear is that this variation is often down to clinical choice, and there has been a growing list of examples where the evidence-base to support these decisions has been weak; in some cases, patient safety has been compromised.

The extreme variation not only compromises patient safety, but it also adds significant costs to the NHS Supply Chain, as every brand used requires inventories and the purchasing power that comes through high-volume procurement is reduced. Addressing variation therefore should not only improve safety and efficacy but also provide the opportunity to secure better deals and improved value for money for trusts.

NHS Improvement recently re-launched the PPIB as the NHS Spend Comparison Service (NHS SCS),[51] to allow trusts to compare the products they use and prices they pay with other trusts across the NHS. The service is primarily targeted to NHS procurement staff, but GIRFT is working to tailor the data for medical directors and NHS clinicians, and place it alongside clinical outcome and HES data, so they can better understand the impact of the decisions they make.

Analysis of NHS SCS data reveals significant variation in brands consumed and prices paid for consumables used in radiology.

For example, we found significant variation in the use of biopsy devices and needles with over 50 brands from over 20 suppliers used across the service. NHS trusts spend £10.7m per annum on these devices and the NHS SCS data not only shows significant variation in prices for each brand but also in the prices paid for the same brand from the same supplier. The two most commonly used brands account for a third of the £10.7m spent on these devices.

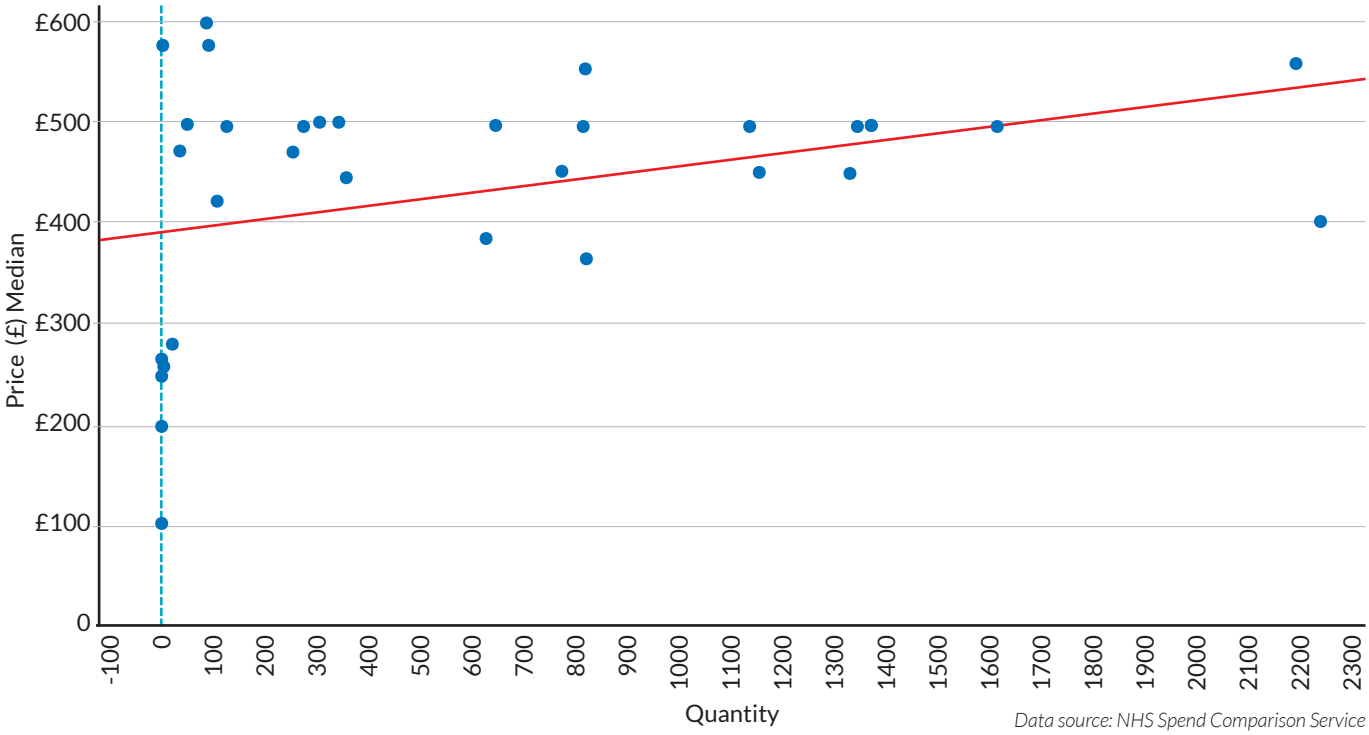
We looked at the most frequently purchased needle from each brand. For one, which the NHS spends over £600k a year on, the lowest price paid per item by a NHS trust was £15, while the highest was £22. If all trusts bought at the lowest price, the NHS would save £73,680 on this item alone. The other needle is typically bought in boxes of five. The lowest price paid for a box was £135 and the highest £203. In total, the NHS annual spend on this product was over £660k. If all trusts could achieve the lowest price then the NHS would save £110,846. Together, this amounts to a potential saving of £200k a year on these two products alone through better procurement.

