

# Clinical radiology UK workforce census 2017 report





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**There is a risk that the increased pressure on service will compromise patient safety**

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## Foreword

This is the tenth annual clinical radiology census. Huge thanks go to all NHS radiology departments for completing it with a 100% response rate once again.

This highly detailed information on the radiology workforce and workload allows the RCR to influence healthcare policy. The critical shortage of clinical and interventional radiologists in the face of ever increasing clinical demands has been highlighted to the Government and policy makers via the output of this and previous censuses on many occasions. Census data can predict the success or failure of ambitious NHS plans reliant on additional radiologist staffing, for example, early diagnosis of cancer via rapid access diagnostic centres, new or proposed screening regimens for prostate and lung cancer, seven-day NHS services and stroke thrombectomy. The absence of a viable workforce will stifle transformation in the short term.

Failure to address radiology workforce shortages over many years has resulted in only a 3% annual increase in consultant numbers. This falls far short of the 10–12% annual increase in complex imaging, and results in inability to provide a comprehensive 24/7 service for critically ill patients requiring intervention or specialist paediatric imaging. The estimated gap between capacity and demand in 2017 is 1,000 full-time consultants, rising to 1,600 in five years' time.

The data have been and are being used to make the case for a stepwise increase in training numbers to Health Education England and the equivalent bodies in Northern Ireland, Scotland and Wales. The announcement of the significant increase in NHS funding is welcomed and all radiology departments, radiology training schemes and radiology schools are encouraged to bid for training posts for clinical and interventional radiology trainees and identify the 50% funding required from their hospitals to expedite these.

The format and scope of this report closely follows those published since the first RCR workforce census in 2008. For the 2017 report, we have included information on radiology training numbers and projected numbers of training completions, and highlighted the marked workload/workforce mismatch, the huge extra costs of outsourcing and insourcing and the international nature of the workforce.

The RCR would like to thank all clinical directors and workforce leads who submitted information for 2017, and the RCR Regional Chairs who have been particularly helpful in encouraging departments to submit their census data.

**Dr Caroline Rubin**  
**Vice President, Faculty of Clinical Radiology**

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## 1. Executive summary

### 1.1 Objectives

The objectives of The Royal College of Radiologists' (RCR) 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
- Forecast future workforce numbers and working patterns, by analysing census data and trends together with RCR specialty training data
- 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
- Gain insight into the methods used to manage the shortfall in the radiology workforce and the associated impacts.

The data and trends identified in this report will be used by the RCR and others to inform local and national radiology workforce training, planning and policy.

### 1.2 Key findings

- **Rising demand:** The demand for radiology services has increased rapidly over recent years, particularly for more complex imaging which takes longer to interpret and report. This has resulted in an estimated increase of 30% in the overall diagnostic reporting workload in the last five years.
- **Increasing gap between supply and demand:** The gap between the workforce 'supply' and 'demand' for radiology services is forecast to increase from an estimated shortfall of 1,000 consultants in 2017 to an estimated shortfall of 1,600 consultants in five years' time, highlighting the urgent need to address workforce shortages.
- **Inability to meet reporting requirements:** Increased demand means that almost all radiology departments are struggling with workload. In the 2017 census, only 3% of radiology departments stated that they were able to meet all their reporting requirements within staff contracted hours.
- **Increased outsourcing and insourcing:** To manage workload, radiology departments have significantly increased the use of outsourcing to teleradiology companies and insourcing (paid reporting by departments' radiologists, additional to core contracted hours). This expenditure was estimated to have reached £116 million in the financial year 2016/17, double the estimated expenditure three years previously. £116 million is equivalent to the combined salaries of approximately 1,300 full-time consultant clinical radiologists.<sup>1</sup>
- **Unreported images:** Despite the increase in outsourcing and insourcing to meet demand, 44% of radiology departments disclosed that some images were auto-reported or unreported. This is concerning due to the potential for diagnoses to be missed or delayed.
- **Increased number of vacant posts:** Radiology departments are struggling to fill vacant posts. The vacancy rate rose from 8.5% in 2016 to 10.3% in 2017.<sup>a</sup> In 2017, 386 consultant clinical radiologists posts remained vacant, seven in ten (69%) of which had been unfilled for over a year. Only 19% of vacant posts are covered by locums, while the other 81% remain vacant, leaving radiology departments struggling to cover the workload.

- **Increased international recruitment:** In an attempt to fill vacant consultant clinical radiologist posts, radiology departments are increasingly turning to international recruitment, with almost half trying to recruit from outside of the UK in 2017. Success was limited, however, with half of those who did try failing to recruit.
- **Variation across the UK:** Some geographical areas are particularly hard-hit by workforce shortages. For example, Northern Ireland, Scotland and Wales saw no significant increase in consultant clinical radiologist numbers between 2012 and 2017.
- **Specialist interests:** Similarly, some clinical radiology specialty interests are particularly hard hit by workforce shortages. For example, the shortfall in consultant breast radiologists across the UK is predicted to increase as, over the next five years, for every three that leave the profession only two are predicted to join.
- **Risk to patient safety:** There is a risk that increased pressure on services will compromise patient safety. Between 2012 and 2017 the time allocated to supporting professional activities (SPAs) was steadily eroded, with over 400 less than full-time (LTFT) consultants having fewer than the minimum recommended 1.5 SPAs, compromising their ability to keep their knowledge up-to-date and revalidate.<sup>2,3</sup> Inadequate SPA time may also reduce consultant time available for audit and quality improvement activities, which are important drivers of service improvements.

a. The percentage of WTE staff in post against planned workforce levels.

### 1.3 Recommendations

**Increase clinical radiology training places:** Radiology is a popular specialty for foundation doctors with a high fill rate (typically 100% in recent years), a low attrition rate and sufficient capacity for training places to be significantly increased. Additional training places would reduce workforce shortages.

**International recruitment initiatives:** Removing and/or reducing some of the barriers to international recruitment would facilitate international recruitment. 'Consultants in clinical radiology' is a category included on the UK Government shortage occupation list, which recognises there are not enough UK resident consultants to fill vacancies.<sup>4</sup> The addition of non-consultant clinical radiology posts to the shortage occupation list would increase the number of appropriately qualified international doctors who could support radiology service delivery across the UK.

**Incentivise more UK trainees to continue their careers in the UK:** Currently 83% of those who complete specialist training in clinical radiology in the UK take up UK NHS consultant clinical radiologist posts; 17% choose not to do so. If half of these could be persuaded to take up posts, over the next five years it would result in an additional 100 consultants.

