Investing in the Clinical Radiology Workforce – The Quality and Efficiency Case

June 2012

Executive Summary

1. Clinical radiology is at the centre of modern medicine and is critical to the strategic ambitions of the NHS.
2. High quality clinical radiology delivers significant improvement in patient outcomes. Strengthening the relationship between primary care and clinical radiology yields benefits in earlier diagnosis, the patient experience and patient safety.
3. There is an increased demand from clinicians and the public for better access to imaging services. This has resulted in a 26.5% increase in radiology examinations conducted in England, from just over 30 million in 2004/5 to almost 39 million in 2010/11.[1]
4. The increased demand on clinical radiologists comes in a number of forms. These include an increased number of attendances, increased diversity of investigations, increased access to diagnostic services and the increased need for interventional radiology.
5. The workload for the clinical radiologist has grown not only in volume but also complexity. This has been driven by the ever-expanding choice of available imaging techniques and the increasing inherent complexity of the examinations themselves. Since 2004/5 the number of CT examinations has risen by 86% and MRI examinations by 125%.[1] Regardless of population growth, it is widely accepted that the workload of clinical radiologists will continue to grow with continued advances in imaging technology.
6. Clinical radiology has shown further innovation in managing the challenges of this increasing workload, but the measures employed, including role extension and skill mix have only temporised and have not, and will not, provide a sustainable solution.
7. The role of clinical radiologists goes far beyond producing reports on imaging studies. The mandatory need for radiologist input to multidisciplinary team meetings (MDTMs) demonstrates their central role. The input of clinical radiologists to MDTMs is significant, with approximately 10% of their clinical work attributed to this.
8. The Royal College of Radiologists' (RCR) census of UK radiology departments undertaken in 2010 showed there to be 4.6 clinical radiologists per 100,000 of population.[2-3] To satisfy the needs of patients and the NHS, the RCR believes the UK requires a minimum of 8 clinical radiologists per 100,000 of population. This would bring it into line with comparable European countries.
9. UK vacancy data in 2010 showed 245 unfilled consultant radiologist posts, equating to 9% of the clinical radiology workforce.[2] Almost half of these posts had been advertised but failed to appoint due to a lack of suitable applicants. A UK study showed clinical radiologists appear to be at greater risk of burn-out than consultants working in other specialties.
10. The high number of expected retirements in the next few years, set against static training numbers, means the gap between workforce supply and demand in clinical radiology may not close.[2] If this is not rectified, this situation will continue to deteriorate and will seriously affect patient care and safety.
11. To address the shortfall, the RCR is seeking an increase of 60 trainees per year for the next five years. Spare capacity exists in the UK training scheme to accommodate these numbers. The RCR believes an increase of 60 per year is realistic and the minimum to sustain a quality imaging service.

1. Introduction

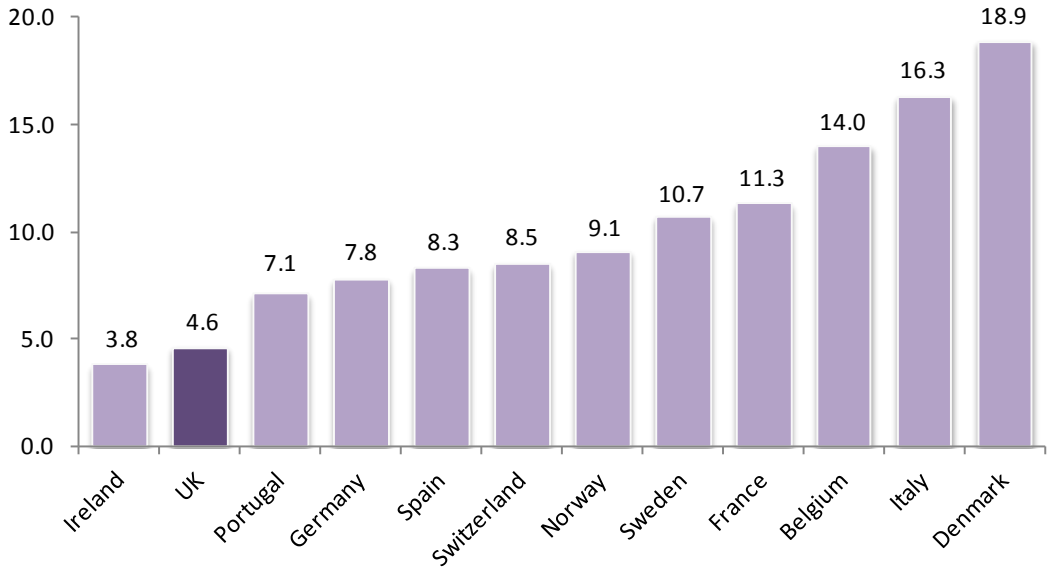
A key aim of this document is to facilitate a clear understanding of the pivotal role of clinical radiology in modern healthcare and to illustrate how the clinical radiologist is a vital part of the majority of patients' diagnostic pathways.

The authors hope, that with this increased awareness, those who read it will understand and support the case for an increase in the clinical radiology workforce in the UK which is articulated in the second part of the document.

There has, quite rightly, been an increased demand by clinicians and the public for better access to clinical radiology. This has resulted in a 26.5% increase in radiology examinations conducted in England, from just over 30 million in 2004/5 to almost 39 million in 2010/11.[1]

Part of this increase is because the UK has had a lower than average rate of the use of imaging. This is reflected in the low numbers of clinical radiologists per head of population compared with European counterparts, being next to the bottom in this comparison (Figure 1).

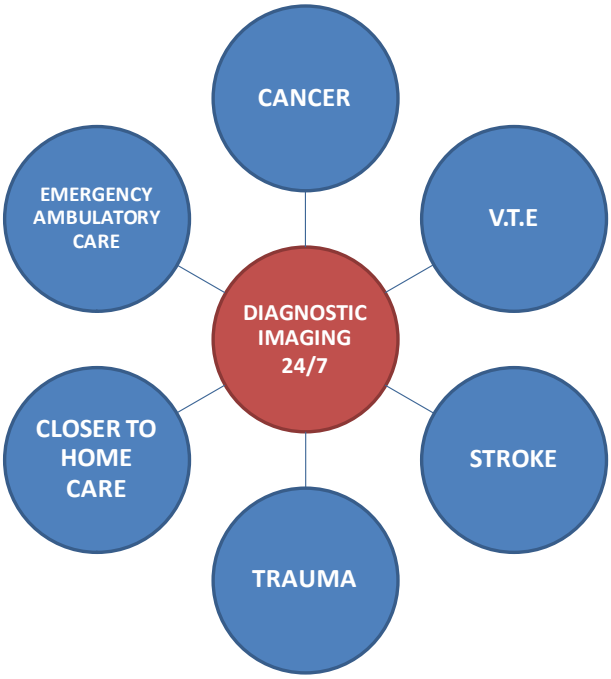
Figure 1 Number of clinical radiologists per 100,000 of population (headcount), 2008 [2-5]



2. The role of clinical radiology in healthcare

Clinical radiology is at the centre of modern medicine and is critical to the strategic objectives of the NHS. In particular it plays a vital role in cancer, trauma and stroke care.