If all trusts were able to achieve the best prices paid for each brand then the NHS could save nearly £2m per annum – a 20% saving – on the £10.7m spent on biopsy devices. This does not take into account the even greater savings that can be made through rationalising the number of brands used and only purchasing those that represent the best value for the NHS.

Similar variation appears to exist across all consumables used in radiology with no correlation between prices paid and volumes purchased. Indeed, in neuroradiology, if a trend can be detected it appears those trusts buying the most are paying the highest prices, which is simply dumbfounding!

[51] *https://digital.nhs.uk/data-and-information/data-collections-and-data-sets/data-collections/spend-comparison-service*

Figure 23: Prices paid per item for neuroradiology consumables, compared to volumes purchased



Data source: NHS Spend Comparison Service

Unwarranted variation – outsourced reporting services

As set out earlier in this report, it is estimated the NHS now spends as much as £120m a year on outsourcing radiology reporting.

As trusts have increased their use of insourced and outsourced reporting, they have developed specifications and entered into partnerships independently, inevitably leading to widespread variation across the NHS. However, it is almost impossible to compare trusts' costs for such services as configurations and specifications vary widely. As the market for these services has grown enormously over the last few years, every effort should be made to get a grip of costs and enable meaningful comparison to ensure trusts secure value for money.

NHS procurement organisations have been trying to get a grip through new commercial frameworks in recent years, but this has been slow progress. For example, the North of England Commercial Procurement Collaborative established a framework in January 2019; to date, just 11 trusts have contracted through it, at an estimated annual value of £5m. A further 29 trusts are in the process of transitioning onto the framework with a potential annual value of £14m.

An outsourcing framework was set up by the category tower under the new NHS Supply Chain procurement model and went live in 2019 but at the time of writing, just three trusts had used it.

As the new operating model for NHS procurement is now in place, it is intended there will be just one framework for the NHS to use, but it will take time for existing agreements to novate over to the new NHS Supply Chain (NHSSC) model. A single provider of procurement frameworks will help to bring some order to the reporting services market, but it is essential that specifications are developed to meet trusts' demands and costs are competitive. To this end, NHSSC has developed a form to capture trusts' outsourcing demands and current arrangements so national comparison can be made. The GIRFT review team strongly advocates that the information required by NHSSC is incorporated into the requirements of the NIDC, which already collects some procurement data. This would support the NHSSC aims, of enabling comparison of current services and identifying opportunities for improvement, without adding to the data collection and submission burden for trusts.

Unwarranted variation – equipment

Much has already been written about the difficulties trusts are facing with an ageing installed base of capital equipment. The Government's £200m investment in replacement equipment is timely and welcome, though the RCR has warned that such investment should be commensurate with investment in staff to operate the equipment and premises to house them. At the time of writing this report, there has been no commitment to such additional investment.

Unsurprisingly, in the absence of capital, there has been a growing trend for trusts to take up Managed Equipment Service (MES) contracts. Some 55 NHS trusts now have MES contracts, up from 30 in 2010. While there are benefits in trusts using MES contracts to solve their ageing equipment problem, they can also be very costly. The alternatives to MES are capital funds, loan financing or leasing – but at present it appears trusts prefer MES contracts. This could be because of the lack of knowledge about other options, so NHSSC is working to help trusts better understand all of their options before committing to MES contracts. Before any trust enters into a MES contract, we recommend they talk to NHSSC to discuss these other options to ensure they obtain the best value for money for their services.