The NHS should consider maximising the following benefits, many of which are cost-neutral, to recruit and retain staff:

- **Greater career flexibility:** Increased access to LTFT working, term-time contracts and flexible childcare facilities to match staff working patterns. Targeted recruitment drives for LTFT consultant clinical radiologists would likely increase the number of applications from those with suitable skills and experience. Currently, only one in ten vacant posts are LTFT, in comparison with one in four filled posts.

- **Supportive workplace conditions, including health and wellbeing services:** Support should be available when staff need it (for example, due to illness, or disability) and there should be zero tolerance of bullying or harrassment.
- **Positive culture:** An organisational culture of listening, trust and empowerment, where continuous learning is actively supported and encouraged should be implemented.
- **Provision of basic lifestyle needs:** For example, 24/7 sale of food, on-call rooms and access to showers.

**Defined standards to support skillmix:** Increased skillmix, including radiographer reporting, is becoming more common as demand for radiology services increases. A regulated curriculum and defined standards of practice are required to ensure that the highest standards of patient care and safety are maintained as radiographer role extension grows.

**Retention strategies:** Well-planned and executed retention strategies targeting those at risk of leaving the NHS, including consultants approaching retirement age, could reduce workforce attrition and have a significant effect on reducing workforce shortages. Between 2012 and 2017, over 350 consultant clinical radiologists retired and a further 400-plus are expected to retire in the coming five years. Research suggests that retention policies should address ways of optimising the clinical contribution of senior doctors, while offering reduced workloads in terms of bureaucracy and working hours, including out-of-hours commitments.<sup>5</sup>

## 2. The UK clinical radiology workforce in 2017

The UK clinical radiology workforce as of September 2017 is summarised in Table 1.

**Table 1. UK clinical radiology workforce, headcount, 2017**

	England	Northern Ireland	Scotland	Wales	UK total
Consultant-grade	3,050	124	320	162	3,656
Trainees	1,244	48	142	63	1,497
Other grades	130	6	7	7	150
Total	4,424	178	469	232	5,303

As of 1 September 2017, there were 3,656 consultant clinical radiologists working in NHS posts in the UK. Of these, 97% were employed in substantive posts and 3% in locum posts. There were 1,497 clinical radiology trainees in post and 150 other grade staff; other grades include associate specialists, clinical assistants, specialty doctors and other trust-grade staff.

Taking into account working patterns and LTFT working, the UK total of 3,656 consultant clinical radiologists translates to 3,390 whole-time equivalents (WTEs).<sup>b</sup>

The consultant clinical radiology workforce (WTE) grew by 13% (+393 consultant WTEs) in the five years to September 2017. This equates to a mean annual growth rate of 3%. Figure 1 shows the five-year trend.

b. A standard full-time (or WTE) NHS consultant contract includes ten programmed activities (PAs), equivalent to a 40-hour week (or 37.5 hours in Wales).

**Figure 1. UK consultant clinical radiology workforce, five-year trend**



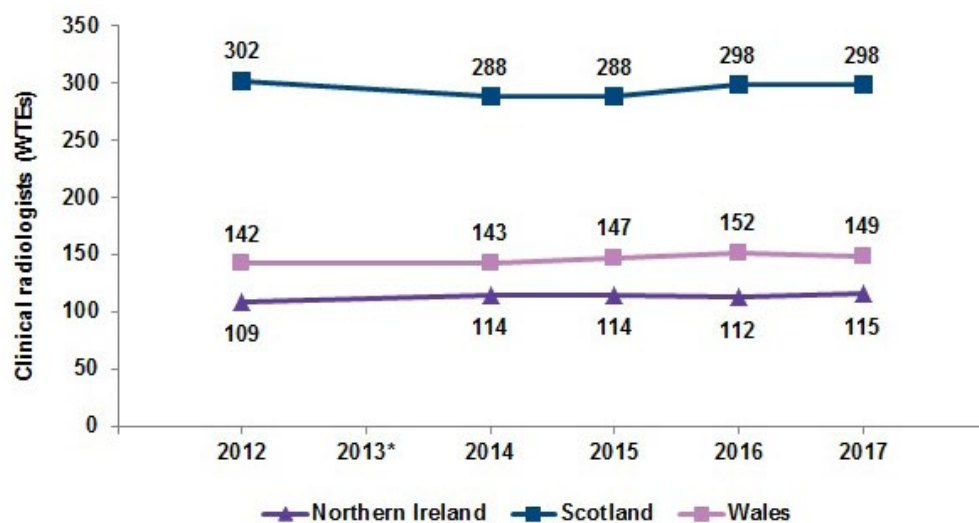
[\*Data for 2013 is not available due to the timing of the census being altered.]

The census data collection date was adjusted from the month of March in previous years of the census to the month of September in 2017. Comparisons of 2017 census data to 2016 census data therefore cover a period of 1.5 years; similarly, comparisons of 2017 census data to 2012 data cover a period of 5.5 years.



The steady growth in the number of consultant clinical radiologists over the past five years has not been seen equally across the UK. Northern Ireland and Wales have seen no significant increase in WTE consultant clinical radiologists since 2012. The number of WTE consultants in Scotland has decreased. This is shown in Figure 2. In contrast, the number of WTE consultant clinical radiologists in England rose from 2,444 WTE in 2012 to 2,828 WTE in 2017.

**Figure 2. Devolved nations, consultant clinical radiology workforce, five-year trend**



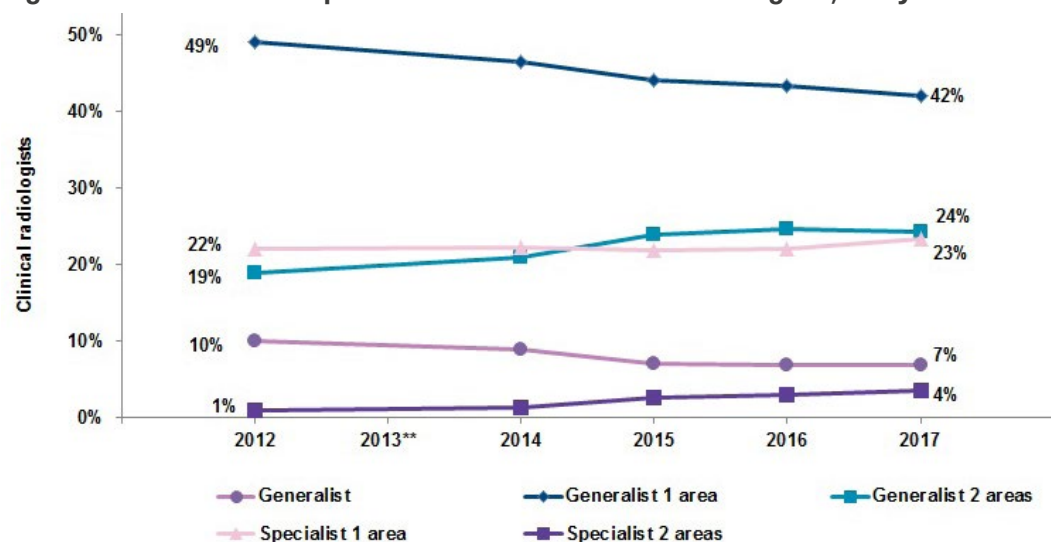
[\*Data for 2013 is not available due to the timing of the census being altered.]