Figure 2 Core NHS activities dependent on clinical radiology



Accurate and timely diagnosis has always been the cornerstone of medical care. In the vast majority of conditions this involves clinical radiology, from the relatively simple chest X-ray to diagnose pneumonia to the complexities of PET-CT in the management of cancer.

This diagnosis relies on the combination of imaging technology and the medical and diagnostic skills of the clinical radiologists making the diagnosis from the images.

Radiology has shown it can make significant improvements in:

- patient outcomes
- patient experience
- patient safety
- efficiency.

2.1 Patient outcomes

Clinical radiology directly contributes to all domains of the recently published *NHS Outcomes Framework*.[6] This is illustrated by the following examples.

- **Preventing people from dying prematurely**
  - ***Early diagnosis of cancer initiative***
    There is good evidence that early diagnosis of cancer leads to better outcomes and that early access to radiology can ensure the most appropriate imaging is obtained leading to the appropriate clinical referral, saving time and unnecessary, inappropriate clinic attendance.[7]

- ***Early diagnosis and management of stroke***
  It is now evident that rapid early radiological diagnosis of thrombotic stroke can facilitate intervention with significantly improved outcomes whilst the use of ultrasound and MRI can diagnose treatable conditions before the stroke occurs.[8]

- **Enhancing quality of life for people with long-term conditions**
  Many people who suffer from long-term conditions can be empowered to live normal lives with appropriate support in primary care. On occasion, they may suffer from exacerbations of their condition, for example, heart failure and chronic obstructive airways disease. Prompt direct access to radiology from primary care often enables such patients to avoid unnecessary hospitalisation.

- **Helping people to recover from episodes of ill health or following injury**
  - ***Trauma services***
    The *Trauma Strategy* has acknowledged the UK lags behind similar developed countries in providing timely access to the full range of services likely to preserve life.[9] Diagnostic imaging, particularly with CT scanning, combined with access to interventional radiology are essential.
  - ***Interventional radiology***
    Interventional radiology has an increasing role in the prolongation of life in non-trauma contexts, for example, post-partum haemorrhage and aortic aneurysm.

2.2 Patient experience

Many people who present to radiology are anxious about the possibility of a diagnosis such as cancer that they fear will detrimentally alter their lives. In many referrals from primary care the exclusion of serious pathology can empower people to lead normal lives. Direct access to a radiologist by GPs ensures that the right imaging test is performed to investigate a suspicion of cancer, for example, and thereby avoid prolonged unnecessary anxiety when this imaging test is normal, and in many cases avoiding unnecessary referral to outpatients, or even hospital admission.

Early and/or direct access to imaging is a key step in making a diagnosis, thereby shortening patient management pathways.

2.3 Patient safety

Clinical radiologists are expert at selecting and tailoring imaging tests to individual clinical presentations. In this way unnecessary, time-consuming and often expensive imaging investigations are avoided and radiation dose to the patient is kept to a minimum.

Interventional radiology is a well-established discipline used to treat (and palliate) numerous medical and surgical conditions instead of more invasive procedures often involving the risks of general anaesthesia and open surgery. There are numerous examples of such radiological interventions. These include stopping acute gastrointestinal haemorrhage by embolisation of the bleeding artery, stenting aortic aneurysms of dissections, relieving jaundice caused by obstruction of the main bile duct, and removal of kidney stones, to name but a few.

2.4 Efficiency

There is increasing emphasis on the need to treat people in the setting of primary care and to promote self-care. The intention is both to improve patient experience but equally to avoid unnecessary use of expensive secondary care resources. This can be facilitated by early diagnosies, made by radiologists.

The radiologist ideally works as part of the multidisciplinary team (MDT) in primary care, signposting to GPs the most appropriate investigations and helping them to decide what (if anything) to do next, for example a further test or appropriate specialist referral. The concept of creating a primary care involvement in the MDT process is attractive; the advantages of GP involvement include more effective commissioning and patient management, and greater integration of primary and secondary care into new healthcare models.

This important role of radiology is illustrated by its integral part in 10 of the 12 recently agreed *Same Day Emergency Care Best Practice Tariffs*.[10] These include pulmonary embolism, renal stones, epileptic seizure and deep vein thrombosis. The aim is to facilitate ongoing care without admission in a significant number of patients who present with these possible diagnoses.

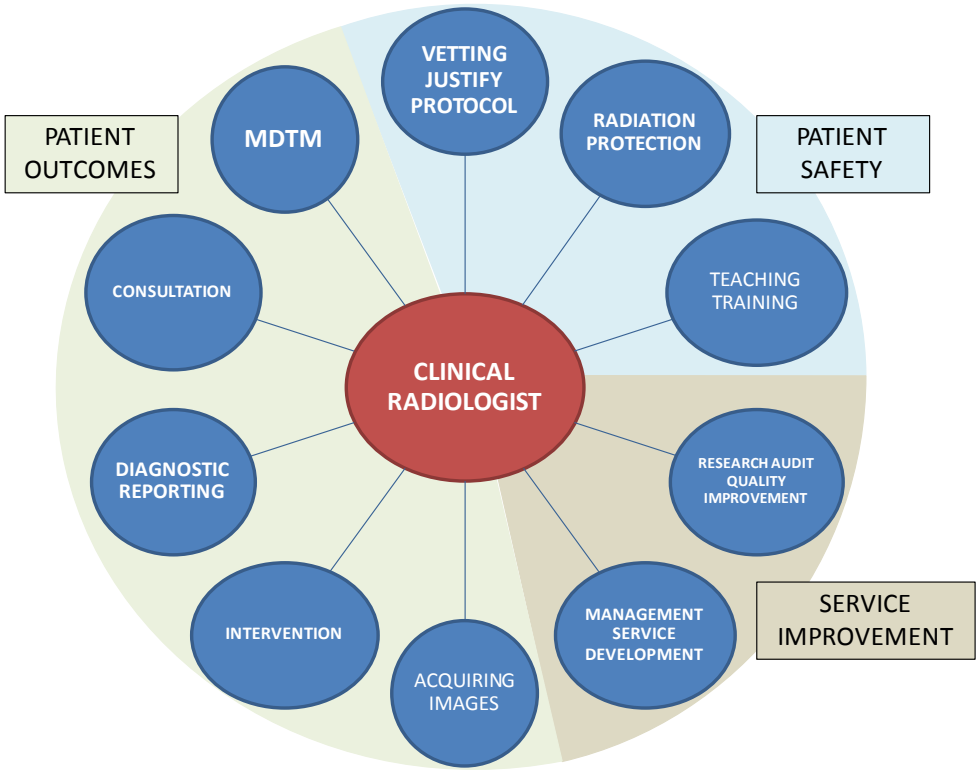
Strengthening the relationship between primary care and clinical radiology will yield benefits in earlier diagnosis, patient experience and patient safety. It will hasten the patient journey, avoid unnecessary delays and allow the patient to be supported within the community.