Reducing unwarranted variation and improving value for money

Over the coming months, and using the new Spend Comparison Service data, the GIRFT procurement team will be working with GIRFT clinical leads and trusts to understand more about the variation in procurement costs across all clinical specialties. The GIRFT programme recognises that there are often sound clinical reasons behind the device and treatment method choice, and that patient quality outcomes, product evidence and product innovation are key considerations alongside supply chain efficiency and best value. As part of this review, the GIRFT team will provide trusts with curated data and will be asking medical and procurement teams to validate and provide evidence for choices made.

The Department of Health and Social Care is expecting the new procurement category towers to help trusts reduce the level of variation in procurement by flexing the buying power of the NHS. Trusts are encouraged to work with the new category towers to support the rationalisation and standardisation of procurement.

Recommendation	Actions	Owners	Timescale
19. Trusts should work with NHS partners to enable improved procurement of services, devices and consumables through cost and pricing transparency, aggregation and consolidation, and by sharing best practice.	**a** GIRFT to use sources of procurement data, such as the NHS Spend Comparison Service and relevant clinical data, to identify optimum value for money procurement choices, considering both outcomes and cost/price.	GIRFT, individual trusts, category towers, STPs/ICS	Ongoing
	b GIRFT to identify opportunities for improved value for money, including the development of benchmarks and specifications. Locate sources of best practice and procurement excellence, identifying factors that lead to the most favourable procurement outcomes.		
	c Trusts, STPs and GIRFT to use Category Towers to benchmark and evaluate products and seek to rationalise and aggregate demand with other trusts to secure lower prices and supply chain costs.		
	d NHSSC to link with NIDC to incorporate data about insourced/outsourced services within the national data collection processes and allow comparison across the NHS.		
	e All trusts to ensure their future arrangements for outsourcing are negotiated through NHSSC's commercial framework.		
	f Trusts to talk to NHSSC before entering into MES contracts to ensure they explore all of their options for financing new equipment.		

6. Reducing the impact of litigation

Each of the GIRFT workstreams has been asked to examine the impact and causes of litigation in their field – with a view to reducing the frequency of litigation and more importantly reducing the incidents that lead to it. Ensuring clinical staff have the opportunity to learn from claims in conjunction with learning from complaints, serious incidents (SIs/patient safety incidents) and inquests will lead to improved patient care and reduced costs, both in terms of litigation itself and the management of the resulting complications of potential incidents.

Data obtained from NHS Resolution shows that clinical negligence claims in radiology were estimated to cost between £57.4 and £103.4 million per year over the last five years.

Table 2: Volume and cost of medical negligence claims against Radiology notified to NHS Resolution 2013/14 to 2017/18

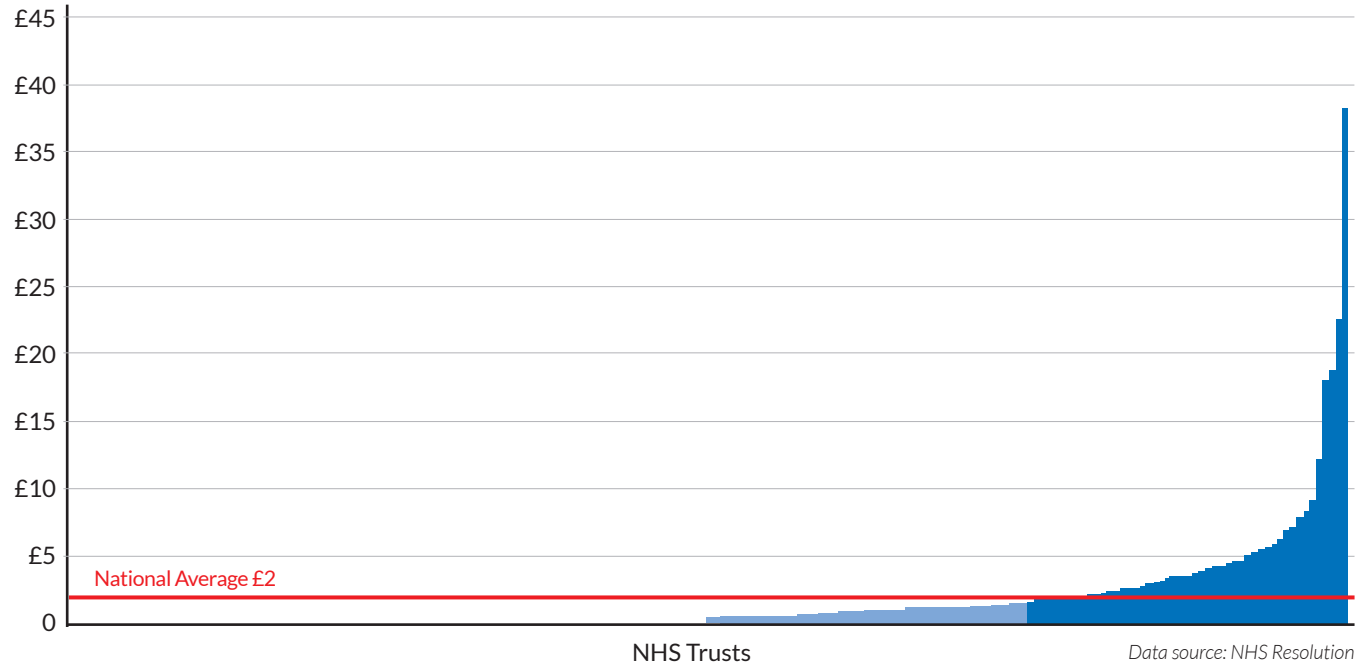
Year	Number of claims	% change in claims number	Total costs (£m) (including estimated and reserve values)	% change in Total costs
2013/14	329		£61.7m	
2014/15	350	6	£57.4m	-7
2015/16	385	10	£75.3m	31
2016/17	353	-8	£89.1m	18
2017/18	388	10	£103.4m	16
Total	**1805**		**£386.9m**	

