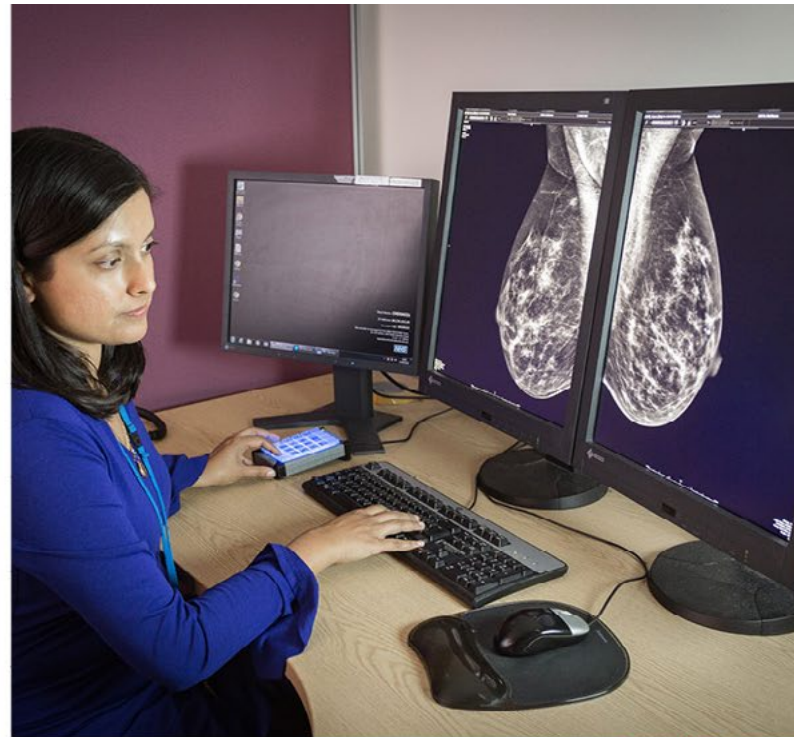


Clinical radiology UK workforce census 2018 report



April 2019

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Prompt and appropriate imaging and intervention improves patient outcomes and avoids unnecessary procedures.

Foreword

Our 11th annual workforce census is a powerful and accurate reflection of the pressures affecting both diagnostic and interventional radiology. The census provides vital information to the UK Government and healthcare policy-makers on the critical need to develop both diagnostic and interventional radiology services and the adverse impact on patients of failing to do so. A huge thank you to all NHS imaging departments in the UK who completed the census, allowing us to have a 100% complete data set for the 11th year running.

Clinical radiology, both diagnostic and interventional, continues to be fundamental to the management of patients. Modern healthcare relies on rapid access to and interpretation of imaging examinations which are integral to the delivery of high-quality, patient-centred care. The demand for imaging is unrelenting and set to increase in light of the ambitions set out in the NHS *Long Term Plan*.¹ We already see a year-on-year increase in demand for complex cross-sectional imaging. In the past five years alone, there has been a 54% increase in demand for computed tomography (CT) and a 48% increase in magnetic resonance (MR) examinations.² Prompt and appropriate imaging and intervention improves patient outcomes and avoids unnecessary procedures.

The RCR 2018 census report makes very concerning reading. It demonstrates the major workforce gap; trusts are unable to recruit and fill consultant vacancies, with six out of ten consultant posts remaining unfilled at 12 months. This workforce gap continues to impact on the delivery of patient care, and potentially patient safety, with only 2% of departments fulfilling their reporting requirements within contracted hours and not enough trainees to keep pace with current demand, let alone develop services.

In addition to the impact on patient care, there is a financial impact for the NHS, as trusts look to alternative, often more expensive methods of providing the service. The cost of outsourcing, ad hoc locums and insourcing has spiralled to £165 million per year. This figure has tripled since 2014 and is equivalent to the combined salaries of 1,887 consultant radiologists.³

We would like to thank all imaging departments for returning the census data as well as the clinical directors and workforce leads for their support and engagement. Our RCR Regional Chairs have been vital in helping to support and encourage departments to complete the task, and we could not have done it without them.

I would personally like to thank our Data, Audit and Surveys team for collating the results and producing the survey so quickly.

Professor Mark Callaway

Medical Director, Professional Practice, Faculty of Clinical Radiology

1. Executive summary

1.1 Objectives

The objectives of The Royal College of Radiologists' (RCR) 2018 clinical radiology workforce census are:

- To provide comprehensive, accurate and timely information on the numbers, distribution and working patterns of UK consultant-grade clinical radiologists in NHS radiology departments
- To forecast future workforce numbers and working patterns, by analysing census data and trends together with RCR specialty training data
- To highlight data, trends or regional variations which give cause for concern, including any mismatch between workforce supply and the demand for diagnostic and interventional radiology
- To gain insight into the methods used to manage the shortfall in the radiology workforce and the associated (costs and other) impacts.

The data and trends identified in this report should inform local and national radiology workforce training, planning and policy.

1.2 Key findings and recommendations

The 2018 clinical radiology workforce census data highlight concerning trends of increased demand for medical interpretation of diagnostic images and interventional radiology services, increased workforce shortages and spiralling costs. The radiology workforce is showing signs of stress and burnout, and workforce shortages are negatively impacting patient care. The RCR makes several recommendations to tackle these issues.

1. Workforce shortages in clinical radiology are negatively impacting patient care.

- **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.**
- In 2018, **one in five consultant clinical radiologists** (n=731) had **fewer than the minimum recommended 1.5 supporting professional activities** (SPAs), a significant increase from the one in eight consultants reported four years ago.^{4,5}

Recommendations

- The UK Government and health education departments in England and the devolved nations should substantially increase the number of funded radiology trainee places.
- Global Fellowship schemes should be used as a stopgap measure to rapidly increase the UK SAS-grade clinical radiology workforce.*

What is the RCR doing?

- Using census data, the RCR continues to lobby health education, training and workforce planning bodies across the UK, asserting the need to fund as many training places as possible.

*SAS grade comprises associate specialists, specialty doctors, and trust-grade staff.

- The RCR is working with Apollo Healthcare Hospitals in India and Health Education England to implement a Global Fellowship Scheme. In this scheme, overseas FRCR-qualified radiologists are appointed to SAS-grade posts for a three-year period on an 'earn, learn and return' basis, to cover vacant consultant clinical radiologist posts. The RCR is also working on developing similar schemes in the devolved nations.
- The RCR is working with the NHS Improvement National Imaging Optimisation Delivery Board (NIOOB) to produce standards on reporting turnaround times.
- The NHS workforce implementation plan, an essential part of the NHS *Long Term Plan*, is due to be published later in 2019.¹ The RCR has representation on the 'future medical and dental workforce' sub-group and will be providing expert guidance on the clinical radiology and clinical oncology workforce. The RCR is in dialogue with the Chief Executive of NHS Improvement and NHS England regarding the NHS *Long term plan*.¹

2. Consultant clinical radiologists are showing signs of stress and burnout, with early retirement resulting in the loss of valuable expertise.

- A large number of long-term vacancies, two-thirds of which are not covered by locums, means that **many consultant clinical radiologists are covering workforce gaps**. Increased workload over a prolonged period **leads to stress and burnout, which in turn can lead to adverse patient outcomes**.⁶
- **Half of clinical radiologists retire at or before the age of 61, influenced by factors such as work-life balance and concerns about pension tax penalties**. If consultant clinical radiologists were **incentivised to retire later at the age of 65**, instead of the current average of 61, this would **halve the forecast number of retirements over the next five years**.
- **In 2018 one in three consultant clinical radiologists reported experiencing work-related stress that negatively affects their work**.⁷

Recommendations

- NHS employing organisations should foster a supportive workplace culture and offer flexible employment options. This values the importance of staff wellbeing and can maximise retention.
- NHS employing organisations should ensure that all consultants have sufficient SPA allocation. This is crucial to maintain their knowledge base, to revalidate and to undertake audit and quality-improvement activities.
- HM Treasury should adjust UK pension regulations as they currently incentivise early retirement.
- Hospitals should tailor mandatory training, including information governance, more closely to the clinical work their doctors are performing, so that radiologists only spend time on mandatory training that is highly relevant to their practice.

What is the RCR doing?

- The RCR is working to identify the core drivers for stress and burnout among clinical radiologists, with the aim of producing targeted resources and support mechanisms.
- The RCR continues to lobby relevant bodies to get the UK lifetime allowance pension cap lifted for NHS doctors.

3. Many radiology departments are struggling to cope with workload; expenditure has spiralled due to an increase in outsourcing and insourcing as they attempt to meet reporting demands.

- With persistent workforce shortages, **only 2% of UK trusts/health boards were able to meet their reporting requirements within consultant clinical radiologists' contracted hours in 2018**; this compares to 8% in 2014, indicating that workforce shortfalls have increased.
- Radiology departments are unable to recruit the staff they need with **six in ten consultant** clinical radiologist **vacancies** remaining **unfilled for 12 months or more**.
- In 2018, radiology departments spent an estimated **£165 million on outsourcing** to teleradiology companies, **insourcing** and the employment of **ad hoc locums**.^{*} £165 million is **almost triple the expenditure reported in 2014** and is **equivalent to the combined salaries of 1,887 full-time consultant clinical radiologists**.³
- **Almost half of trusts/health boards reported leaving imaging studies auto-reported or unreported**; this is highly concerning due to the potential for diagnoses to be missed or delayed.^{**}

Recommendations

- NHS employing organisations should create and implement robust retention strategies to minimise radiology workforce attrition at all career stages.
- To reduce unwarranted imaging investigations, the RCR's radiological investigation guidelines tool, *iRefer*, should be used.⁹ Based upon the best available evidence, this tool supports referring general practitioners (GPs), radiographers, clinicians and other healthcare professionals to determine the most appropriate imaging investigation(s) or intervention for their patients, and cuts down on the number of unnecessary imaging investigations performed.
- The number of SAS-grade radiologists should be increased through the following measures:
 - The UK Government should add non-consultant clinical radiology posts to the UK Shortage Occupation List (SOL)⁹
 - NHS employing organisations should review pay scales for SAS-grade roles to attract strong candidates
 - NHS employing organisations should reopen the associate specialist grade for new entrants to help promote SAS doctor career development and progression within radiology.

^{*} Paid reporting by departments' radiologists, additional to core contracted hours.

^{**} An auto-report is a standardised automatic response sent to referring clinicians, stating it is their responsibility to either provide a formal imaging report or to request one from the radiology department.

What is the RCR doing?

- The RCR submitted a detailed response to the Migration Advisory Committee *Call for Evidence* in January 2019, asserting the need for inclusion of non-consultant, non-training, medical staff posts in clinical radiology in the SOL, and will continue to engage as the list is finalised.¹⁰
- The RCR supported the Academy of Medical Royal Colleges (AoMRC) call for the reopening of the associate specialist grade.
- The RCR conducts an annual unreported images snapshot survey to monitor reporting turnaround times and the extent of diagnostic reporting delays.

4. Clinical radiology trainee numbers need to treble to close the forecast gap between supply and demand.

- In 2019, an estimated **154 trainees will enter the UK consultant workforce, insufficient to fill even half of the 379 consultant vacancies reported in 2018.**
- Currently, **83% of those who complete specialist training in clinical radiology in the UK take up UK NHS consultant clinical radiologist posts** within two years; 17% choose not to do so (estimated to be 39 potential candidates per year over the next five years). Increased retention would help to close the growing gap between supply and demand.
- **Specialist training numbers would need to treble from the current average** of 265 new trainees each year to 808 per year for the next five years (2019–2023) to rectify the forecast shortfall of 1,867 WTE consultant clinical radiologists in 2023 by UK training alone.*

Recommendations

- To reduce the gap between supply and demand, the number of funded training places should increase radically from 2019, taking into account training capacity constraints and local service needs.
- NHS employing organisations should create attractive, flexible posts, in supportive environments, with greater learning and career opportunities. This will incentivise more trainees to take up consultant posts in the UK rather than overseas.

What is the RCR doing?

- Using census data, the RCR continues to lobby health education, training and workforce planning bodies across the UK, asserting the need to fund as many training places as possible.
- The RCR promotes radiology at undergraduate level, provides online resources and participates in careers events to attract medical students and junior doctors into radiology. Clinical radiology is a popular specialty; training places have been oversubscribed for the past five years (with three applicants for every post in 2018), so extra places would be easily filled.

* A WTE is a whole-time (or full-time) doctor with a ten programmed activities (PAs) per week contract; this is equivalent to a 40-hour week in England, Northern Ireland and Scotland and equivalent to a 37.5-hour week in Wales.

5. Demand for diagnostic and interventional radiology services is forecast to rise further; some roles and locations are particularly vulnerable to workforce shortages.

- Over the past five years, there have been significant increases in the volumes and complexity of imaging, for example, the volumes of **CT and MRI scans have increased by an average of 10% (over half a million imaging studies) per year in England.**² This has dramatically increased the diagnostic radiologist workload, as complex imaging takes much longer to interpret and report.
- The **estimated shortfall** of 1,104 radiologists (23% shortfall) in 2018 is **forecast to rise to 1,867 (31% shortfall) in five years (2023)**, driven by increased demand for diagnostic imaging and interventional procedures.
- **Variation across the UK:** Northern Ireland and Wales have only seen 2% growth per annum in WTE consultant clinical radiologists and Scotland has seen only 1% growth per annum.
- **Specialists:** the shortage of breast, chest/lung and paediatric consultant clinical radiologists is forecast to increase over the next five years.