3. The role of the clinical radiologist

Clinical radiologists are doctors who have completed higher postgraduate training and qualifications.

The role of the clinical radiologist is a wide and varied one which extends far beyond providing opinions on imaging examinations; they use their radiological and clinical knowledge and skills to provide a consultation which helps guide non-radiological clinicians, be they hospital doctors or general practitioners, to request the most appropriate investigation for their patients from the increasing number of imaging options now available. They also conduct many and various hands-on imaging procedures such as ultrasound and fluoroscopic examinations as well as a wide range of image-guided interventional procedures. In these various roles they contribute to patient safety, patient outcomes and service improvement as illustrated in Figure 3 and Exhibit 1.

Figure 3 The role of the clinical radiologist



The role of the consultant radiologist is complex and involves undertaking many different activities. There is evidence that less than 50% of a consultant radiologist' s time is spent interpreting images. The value of the radiologist in delivering a consultant delivered service should not be underestimated or merely equated to reporting output. The following is an excerpt from the Academy of Medical Royal Colleges publication *The Benefit of Consultant-delivered Care*.[11]

The key benefits of consultant-delivered care, identified in the written and oral evidence received are:

- *Rapid and appropriate decision making*
- *Improved outcomes*
- *More efficient use of resources*
- *GP's access to the opinion of a fully trained doctor*
- *Patient expectation of access to appropriate and skilled clinicians and information*
- *Benefits for the training of junior doctors.*

Exhibit 1

The role of the clinical radiologist

- Developing and managing imaging pathways
- Contributing to patient care pathways
- Developing and updating diagnostic protocols to ensure:
  - The correct investigations are performed in the correct sequence
  - Each examination is performed in an optimum way
- Employing radiation protection and radiation reduction methodology to protect patients from the harmful effects of ionising radiation
- Managing the patient experience in the imaging department
- Conducting/performing hands-on imaging examinations e.g. ultrasound, fluoroscopy etc.
- Making diagnoses from the imaging and issuing radiological reports on the imaging studies
- Deciding on any further, appropriate imaging: the right test, at the right time
- Interventional radiology:
  - Minor: Abscess drainage, tissue biopsy, nephrostomy
  - Major: Complex intravascular, hepatobiliary, musculoskeletal and renal tract procedures, tumour ablation, targeted thrombolysis
- Playing a central role in multidisciplinary team meetings (MDTMs) – see Figures 4 and 5. Radiologists play a pivotal role in discussing and correlating the current and previous imaging findings, in relation to the pathology and clinical findings and other clinical investigations; and in deciding further patient management strategies.
- Teaching and training:
  - Trainee radiologists
  - Non-radiological doctors of all grades
  - Radiographers and sonographers
  - Medical students
  - Other disciplines: physicists, nurses, midwives etc.
- The quality assurance (QA) of training:
  - Local QA of training programme
  - Formal assessment of trainee progress – shop floor supervision and assessment to ensure patient safety
- The wider NHS:
  - Standard setting activities such as National Institute for Health and Clinical Excellence (NICE) standards
  - Evolving training curricula to meet the needs of the modern NHS
  - Involvement in setting and overseeing national examinations/assessments as required by the GMC
  - Involvement with national healthcare strategies and initiatives at Department of Health level.

3.1 The evolving impact of multidisciplinary team meetings (MDTMs)

As demonstrated above, the role of clinical radiologists goes far beyond producing reports on imaging studies. This is illustrated by their central role in clinical patient management as evidenced by the mandatory need for radiologist input to MDTMs. These are the main fora for deciding patient management and many decisions are made upon the imaging findings or from the results of image-guided biopsy. The close working relationships of the radiologist with their front line clinical colleagues as well as other vital members of these teams (pathologists, for

example) can significantly improve the outcomes for patients ensuring rapid access to appropriate diagnostic test and treatments.

The benefits of MDTMs was first acknowledged in cancer but has now spread to multiple non-cancer teams. Figures 4 and 5 show the typical range of such teams involving clinical radiologists.

Figure 4 Cancer MDTMs involving clinical radiologists

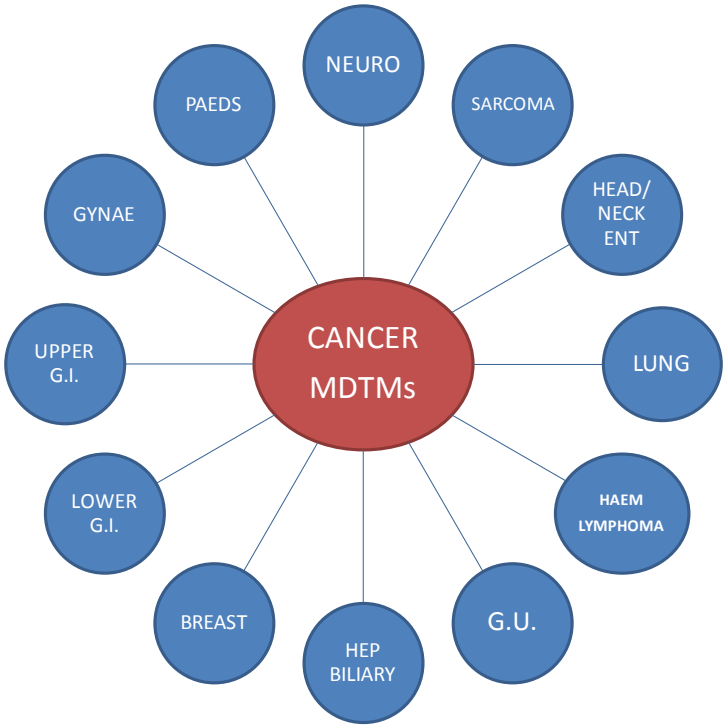
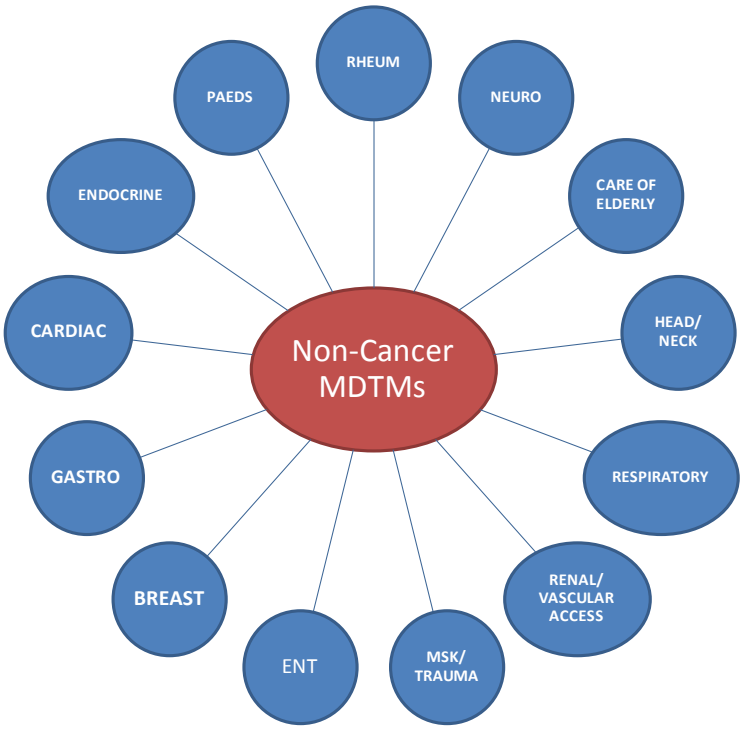