Data source: NHS Resolution 2013/14 to 2017/18

As the table above shows, there has been an overall increase in both volume and estimated costs of claims over this five-year period, mirroring the ongoing increase in cost of clinical negligence claims across the NHS. Compared to other specialties, radiology has the seventh highest total number of claims (as a sum over the five-year period) and the eighth highest total costs.

However, when considered in the context of the activity conducted by radiology departments, the estimated cost of litigation per activity is very low, at just £2 per radiological diagnostic test. There are significant differences between trusts.

Figure 24: Variation in England between trusts in estimated litigation costs for Radiology per radiological diagnostic test (Activity denominator includes total number of imaging activities in DID1a data set excluding nuclear medicine, for patients of all ages.)



Data source: NHS Resolution

While this low average cost per activity could be deemed to suggest radiology departments are performing comparatively well, it should be recognised that there are many more negligence claims that involve radiology in some way – even if the claim was not ultimately made against the radiology department. As a simple example, a failure to spot a fracture may lead to a claim against an emergency department, rather than radiology. The available data does not readily allow analysis of such issues.

What is clear, however, is that error does occur within radiology – a point emphasised by looking at the causes of claims.

The most common causes for claims over the five-year period were related to 'Interpretation of results' (1502 claims, 67%) and 'Judgement/ timing' (473 claims, 21%).[52] These findings echoed those of previous studies into litigation against radiology, such as the analysis, published in 2018, of settled claims against radiology between 1995 and 2014.[53] Of the 791 settled claims over this twenty-year period, the author identified that 174 related to alleged missed or delayed diagnosis of a tumour and 136 related to delayed diagnosis. A further 75 claims were settled due to an injury in the radiology department.

It is important to note that this 2018 study focused on settled claims only – i.e. those where there was little or no dispute. Nonetheless, it is clear from both that study and the data considered by GIRFT that the two biggest causes of claims against radiology are interpretation of results – i.e. error – and judgement/timing, which is largely about delays in diagnosis. Both have potentially significant risks to patients.

As this report has made clear, these are known issues within radiology and arguably reflect the very high workload and pressures of demand that departments face. It is hoped that the recommendations in this report will help address these issues – by making better use of radiologist and radiographer time and resource, plus insourcing and outsourcing where necessary, to accelerate reporting. In addition, closer team working, both within radiology and through the MDT process, provides a means of reviewing reports and potentially identifying errors or oversights earlier.

The 2018 analysis highlighted various factors (drawn from previous studies) which may contribute to increased error. It noted that errors are more likely towards the end of a reporting session or after high numbers of reports have already been completed and that visual fatigue can be a factor. There are opportunities to address these issues through managing the time radiologists and radiographers spend reporting and the volume of work they are asked to do in a reporting session; improved reporting facilities, such as the reporting rooms shown earlier in this document, can help minimise visual fatigue.

[52] Due to the multifactorial nature of the claims, often more than one cause was attributed to each claim. This has therefore resulted in more causes identified than claims listed.