Recommendations

- UK training bodies should undertake long-term strategic national workforce planning, based upon the forecast future demand for both diagnostic and interventional radiology services – taking account of the staffing required to deliver best practice for the benefit of patients.
- The General Medical Council (GMC), health education bodies, NHS England and the equivalent devolved nation bodies, should support the further development of relevant credentials (particularly in breast imaging and in stroke mechanical thrombectomy) to make best use of the skills of other clinical doctors to support targeted areas of acute need for radiology services.¹¹

What is the RCR doing?

- The RCR is developing an interventional neuroradiology (acute stroke mechanical thrombectomy and aneurysm coiling) credential and a credential for breast clinicians.
- The RCR Interventional Radiology Committee is working to improve the training for and practice of interventional radiology for the benefit of patients.
- RCR Officers hold regular meetings with the NHS England National Clinical Director for Diagnostics, to keep the need for diagnostic and interventional radiology at the forefront of NHS England plans. Annual meetings are held with the Chief Medical Officers of Scotland, Wales and Northern Ireland, and with their Radiology Standing Committees, to discuss radiology workforce issues pertinent to the the devolved nations.
- This annual workforce report identifies the likely future supply of consultant clinical radiologists, along with the gap between the supply and the anticipated demand. These robust data should be used to support local and national workforce planning.

2. The UK clinical radiology workforce in 2018

This section provides an overview of the radiology workforce in September 2018. Information is provided on the size of the workforce, trends, specialisms, working activities and less than full-time working.*

2.1 Overview of the radiology workforce

Teams of consultant radiologists, SAS-grade doctors, radiographers and others deliver diagnostic and interventional radiology (IR) services in the UK. Table 1 shows that there were 3,927 consultant-grade clinical radiologists in post in September 2018. This includes NHS, academic and mixed NHS/academic posts.

Table 1. UK clinical radiology workforce (headcount), 2018

	England	Northern Ireland	Scotland	Wales	UK total
Consultant-grade	3,296	135	327	169	3,927
Trainees	1,286	51	149	69	1,555
SAS-grade*	65	0	2	2	69
Total	4,647	186	478	240	5,551

[SAS grade comprises associate specialists, specialty doctors and trust-grade staff.]

The number of consultant clinical radiologists employed in the UK increased by 271 to 3,927 in the 12 months to September 2018. Taking into account working patterns of less than full-time (LTFT) doctors, the UK total of 3,927 consultant clinical radiologists equates to 3,622 whole-time equivalents (WTEs).**

The vast majority (98%, n=3,848) of consultant clinical radiologists are employed in NHS posts. The remainder (2%, n=79) are employed in academic or mixed NHS/academic posts. Over the past four years, there has been minimal growth (n=1) in the (combined) number of academic and mixed NHS/academic consultants; academic posts have halved (from 51 to 25), while 'mixed NHS/academic' posts have doubled (from 27 to 54). The lack of growth of academic posts is concerning given the importance of teaching and research to the advancement of clinical radiology.

Of the 3,927 consultant clinical radiologists in post, 95% (n=3,738) are employed in substantive posts and 5% (n=189) in locum posts. The number of locums has increased by 89% over the past year.

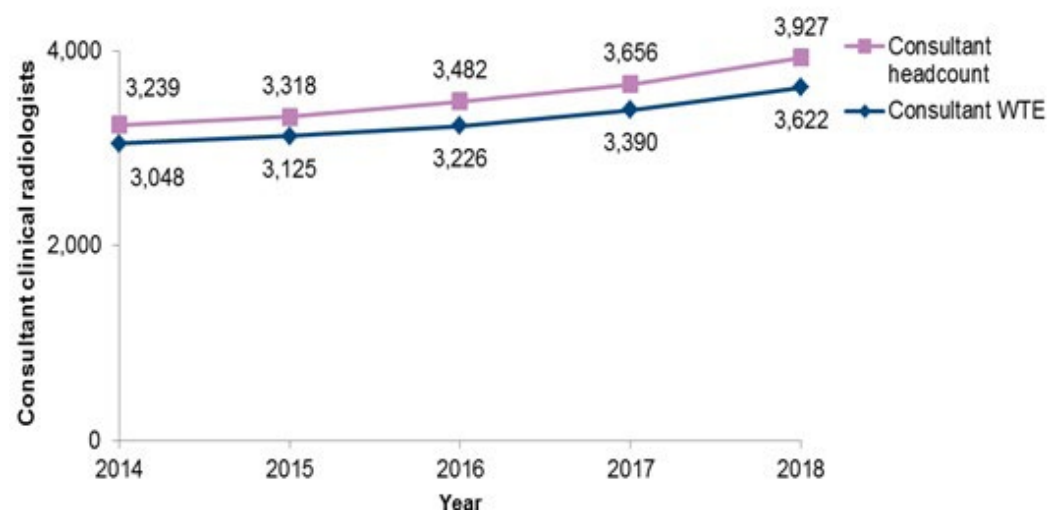
*This report examines trends over the past four and a half years, from March 2014 to September 2018.

**The calculation of WTEs throughout this report conforms to the NHS convention of calculating one WTE as ten PAs (that is, it excludes PAs that exceed ten). WTEs include direct clinical care (DCC) and supporting professional activities (SPA), but exclude research and additional responsibility PAs.

2.2 Consultant workforce – trends across UK countries

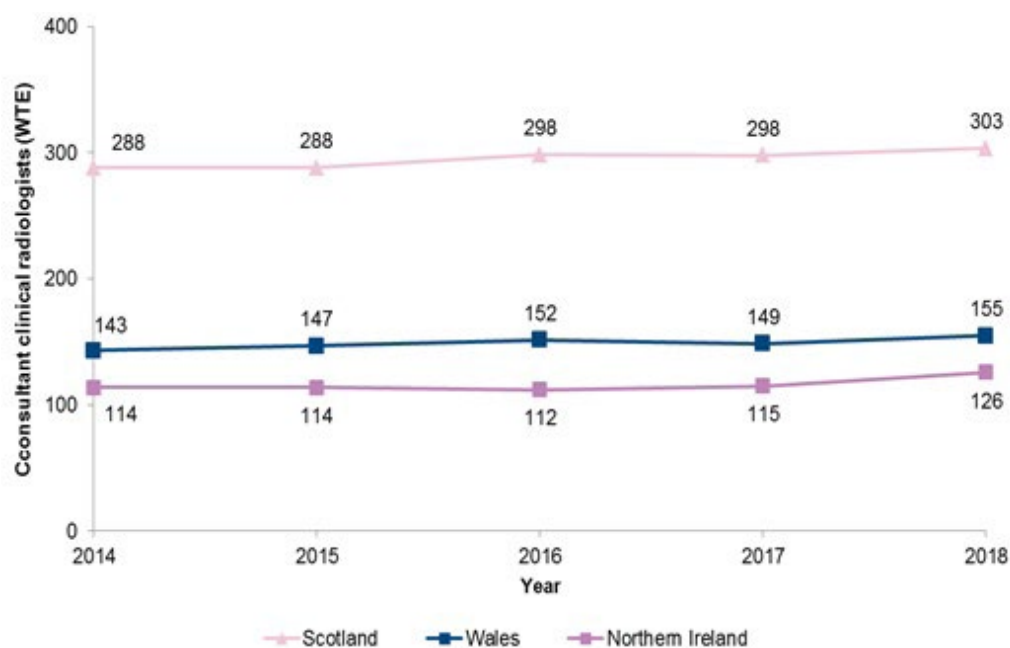
The WTE consultant clinical radiology workforce has grown by an average of 4% per annum over the past four years; the growth in the 12 months to September 2018 was higher at 7%. Doubling of locum numbers has supported growth in the past 12 months; if locums are excluded and only substantive posts are considered, growth in the 12 months to September 2018 was 5%. Figure 1 shows the trend from 2014 to 2018.

Figure 1. UK consultant clinical radiology workforce 2014–2018



There is variability across the UK in terms of growth in the clinical radiology workforce over the past four years. The number of consultant clinical radiologists has increased by an average of 5% (119 WTEs) per annum in England (from 2,503 in 2014 to 3,038 in 2018). In contrast, in Northern Ireland and Wales, only 2% growth per annum (three WTEs) has been seen. For Scotland, the figure is the lowest at 1% per annum (three WTEs). These results are shown in Figure 2.

Figure 2. Consultant clinical radiology workforce, devolved nations 2014–2018



There is also variability across the UK in terms of the number of consultant clinical radiologists per 100,000 population. While the UK average is 5.5, Wales only has 5.0 consultant clinical radiologists per 100,000 population, while Northern Ireland has 6.7. England and Scotland are in line with the UK average with 5.5 and 5.6 respectively.

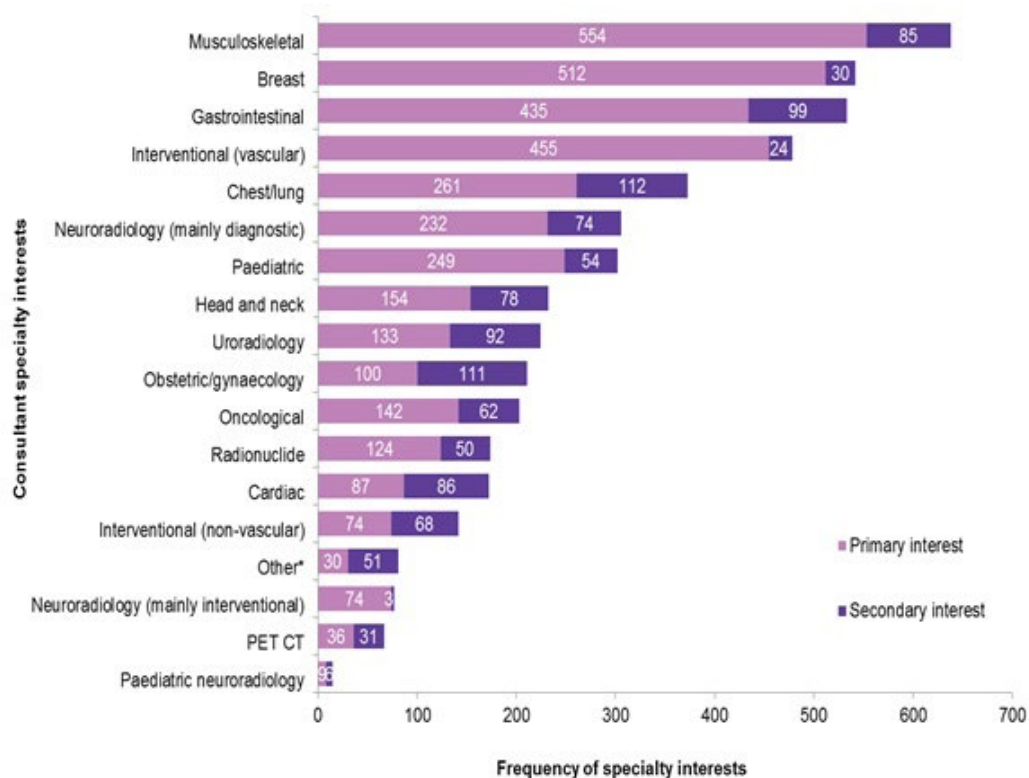
2.3 Specialty areas of practice

Respondents to the census were asked to categorise radiologists according to whether they are generalists or specialists. In 2018, approximately three-quarters of consultants (73%) were categorised as 'generalists' with zero, one or two main areas of interest. There have been small shifts in generalist and more specialist consultant roles between 2014 and 2018 as follows.

- 'Generalists with one main area of interest' decreased from 47% to 42%.
- 'Specialist with two main areas of interest' increased from 1% to 4%.
- 'Generalist with two main areas of interest' increased from 21% to 24%.

The census collects information on consultant clinical radiologists' primary and secondary specialty areas of interest. Figure 3 shows that the most common specialty areas of practice are musculoskeletal, breast, gastrointestinal and vascular IR, which together account for approximately half (46%) of all specialty interests.

Figure 3. Consultant clinical radiologists' primary and secondary specialty interests, 2018



*'Other' includes the following: medical education, imaging information technology (IT), trauma, research, forensic and endocrine radiology.

[Frequency of specialty interests exceeds headcount as consultant clinical radiologists may indicate both primary and secondary areas of interest.]

2.4 Interventional radiology

IR is a recognised sub-specialty of clinical radiology. Interventional radiologists perform minimally invasive image-guided procedures in many areas of the body, including providing emergency treatment for patients with bleeding, sepsis and stroke. IR has revolutionised patient care in a wide range of diseases and has replaced or enhanced many surgical procedures. However, with ongoing workforce shortages, IR provision remains variable. Many hospitals have limited, or in some instances, no direct access to IR services.

The 2018 census has confirmed the following types and numbers of interventional radiologists currently practising, as summarised in Table 2.

- 466 (WTE) consultant vascular interventional radiologists (13% of the UK consultant radiology workforce).*
- 132 (WTE) consultant non-vascular interventional radiologists (4% of the UK consultant radiology workforce).**
- 75 (WTE) consultant interventional neuroradiologists (2% of the UK consultant radiology workforce).***

Table 2. Consultant radiologists (WTEs) with a primary or secondary interest in IR, by IR type, 2018

	Vascular IR	Non-vascular IR	Neuro (mainly IR)	Total
England	402	116	67	585
Northern Ireland	14	5	2	20
Scotland	33	6	5	44
Wales	17	6	1	24
UK total	466	132	75	674

[Due to rounding, numbers in this table may not add up precisely to the totals provided.]
[12 WTEs appear under both 'vascular IR' and 'non-vascular IR'. (Their primary interest is vascular and their secondary interest is non-vascular IR, with one vice-versa.) The above table, therefore, overstates WTE IR consultants by 2%.]