Figure 5 Non-Cancer MDTMs involving clinical radiologists



4. The case for an increased workforce

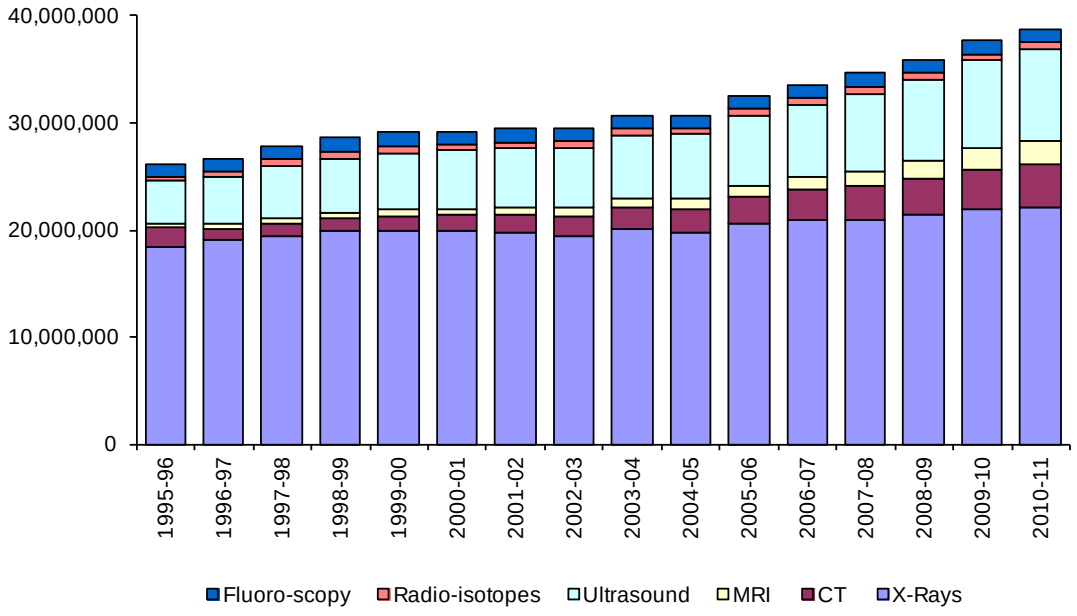
The previous sections demonstrate that radiology is an essential component of modern medicine and as a result there has been a marked increase in the demand for its services. This increased demand on clinical radiologists comes in a number of forms:

- increased number of attendances
- increased diversity of investigations
- increased complexity of imaging studies
- increased access to diagnostic services (24/7)
- increased input of clinical radiologists to the multidisciplinary team
- increased need for interventional radiology
- increased access from primary care.

4.1 Increased number of attendances

The phenomenal growth in the number of attendances over the last decade for radiology is illustrated in Figure 6. This demonstrates a 26.5% increase from just over 30 million in 2004/5 to almost 39 million in 2010/11. There is no evidence from this data that the demand has begun to plateau out and so year on year increase is expected for the foreseeable future.

Figure 6 Total number of imaging and radiodiagnostic examinations or tests, by imaging modality, England, 1995–96 to 2010–11[1]



4.2 Increased diversity of investigations

Figure 6 shows that, although there has been an increase in most imaging modalities, the biggest percentage rise is in the more complex tests or those that are the most labour intensive; since 2004/5 CT examinations have increased in number by 86% and MRIs by 125%.

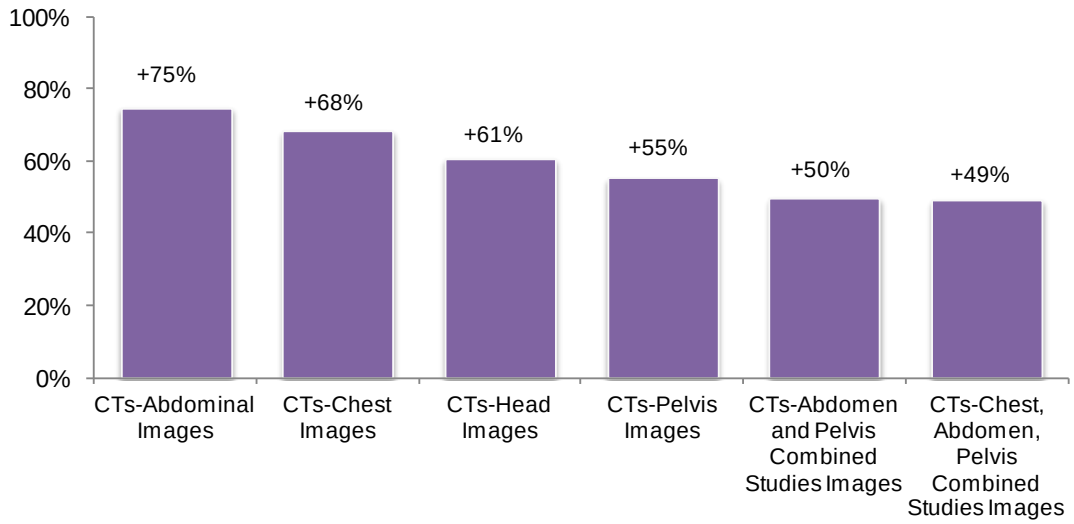
During the last 10 years, the following new tests have become routine in most radiology departments:

- cardiac CT & MR
- contrast-enhanced ultrasound
- CT colonography
- CT urography
- MR cholangiopancreatography
- MR diffusion-weighted imaging
- PET-CT.

4.3 Increased complexity

New technology allows significant enhancement of diagnostic information. The price to pay is that although the imaging equipment gets faster, the number of images to be reviewed in an individual cross-sectional imaging study has vastly increased (Figure 7). This has a direct impact on the clinical radiology workload.

Figure 7 Images per exam between 2007 and 2010, % change[2]



In addition, it is necessary for the radiologist to perform complex post-processing image manipulation on these increased amounts of imaging data per study, for example 3D vessel rendering for diagnostic purposes, to make a precise and accurate diagnosis in each case.