## 2.1 Specialty areas of practice

In 2017, approximately three-quarters of consultants (73%) were categorised as 'generalists' with zero, one or two main areas of interest. The full results are shown in Figure 3. There was a small shift from 'generalists' to more specialist consultant roles between 2012 and 2017.

- 'Specialist with one main area of interest' increased from 22% to 23%.
- 'Specialist with two main areas of interest' increased from 1% to 4%.

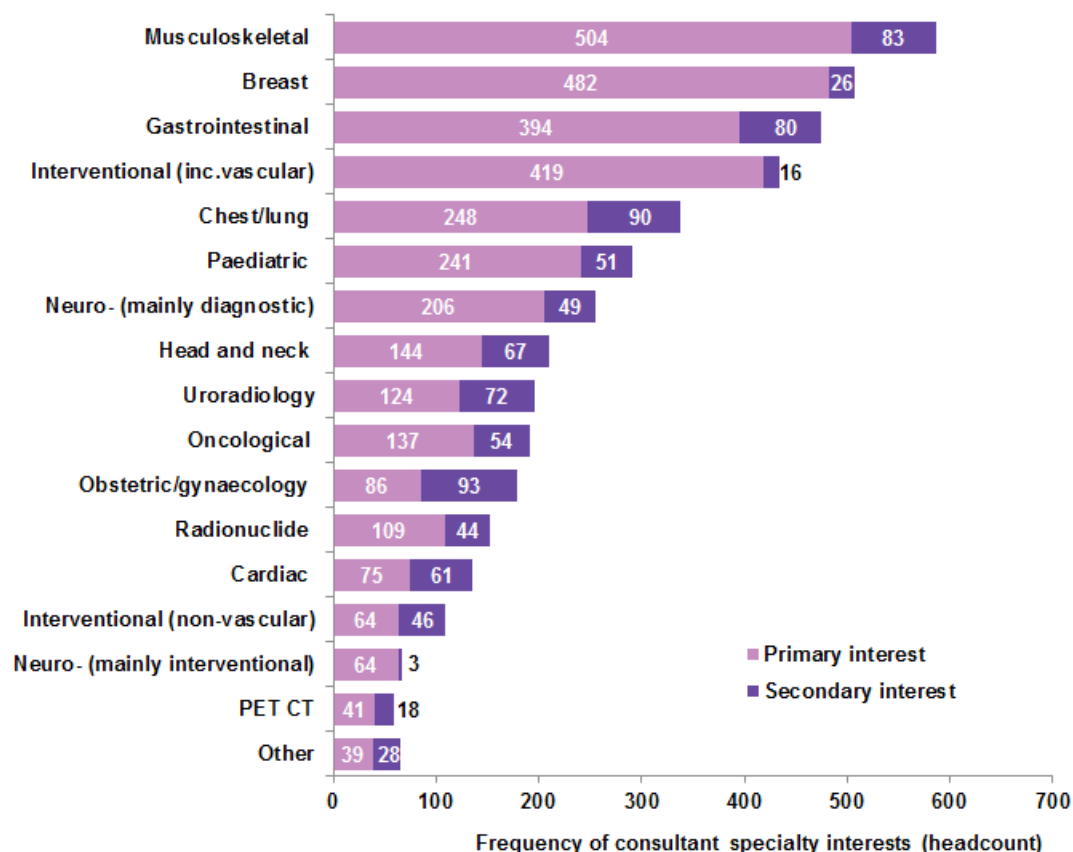
**Figure 3. Generalist and specialist consultant clinical radiologists, five-year trend**



[\*Data for 2013 is not available due to the timing of the census being altered.]

The census collects information on consultant clinical radiologists' primary and secondary area(s) of interest. Figure 4 shows that the most common specialty areas of practice are musculoskeletal, breast, gastrointestinal and interventional radiology.

**Figure 4. Consultant clinical radiologists' primary and secondary specialty interests, 2017**



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

**Interventional radiology (IR)** is a sub-specialty of clinical radiology and is the collective name given to radiological procedures where the aim is to treat the patient with minimally invasive image-guided techniques. Well-recognised advantages of IR include reduced risks, shorter hospital stays and lower costs.<sup>6</sup>

The 2017 census shows:

- 435 consultant radiologists (426 WTEs, 13% of UK total) have a primary or secondary interest in **vascular** interventional radiology. Vascular procedures are those undertaken on arteries, veins and the lymphatic system, for example to stop bleeding (haemorrhage), treat narrowing of arteries (vascular disease) or to treat blood clots and blocked veins.
- 110 (102 WTEs, 3% of total) have a primary or secondary interest in non-vascular interventional radiology. **Non-vascular** intervention includes treatment of benign conditions and cancer.

- 67 (67 WTEs, 2% of total) have a primary or secondary interest in **neuroradiology (mainly interventional)**. Interventional neuro-radiologists undertake minimally invasive procedures on the brain and spinal cord, for example to treat strokes.

For the safety of patients, acute hospital trusts must have formal and robust arrangements to ensure provision of emergency services 24 hours a day, every day of the year. The provision of interventional radiology is no exception and all patients, regardless of geography and hospital size, should have timely access to interventional radiology.<sup>6</sup>

Services consisting of six or more interventional radiologists will usually be able to provide an effective and sustainable IR service.<sup>7</sup> Despite this, the 2017 census data shows that only one in seven UK trusts/health boards employ a team of six or more consultant interventional radiologists. More than two-thirds of UK trusts/health boards employ fewer than four consultant interventional radiologists. Tables 2 and 3 show UK staffing levels.