[53] O. Hulson (2018) "Litigation claims in relation to radiology: what can we learn?" Clinical Radiology 73 (2018) 893-901 www.ncbi.nlm.nih.gov/pubmed/29980323

Despite these steps, it must be recognised that individual error can and will occur, so it is essential that every effort is made to learn from clinical negligence claims, to improve the safety and quality of patient care, and to reduce the costs of litigation. Effective learning from claims allows good practice to be shared and has the potential to reduce claims and to ensure that resources are not unnecessarily diverted from front line care. Most importantly, this learning means more patients receive the right care first time with fewer failed or ineffective treatments, decreased length of stay, and less care packages needed by patients suffering complications.

In this context, we welcome the initiative led by the RCR to introduce Radiology Events And Learning Meetings (REALMs), which provides a standard framework for this kind of reflection and learning.[54]

It was clear during GIRFT visits that many providers had little knowledge of the claims against them. This includes some with high litigation costs per activity as well as those at the low end. As a consequence, very few lessons have been learnt from the claims to inform future practice. Further work is needed at both a local and national level to analyse claims to maximise this opportunity to improve patient care.

Recommendation	Actions	Owners	Timescale
20. Trusts should seek to reduce litigation costs by application of the GIRFT Programme's five-point plan.	**a** Clinicians and trust management to assess their benchmarked position compared to the national average when reviewing the estimated litigation cost per activity. Trusts would have received this information in the GIRFT 'Litigation data pack' published in June 2019.	GIRFT, NHS Resolution, individual trusts	For immediate action.
	b Clinicians and trust management to discuss with the legal department or claims handler the claims submitted to NHS Resolution included in the data set to confirm correct coding to that department. Inform NHS Resolution of any claims which are not coded correctly to the appropriate specialty via CNST.Helpline@resolution.nhs.uk		Upon completion of 20A.
	c Once claims have been verified clinicians and trust management to further review claims in detail including expert witness statements, panel firm reports and counsel advice as well as medical records to determine where patient care or documentation could be improved. If the legal department or claims handler needs additional assistance with this, each trusts panel firm should be able to provide support		Upon completion of 20B.
	d Claims should be triangulated with learning themes from complaints, inquests and serious incidents (SI/patient safety incidents) and where a claim has not already been reviewed as SI/patient safety incidents we would recommend that this is carried out to ensure no opportunity for learning is missed. The findings from this learning should be shared with all front-line clinical staff in a structured format at departmental/directorate meetings (including Multidisciplinary Team meetings, Morbidity and Mortality meetings where appropriate).		Upon completion of 20C.
	e Where trusts are outside the top quartile of trusts for litigation costs per activity GIRFT we will be asking national clinical leads and regional hubs to follow up and support trusts in the steps taken to learn from claims. They will also be able to share with trusts examples of good practice where it would be of benefit.		For continual action throughout GIRFT programme.

[54] *See www.rcr.ac.uk/publication/standards-radiology-events-and-learning-meetings*

Notional financial impact

Our report sets out a number of ways in which we believe we can improve the delivery of radiology services in England.

Radiology as a specialty supports almost all other hospital specialties in the diagnosis and management of patients. GIRFT traditionally calculates notional financial opportunities for each of its national reports based on potential savings in areas such as reducing length of stay (LOS) or readmission rates. While radiology enables earlier diagnosis, attributable savings such as LOS savings would be realised in other departments. It is also very difficult to ascribe savings based on reduction in reference costs, due to the poor quality of this data in radiology.

Therefore, we have not calculated notional financial opportunities for this national report. We believe that there are potential financial savings to be made in radiology nationally, by optimising procurement in radiology for things such as IR consumables or contrast media, or optimising the outsourcing/insourcing of reporting. However, to understand these opportunities, further work is required.

GIRFT will undertake further work once the national report is published to understand what these may potentially be.

Mid Yorkshire Hospitals NHS Trust

About the GIRFT programme

Getting It Right First Time (GIRFT) is a national programme designed to improve medical care within the NHS.

Funded by the Department of Health and Social Care and jointly overseen by the Royal National Orthopaedic Hospital NHS Trust and NHS England and NHS Improvement, it combines wide-ranging data analysis with the input and professional knowledge of senior clinicians to examine how things are currently being done and how they could be improved.