This increased complexity of imaging studies being introduced into routine clinical practice will continue. Clinical radiologists have already introduced many very effective non-invasive diagnostic procedures which have replaced older more patient-invasive investigations, for example CT colonography to replace the barium enema and CT coronary angiography to replace conventional fluoroscopic coronary angiograms. There are new technologies already in final clinical trial β testing, such as PET-MR, and new forms of molecular imaging, such as 7.0 Tesla MR scanning, which will undoubtedly be introduced into clinical practice within the next five years.

4.4 Increased access to diagnostic services (24/7)

Increased access to diagnostic services is required for prompt diagnosies, for example for stroke care, trauma, deep vein thrombosis, pulmonary embolus and head injury. There is also,

quite rightly, an increased expectation by the public that access to imaging should be readily available when their needs arise. This is highlighted by the recent Department of Health publication *Implementing 7 day working in Imaging Departments: Good Practice Guidance*, a report from the National Clinical Advisory Group.[12]

In the introduction, Sir Bruce Keogh, Medical Director of the NHS, states:

> *"Diagnostic services, including imaging, are central to all secondary care and a significant proportion of primary care, yet expensive plant lies underutilised on Saturdays and Sundays while patients wait, creating inconvenience and unnecessary anxiety. Inefficient weekend diagnostic services also complicate the lives of general practitioners who are seeking answers for their patients and the lives of hospital staff who have to explain that nothing can happen for a couple of days, while patients wait on the wards for the weekend to pass before decisions are made.*
>
> *If we genuinely want to offer a patient focussed and efficient service based on clinical outcomes, the way we deliver services must change with the times to meet our patients' hopes and expectations. Furthermore, the economic environment should catalyse this process.*
>
> *I am delighted that the publication of this report coincides with the first meeting of expert stakeholders, who will consider how routine seven day working in specific clinical services could be introduced successfully across the NHS."*

A number of radiology services have already developed this 24/7 access with the expected improvements in patient care but in all instances it has required an increase in radiology workforce. Exhibit 2 is a real example of seven-day working in practice at a medium-sized hospital.

Exhibit 2

Case Study – Torbay Hospital

Torbay Hospital has had a regular weekend radiology service for over ten years. There is a consultant radiologist in the department during the daytime on Saturday and Sunday. They respond to all urgent inpatient requests throughout the weekend ensuring patients do not have their treatment delayed. In addition they offer some access to urgent outpatient referrals. The radiologist also reports most of the emergency and inpatient plain films.

Comparing 2011 numbers with 2007 numbers:
- CTs completed Saturday and Sunday 0800 to 1800 have increased 33%
- CTs completed Saturday and Sunday 1800 to 0800 have increased 74%
- Ultrasounds completed Saturday and Sunday 0800 to 1800 have increased 15%.

4.5 Increased input of clinical radiologists to the multidisciplinary team

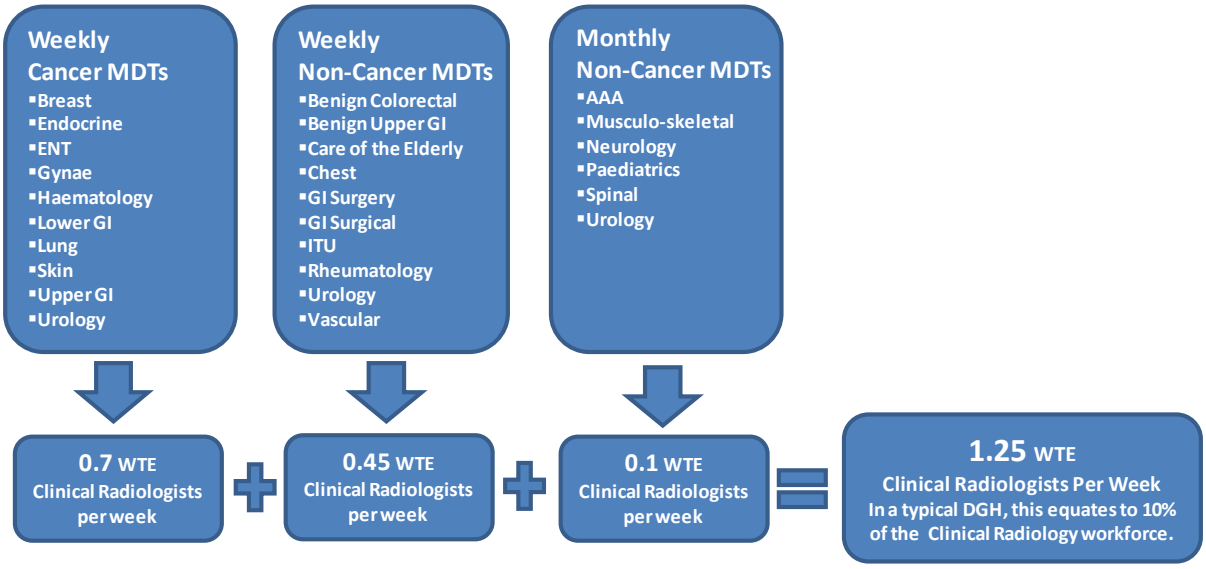
The case for the multidisciplinary team meeting (MDTM) has been outlined in Section 3.1. The increased complexity of medicine in all its facets has meant that subspecialisation is essential in all medical fields so that doctors can practise as up-to-date experts in their field. The need to bring this expertise together is strongly supported under the auspices of the MDTM which puts the patients' care at the centre of all we do.

Figure 8 is a real example of MDTM activity in a medium-sized hospital. This shows the input of clinical radiologists to MDTMs is significant, with approximately 10% of their clinical input attributing to this.

Unlike other clinicians, radiologists' (and pathologists') input is not limited to the time spent in the meeting, but also preparation and follow-up time can be as long if not longer than the meeting itself.

Respondents to the RCR census showed that the frequency of MDTMs increased for clinical radiologists by 30% since 2007 and preparation time required for MDTMs increased by 28%.[2]

Figure 8 Medium-sized hospital with 13 WTE consultant radiologist establishment



4.6 Increased need for interventional radiology

The number of interventional radiology examinations has shown a huge rise, increasing by over 50% since 2007.[2] The need to improve the delivery and geographical equity of interventional radiology is recognised within the Department of Health White Paper *Equity and Excellence: Liberating the NHS*.[13]

The requirement for an expanded interventional radiology workforce is best evidenced in *Regional Networks for Major Trauma*, a report by NHS Clinical Advisory Groups recommending 24-hour access to interventional and diagnostic radiology capability.[9] This is further supported by two further Department of Health publications:

- *Interventional Radiology: Guidance for Service Delivery*
- *Interventional Radiology: Improving Quality and Outcomes for Patients*.[14-15]