**Table 2. Consultant radiologists (WTEs) with primary or secondary interest in IR, 2017**

	2017	Change since 2012
England	508	+91
Northern Ireland	17	+1
Scotland	46	No change
Wales	24	No change
UK total	596	+92

(Sum of counts may not equal total due to rounding)

**Table 3. Consultant radiologists (WTEs) with primary or secondary interest in IR, by IR type, 2017**

	Vascular IR	Non-vascular IR	Neuro (mainly IR)	Total
England	359	88	62	508
Northern Ireland	11	5	2	17
Scotland	38	6	3	46
Wales	19	4	1	24
UK total	426	102	67	596

(Sum of counts may not equal total due to rounding)

## 2.2 Recruitment

It is proving increasingly difficult for the UK to recruit the number of consultant clinical radiologists it needs. The census shows an increase from 308 to 386 in the number of unfilled consultant clinical radiologist posts in the UK between 2016 and 2017. The corresponding UK vacancy rate (the percentage of WTE staff in post against planned workforce levels) rose from 8.5% to 10.3%.

Table 4 shows the extent of unfilled posts across the UK. The highest vacancy rate was reported in Northern Ireland (18.4%).

**Table 4. Unfilled consultant clinical radiologist posts, 2017**

	England	Northern Ireland	Scotland	Wales	UK total
Unfilled posts	312	26	36	12	386
Vacancy rate	10.0%	18.4%	10.7%	7.2%	10.3%

Six in every ten unfilled posts (59%) were either advertised but failed to appoint or were not thought worth advertising (see Table 5). 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.

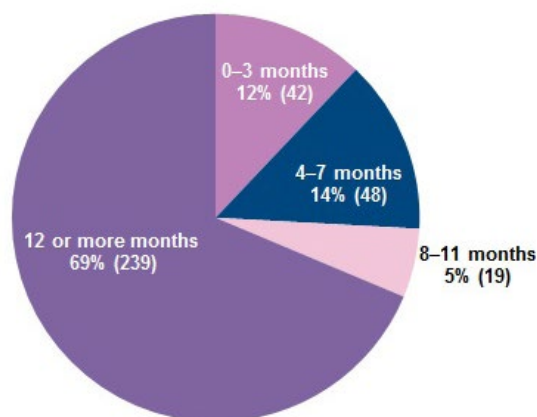
**Table 5. Status of unfilled consultant clinical radiologist posts, 2017**

Status	Unfilled posts	Percentage of total
Funded but not yet advertised	54	14%
Funded but not thought worth advertising	37	10%
Advertised but failed to appoint	188	49%
Advertised but not yet interviewed	47	12%
Appointed but not yet taken up	60	16%
Total	386	100%

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

In addition to an increase in the number of unfilled posts, the number of long-term vacancies also rose. Figure 5 shows that, where reported, seven out of ten (69%, n=239) consultant clinical radiologist vacancies have been unfilled for over a year, an increase from six out of ten (61%, n=188) in 2016, highlighting the diminishing pool of appointable candidates.

**Figure 5. Unfilled consultant clinical radiologist posts – period unfilled, 2017**



Nine out of ten consultant clinical radiologist vacancies reported in 2017 were for full-time posts and one in ten for less than full-time.

Table 6 shows the primary specialty interests sought for vacant consultant posts. Breast and musculoskeletal radiology were most in demand, indicating a shortage of consultant clinical radiologists specialising in these areas. The vacancy rate in 2017 was highest for cardiac radiology, at 13.5%.

**Table 6. Primary interest sought for unfilled consultant clinical radiology posts**

Primary interest	Unfilled posts	Vacancy rate
Breast radiology	46	9.3%
Musculoskeletal radiology	45	9.1%
Interventional radiology (vascular)	39	8.9%
Gastrointestinal radiology	29	7.2%
Chest/lung radiology	20	7.9%
Paediatric radiology	19	7.8%
Neuroradiology (mainly diagnostic)	18	8.6%
Head and neck radiology	16	11.0%
Oncological radiology	15	10.1%
Cardiac radiology	11	13.5%
Uroradiology	10	8.2%
Other/not known	118	–
Total	386	10.3%

Locum cover can ease the workload of radiology departments as they struggle to recruit successfully to substantive consultant posts. However, the results of the census show that recruiting to locum posts has also proved difficult. In 2017, only two in every ten unfilled consultant posts were being covered by locums, despite seven in ten being long-term vacancies, unfilled for 12 months or more.

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### 3. Workforce supply and attrition

Influences on the supply of the consultant clinical radiology workforce include entrants from UK specialist training and from outside the UK, set against attrition from retirements and other leavers, and the trend towards flexible working patterns.

#### 3.1 Supply from UK specialist training

Table 7 shows the estimated number of Certificates of Completion of Training (CCTs) that will be awarded in clinical radiology and the estimated subsequent number of new entrants to the consultant clinical radiology workforce in the next five years. The number of CCTs is expected to average 225 per year, higher than the average of 186 per year observed over the past five years. This is primarily attributable to an increased number of training places over this period.

Successful completion of specialist training in clinical radiology in the UK normally requires a minimum of five years of full-time training, with an additional sixth year for those who are accepted onto the interventional radiology subspecialty pathway. Trainees took an average of 5.7 years to complete UK clinical radiology specialist training in the five-year period up to 2017. Full-time trainees took an average of 5.4 years and LTFT trainees took an average of 7.3 years.

Census data indicates that 83% of those who completed UK specialist training between 2009 and 2012 were appointed to an NHS consultant clinical radiology post within five years. The 17% attrition rate varied significantly dependent on country of primary medical qualification; the attrition rate was 11% for UK graduates and 23% for non-UK graduates.

In 2017, 17% of trainees were LTFT at the point of attaining their CCT compared to 15% in 2012. The effect of flexible working patterns and LTFT-working on future workforce supply is discussed in section 3.3.