Working to the principle that a patient should expect to receive equally timely and effective investigations, treatment and outcomes wherever care is delivered, irrespective of who delivers that care, GIRFT aims to identify approaches from across the NHS that improve outcomes and patient experience, without the need for radical change or additional investment. While the gains for each patient or procedure may appear marginal they can, when multiplied across an entire trust – and even more so across the NHS as a whole – deliver substantial cumulative benefits.

The programme was first conceived and developed by Professor Tim Briggs to review elective orthopaedic surgery to address a range of observed and undesirable variations in orthopaedics. In the 12 months after the pilot programme, it delivered an estimated £30m-£50m savings in orthopaedic care – predominantly through changes that reduced average length of stay and improved procurement.

The same model is now being applied in 40+ different areas of clinical practice. It consists of four key strands:

- a broad data gathering and analysis exercise, performed by health data analysts, which generates a detailed picture of current national practice, outcomes and other related factors;
- a series of discussions between clinical specialists and individual hospital trusts, which are based on the data – providing an unprecedented opportunity to examine individual trust behaviour and performance in the relevant area of practice, in the context of the national picture. This then enables the trust to understand where it is performing well and what it could do better – drawing on the input of senior clinicians;
- a national report, that draws on both the data analysis and the discussions with the hospital trusts to identify opportunities for NHS-wide improvement; and
- an implementation phase where the GIRFT team supports providers to deliver the improvements recommended.

GIRFT and other improvement initiatives

GIRFT is part of an aligned set of workstreams within NHS Improvement. It is the delivery vehicle for one of several recommendations made by Lord Carter in his February 2016 review of operational efficiency in acute trusts across England.

As well as support from the Department of Health and Social Care and NHS England and NHS Improvement, it has the backing of the Royal Colleges and professional associations.

GIRFT has a significant and growing presence on the Model Hospital portal, with its data-rich approach providing the evidence for hospitals to benchmark against expected standards of service and efficiency. The programme also works with a number of wider NHS programmes and initiatives which are seeking to improve standards while delivering savings and efficiencies, such as NHS RightCare, acute care collaborations (ACCs), and sustainability and transformation partnerships (STPs).

Implementation

GIRFT has developed a comprehensive implementation programme designed to help trusts and their local partners to address the issues raised in trust data packs and the national specialty reports to improve quality. GIRFT regional hubs provide support at a local level with clinical and project delivery leads able to visit trusts and local stakeholders in each region on a regular basis. They advise on how to reflect the national recommendations into local practice and support efforts to deliver any trust specific recommendations emerging from the GIRFT visits. These teams also help to disseminate best practice across the country, matching up trusts who might benefit from collaborating in selected areas of clinical practice.

Through all its efforts, local or national, the GIRFT programme strives to embody the 'shoulder to shoulder' ethos that has become GIRFT's hallmark, supporting clinicians nationwide to deliver continuous quality improvement for the benefit of their patients.

Glossary

Contrast media

Also known as contrast agents. To help with diagnosis and enhance the visibility of certain structures, patients may be injected with a contrast medium before any X-ray based imaging (including CT) or an MRI, or they may ingest an oral contrast medium.

CT

A CT scan or computerised tomography scan makes use of computer-processed combinations of many X-ray measurements taken from different angles to produce cross-sectional images of specific areas of a scanned object, allowing the user to see inside the object without cutting.

DEXA

DEXA stands for dual energy X-ray absorptiometry. It uses low dose X-rays to measure bone density.

Fluoroscopy

Fluoroscopy is an imaging modality that uses multiple X-rays to allow real-time visualisation of body structures. During fluoroscopy, X-ray beams are continually emitted and captured on a screen, producing a real-time, dynamic image.

Imaging

Medical imaging is the technique and process of creating visual representations of the interior of a body for clinical analysis and medical intervention, as well as visual representation of the function of some organs or tissues.

Insourcing

In this report, insourcing refers to paying the radiology department staff to conduct activity such as reporting, outside of their contracted hours. It is an alternative approach to outsourcing this activity to a third party.

Interventional radiology

Interventional radiology (IR) refers to minimally invasive, image-guided medical treatments. Procedures use real-time imaging techniques, including X-rays and ultrasound, to guide the operator.

iRefer

The RCR's iRefer guidelines are evidence-based guidelines for use by referring clinicians for approximately 280 imaging related clinical scenarios. iRefer is also now available in a clinical decision support (CDS)-enabled version that integrates with referral systems in primary and secondary care.

MES

In this report, MES refers to Managed Equipment Services – a way of leasing radiology equipment as part of a managed service that also includes support and replacement.