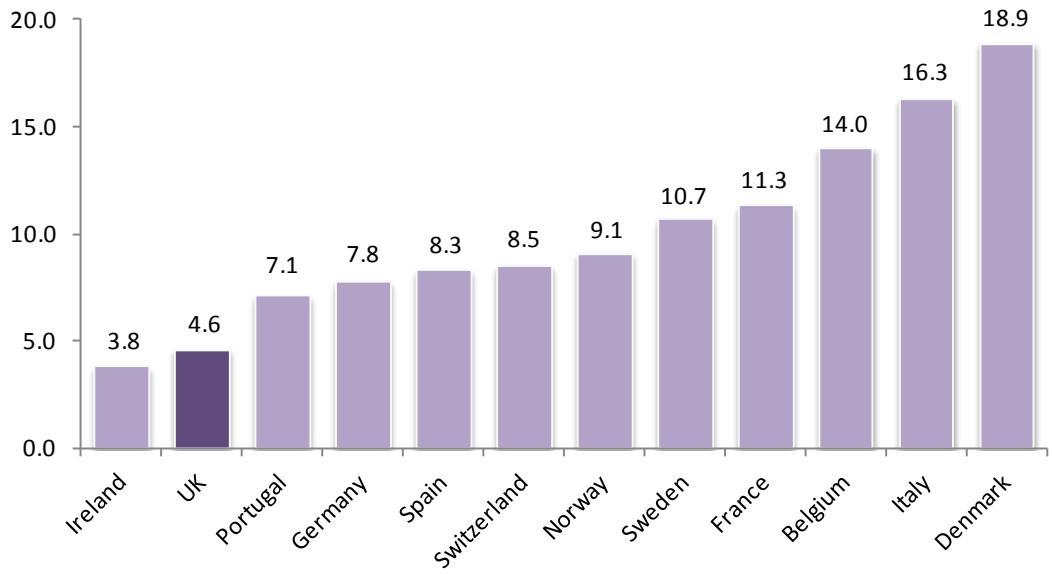
The latter illustrates how the NHS can improve quality, safety and productivity while delivering comparable or better outcomes for patients with shorter hospital stays and fewer major complications.

5. The shortfall – the current and predicted workforce

5.1 The evidence

The RCR census in 2010 showed there are at present 2,869 clinical radiologists employed in the UK.[2] This equates to 4.6 clinical radiologists per 100,000 of population. The graph in Figure 9 confirms that the UK has one of the lowest radiologist workforces in Europe. From this comparison the RCR believes we should aspire to a figure of 8 per 100,000 which would still only put us in the mid-range compared with our European counterparts

Figure 9 Number of clinical radiologists per 100,000 of population (headcount), 2008 [2-5]



The RCR census achieved a 100% response and was acknowledged by the Centre for Workforce Intelligence as the most accurate assessment of the current workforce. It builds on equivalent data for previous years.

Through the census, over 80% of radiology departments reported their workload requirements are not met by radiology staff within their contracted hours. More than 60% of departments pay overtime to help get through their workload. Worryingly, 39% of departments are leaving imaging studies unreported or 'auto-reported' (a digital means of removing unreported imaging studies from an electronic work-list but leaving them unreported) due to lack of resource.

RCR vacancy data collected through the census in 2010 showed there were 245 unfilled consultant radiologist posts, representing 9% of the clinical radiology workforce in the UK. Almost half of these have been advertised but failed to appoint. Evidence of the shortfall of consultant clinical radiologists is also available from returns of Advisory Appointment Committees (AACs). In 2010, between 30–40% of AACs for clinical radiology consultant posts failed to result in an appointment. In the majority of cases this was due to a lack of suitable applicants. There is a very significant concern that longstanding vacancies have already had an effect on producing hidden vacancies, as many trusts will not explore business cases for further expansion if they cannot fill existing posts.

5.2 The current risks of the shortfall

We have already mentioned the beneficial role clinical radiology can make to patient safety but the converse is also true. If radiology cannot keep up with the demands upon it, then inevitable delays in diagnosis occur which creates their own safety issues.

This was the problem requiring public national investigation in Northern Ireland in 2011. One of the major factors contributing to the unintentional accumulation of many months' worth of unreported X-ray examinations, was that there were simply too few clinical radiologists in post to cope with the amount of reporting work there was to do, and those who were employed were spread too thinly to be able to perform and report all the complex imaging investigations integral to a modern imaging department, or even to supervise others doing so. This led to a number of documented cases of substandard patient care.

The result included a significant delay in making the diagnosis of lung cancer in several patients. Obviously there is no point in performing any imaging test, often exposing the patient to ionising radiation, unless there is the radiologist workforce available to interpret those imaging studies in a timely manner and issue a formal report, which will be acted upon to ensure that the patient has the best possible outcome.

The current shortfall in the radiological workforce in the UK, and the consequent inability to cope with the workload which is the remit of a clinical radiologist, is leading to low morale in many imaging departments in the UK. This has led in a number of instances (brought to the attention of the RCR) of prolonged absenteeism of consultant clinical radiologists through stress-related illness. Obviously this compounds the situation, leading to further stress for the remaining clinical radiologists in the department, worsening morale and even greater difficulty in coping with the workload. The RCR census has provided concerning data on the high percentage of consultant clinical radiologists opting for early retirement, a further indicator of work-induced "burn-out".

Furthermore, a UK study showed clinical radiologists appear to be at greater risk of burnout than consultants working in other specialties predominantly related to workload and inadequacies in current staffing and facilities.[16]

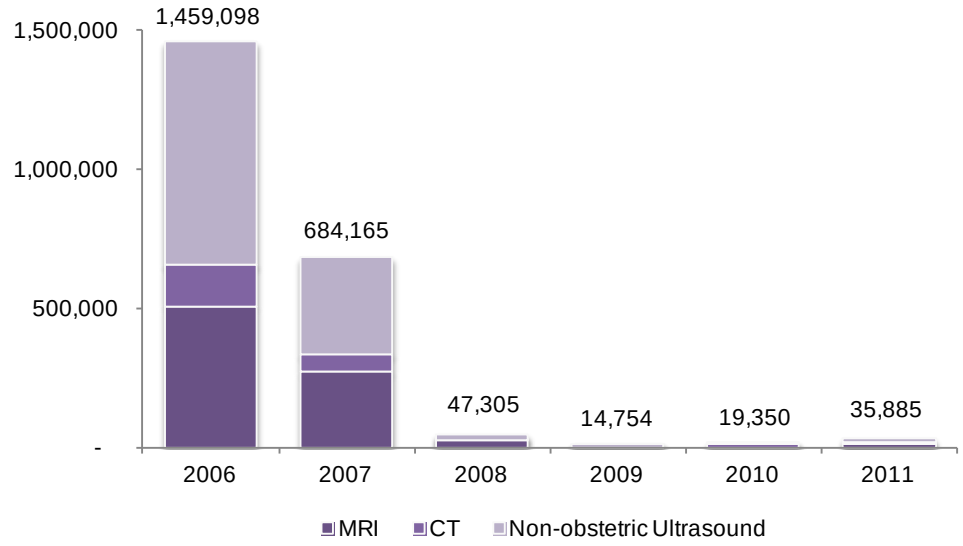
5.3 The action clinical radiology has taken to address the shortfall

Clinical radiology has embraced a number of initiatives and improvement methods to cope with the increasing demands on its services. Much of this work is evidenced by NHS Improvement (www.improvement.nhs.uk). This includes using "improvement science" such as "lean" thinking, queuing theory and the "model for improvement" to significantly improve patient flow.