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**Table 7. Estimated training completions (CCTs) and subsequent consultant clinical radiologists, next five years**

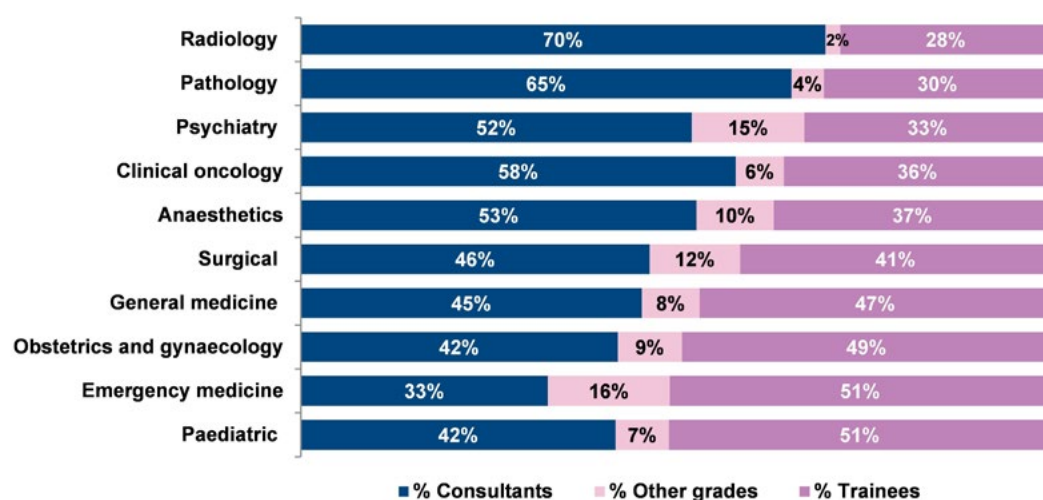
	Estimated CCTs (headcount)	Estimated subsequent UK consultants <sup>c</sup> (headcount)	Estimated subsequent UK consultants (WTE <sup>d</sup> )
2018	187	155	143
2019	210	174	160
2020	229	190	175
2021	244	202	186
2022	257	213	196
<b>2018–2022 total</b>	<b>1,127</b>	<b>934</b>	<b>860</b>
<b>2018–2022 average per year</b>	<b>225</b>	<b>187</b>	<b>172</b>

c. Estimated attrition rate of 17%

d. Estimated participation rate of 92% (see section 3.3)

The 386 unfilled consultant posts reported in 2017 (see section 2.2) exceeds the number of trainees estimated to enter the UK consultant workforce in each of the next five years (shown on Table 7). Without significant changes to supply or the demand for radiology services, the shortfalls currently being experienced across the clinical radiology workforce will increase.

Despite the increased number of trainees, clinical radiology has the lowest ratio of trainees (28%) to consultants (70%) compared to other medical specialties, indicating the scale of the challenge for clinical radiology to replenish its current consultant workforce.<sup>8</sup>

**Figure 6. Percentage of consultants, trainees and other grades across specialty groups – England, 2017<sup>8</sup>**

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



Analysis of the data for clinical radiologists who completed their specialist training in the UK in the ten-year period from 2008 to 2017 and were subsequently reported as employed in a consultant post in the 2017 workforce census shows:

- The majority of consultant clinical radiologists take up employment in the country where they undertook their specialist training
- Of those employed in a consultant post in Wales, only 73% completed their specialist training in Wales, however Wales gained from other UK countries
- Of those employed in a consultant post in Scotland, 81% completed their specialist training in Scotland, however the data shows Scotland suffered a net loss overall (see Table 8).

**Table 8. Snapshot of country of UK specialist training and employment, 2017**

	England	Northern Ireland	Scotland	Wales
Gain from other UK countries	+3%	+11%	+13%	+29%
Loss to other UK countries	-3%	-11%	-19%	-27%

[Snapshot relates to clinical radiologists who completed their specialist training in the UK in the ten-year period from 2008 to 2017 and were reported as employed in a consultant post in the RCR 2017 UK workforce census.]

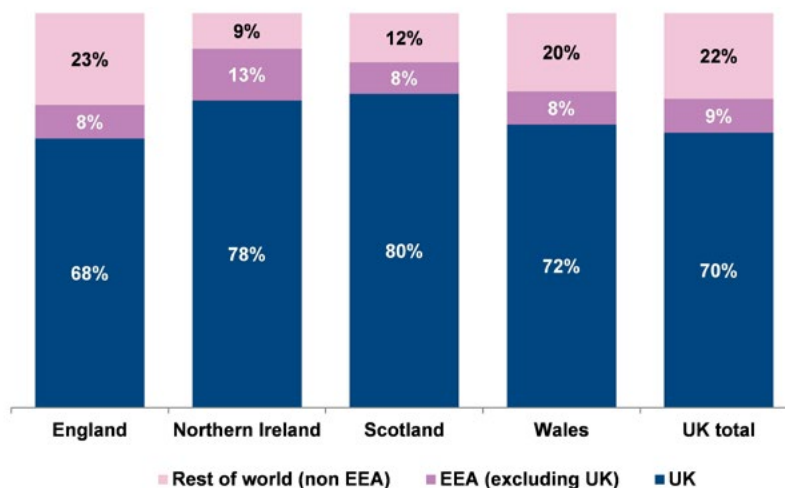
### 3.2 Supply from outside the UK

Census data show that approximately 270 clinical radiologists (equivalent to 261 WTEs) who undertook their specialist training outside of the UK have been recruited to UK NHS consultant posts in the past five years.

Although the country of specialist training is not known for these 270 consultants, data is available for country of primary medical qualification (PMQ). Just under half (46%) were European Economic Area (EEA) (excluding UK) graduates and just over half (54%) were non-EEA graduates. Graduates from India, Egypt, Italy, Greece and Pakistan accounted for half of the clinical radiologists recruited to NHS consultant posts from outside the UK between 2012 and 2017.

Figure 7 shows the source of newly appointed consultant clinical radiologists in the UK in 2017.

**Figure 7. Source of newly appointed consultant clinical radiologists in the UK, 2017**



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

Following the EU referendum in 2016, the evidence to date shows the NHS is finding it increasingly difficult to attract the clinical staff it needs from the EU; the proportion of European doctors gaining a licence in the UK has fallen from 25% of the total in 2014 to just 16% in 2017.<sup>9</sup> Similarly, the proportion of European doctors registered as clinical radiologists on the General Medical Council (GMC) specialist register fell from 42% of the total in 2014 to 28% in 2017.<sup>9</sup>

The specialty is working hard to offset the downturn in supply from the EU with greater efforts towards wider international recruitment (see page 19), however, there seems to be little evidence that the number of consultant clinical radiologists recruited from outside the UK will change over the next few years, despite current workforce shortages in radiology. It is assumed that international recruitment will remain static resulting in recruitment of 261 consultant WTEs over the next five years.

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.

### Experiences of international recruitment

International recruitment is becoming more common, which is perhaps unsurprising given the increase observed in the number of vacancies to be filled.

Nearly half (48%) of UK radiology departments tried to recruit from outside of the UK in 2017. This is an increase from a third (34%) two years prior (Table 9).