There is wide variability across the UK in terms of the number of consultant interventional radiologists per million population. While the UK average is ten IR consultants per million population, Wales and Scotland have only eight, while England and Northern Ireland have 11. This may indicate that the workforce shortage of interventional radiologists is more significant in Wales and Scotland.

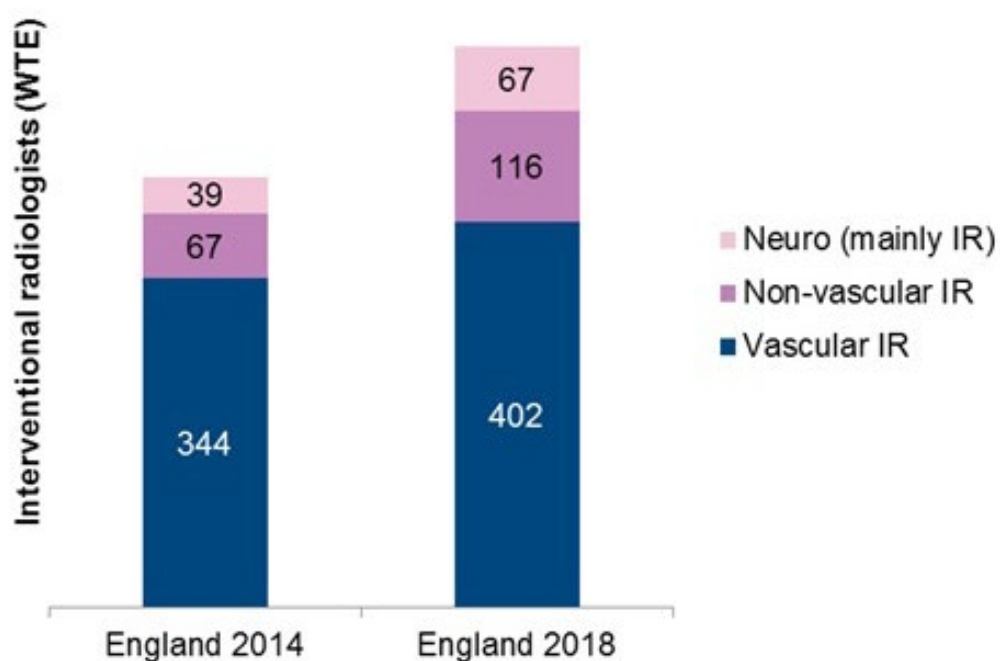
*Vascular procedures are those undertaken on arteries, veins and the lymphatic system, for example, to stop bleeding (haemorrhage), treat narrowing of arteries (vascular disease), to treat enlargement/expansion of blood vessels (aneurysms) or to treat blood clots and blocked veins.

**Non-vascular intervention includes treatment of non-vascular conditions (including urgent treatment to control sepsis) and cancer.

***Interventional neuroradiologists undertake minimally invasive procedures in the brain and spinal cord, for example, to treat strokes.

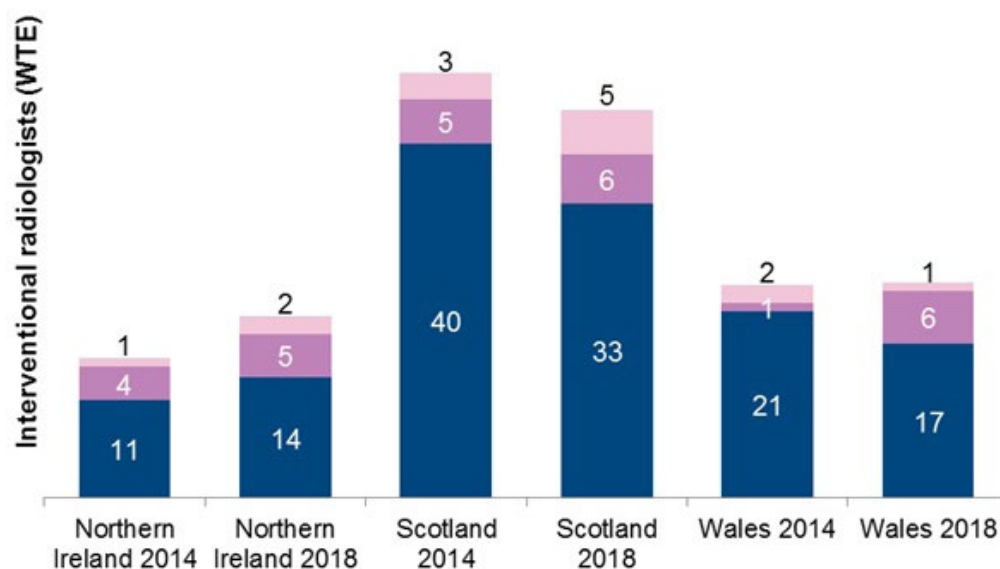
There is also variability across the UK in terms of growth in the IR workforce over the past four years. This is shown in Figures 4 and 5. While England and Northern Ireland have seen increases in the numbers of WTE interventional radiologists, the overall number in Wales has not changed. In Scotland, there are fewer interventional radiologists than four years ago.

Figure 4. Consultant radiologists (WTEs) with a primary or secondary interest in IR, 2014 and 2018 – England



[Ten WTEs appear under both 'vascular IR' and 'non-vascular IR' in 2018. (Their primary interest is vascular, and their secondary interest is non-vascular IR, with one vice-versa.) The above figure, therefore, overstates WTE IR consultants by 2%.]

Figure 5. Consultant radiologists (WTEs) with a primary or secondary interest in IR, 2014 and 2018 – Northern Ireland, Scotland and Wales



For the safety of patients, regardless of geography and hospital size, timely access to IR should be available.¹² Services consisting of six or more interventional radiologists will usually be able to provide an effective and sustainable 24-hour IR service.¹³ Despite this, the 2018 census data show that only one in five UK trusts/health boards (36 out of a total of 172) employ a team of six or more consultant interventional radiologists.

2.5 Programmed activities

The census collects data on contracted programmed activities (PAs) for each consultant clinical radiologist. A full-time post consists of ten or more PAs, equivalent to a 40-hour working week in England, Northern Ireland and Scotland and a 37.5-hour working week in Wales.

The census shows that full-time consultant clinical radiologists were contracted for an average of 10.8 PAs per week in 2018, equivalent to a 43-hour working week.

[Many consultant clinical radiologists take on additional paid and unpaid reporting, outside their core contracted hours (see 'managing demand' data in section five).]

The census collects data relating to the following types of programmed activities:

- **Direct clinical care (DCC):** *Work directly relating to the prevention, diagnosis or treatment of illness.⁴ DCC includes (but is not limited to) reporting of imaging investigations, participation in clinical meetings and supervision of registrars and/or radiographers.*
- **Supporting professional activities (SPAs):** *Activities undertaken to comply with clinical governance and revalidation requirements, including mandatory training, audit and quality improvement, continued professional development and appraisal.⁴ SPA also includes activities such as teaching and training.*

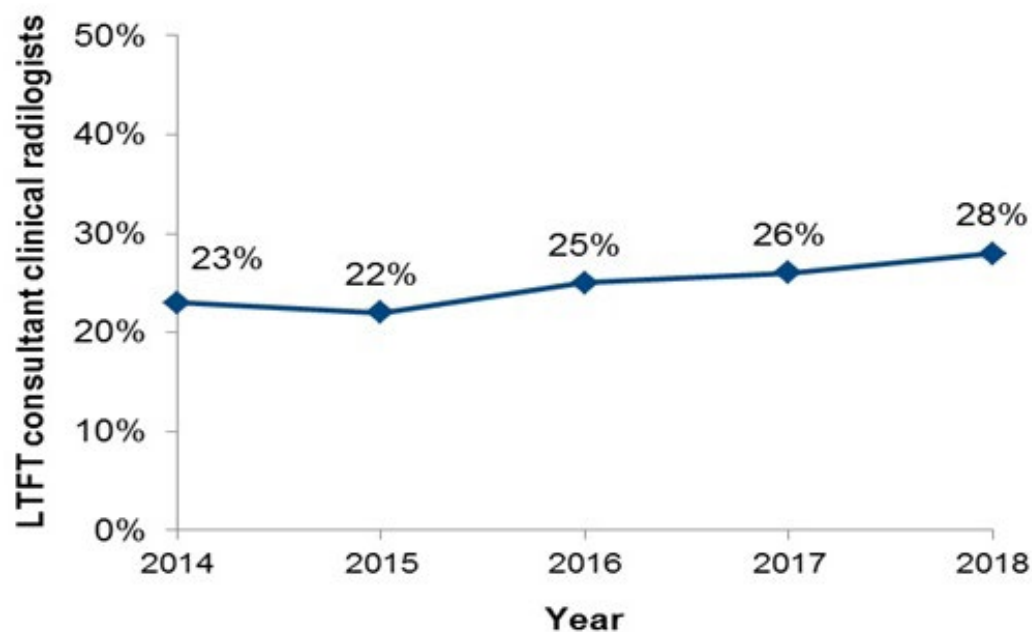
The RCR recommends that the DCC element of the job plan for a full-time consultant should not usually exceed 7.5 PAs and should be balanced by 2.5 SPAs.⁴ However, consultant clinical radiologists are under pressure to increase the proportion of their time spent delivering DCC activities. Consequently contracted DCCs have risen, and SPAs have decreased over the past few years. In 2018, full-time NHS consultant clinical radiologists were contracted for an average of 8.8 DCCs and 2.0 SPAs per week; this is equivalent to five hours more DCCs and two hours fewer SPAs per week than the RCR recommendation.

The RCR and Academy of Medical Royal Colleges recommend that consultants' job plans have a minimum of 1.5 SPAs per week.^{4,5} In 2018, 19% of consultant clinical radiologists (n=731) had fewer than the minimum, a significant increase from the 12% of consultants (n=400) reported as not meeting this minimum four years ago. Inadequate SPA time compromises the ability of doctors to keep their knowledge up to date and revalidate and to undertake audit and quality-improvement activities, which improve services and facilitate better patient outcomes.

2.6 Less than full-time working

The percentage of consultant clinical radiologists working LTFT (fewer than ten contracted PAs per week) has increased from 23% in 2014 to 28% in 2018. This is shown in Figure 6.

Figure 6. LTFT working, UK consultant clinical radiologists 2014–2018



All four UK countries have seen an increase in LTFT working over the past four years. In 2018, the UK workforce capacity reduction due to LTFT working equated to 305 WTE consultant clinical radiologists or 8% of the workforce. Levels of workforce reduction due to LTFT working are broadly similar across UK countries at between 7% and 8%. This is shown in Table 3.

Table 3. UK consultant clinical radiologist workforce reduction due to LTFT working – devolved nations, 2014 and 2018

Workforce reduction due to LTFT working	England	Northern Ireland	Scotland	Wales	UK total
2014	6% 160 WTEs	4% 5 WTEs	6% 19 WTEs	5% 7 WTEs	6% 191 WTEs
2018	8% 258 WTEs	7% 9 WTEs	7% 24 WTEs	8% 14 WTEs	8% 305 WTEs

[Workforce reduction = 100% – (WTE consultants/consultant headcount). This takes into account both the frequency and extent of LTFT working.]

LTFT working is more common among the following two groups of consultants.

- Those aged 60 and over – this group accounts for approximately one-third of the workforce reduction due to LTFT working.
- Female consultants age 40–54 – this group also accounts for approximately one-third of the workforce reduction due to LTFT working.

The census did not capture reasons for LTFT working. Reasons may include work–life balance and combining a consultant role with other roles in education, research and clinical leadership. Given the demand for flexible and LTFT roles, NHS employing organisations should ensure the availability of and support for flexible career options, to maximise staff wellbeing and retention. It is also vital that workforce planning for clinical radiology factors in the reduction in workforce capacity resulting from more people choosing LTFT working.

3. Recruitment and attrition of consultant clinical radiologists in 2018

It is continuing to prove difficult for UK radiology departments to recruit the number of consultant clinical radiologists they need, with a lack of suitable candidates and difficulties of recruiting from overseas cited as key barriers.

3.1 Vacancies and vacancy rates

The census shows there were 379 vacant consultant clinical radiologist posts in the UK in September 2018, which equates to a vacancy rate of 9%.* However, it is likely that vacancies reported through the census are an underestimate of the true extent of workforce shortages as funding and authorisation may not be sought for posts which are anticipated to be extremely difficult to fill.

Table 4 shows that the 2018 vacancy rates were broadly similar across UK countries, except Northern Ireland which had a significantly higher vacancy rate, at 18%.