The use of skill-mix in many aspects of the service has meant that radiographers can now make a contribution to the reporting workload. [However reporting radiographers cannot be a substitute for clinical radiologists who, by virtue of their training, possess a broad-based understanding of presenting medical conditions as well as wider clinical patient management.]

Clinical radiology has always been at the forefront of utilising new technology and the introduction of picture archive and communication systems (PACS) across the UK has facilitated further efficiencies. The impact of improvement work is evidenced by the significant reduction in waiting times as part of the 18-week initiative (Figure 10).

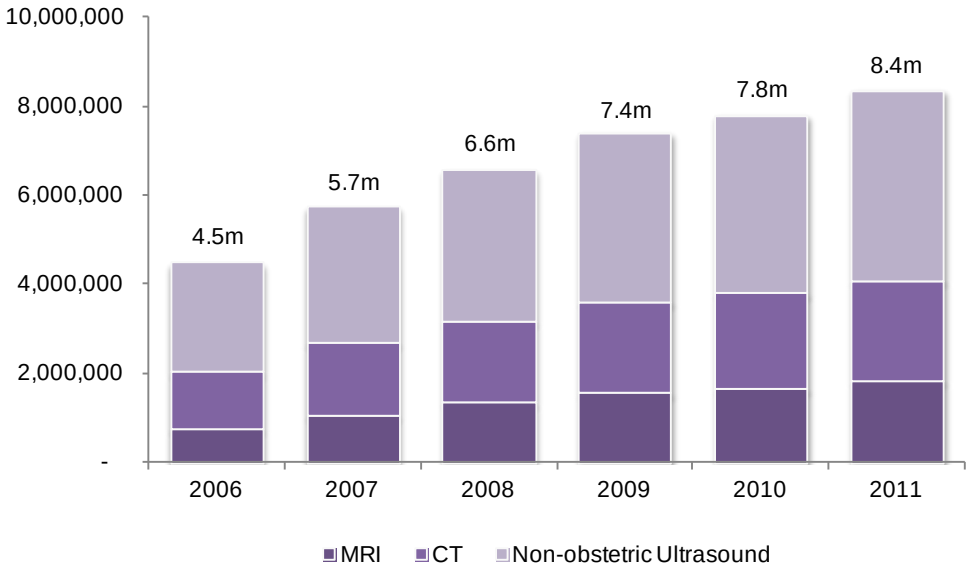
Figure 10 Commissioner data for patients waiting longer than 6 weeks[17]



It must be noted that there has been a slight increase in waiting times in recent months and this reflects the fact that, despite this hard work, the system has reached its capacity through the significant increase in overall activity (Figure 11).

Figure 11 shows the waiting list activity for CT, MRI and non-obstetric ultrasound has increased from 4.5 million in 2006 to 8.4 million in 2011.

Figure 11 Commissioner data for waiting list activity[17]



6. Closing the gap – proposed solution

With a high number of expected retirements in the next few years, set against static training numbers, the gap between supply and demand in clinical radiology will not be closed and the provision of adequate radiological services in the UK will be jeopardised.[2]

Figure 12 overleaf shows the gap between the supply of radiologists and that required to deliver effective, safe, patient-centred radiology services.

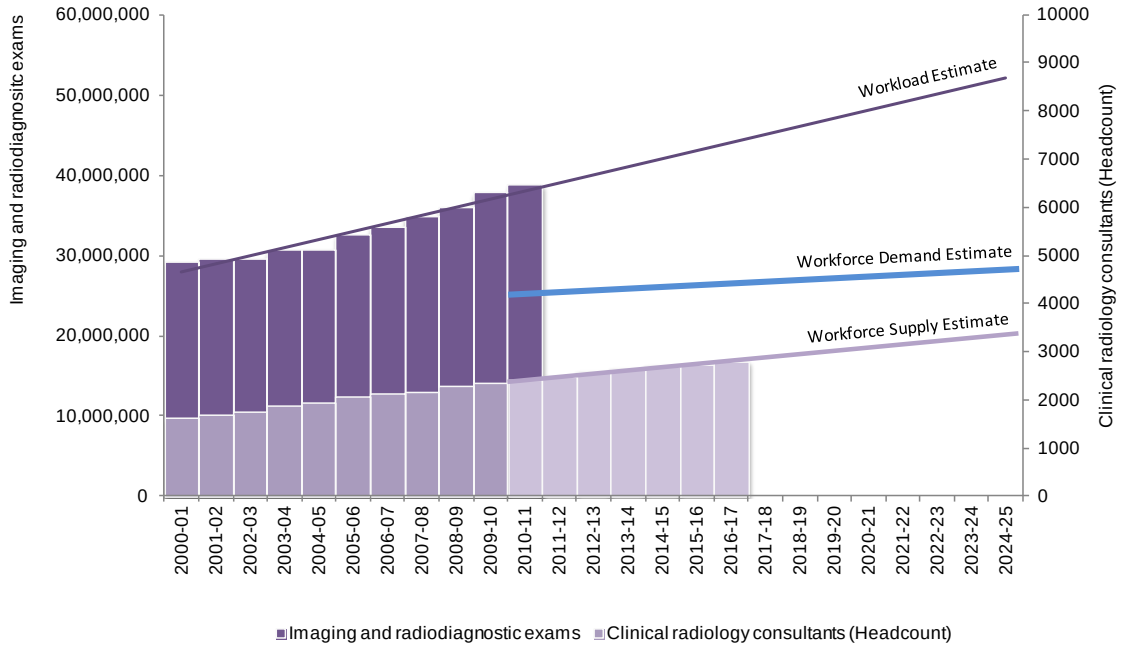
The RCR census showed there are 2,323 clinical radiologists employed in England and 2,869 employed across the UK as a whole – the latter equating to 4.6 clinical radiologists per 100,000 of population in the UK.[2]

As stated earlier, to satisfy the needs of patients and the NHS, the RCR believes the UK requires a minimum of 8 clinical radiologists per 100,000 of population. This would bring it into line with comparable European countries, demonstrated in Figure 9. If this was the case the current number of 2,323 clinical radiologists in England should instead be above 4,000. Further, taking into account population growth, more than 4,600 clinical radiologists will be needed in England by 2025 to ensure the sustained delivery of high-quality patient care to meet the increasing demand.