**Table 9. Attempted international recruitment, 2015 to 2017**

Year	Percentage of radiology departments
2017	48%
2016	43%
2015	34%

International recruitment activity has been variable across the UK; two-thirds of the radiology departments in Northern Ireland attempted international recruitment in 2017, compared to less than a third in Scotland and in Wales (figures shown in Table 10).

**Table 10. Attempted international recruitment, 2017**

Country	Percentage of radiology departments
England	50%
Northern Ireland	67%
Scotland	30%
Wales	30%
UK total	48%

Of the 89 UK radiology departments that attempted international recruitment in 2017, success was limited with approximately half failing to recruit.

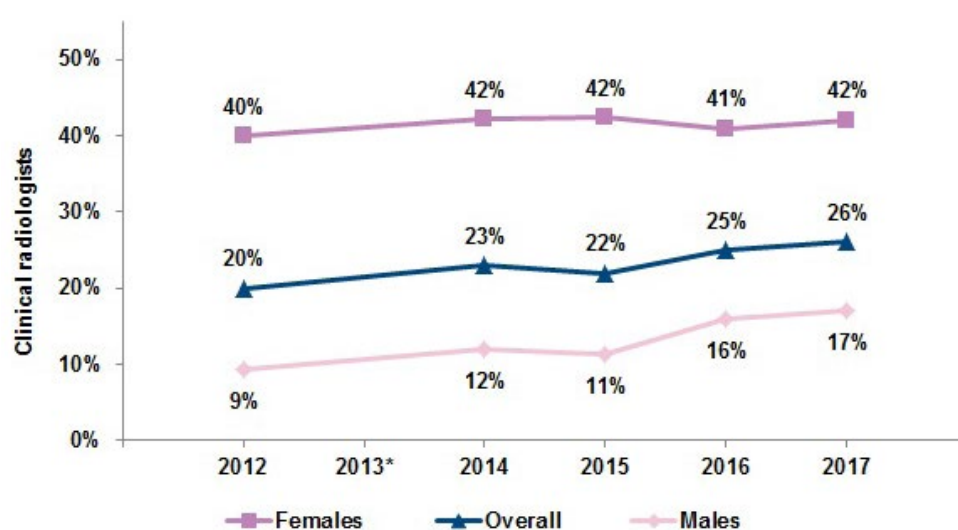
In summary, census feedback indicates that recruiting internationally can be a difficult and time-consuming process, which does not always result in success. Nonetheless, the trends shown in census data are those of increased international recruitment efforts.

### 3.3 Flexible working: less than full-time (LTFT) working

The 2017 census data showed an increase in less than full-time working among consultant clinical radiologists.<sup>e</sup> The percentage of consultant clinical radiologists working LTFT increased between 2012 and 2017 from 20% to 26% (shown in Figure 8). The rise is almost wholly attributable to the doubling of LTFT-working among men, from 9% in 2012 to 17% in 2017.

e. Less than full-time (LTFT) working is defined as working fewer than ten contracted PAs per week, which is the equivalent to a 40-hour working week in England, Northern Ireland, Scotland and a 37.5 hour working week in Wales.

**Figure 8. UK consultant clinical radiology workforce, LTFT working, five-year trend**



[\*Data for 2013 is not available due to the timing of the census being altered.]

The increase in LTFT working has been observed across the UK, shown in Table 11. The largest increase has been observed in Northern Ireland and Scotland, with a nine and ten percentage point increase respectively. Wales has the highest proportion of consultants working LTFT, at 29%.

**Table 11. UK consultant clinical radiology workforce – LTFT working, 2012 to 2017**

	England	Northern Ireland	Scotland	Wales	UK total
2012	20%	16%	15%	22%	20%
2017	26%	25%	25%	29%	26%

For the purposes of workforce planning, a 'participation rate' is used to calculate the effect of LTFT-working on workforce capacity. The participation rate across the UK consultant clinical radiology workforce has declined from 94% in 2012 to 93% in 2017. If this trend continues, the effect will equate to an estimated 81 fewer consultant clinical radiologists (WTEs) in the five-year period to 2022.

### Programmed activities (PAs)

A PA is a session, equivalent to four hours (or 3.75 hours in Wales).

The census collects data regarding three types of PAs for consultant clinical radiologists.

- Direct clinical care (DCC) PAs: Work relating to the prevention, diagnosis and treatment of illness.<sup>3</sup>
- Supporting professional activities (SPAs): Include teaching/training, continued professional development, audit and research. The RCR and the Academy of Medical Royal Colleges (AOMRC) both recommend a minimum of 1.5 SPAs to enable a consultant to provide evidence for enhanced appraisal and revalidation.<sup>2,3</sup>
- Additional PAs: Additional responsibilities may include being a medical director, clinical director or lead clinician, or educational roles such as a clinical tutor.<sup>3</sup>

The mean number of contracted PAs for LTFT UK consultant clinical radiologists is 6.7, which is equivalent to a 27-hour week, excluding hours worked above contracted PAs. In 2017, full-time consultant clinical radiologists were contracted for an average of 10.9 PAs, comprising 8.8 DCC PAs and 2.1 SPAs. This equates to a 44-hour working week, excluding hours worked above contracted PAs. There has been an increase in contracted DCC PAs, from 8.6 in 2012 to 8.8 in 2017 and a corresponding decrease in contracted SPAs from 2.3 in 2012 to 2.1 in 2017.

In 2017, 4% of full-time consultant clinical radiologists (n=113) and 45% of less than full-time (LTFT) consultants (n=427) had fewer than the minimum 1.5 SPAs recommended by the RCR and AOMRC.<sup>2,3</sup> This compromises the ability of doctors to keep their knowledge up to date and revalidate and therefore raises concern about the consequent impact on patient safety. Adequate SPA time is also important to enable consultants to undertake audit and quality-improvement activities, leading to service improvements.

### 3.4 Estimated attrition

The census collects data on whether consultant clinical radiologists have left their posts, along with their reasons for leaving. In the 18 months to September 2017, 276 consultant clinical radiologists (equivalent to 238 WTEs) were reported through the census as having left the workforce.

#### Retirement

The primary reason for consultant-grade attrition reported in the RCR census in 2017 was retirement. The median age of retirement over the last five years has been between 60 and 62 (see Table 12).