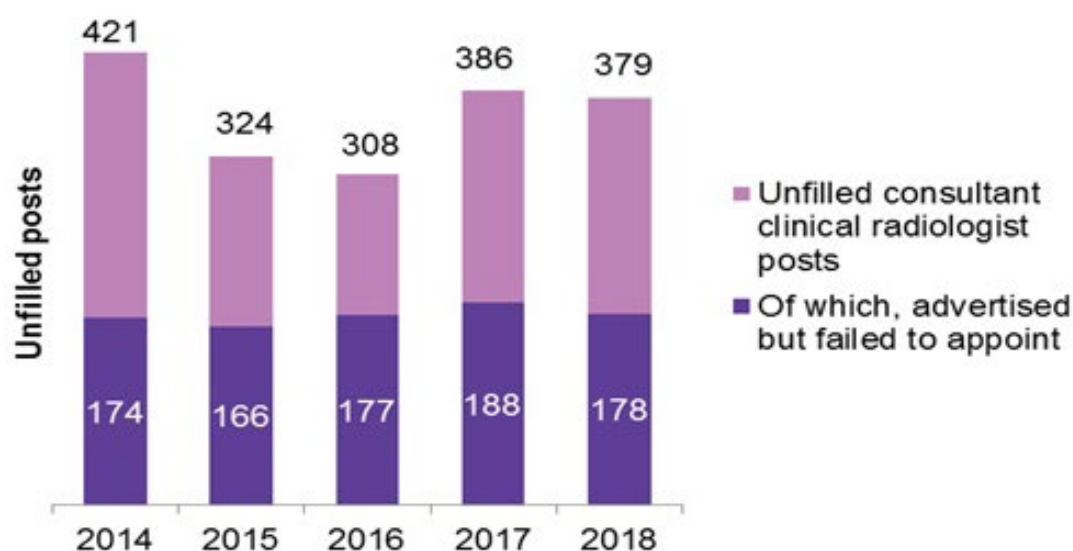
Table 4. Unfilled consultant clinical radiologist posts and vacancy rates 2018

	England	Northern Ireland	Scotland	Wales	UK total
Unfilled posts	309	27	27	16	379
Vacancy rate	9%	18%	8%	10%	9%

[This table shows the count of 'unfilled posts']

Over the past four years, approximately half of advertised consultant clinical radiologist posts have remained unfilled. This is shown in Figure 7. In 2018, 178 consultant clinical radiologist posts were advertised, but not filled, which suggests a lack of suitable candidates.

Figure 7. Status of unfilled consultant clinical radiologist posts 2014–2018



[This figure shows the count of 'unfilled posts']

*Percentage of WTE staff in post against planned workforce levels (WTE vacancies + WTE consultants in post).

As radiology departments are frequently unsuccessful in filling advertised consultant clinical radiologist posts, the posts remain vacant for long periods. Figure 8 shows that six in ten vacancies (61%, n=233) have been unfilled for 12 months or more. This is very similar to the position reported in 2017 when 239 vacancies were unfilled for 12 months or more.

Figure 8. Unfilled consultant clinical radiologist posts – period unfilled 2018

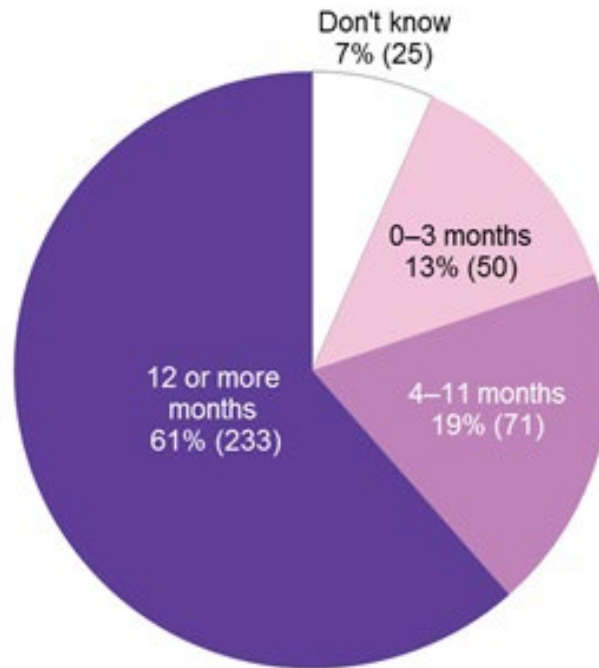


Table 5 shows the primary specialty interests sought for vacant consultant posts in 2018. Breast, vascular IR, paediatric and musculoskeletal radiology were most in demand, indicating a shortage of consultant clinical radiologists specialising in these areas. The vacancy rate in 2018 was highest for non-vascular interventional radiologists, at 14%.

Table 5. Primary interest sought for unfilled consultant clinical radiology posts, 2018

Primary interest	Unfilled posts	Vacancy rate
Interventional radiology (non-vascular)	13	14%
Paediatric radiology	35	13%
Obstetric/gynaecology radiology	12	12%
Head and neck radiology	19	12%
Neuroradiology (mainly interventional)	9	11%
Radionuclide radiology	13	10%
Cardiac radiology	9	10%
Oncological radiology	14	10%
Uroradiology	13	9%
Neuroradiology (mainly diagnostic)	22	9%
Breast radiology	41	8%
Interventional radiology (vascular)	39	8%
Musculoskeletal radiology	30	5%
Gastrointestinal radiology	23	5%
Chest/lung radiology	10	4%
Other	77	–
Total	379	9%

3.2 Overseas recruitment

Radiology departments are increasingly turning to overseas recruitment to try to fill consultant clinical radiologist vacancies; the number of UK trusts/health boards attempting overseas recruitment increased from 66 (37% of total) in 2015 to 93 (54% of total) in 2018.

All four UK countries reported that the majority of radiology departments had attempted overseas recruitment in 2018. The highest proportion was reported by Northern Ireland – which has the highest vacancy rate at 18% – where eight out of the nine radiology departments had attempted overseas recruitment.

Success with overseas recruitment was variable across UK countries; while two-thirds (65%) of radiology departments in England were successful in at least some instances, less than half of radiology departments (41%) across Northern Ireland, Scotland and Wales were successful.

In 2018, overall a third of consultant clinical radiologists working in the UK were international medical graduates (IMGs). IMGs are doctors who undertook their medical degree (or equivalent medical qualification) outside of the UK. Just over a third (36%) of these IMG consultants undertook their specialist training in the UK. Of consultant clinical radiologists reported in the 2018 census:

- 67% undertook their primary medical qualification (PMQ) in the UK (a decrease from 69% in 2014)
- 22% are non-European Economic Area (EEA) graduates
- 10% are EEA graduates
- The country of PMQ is not known for 2% of consultants.

[Percentages may not total 100% due to rounding.]

The challenges of overseas recruitment

Several radiology departments commented on the difficulties they found when recruiting from overseas.

Some departments commented on the lack of good-quality candidates, and that those who are good can pick between roles and locations, resulting in job offers being declined. Trusts reported the following experiences.

- *'Very few suitable candidates.'*
- *'Two candidates pulled out nine months into the recruitment process.'*
- *'Several candidates have declined to come as they got a better offer elsewhere or they were expecting more money.'*
- *'Trust recruitment processes delayed offering posts; therefore, candidates were appointed elsewhere.'*
- *'When offered the post [the candidate] decided to decline and look for a post at a major teaching hospital.'*
- *'Several have refused to start on a 12-month trust locum consultant contract with same terms and conditions as substantive starter consultant salary, despite no UK experience.'*
- *'When you get someone who can come and agrees to work, they back out because they can get paid more as a locum through an agency.'*

Others commented on specific difficulties encountered.

- *'Difficult to [recruit overseas] for permanent consultant posts as people don't have specialist registration.'*
- *'Most [overseas candidates] struggle with a working knowledge of English which is fundamental [for the role].'*
- *'Difficult to judge experience via Skype.'*

Several comments focused on overseas recruitment being a complex and lengthy process, with limited success and candidates often requiring significant support.

- *'Two candidates have been awaiting visas/English exams for about nine months.'*
- *'Visas difficult and time-consuming.'*
- *'At least two overseas candidates have been offered positions but waiting on various procedures including General Medical Council (GMC) clearance. Seems like a very lengthy process.'*
- *'Took a very long time. We interviewed two potential candidates on Skype. There were problems with visas and the English exam. The candidates gave up.'*
- *'Many overseas candidates are not GMC registered or require support to attain their IELTS [English examination] and work permit requirements. The department is not of sufficient capacity to support these candidates to achieve a consultant role.'*

3.3 Locum cover for vacant posts

Locum cover can ease the workload of radiology departments as they struggle to recruit to substantive posts. However, recruiting locums is proving difficult, with only a third (32%, n=122) of the 397 consultant clinical radiologist vacancies reported in 2018 covered by locums, despite the majority of vacancies (61%) being unfilled for 12 months or more.

Cover for a vacant post is the most common reason for appointing a locum consultant clinical radiologist and accounts for two-thirds (64%) of locum appointments. Other reasons given for the appointment of locums are to manage ad hoc shortfalls in reporting capacity and to provide cover for maternity leave or long-term sickness.

A large number of long-term vacancies and low-level of cover by locums mean that many consultant clinical radiologists are covering workforce gaps. Increased workload over a prolonged period leads to stress and burnout, which in turn can lead to adverse patient outcomes.⁵ The *RCR Membership Engagement Survey 2018* found that 35% of radiologists reported experiencing work-related stress that negatively affects their work.¹⁴

3.4 Consultant attrition (including retirements)

The census collects data on whether consultant clinical radiologists have left their posts, along with their reasons for leaving. In the 12 months to September 2018, 246 consultant clinical radiologists (equivalent to 200 WTEs) were reported as having left the workforce, equivalent to 6% attrition.*

Retirement

The most frequently cited reason for consultants leaving is retirement. The median age of retirement over the last four years has been between 60 and 62 (see Table 6). Key factors which influence consultants' decisions on whether to retire early from NHS work are work-life balance and concerns about pension tax penalties for exceeding the lifetime allowance.¹⁵

Table 6. Median retirement age of UK consultant clinical radiologists 2014–2018

	2014	2015	2016	2017	2018
Median age	61	60	60	62	61

[In the context of the RCR census, retirement means retiring from working as a clinical radiologist permanently.]

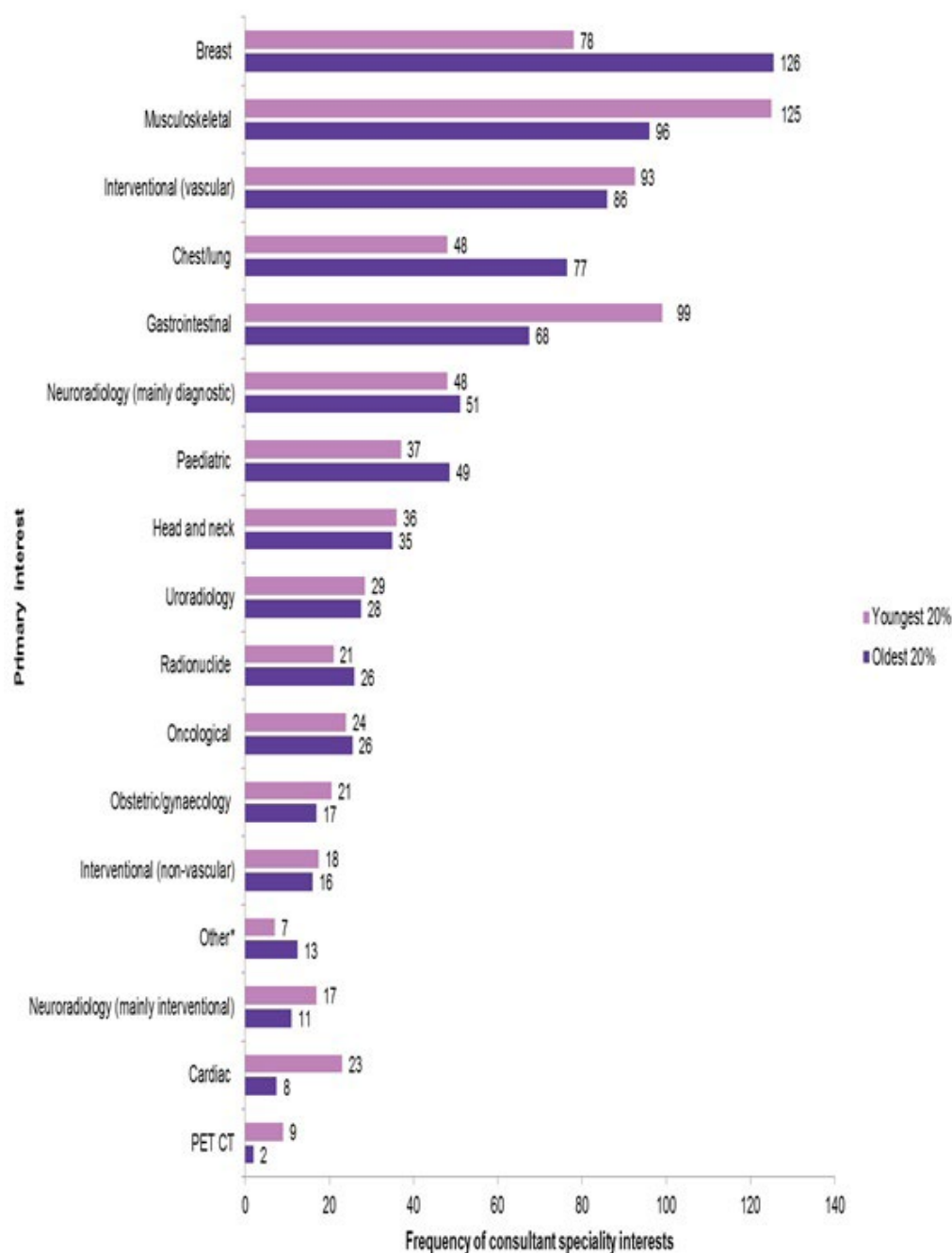
Potential impact of retirements – shortages of specialists

Early retirement results in increased workforce shortages and the loss of valuable experience, knowledge and expertise.

* Attrition is calculated as WTE leavers/mean WTE consultant workforce.

As a means of highlighting potential shortages of specialist radiologists in coming years, Figure 9 shows the primary area of interest of the youngest 20% and the oldest 20% of consultant clinical radiologists. If there is no significant change in demand for radiology services, there is likely to be an increased shortage of specialist breast, chest/lung and paediatric consultant clinical radiologists over the coming five years.