To achieve these numbers, in excess of a hundred trainees would need to be added to the clinical radiology training programme each year from 2013 to 2018 inclusive. The RCR can, however, acknowledge that an increase of this magnitude would be untenable – instead the RCR is seeking an increase of 60 trainees per year for the next five years in the UK. The spare capacity that exists in UK training schemes would accommodate an increase of 60 per year. The RCR believes an increase of 60 per year is realistic and the minimum necessary to sustain a quality imaging service.

This increase in trainee numbers will increase the future number of consultants. This, in turn, will increase training capacity to allow further increases in the trainee intake from 2019.

Figure 12 The gap between workforce supply and demand, England 2000 to 2025[2-5,17,18]



The following additional assumptions have been applied.

- A minimum 8 clinical radiologists are required per 100,000 population to reach equity with developed countries of similar socio-economic profiles as UK and to preserve the quality of healthcare within the NHS
- Participation rates for each age band remain constant for the specialty until 2025, with an overall participation rate of 0.95 in the RCR census for 2010. However, as the consultant age distribution changes by year, the overall participation rate may also vary by year
- A specialty training period of five years (ST1-ST5) for clinical radiology
- Average delays in training of approximately one year to model the effect of out of programme experiences (OOPE) and maternity leave
- All trainees gaining a CCT in clinical radiology begin working as a clinical radiology consultant within the same year
- Young leavers from consultant workforce at c.0.7% PA[2]
- Average retirement modelled at 62, with those aged 62+ expected to retire equally over the next five years. [2]

7. Conclusion

The role of clinical radiology and the clinical radiologist is crucial for delivery of high-quality, safe and efficient patient-centred care. The innovations implemented by clinical radiologists in the last two decades have radically improved healthcare.

The workload for the clinical radiologist has increased hugely, not only in volume but also complexity. This has been driven by the ever-expanding choice of available imaging techniques and the increasing inherent complexity of the examinations themselves. Regardless of population growth, it is widely accepted that the workload of clinical radiologists will continue to increase with further advances in imaging technology and the impact of commissioning.

Clinical radiology has shown further innovation in managing the challenges of this increasing workload, but the measures employed, including role extension, skill mix and new technologies, have only temporised and have not, and will not, provide a sustainable solution.

Forecasts show that supply is not expected to reach the RCR projected requirement level by 2025. The RCR has serious concerns over the inadequate size of the current clinical radiology workforce and the ability of the specialty to meet service needs and deliver the quality of care patients deserve.

The RCR believes an increase in the number of training posts in both diagnostic and interventional radiology is essential to sustain effective radiology services.

To start to approach the radiologist workforce of similar European countries, the RCR is seeking an increase of 60 trainees per year for the next five years in the UK. There is spare capacity in the UK training schemes to accommodate such an increase.

As well as alleviating the current pressure that clinical radiologists are experiencing, consultant expansion in radiology would deliver a number of important benefits:

- The shift to extended day and seven-day working patterns in healthcare
- Consultant-delivered specialist services
- Earlier diagnostic testing for cancer patients which improves outcome
- More efficient use of resources based in primary care, avoiding unnecessary hospital attendance and admissions
- Real-time radiology reporting turnaround without reporting backlogs
- Improved patient choice and better patient experience
- Improved countrywide access to full interventional radiology services
- Greater and more timely contribution to emerging trauma, stroke and cancer networks.

References

1 Department of Health. *Imaging and radiodiagnostics.* DH 2011. www.dh.gov.uk/en/Publicationsandstatistics/Statistics/Performancedataandstatistics/HospitalActivityStatistics/DH_077487 (last accessed 23/02/2012)

2 The Royal College of Radiologists. *2010 Workforce Census* (data adapted from). RCR 2011. www.rcr.ac.uk/content.aspx?PageID=1531 (last accessed 23/02/2012)

3 Office of National Statistics. *Population Projections*. ONS 2011. www.statistics.gov.uk/hub/population/population-change/population-projections/index.html (last accessed 23/02/2012)

4 CIA. *World Factbook.* CIA 2011. https://www.cia.gov/library/publications/the-world-factbook/fields/2119.html#171 (last accessed 23/02/2012)

5 Autier, P and Ouakrim, D A. *Determinants of the number of mammography units in 31 countries with significant mammography screening.* Br J Cancer, 2008 October 7; 99(7): 1185–1190.

6 Department of Health. *NHS Outcomes Framework 2012-2013.* DH 2011. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_131700 (last accessed 23/02/2012)

7 Richards M A. *The size of the prize for earlier diagnosis of cancer in England.* British Journal of Cancer, 2009; 101: S125–S129.

8 Coutts S B, Eliasziw M, Hill M D, Scott J N, Subramaniam S, Buchan A M, Demchuk A M. *An improved scoring system for identifying patients at high early risk of stroke and functional impairment after an acute transient ischemic attack or minor stroke.* International Journal of Stroke, 2008; 3(1): 3-10

9 NHS Clinical Advisory Groups. *Regional Networks for Major Trauma.* NHS Clinical Advisory Groups 2010. www.excellence.eastmidlands.nhs.uk/welcome/improving-care/emergency-urgent-care/major-trauma/nhs-clinical-advisory-group (last accessed 23/02/2012)

10 Department of Health. *Update to Best Practice Tariffs.* DH 2011. www.dh.gov.uk/health/2011/12/bpt-update (last accessed 23/02/2012)

11 Academy of Medical Royal Colleges. *The benefits of consultant delivered care*. AoMRC 2012 http://aomrc.org.uk/publications/reports-a-guidance/doc_download/9450-the-benefits-of-consultant-delivered-care.html (last accessed 22/06/2012)

12 National Imaging Clinical Advisory Group. *Implementing 7 Day working in Imaging Departments: Good Practice Guidance.* DH 2012. www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_132083.pdf (last accessed 23/02/2012)

13 Department of Health. *White Paper Equity and Excellence: Liberating the NHS.* DH 2010. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_117353 (last accessed 23/02/2012)

14 National Imaging Board. *Interventional radiology: guidance for service delivery.* DH 2010. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_121904 (last accessed 23/02/2012)

15 Department of Health. *Interventional radiology: improving quality and outcomes for patients.* DH, 2009. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_109130 (last accessed 23/02/2012)

16 Graham J, Ramirez A J, Field S and Richards M A. *Job stress and satisfaction among clinical radiologists.* Clinical Radiology, 2000; 55: 182-185.

17 Department of Health. *Diagnostics.* DH 2011. www.dh.gov.uk/en/Publicationsandstatistics/Statistics/Performancedataandstatistics/HospitalWaitingTimesandListStatistics/Diagnostics/index.htm (last accessed 23/02/2012)

18 NHS Information Centre. *NHS Staff 2000-2010 (Medical and Dental).* NHS 2011. www.ic.nhs.uk/statistics-and-data-collections/workforce/nhs-staff-numbers/nhs-staff-2000--2010-medical-and-dental (last accessed 23/02/2012)