MRI

Magnetic resonance imaging (MRI) use strong magnetic fields, magnetic field gradients, and radio waves to generate images of the organs in the body.

NIDC

The National Imaging Data Collection. A data collection recently developed and undertaken by NHS England and NHS Improvement. It includes information on staffing, activity, finance and capital assets.

National Imaging Optimisation Delivery Board (NIODB)

A stakeholder board set up by NHS England and NHS Improvement to steer the direction of the Imaging Transformation Programme following the Carter Review

Order Comms

Order Comms refers to an IT system that allows diagnostic imaging and treatment services to be requested electronically.

Outsourcing

Outsourcing is an agreement in which one company hires another company to be responsible for a planned or existing activity that is or could be done internally, and sometimes involves transferring employees and assets from one firm to another. In this report, it refers to a hospital trust hiring another company to conduct imaging and/or reporting on its behalf.

PACS (Picture Archiving and Communication System)

A picture archiving and communication system is a medical imaging technology which provides economical storage and convenient access to images from multiple modalities.

Plain film

Plain film refers to standard X-rays.

Radiographer

Radiographers are healthcare professionals who specialise in the imaging of human anatomy for the diagnosis and treatment of pathology.

Radiologist

A radiologist is a doctor who specialises in diagnosing and treating disease and injury, using medical imaging techniques.

Reporting

In radiology, reporting refers to the completed imaging being analysed and a written report being delivered to explain what the imaging shows.

RIS

A radiological information system (RIS) is the core system for the electronic management of imaging departments. The major functions of the RIS can include patient scheduling, resource management, examination performance tracking, reporting, results distribution, and procedure billing.

RCR

The Royal College of Radiologists (RCR) leads, educates and supports doctors who are training and working in the specialties of clinical oncology and clinical radiology.

Sonographer

A sonographer is a healthcare professional who specialises in the use of ultrasound.

SoR

The Society of Radiographers is a professional body and trade union that represents more than 90 percent of the diagnostic and therapeutic radiographers in the United Kingdom.

Ultrasound

Medical ultrasound is a diagnostic imaging technique used to create an image of internal body structures such as tendons, muscles, joints, blood vessels, and internal organs. In this report, and in the GIRFT radiology workstream, we have focused on diagnostic ultrasound and not maternal ultrasound.

X-ray

X-rays are a form of electromagnetic radiation that can pass through most objects, including the body. Medical X-rays are used to generate images of tissues and structures inside the body.

Acknowledgements

I have immensely enjoyed the opportunity to serve as GIRFT clinical lead, allowing to meet with radiology teams carrying out such excellent work across the country. It has been both inspiring and reassuring to see the ways services are rising to the challenges we all face, in a collegiate, collaborative and constructive manner. I'd like to thank all of the clinicians and managers who have given their time to welcome me and the rest of the GIRFT team.

That team itself has been incredibly supportive throughout the process, bringing their own expertise and insight to our deep dive visits and to the development of this report. Thank you to Dr Giles Maskell, who has worked alongside me through the project, Dr Tim Taylor, who advised during the initial phase of the project, and to our radiology advisors Lucy Beeley and Elaine Quick, who have offered a different and invaluable perspective to our work.

Gail Roadknight, as project manager, has co-ordinated the process with incredible efficiency and calmness, and been a great companion in the visits. I am also grateful to the GIRFT policy team for their input and advice: thank you to Matthew Barker, Marie Rogerson and Hassan Abu-Bakir. Andrew Boasman has led the analysis, diligently compiling data and responding to our many queries about what it might show. My thanks too to Paul Roberts, who assisted with drafting, John Warrington and Scott Pryde for their advice on complex procurement issues, John Machin, our litigation lead, and Maddy Connolly who helped us understand the potential financial impact of our recommendations.

We have also benefited, as all GIRFT workstreams have, from the support of Professor Tim Briggs and Rachel Yates, and from the input of fellow GIRFT clinical leads, bringing insight from their specialties.

Beyond the team, I would also like to thank our many stakeholders, for their detailed written comments and their engagement at our stakeholder event. It is clear that many of our stakeholders, from professional associations to charities to frontline teams, recognised many of the challenges we identified and shared our concerns. We know our recommendations are only part of the solution, but we are grateful for their support.

Finally, thanks to my colleagues at Nottingham University Hospitals for enabling me to lead this process and to my family for their help and encouragement.

Dr Katharine Halliday

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