Figure 9. Primary area of interest of oldest and youngest UK consultant clinical radiologists, 2018



[*Other* includes the following: imaging IT, trauma, research and forensic radiology.]

4. Workforce supply and attrition – five-year forecast

Influences on the supply of the consultant clinical radiology workforce include entrants from UK specialist training and recruitment from overseas, set against attrition from retirements and other leavers, and the trend towards flexible working patterns. This section uses census and training data to forecast the workforce supply and attrition in the next five years.

4.1 Supply from UK specialist training

After completing a degree in medicine and two years of foundation training, doctors can start UK specialist training in clinical radiology. Full-time specialist training in clinical radiology indicatively takes a minimum of five years to complete, with an additional sixth year for those who are accepted onto the IR subspecialty pathway. This section uses RCR training data to calculate the number of UK-trained consultant clinical radiologists who will join the workforce in the next five years; this is estimated to be an average of 173 WTE consultants per year, as shown in Table 7.

In 2019, an estimated 154 WTE consultants will enter the UK workforce following completion of UK specialist training; this is insufficient to replace the 200 WTEs who left the workforce in the 12 months to September 2018 (see [Section 3.4 Consultant attrition](#)) and is insufficient to fill even half of the 379 consultant vacancies (see [Section 3.1 Vacancies and vacancy rates](#)). Without significant changes to the supply or delivery of radiology services, the shortfalls currently experienced across the clinical radiology workforce are likely to increase.

Table 7. Estimated training completions (Certificate of Completion of Training [CCT]) and subsequent consultant clinical radiologists – next five years

Year	Estimated CCTs* (headcount)	Estimated subsequent UK consultants** (headcount)	Estimated subsequent UK consultants*** (WTE)
2019	202	168	154
2020	207	172	158
2021	227	188	173
2022	240	199	183
2023	257	214	197
2019–2023 total	1,134	941	866
2019–2023 average per year	227	188	173

[Due to rounding, numbers in this table may not add up precisely to the totals provided.]

*Based on current training numbers, the average training length of five years and eight months and estimated attrition of 10%. 2019–2021 figures include an estimated 25 IR CCTs per annum.

**Estimated attrition rate of 17% – based on a comparison of RCR training data (2012–2016 CCTs) with census data (2016–2018) to identify UK trainees who have and have not taken up consultant roles.

***Estimated participation rate of 92% based on the current scale of LTFT working.

The 2018 RCR training data show a three-month increase in the average length of time taken to complete specialist training in clinical radiology in the UK, from five years and five months (trainees completing 2009–2013) to five years and eight months (trainees completing 2014–2018). This is shown in Table 8. The increase is likely attributable (in part) to the increased uptake of out-of-programme activities.

Table 8. Average (mean) length of specialist training – clinical radiology

Time period	Full-time	LTFT	Overall
2009–2013	5 years 1 month	7 years 1 month	5 years 5 months
2014–2018	5 years 5 months	7 years 4 months	5 years 8 months
Difference	4 months	3 months	3 months

Over the past ten years, there has also been an increase in the number of LTFT trainees. In the five years up to 2018, on average 18% of trainees were LTFT (at the point of completing their training) compared to 15% in the five years up to 2013.

The effect of the increased (average) length of training and the increase in LTFT trainees is a decreased supply (over the short-term) of recently qualified applicants for consultant clinical radiology posts.

A comparison of RCR training and census data shows that 17% of those completing UK specialist training (and gaining CCT) between 2012 and 2016 have not so far taken up a (substantive or locum) consultant clinical radiology post in the UK. The attrition rate varied from the average of 17% dependent on country of primary medical qualification; the attrition rate was 15% for UK graduates and 24% for non-UK graduates.

4.2 IR – supply from UK specialist training

In 2019, an estimated 20 WTE consultant interventional radiologists will enter the UK workforce, following completion of UK specialist training, insufficient to fill even half of the 61 consultant IR vacancies (reported in **Section 3.1 Vacancies and vacancy rates**). This is shown in Table 9.

Table 9. Estimated training completions (CCTs) in IR and subsequent consultant interventional radiologists – next three years

Year	Estimated IR CCTs*	Estimated subsequent UK IR consultants**	Estimated subsequent UK IR consultants***
	Headcount	Headcount	WTE
2019	25	21	20
2020	25	21	20
2021	25	21	20
2019–2023 total	75	63	60

*Based on current IR training numbers, the average training length (six years for full-time trainees and seven years and seven months for LTFT trainees) and estimated attrition of 19% (an average of six IR trainees leave training each year).

**Estimated attrition rate of 16% – based on a comparison of RCR training data (2013–2016 CCTs) with census data (2016–2018) to identify UK trainees who have and have not taken up consultant roles.

***Estimated participation rate of 94% based on the current scale of LTFT working.

It is forecast that there will be an increase of two WTE consultant interventional radiologists per year over the next three years, equivalent to 0.3% growth per annum. This is based on 20 WTE trainees forecast to join the workforce and 18 WTE retirees predicted to leave (based on an average age of retirement of 61 years). This forecast does not take into account overseas recruitment or changes in attrition rates.

4.3 Supply from overseas recruitment

The 2018 census data show that approximately 100 WTE consultant clinical radiologists, who undertook their specialist training outside of the UK were recruited to UK NHS consultant posts each year, in the past five years. Census data do not provide any evidence of a decrease in EEA doctors since the outcome of the June 2016 referendum to leave the European Union.

Assuming the current rate of overseas recruitment remains constant over the next five years, it is estimated that approximately 500 WTE consultant clinical radiologists will be recruited to substantive posts in the UK by 2023.

4.4 Supply from other sources

There is supply, albeit smaller, through other routes to the UK consultant clinical radiology workforce. This group comprises those predicted to return to practice, recruitment of consultant clinical radiologists for whom the country of PMQ is unknown and UK medical graduates who qualify via the Certificate for Eligibility for Specialist Registration (CESR). This supply is estimated to total 68 WTEs in the next five years, in line with the last five years.

4.5 Retirement scenarios and forecast attrition

Retirement scenarios – estimated attrition and the effect of retention strategies

On the assumption that the median retirement age remains unchanged at 61 years (see **Section 3**), an estimated 618 WTE consultants (17% of the current consultant workforce) are expected to retire in the next five years. Given the continuing shortfall in the consultant clinical radiology workforce, this level of attrition is likely to put considerable additional strain on the workforce. Well-planned and executed retention strategies targeting those with an increased likelihood of leaving the NHS, including consultants approaching retirement age, would have a significant effect on reducing the workforce shortfall. Older consultants are also a valuable source of training and mentoring for more junior doctors and have considerable experience, knowledge and expertise. The following scenarios demonstrate the potential positive impact of postponing retirement on workforce attrition, summarised in Table 10.

Scenario 1: Median age of retirement remains at 61 representing no change from 2018.

Scenario 2: If consultant clinical radiologists were incentivised to continue to work full-time and retire at the age of 65, this would halve the number of retirements, with estimated retention of 340 WTE consultants (in comparison with the current situation, Scenario 1).

Scenario 3: If consultants were incentivised to work on LTFT contracts of six PAS (equivalent to a 24-hour week) from age 60 and retire at the age of 65, this would reduce retirements by a third, with estimated retention of 264 WTE consultants (in comparison with the current situation, Scenario 1).

Table 10. Effect of retention strategies/retirement age, next five years

Age of retirement	Estimated consultant retirements (WTEs), next five years
Scenario 1: 61 years (no change from the 2018 median age of retirement)	618
Scenario 2: 65 years	278 (340 fewer relative to scenario 1)
Scenario 3: 65 years plus all consultants age 60–64 working LTFT	354 (264 fewer than scenario 1)

Other leavers

Assuming the annual attrition rate of 1% for other leavers (that is, all leavers excluding retirements) remains unchanged, attrition in the next five years for this cohort is expected to total 232 consultants (WTEs).

4.6 Less than full-time working

The UK consultant clinical radiologist workforce capacity loss due to LTFT working has increased from 6% (191 WTEs) in 2014 to 8% (305 WTEs) in 2018 (see **Section 2**). If this trend continues, the effect will equate to an estimated 88 fewer consultant clinical radiologists (WTEs) in the five years to 2023.

5. Increased demand for radiology services

Medical imaging is used to diagnose and monitor medical conditions and is an integral part of the majority of medical pathways. Consultant clinical radiologists provide expert guidance to other clinicians regarding which of the many available diagnostic imaging tests is most likely to answer a clinical question, interpret and report medical images and attend multidisciplinary team meetings (MDTMs) to discuss complex cases and cancer cases.¹⁶

There has been a significant increase in the demand for radiology services and therefore the workload of radiologists. This is a result of increased:

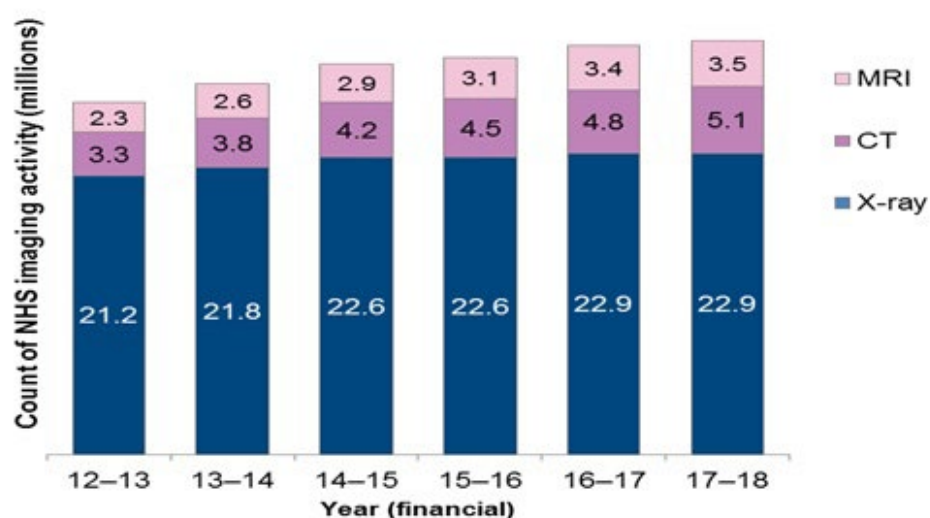
- Demand for diagnostic imaging, driven by population increases, an aging population and increased multi-morbidity, along with increased screening
- Complexity and diversity of imaging studies and the increased number of images to be reviewed in each imaging study
- Demand for IR
- Input of clinical radiologists into MDTMs. The 2018 census data show that consultant clinical radiologists spend an average of four to five hours preparing and attending MDTMs in a typical week.

The increase in demand for medical imaging (and in particular complex imaging) observed in the last five years is highly likely to continue over the next five years due to initiatives such as rapid diagnostic and assessment centres, new clinical pathways and expansions in cancer screening programmes.

5.1 Demand for diagnostic imaging

Three of the most common diagnostic imaging tests carried out on NHS patients in the UK are X-ray, computed tomography (CT) and magnetic resonance imaging (MRI). In England in the year to March 2018, 32 million X-ray, CT and MR imaging tests were reported, with numbers increasing year on year. This is shown in Figure 10. Over recent years, the growth in demand has been exceptionally high for complex imaging; over the past five years (FY12/13–FY 17/18) 1.8 million more CT and 1.1 million more MRI imaging examinations have been undertaken in England (which equates to a 54% increase in CTs and a 48% increase in MRIs).²

Figure 10. Count of NHS imaging activity, England – five-year trend²



Consultant clinical radiologists report the vast majority of X-ray, CT and MRI scans; the remainder is reported by registrars or reporting radiographers, or outsourced to the independent sector.

Table 11 estimates the total number of consultant clinical radiologists required to interpret and report all the X-ray, CT and MRI scans conducted in the UK in FY 2017/18, taking into account the time taken to report each type of image (with complex images taking longer to report) and the estimated percentage of images reported by consultant clinical radiologists.

Table 11. UK diagnostic imaging demand 2018

	Volume of images, England [1]	Volume of images, UK [2]	% of images reported by consultants [3]	Volume of images reported by consultants	Hours to report [4]	Consultant number needed [5]
X-ray	22.9 million	26.0 million	60%	15.6 million	0.5 million	649
CT	5.1 million	5.8 million	90%	5.3 million	1.3 million	1,641
MRI	3.5 million	3.9 million	90%	3.5 million	1.2 million	1,472
Total	31.5 million	35.8 million	–	24.4 million	3.0 million	3,762

[Due to rounding, numbers in this table may not add up precisely to the totals provided.]

Notes to Table 11

[1] Diagnostic Imaging Dataset (DID) 2017/18²

[2] UK-wide estimate calculated using DID and adjusted by population¹⁷

[3] Estimated percentage of modality reported by consultant clinical radiologists¹⁸

[4] Estimated hours to report based on two minutes per X-ray, 15 minutes per CT and 20 minutes per MRI¹⁹

[5] Based on 20 consultant hours per week over 40 weeks^{4,19}

Complexity of imaging is an essential factor to take into account in radiology workload planning, as complex imaging takes significantly longer to interpret and report. For example, Table 11 illustrates that consultant clinical radiologists report nearly double the number of X-rays than CTs and MRIs (combined), yet the consultant X-ray workload (hours required to report) is a quarter of the CT and MRI workload, due to the difference in complexity.

Of the estimated 36 million images reported in the UK in FY 2017/18, it is estimated that 24.4 million were reported by consultant clinical radiologists, taking a total of three million hours to report. In staffing terms, this equates to requiring 3,762 WTE consultant clinical radiologists.