**Table 12. Median age of retirement of consultant clinical radiologists – five-year trend**

	2012	2013*	2014	2015	2016	2017
Median age	61	–	61	60	60	62

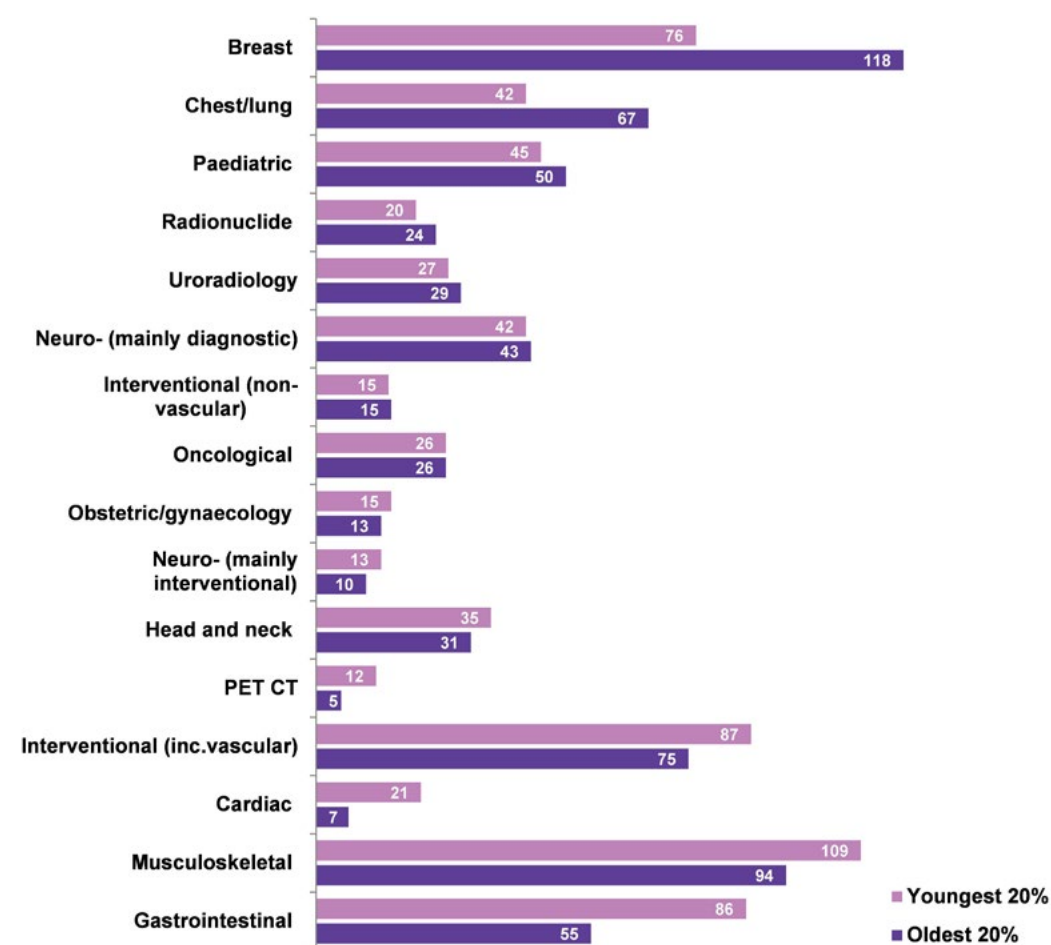
[\*Data for 2013 is not available due to the timing of the census being altered.]

On the assumption that the median retirement age remains unchanged, attrition in the next five years due to retirement is expected to total 495 consultants (WTEs).

As a means of highlighting potential shortages of specialist radiologists in future years, Figure 9 shows the primary area of interest of the oldest 20% and youngest 20% of consultant clinical radiologists as of September 2017. The 'oldest' comprises consultants aged 55 and above. Based on the median age of retirement, four out of five of the oldest 20% are predicted to retire within five years.

Based on these data, for every three breast specialists that leave the profession in the next five years, only two will join. A decrease in the number of chest/lung radiologists is also predicted.

**Figure 9. Consultant clinical radiologists' primary area of interest – oldest 20% and youngest 20%**



### Other leavers

Assuming the annual attrition rate of 1.1% for other leavers (that is, all leavers excluding retirements) remains unchanged, attrition in the next five years for this cohort is expected to total 198 consultants (WTEs).

#### 4. Demand for radiology services

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

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). This is on top of increased complexity and diversity of imaging technologies and studies and the increased number of images to be reviewed in each imaging study
- Increased demand for interventional radiology
- Increased input of clinical radiologists into multidisciplinary team meetings (MDTMs).<sup>10</sup>

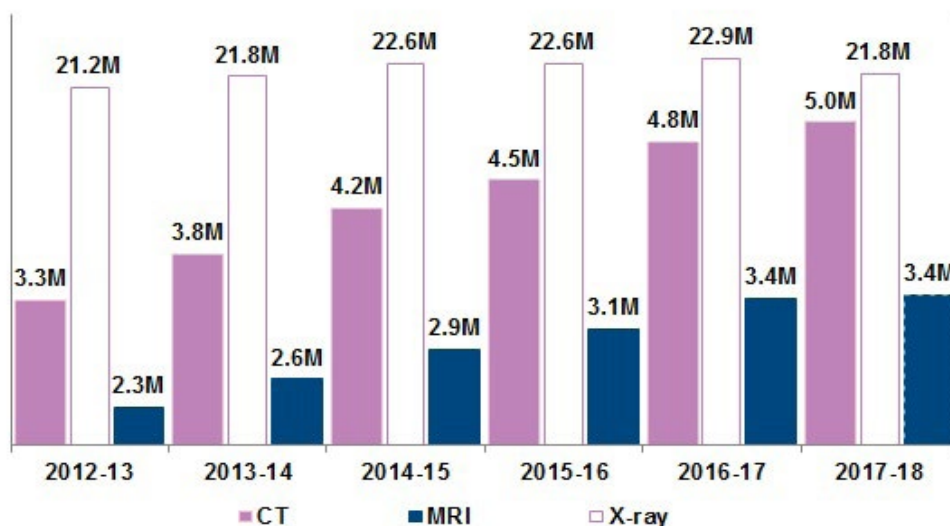
Clinical radiologists have introduced and embraced new ways of working to optimise efficiency and manage the growing demand. An example of this is *iRefer*, the radiological investigation guidelines tool for referrers to determine the most appropriate imaging investigation(s) or intervention for patients.<sup>11</sup> Delivery of *iRefer* in a clinical decision support (CDS) system can inform decisions about managing future demand with regard to commissioning of imaging and interventional services.

The increase in demand and its management are discussed in this section.