As of September 2018, there are 3,622 WTE consultant clinical radiologists in post, of which 3,037 are primarily diagnostic radiologists (and 584 WTEs are primarily interventional radiologists). This translates to an estimated shortfall of 725 consultant clinical radiologists (WTEs) in 2018.

5.2 Demand for interventional radiology

The range of diseases and organs amenable to IR is extensive, and the scope and complexity of IR procedures continue to increase. This has led to increased demand for

IR and exacerbated workforce shortages. For example, a lack of staff and 24/7 provision have been identified as factors contributing to patients experiencing long waits for clinically urgent vascular surgery.²⁰

Estimated shortage of consultant interventional radiologists

There is an estimated shortfall of 379 interventional radiologists, equating to a 36% shortfall.* This is the number needed for trusts/health boards to reach the minimum of six (WTE) interventional radiologists required to provide an effective and sustainable 24-hour IR service.¹³

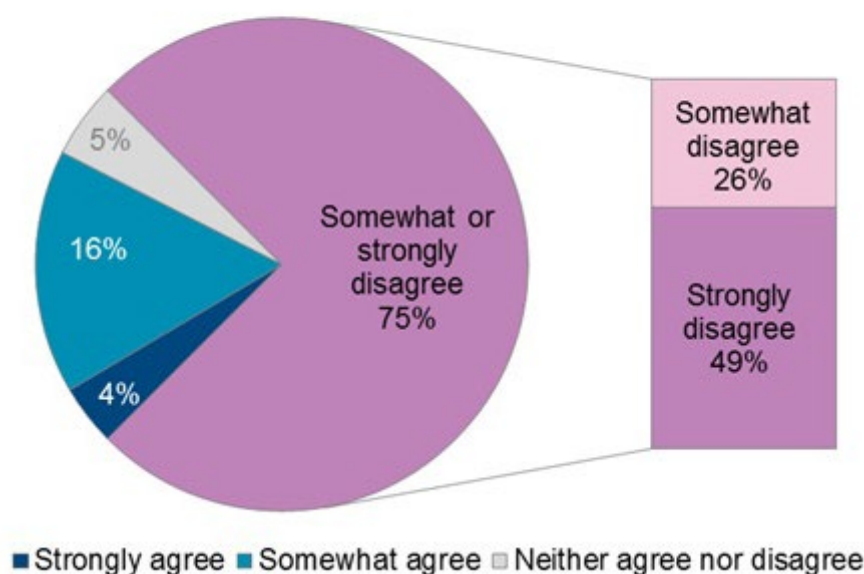
5.3 Managing demand

To capture the views of radiology departments' clinical directors on the impact of any radiology workforce shortages, the 2018 census asked the question 'To what extent do you agree or disagree that there are currently sufficient consultant clinical radiologists employed in your radiology department(s) to be able to deliver safe and effective levels of patient care?' Figure 11 presents the findings. Three-quarters of clinical directors felt there were insufficient clinical radiologists in their department(s) to deliver a safe and effective level of patient care. Half of clinical directors 'strongly disagreed' with the statement.

The GMC echo the above findings in their annual *State of medical education and practice in the UK report* with the strong message, 'The medical profession is at the brink of breaking point in trying to maintain standards and deliver good patient care.'¹³

Figure 11. Clinical directors' views on radiologist staffing levels

To what extent do you agree or disagree that there are currently sufficient consultant clinical radiologists employed in your radiology department(s) to be able to deliver safe and effective levels of patient care?



[The views of seven clinical directors (4% of the total) are excluded from the above chart as they chose the response 'don't know/prefer not to say'.]

* This estimate assumes that the 22 trusts/health boards, which do not employ any consultant interventional radiologists have formal arrangements with other trusts to provide IR services, i.e. it is assumed that the shortfall of interventional radiologists for these trusts/health boards is zero, not six.

Many clinical directors commented on the problems arising from workforce shortages in their radiology departments. Several expressed concern regarding delayed diagnoses and potential patient harm.

- *'Longer turnaround times delayed diagnoses.'*
- *'Delayed diagnosis of cancer and critical findings.'*
- *'Long wait times for results, potential for delayed diagnosis.'*
- *'Failure to meet cancer targets.'*
- *'Working increasingly fast and becoming unsafe.'*
- *'Unreported examinations [are] rising.'*
- *'Actual and perceived pressure to increase the throughput of patients/scans, potentially leading to more errors.'*
- *'We are unable to provide a safe and reliable radiology service.'*
- *'We cannot maintain a safe level of IR service.'*
- *'Risk of not picking up important incidental findings for several weeks.'*
- *'We cannot meet expectations of NICE guidelines clinical pathways.'*
- *'Increase in complaints, litigation etc.'*

Others commented on there being insufficient time for essential activities.

- *'Insufficient time available for teaching, research, audit etc.'*
- *'Consultants do not have sufficient time for MDTM preparation.'*
- *'Colleagues use their SPA time to catch up on clinical work.'*
- *'SPA is (voluntarily) converted to DCC to keep the flow of working going through.'*
- *'Unable to do peer review.'*
- *'With such ruthless work prioritisation, some things such as audit suffer.'*
- *'Insufficient substantive radiologists to train more registrars and advanced practitioners.'*
- *'Support for clinical teams reduced.'*
- *'We cannot innovate services.'*

And some commented on the impact on staff.

- *'With the stress and workload, consultants will burn out quicker, and already we are seeing signs of that.'*
- *'More stress on the workforce precipitating early retirement.'*
- *'Impact on the health of consultant radiologists working long hours.'*
- *'Stress related to fire-fighting.'*
- *'Burnout, poor retention.'*
- *'Personal development plans neglected.'*
- *'MDTM prep is done in peoples' own time/on Sunday evenings at home in some cases.'*

Others were concerned about the lack of resilience in system and implications for the future.

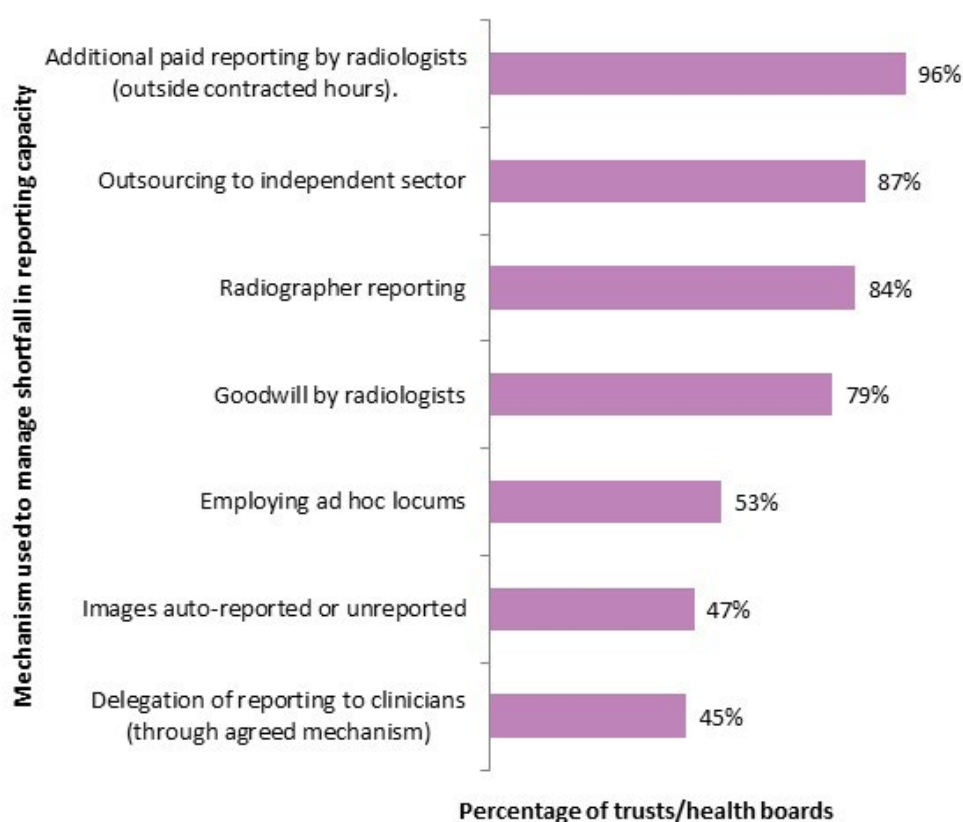
- *'The workload and pressure have significantly increased, all are working harder and longer than ever before. It is not sustainable.'*
- *'No resilience in the system.'*
- *'When folks are away we get behind in the reporting.'*
- *'No overarching strategy to deliver a long-term significant increase in radiologist numbers.'*
- *'It will only take a few key people to retire, and morale will plummet, and the department will start to fail.'*

Only 2% of UK trusts/health boards (n=3) were able to meet their reporting requirements within consultant clinical radiologists' contracted hours in 2018. This compares to 8% in 2014, indicating that workload and/or workforce shortfalls have increased. The census captures data on the various mechanisms used by trusts/health boards to manage shortages in reporting capacity.

Figure 12 shows the mechanisms used to manage shortfalls in reporting capacity in 2018. Nearly all trusts/health boards (96%) pay some (or all) of their consultant clinical radiologists to undertake additional reporting outside their contracted hours. Most of these trusts (79%) also rely on radiologist goodwill (unpaid reporting).

Other frequently used mechanisms were the outsourcing of reporting to an independent sector company and radiographer reporting which are used by 87% and 84% of trusts/health boards respectively. It is concerning that almost half (47%) of trusts/health boards report leaving images auto-reported or unreported, due to the potential for diagnoses to be missed or delayed.

Figure 12. Managing diagnostic imaging demand 2018



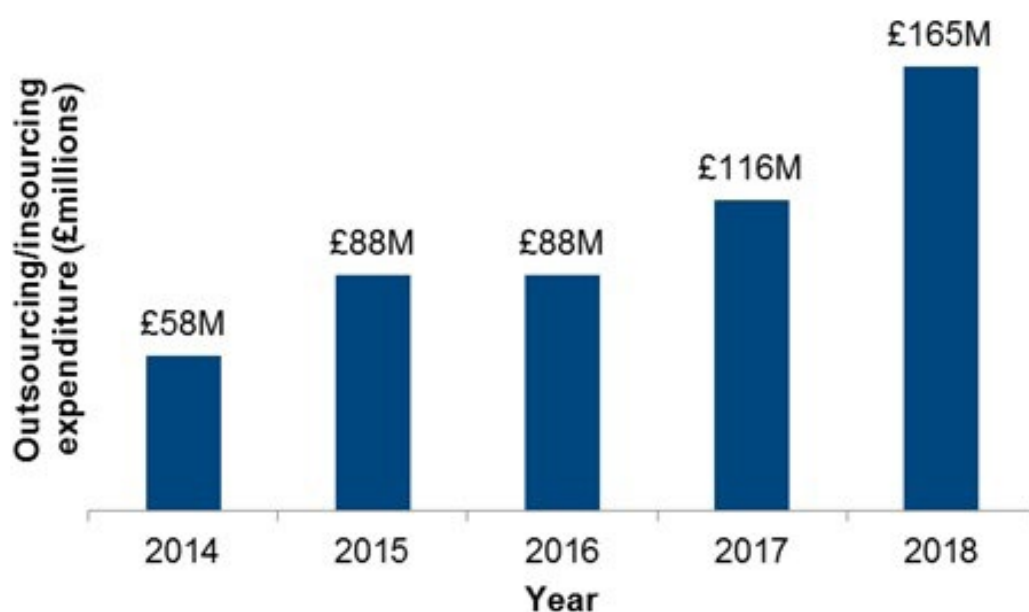
Many of the mechanisms used to manage shortfalls in reporting capacity incur direct and indirect costs. The annual census asks trusts/health boards to report expenditure incurred through:

1. Outsourcing of reporting to the independent sector
2. Insourcing (additional payments to radiologists already contracted to the trust/health board)
3. Employing ad hoc locums.

In 2018, seven in ten trusts were able to provide annual expenditure figures for the above activities, two in ten were able to provide estimated values, and one in ten trusts was unable to provide (or accurately estimate) expenditure figures; the mean reported expenditure has been used to estimate expenditure for these trusts.

In 2018 outsourcing, insourcing and ad hoc locum expenditure totalled £165 million; nearly triple the expenditure for the same activities in 2014. This increase is illustrated in Figure 13. Of the estimated £165 million insourcing/outsourcing costs reported in 2018, £81 million – just under half – was spent on outsourcing, £57 million was spent on insourcing and £27 million was payments for ad hoc locums (and associated agency fees).

Figure 13. UK radiology estimated outsourcing/insourcing expenditure, 2014 to 2018



The UK expenditure of £165 million in 2018 is equivalent to the combined salaries of 1,887 WTE radiology consultants based on point five of the 2018–19 NHS consultant pay scale for England.³ The forecast number of additional radiologists to close the projected shortfall between supply and demand in 2023 is 1,867 (see [Section 6. Closing the gap between supply and demand](#)).

Table 12 shows the estimated reported insourcing/outsourcing expenditure across the four UK countries. Relative to population size, Northern Ireland has the highest reported expenditure at £9.2 million. Scotland is the only UK country with higher insourcing than outsourcing costs.

Table 12. Radiology department estimated outsourcing/insourcing expenditure – by UK country, 2018

Expenditure	England	Northern Ireland	Scotland	Wales	UK total
Outsourcing	£68,631,000	£4,680,000	£3,869,000	£4,160,000	£81,340,000
Insourcing	£47,394,000	£2,921,000	£4,785,000	£1,971,000	£57,072,000
Ad-hoc locums	£20,900,000	£1,645,000	£1,740,000	£2,686,000	£26,971,000
Total	£136,925,000	£9,246,000	£10,393,000	£8,817,000	£165,382,000

Managing demand through optimising efficiency in radiology services

As well as insourcing and outsourcing, radiology departments proactively manage demand through optimising efficiency. There are various approaches to this; these include vetting of imaging referrals by radiology departments to minimise inappropriate demand on radiology services, and utilising the expert guidance of clinical radiologists to help referrers request the most appropriate imaging examination. Furthermore, the use of *iRefer*, an RCR radiological investigation guidelines tool, facilitates referring GPs, radiographers, clinicians and other healthcare professionals in determining the most appropriate imaging investigation(s) or intervention for patients, based upon the best available evidence.⁸

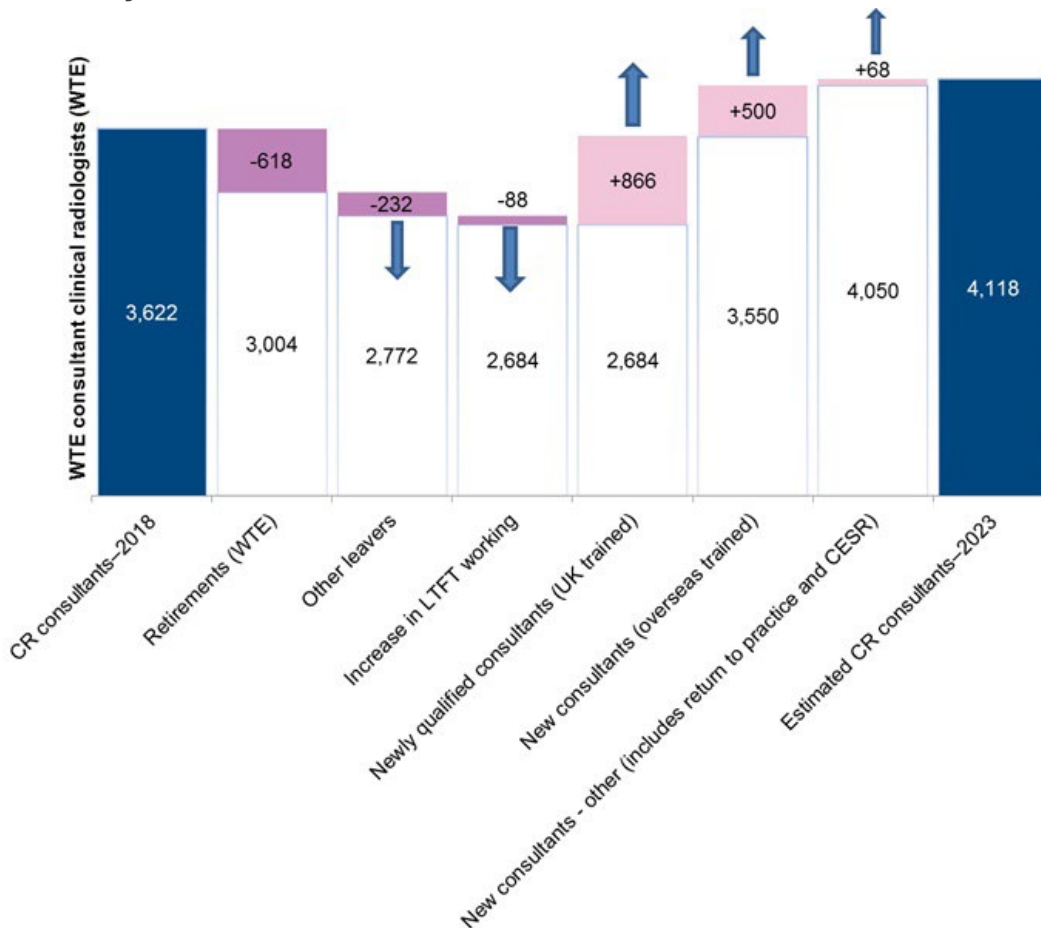
Optimising skillmix is essential in seeking to increase efficiency in radiology services but takes time and expertise to plan and implement and is limited by workforce shortages across many roles. An increase in radiographer reporting means a standardised curriculum and defined standards of practice are needed to ensure that the requisite standards of patient care and safety are maintained.

Artificial intelligence (AI) technologies have potential to increase efficiency in radiology clinical practice. However, as outlined in the RCR's position statement on artificial intelligence, the introduction of AI will likely be an evolutionary process over many years.²¹ The development of machine learning or deep learning algorithms for automated image interpretation requires huge volumes of retrospective patient data to be processed and validated. Sensitivity and specificity testing is then required to ensure the images are being interpreted accurately and reliably and the results of these tests need to be published. Furthermore, robust but flexible, regulatory and governance frameworks will be essential for the introduction of AI technologies into radiology clinical practice to ensure that patients receive optimum care.

6. Closing the gap between supply and demand

To bring together the factors identified as contributing to the future workforce supply, Figure 14 illustrates the estimated supply for the five years, 2018 to 2023.

Figure 14. UK consultant clinical radiology workforce (WTEs) estimated supply – next five years



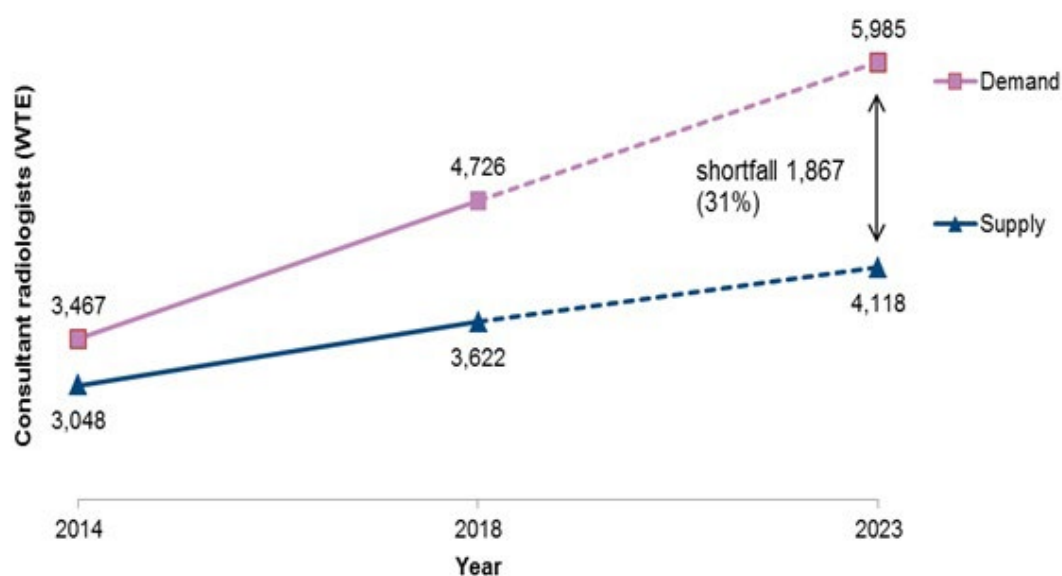
Based on the below projections, there will be an estimated 4,118 WTE consultant clinical radiologists in post in the UK in five years' time (2023), equivalent to a 3% annual increase. Growth is, therefore, forecast to slow down from the 4% growth per annum seen over the past four years.

Projections, next five years to 2023:

Current consultant workforce (2018)	3,622 WTEs
Retirements (median age 61) (see page 29 for details)	-618 WTEs
Other leavers (see page 29 for details)	-232 WTEs
Increase in LTFT working (see page 29 for details)	-88 WTEs
Newly qualified consultants (UK trained) (see page 26 for details)	+866 WTEs
New consultants (overseas trained) see page 28 for details)	+500 WTEs
New consultants – other (includes return to practice and CESR) (see page 28 for details)	+68 WTEs
Estimated CR consultants – 2023	4,118 WTEs

Figure 15 is a simplified illustration of the widening gap between the estimated supply and the expected demand that the consultant clinical radiology workforce is sought to fulfil.

Figure 15. UK consultant clinical radiologists (WTEs), estimated supply and demand 2014–2023



Assumptions, next five years to 2023:

- In 2018, the shortfall is estimated as 1,104 consultant radiologists, comprised of 725 diagnostic radiologists (see page 28 for details) and 379 interventional radiologists (see page 29 for details).
- The 2023 demand estimate assumes linear growth in demand.

This shortfall of 1,104 radiologists (23%) is forecast to rise to 1,867 (31%) by 2023, driven by increased demand for diagnostic imaging and interventional procedures. To rectify the forecast shortfall of 1,867 WTE consultant clinical radiologists in 2023, UK specialist training numbers would need to treble from the current average of 265 new trainees each year to 808 per year for the next five years (2019–2023). Such an increase is not feasible, therefore, to reduce the growing gap between supply and demand, the number of funded clinical radiology training places should increase radically from 2019, taking into account training capacity constraints and local service needs.

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Appendix 1. Background and methodology

Since 2008 (except for 2013), the RCR has gathered clinical radiology workforce data annually through an online census, which is completed by the clinical directors (or their delegates) of every radiology department in the UK. Census data is analysed together with the GMC medical register and clinical radiology specialty training data held by the RCR.

Survey method

Standardised questions (see Appendix 2) have been used year on year to allow for comparison of information and identify trends over time. To facilitate data collection (and data accuracy), 2017 staff data were provided to each radiology department, and clinical directors were asked to update the details, providing details of leavers, new starters and staff changes (for substantive and locum posts as of 1 September 2018). Data were collected through a secure web survey. Clinical directors were provided with unique logins and passwords.

Data accuracy

Due to the use of consistent questions, established processes, data quality checks and the involvement of senior staff, data accuracy is understood to be high. Where discrepancies and outliers were identified in the data, clarification was sought from census respondents.

Response rate

As with previous RCR censuses, the 2018 census achieved a 100% response rate, with all 172 trusts/health boards in the UK submitting information.

Presentation of results

The workforce figures in this report are given as headcount unless otherwise stated. Where a member of staff works part-time across two regions, they will count as a headcount of one in each of the regions, and as one in the UK total, therefore, the sum of the regional headcounts will be slightly higher than the UK headcount. Where WTE figures are used, the calculation conforms to the current NHS convention of excluding PAs that exceed ten. Census information on departmental activity and spending were sought based on the 12 months to 31 March 2018.

Time periods

To consider trends over time, this report uses the March 2014 census as a comparator, that is, this report considers trends over the past four-and-a-half years. Increases or decreases are divided by 4.5 to get the mean annual change.

For simplicity, the phrase 'in 2018' is used in this report to refer to the period covered by the 2018 census, which is October 2017 to September 2018.

The RCR processes data in accordance with UK data protection legislation.

Queries

Queries regarding the census should be sent to census@rcr.ac.uk

Appendix 2. Census questions

*Indicates a mandatory field

Stage 1: Workforce Census Privacy Notice*

Prior to completing the census, please ensure that each person whose personal data are entered into the census has been provided with a copy of the RCR Workforce Census Privacy Notice, which can be found using the following link: [RCR workforce census privacy notice](#).

I have read and accept The Royal College of Radiologists' Workforce Census Privacy Notice. [Tick box]*

Stage 2: Organisational details

The details below are based on information entered in the 2017 census and subsequent updates received by the RCR. Please review and update accordingly. Please ensure the radiology department(s) stated are those for which you will be entering data.

The RCR uses census contact details in case of any query with census data submitted.

2.1 Radiology department(s)* [prepopulated field]

2.2 Trust/health board* [prepopulated field]

2.3 Census contact – full name (person completing the census)*

2.4 Census contact – email*

2.5 Census contact – telephone number*

2.6 Are the clinical director details the same as the census contact details?*

- [Tick box]* Yes – please continue to the next page.
- [Tick box]* No – please enter the clinical director details below.
- Name*
- Email address*
- Telephone number

Stage 3: Staff details – radiology

Please provide details of the following staff employed in your radiology department(s), as of 1 September 2018:

- Consultant-grade radiologists
- SAS-grade radiologists
- Research fellows

Please include:

- Locums
- Staff on long-term leave (for example, maternity/paternity or sick leave)

Please do not include trainees.

3.1 Forename*

3.2 Surname*

3.3 Grade* (drop-down list includes the following)

- Consultant-grade radiologist (NHS contract)
- Consultant-grade radiologist (Mixed NHS/academic – NHS contract)
- Consultant-grade radiologist (Academic – university contract)
- SAS-grade radiologist

- Research fellow
- 3.4 GMC number (consultants only)
- 3.5 Direct clinical care PAs* (All patient-led activities to be counted as DCC.) Please enter the number to one decimal place.
- 3.6 Training only PAs
- 3.7 Supporting professional activities* (All non-DCC and non-training-only PAs to be counted as SPAs.)
- 3.8 Total PAs (DCC, SPA and training PAs) (This box is auto-filled.)
- 3.9 Employment type (This box is auto-filled – full-time for ten PAs or higher, part-time for less than ten PAs.)
- Full-time
 - Part-time
- 3.10 Type of radiologist* (consultants only) – drop-down list
- General
 - General with one main area of interest
 - General with two main areas of interest
 - Specialist with one main area of interest
 - Specialist with two main areas of interest
- 3.11 Area/s of interest (this question is omitted for 'general' radiologists)
- Primary area of interest (drop-down list – breast, cardiac, chest/lung, endocrine ...)
 - Secondary area of interest (same drop-down list)
- 3.12 Employed as a locum (tick box, if not ticked proceed to next question)
- Period employed as locum up to 1 September 2018* (drop-down list)
 - 1–3 months
 - 4–6 months
 - 7–9 months
 - 10–12 month
 - >12 months
 - Reason for locum position (drop-down list)
 - Ad hoc reporting for excess workload
 - Cover for long-term (>1 month) sickness
 - Currently employed to fill a vacant post
 - Maternity/paternity cover
 - Other
- 3.13 Left since 1 Sept 2017 (if not ticked proceed to the next question)
- Reason for leaving (drop-down list)
 - Retired
 - Left for reasons other than retirement
 - Not known/don't wish to say

Stage 4a: Unfilled permanent posts

Please enter details of all funded unfilled permanent clinical radiology posts in your radiology department(s) as of **1 September 2018**. Please include posts which have subsequently been filled, suspended or lost (as well as posts which remain vacant).

Please include vacancies for consultant-grade radiologists, SAS-grade radiologists and research fellows.

4.1 Unfilled post status*

- Funded but not yet advertised
- Funded but not thought worth advertising
- Advertised but not yet interviewed
- Appointed but not yet taken up
- Advertised but failed to appoint AND planning to re-advertise in next three months
- Advertised but failed to appoint AND not contemplating re-advertising in next three months

4.2 Grade*

- Consultant – academic (university contract)
- Consultant-grade radiologist (NHS contract)
- Consultant-grade radiologist (Mixed NHS/academic – NHS contract)
- Consultant-grade radiologist (Academic – university contract)
- SAS-grade radiologist
- Research fellow

4.3 Total PAs*

4.4 Employment type (This box is auto-filled – full-time for ten PAs or higher, part-time for less than ten PAs)

- Full-time
- Part-time

4.5 Type of radiologist (drop-down list includes the following)*

- General
- General with one main area of interest
- General with two main areas of interest
- Specialist with one main area of interest
- Specialist with two main areas of interest

4.6 Area/s of interest (this question is omitted for 'general' radiologists)

- Primary area of interest (drop-down list)
- Secondary area of interest (drop-down list)

4.7 Unfilled period (to the nearest month) (drop-down list: 1 month, 1 month...12+ months, don't know)*

Section 4b: Recruitment

4.8 Has your department tried to recruit candidates from outside the UK in the 12-month period ending 1 September 2018?*

Yes/No/Don't know

If yes, was this successful?*

Yes/Yes but not in all instances/No/Don't know

4.9 Additional comments relating to recruitment from outside the UK in the last 12 months:

Stage 5a: Workforce capacity

Since 2014 the RCR has monitored trends in methods used to manage the shortfall in reporting capacity, along with associated costs. This information has proven invaluable for workforce planning purposes. When completing this section, please note that references to 'department' means all departments that your census submission relates to.

5.1 Please indicate how your department managed any shortfalls in reporting capacity in the financial year ending 31 March 2018. Please tick all that apply.

- Additional paid reporting by the department's own radiologists outside their contracted hours
- Delegation of reporting to clinicians through an agreed mechanism
- Employing ad-hoc locums
- Goodwill by radiologists
- Images left unreported or auto-reported
- Outsourcing reporting to an independent sector company
- Reporting by radiographers
- N/A – all reporting requirements were met by radiology staff within contracted hours.
- Other (please specify)

The RCR has monitored trends in radiology outsourcing/insourcing costs since 2014. This information has proven invaluable for workforce planning purposes.

5.2 What was the total department spending on the following radiology costs in the 12 months ending 31 March 2018?*

[Please mark against each whether the expenditure figure you have entered is: actual/estimated/not known]

- Outsourcing to teleradiology companies (daytime and overnight): £
 - Actual/Estimated/Not known*
- Additional payments to contracted radiologists (insourcing): £
 - Actual/Estimated/Not known *
- Ad-hoc locums appointed to cover excess reporting workload (include salaries, on-costs and agency fees): £
 - Actual/Estimated/Not known *

5.3 What was the total department spend to provide out-of-hours radiology (in the 12 months ending 31 March 2018)? *

Comments relating to the expenditure values given above:

5.4 Approximately how many of the consultant clinical radiologists included in your census submission regularly provide a general out-of-hours service? (Headcount). *

5.5 In an average week, approximately how many sessions (direct or SPA) are lost due to compensatory arrangements following out-of-hours working?

5.6 How much radiologist time (measured in PAs) does your department spend on preparing and attending MDTMs (in an average week)? For example, 12 consultants spending 1 PA per week = 12 *

5.7 In total, how many radiologist sessions were lost in your department due to illness during the 12-month period ending 31 March 2018?*

Stage 5b: Additional questions

5.8 How many Administration of Radioactive Substances Advisory Committee (ARSAC) license holders worked for your radiology department(s) as of 1 September 2018?

- Number of radiologists (drop-down list: 0/1/2/3/4/5/6/7/8/9/10/unknown)
- Number of nuclear medicine physicians (drop-down list: 0/1/2/3/4/5/6/7/8/9/10/unknown)

Stage 6: Workforce shortages

To what extent do you agree or disagree that there are currently sufficient consultant clinical radiologists employed in your radiology department(s) to be able to deliver safe and effective levels of patient care.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
- Don't know/prefer not to say

Those who choose 'somewhat disagree' or 'strongly disagree' are asked the following question:

What are your key concerns regarding the impact of radiology workforce shortages?

Stage 7: Final comments

7.1 Finally, please let us know if you have any feedback specific to the RCR census itself, to further improve the data or survey process in future years:

7.2 Any other comments:

Appendix 3. Census completions

Thank you to the following trusts and health boards for completing the 2018 census:

England – East Midlands

Chesterfield Royal Hospital NHS Foundation Trust
Kettering General Hospital NHS Foundation Trust
Northampton General Hospital NHS Trust
Nottingham University Hospitals NHS Trust
Sherwood Forest Hospitals NHS Foundation Trust
United Lincolnshire Hospitals NHS Trust
University Hospitals of Leicester NHS Trust

England – East of England

Basildon and Thurrock University Hospitals NHS Foundation Trust
Bedford Hospital NHS Trust
Cambridge University Hospitals NHS Foundation Trust
East and North Hertfordshire NHS Trust
East Suffolk and North Essex NHS Foundation Trust
James Paget University Hospitals NHS Foundation Trust
Luton and Dunstable University Hospital NHS Foundation Trust
Mid-Essex Hospital Services NHS Trust
Norfolk and Norwich University Hospital NHS Foundation Trust
North West Anglia NHS Foundation Trust
Papworth Hospital NHS Foundation Trust
Southend University Hospital NHS Foundation Trust
The Princess Alexandra Hospital NHS Trust
The Queen Elizabeth Hospital King's Lynn NHS Trust
West Hertfordshire Hospitals NHS Trust
West Suffolk NHS Foundation Trust

England – London

Barking, Havering and Redbridge University Hospitals NHS Trust
Barts Health NHS Trust
Chelsea and Westminster Hospital NHS Foundation Trust
Croydon Health Services NHS Trust
Epsom and St Helier University Hospitals NHS Trust
Great Ormond Street Hospital for Children NHS Foundation Trust
Guy's and St Thomas' NHS Foundation Trust
Homerton University Hospital NHS Foundation Trust
Imperial College Healthcare NHS Trust
King's College Hospital NHS Foundation Trust
Kingston Hospital NHS Foundation Trust

Lewisham and Greenwich NHS Trust
London North West Healthcare NHS Trust
Moorfields Eye Hospital NHS Foundation Trust
North Middlesex University Hospital NHS Trust
Royal Brompton and Harefield NHS Foundation Trust
Royal Free London NHS Foundation Trust
Royal National Orthopaedic Hospital NHS Trust
St George's University Hospitals NHS Foundation Trust
The Hillingdon Hospitals NHS Foundation Trust
The Royal Marsden NHS Foundation Trust
University College London Hospitals NHS Foundation Trust
Whittington Health NHS Trust

England – North East

City Hospitals Sunderland NHS Foundation Trust
County Durham and Darlington NHS Foundation Trust
Gateshead Health NHS Foundation Trust
Newcastle upon Tyne Hospitals NHS Foundation Trust
North Cumbria University Hospitals NHS Foundation Trust
North Tees and Hartlepool NHS Foundation Trust
Northumbria Healthcare NHS Foundation Trust
South Tees Hospital NHS Trust
South Tyneside NHS Foundation Trust

England – North West

Aintree University Hospital NHS Foundation Trust
Alder Hey Children's NHS Foundation Trust
Blackpool Teaching Hospitals NHS Foundation Trust
Bolton Hospital NHS Foundation Trust
Countess of Chester Hospital NHS Foundation Trust
East Cheshire NHS Trust
East Lancashire Hospitals NHS Trust
Lancashire Teaching Hospitals NHS Trust
Liverpool Heart and Chest NHS Foundation Trust
Manchester University Hospitals NHS Foundation Trust
Mid-Cheshire Hospitals NHS Foundation Trust
Pennine Acute Hospitals NHS Trust
Royal Liverpool and Broadgreen University Hospitals Trust
Salford Royal NHS Foundation Trust
Southport and Ormskirk Hospital NHS Trust
St Helens and Knowsley Teaching Hospitals NHS Trust

Stockport NHS Foundation Trust
Tameside and Glossop Integrated Care NHS Foundation Trust
The Christie NHS Foundation Trust
The Clatterbridge Cancer Centre NHS Foundation Trust
The Walton Centre NHS Foundation Trust
University Hospitals of Morecambe Bay NHS Foundation Trust
Warrington and Halton Hospitals NHS Foundation Trust
Wirral University Teaching Hospital NHS Foundation Trust
Wrightington, Wigan and Leigh NHS Foundation Trust

England – South Central

Buckinghamshire Healthcare NHS Trust
Hampshire Hospitals NHS Foundation Trust
Isle Of Wight NHS Trust
Milton Keynes University Hospital NHS Foundation Trust
Oxford University Hospitals NHS Foundation Trust
Portsmouth Hospitals NHS Trust
Royal Berkshire NHS Foundation Trust
University Hospital Southampton NHS Foundation Trust

England – South East

Ashford and St Peter's Hospitals NHS Foundation Trust
Brighton and Sussex University Hospitals NHS Trust
Dartford and Gravesham NHS Trust
East Kent Foundation Hospitals University NHS Trust
East Sussex Healthcare NHS Trust
Frimley Health NHS Foundation Trust
Maidstone and Tunbridge Wells NHS Trust
Medway NHS Foundation Trust
Queen Victoria Hospitals NHS Foundation Trust
Royal Surrey County Hospital NHS Foundation Trust
Surrey and Sussex Healthcare NHS Trust
Western Sussex Hospitals NHS Foundation Trust

England – South West

Dorset County Hospital Foundation Trust
Gloucestershire Hospitals NHS Foundation Trust
Great Western Hospitals NHS Foundation Trust
North Bristol NHS Trust
Northern Devon Healthcare NHS Trust
Plymouth Hospitals NHS Trust
Poole Hospital NHS Foundation Trust

Royal Cornwall Hospitals Trust
Royal Devon and Exeter NHS Foundation Trust
Royal United Hospitals Bath NHS Trust
Salisbury NHS Foundation Trust
Taunton and Somerset NHS Foundation Trust
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trusts
Torbay and South Devon Healthcare NHS Foundation Trust
University Hospitals Bristol NHS Foundation Trust
Weston Area Health NHS Trust
Yeovil District Hospital NHS Foundation Trust

England – West Midlands

Birmingham Women's and Children's NHS Foundation Trust
George Eliot Hospital NHS Trust
Heart of England NHS Foundation Trust
Sandwell and West Birmingham Hospitals NHS Trust
Shrewsbury and Telford Hospital NHS Trust
South Warwickshire NHS Foundation Trust
The Dudley Group NHS Foundation Trust
The Robert Jones and Agnes Hunt Orthopaedic Hospital NHS Trust
The Royal Orthopaedic Hospital NHS Foundation
The Royal Wolverhampton Hospitals NHS Trust
University Hospital Birmingham NHS Foundation Trust
University Hospitals Coventry and Warwickshire NHS Trust
University Hospitals of Derby and Burton NHS Foundation Trust
University Hospital of North Midlands NHS Trust
Walsall Healthcare NHS Trust
Worcestershire Acute Hospitals NHS Trust
Wye Valley NHS Trust

England – Yorkshire and the Humber

Airedale NHS Foundation Trust
Barnsley Hospital NHS Foundation Trust
Bradford Teaching Hospitals NHS Foundation Trust
Calderdale and Huddersfield NHS Foundation Trust
Doncaster and Bassetlaw Hospitals NHS Foundation Trust
Harrogate and District NHS Foundation Trust
Hull and East Yorkshire Hospitals NHS Trust
Leeds Teaching Hospitals NHS Trust
Mid-Yorkshire Hospitals NHS Trust
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust

Sheffield Children's NHS Foundation Trust
Sheffield Teaching Hospitals NHS Foundation Trust
The Rotherham NHS Foundation Trust
York Teaching Hospital NHS Foundation Trust

Northern Ireland

Belfast Health and Social Care Trust
Northern Health and Social Care Trust
South Eastern Health and Social Care Trust
Southern Health and Social Care Trust
Western Health and Social Care Trust

Scotland


NHS Ayrshire and Arran
NHS Borders
NHS Dumfries and Galloway
NHS Fife
NHS Forth Valley
NHS Grampian
NHS Greater Glasgow and Clyde
NHS Highland
NHS Lanarkshire
NHS Lothian
NHS Tayside
NHS Western Isles

Wales

Abertawe Bro Morgannwg University Local Health Board
Aneurin Bevan Health Board
Betsi Cadwaladr University Health Board
Cardiff and Vale University Health Board
Cwm Taf Health Board
Hywel Dda Health Board
Velindre NHS Trust



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