##### 4.1 Increased 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) which account for the majority of consultant clinical radiologists' reporting workload. Over recent years, the growth in demand has been particularly high for complex imaging. For example, in England between financial year (FY) 2012/13 and FY 2017/18, there has been a 49% increase in the volume of CT scans and 45% increase in the volume of MRI scans, as illustrated in Figure 10.<sup>12</sup>

**Figure 10. Count of NHS imaging activity, England – five-year trend<sup>12</sup>**



Consultant clinical radiologists report the majority of X-ray, CT and MRI scans; the remainder are reported by registrars, reporting radiographers, other clinicians, or other mechanisms.

Table 13 considers the total number of radiologist hours required to interpret and report X-ray, CT and MRI scans conducted in the UK in 2017, taking into account the volume of images, the percentage reported by consultant clinical radiologists (as opposed to other clinicians), and the time taken to report.

**Table 13. UK diagnostic imaging demand, 2017**

	Volume of images, England[1]	Volume of images, UK [2]	% of images reported by consultants [3]	Volume of images reported by consultants [2]x[3]	Hours to report [4]	Consultant number needed [5]
X-ray	21.8 million	25.9 million	60%	15.5 million	0.5 million	663
CT	5.0 million	5.9 million	90%	5.3 million	1.3 million	1,686
MRI	3.4 million	4.0 million	90%	3.6 million	1.2 million	1,498
Total	30.2 million	35.9 million	–	24.5 million	3.1 million	3,847

(Sum of counts may not equal total due to rounding)

**Notes to Table 13**

[1] Diagnostic Imaging Dataset (DID) 2017/18<sup>12</sup>

[2] UK-wide estimate calculated using DID and adjusted by population<sup>13</sup>

[3] Estimated percentage of modality reported by consultant clinical radiologists<sup>14</sup>

[4] Estimated hours to report based on two minutes per X-ray, 15 minutes per CT and 20 minutes per MRI<sup>15</sup>

[5] Based on 20 consultant hours per week over 40 weeks<sup>3,15</sup>

Complexity of imaging is an important factor to take into account in radiology workload planning. Table 13 illustrates that clinical radiologists reported nearly three times more X-rays than CTs and MRIs combined, yet the CT and MRI interpreting and reporting constitutes in excess of 80% of their reporting workload as these imaging modalities take significantly longer to interpret and report.

Of the estimated 36 million images to report in the UK in 2017, 24.5 million are estimated to be reported by consultant clinical radiologists, taking a total of 3.1 million hours to report. In staffing terms, this equates to requiring the time of 3,847 WTE consultant radiologists. As of 2017, there are 3,390 in post, of which approximately 2,843 are primarily diagnostic radiologists (as opposed to the 547 WTEs with a primary interest in interventional). This translates to an estimated shortfall in 2017 of 1,004 consultant clinical radiologists (WTEs).

The equivalent calculation based on 2012 data identified that the diagnostic reporting workload of UK consultant clinical radiologists is estimated to have increased by 30% between 2012 and 2017, driven by the huge increase in volumes of CT and MRI scans.

Based on the increasing volumes of complex imaging illustrated in Figure 10, the gap between supply and demand is forecast to widen in the next five years from the current shortfall of approximately 1,000 consultant clinical radiologist WTEs to an estimated shortfall of approximately 1,600 WTEs in 2022.



## 4.2 Increased demand for interventional radiology

The range of disease processes and organs amenable to interventional radiology is extensive and the scope and complexity of IR procedures continues to increase.<sup>16</sup> For example:

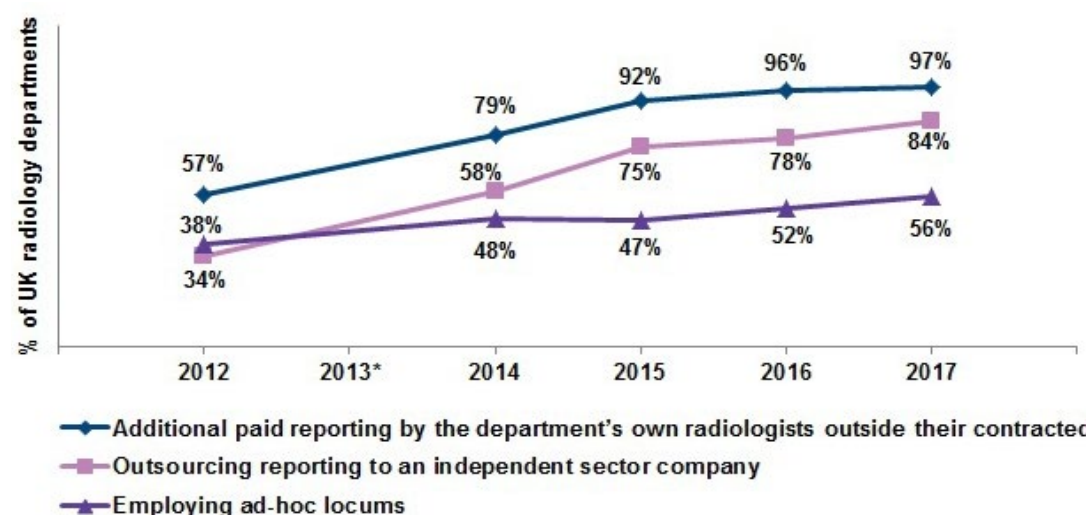
- It is estimated that in England alone up to 8,000 stroke patients per year are eligible for mechanical thrombectomy.<sup>17</sup> Meeting the needs of these patients, as well as those in Northern Ireland, Scotland and Wales, will require a significant increase in the consultant interventional neuroradiologist workforce.
- Interventional oncology is a discipline that has expanded dramatically over the past few decades and plays an increasing and important role in the management of cancer patients. It offers minimally invasive treatment options that enable the safe and effective clinical management of cancer patients.
- A lack of staff and lack of 24/7 provision have both been identified as factors contributing to patients experiencing long waits for clinically urgent vascular surgery.<sup>16</sup> The 2018 *Getting It Right First Time* (GIRFT) vascular surgery report recommends that the options to increase the vascular surgery and interventional radiology workforce are assessed.<sup>18</sup>

## 4.3 Managing demand

Only 3% of UK radiology departments reported in the 2017 census that they were able to meet their reporting requirements within staff contracted hours.

Radiology departments use a number of methods to manage shortfalls in reporting capacity. Figure 11 shows that, between 2012 and 2017, there was an increase in the percentage of radiology departments incurring costs to manage their shortfalls in reporting capacity.

**Figure 11. Managing diagnostic imaging demand, five-year trend**

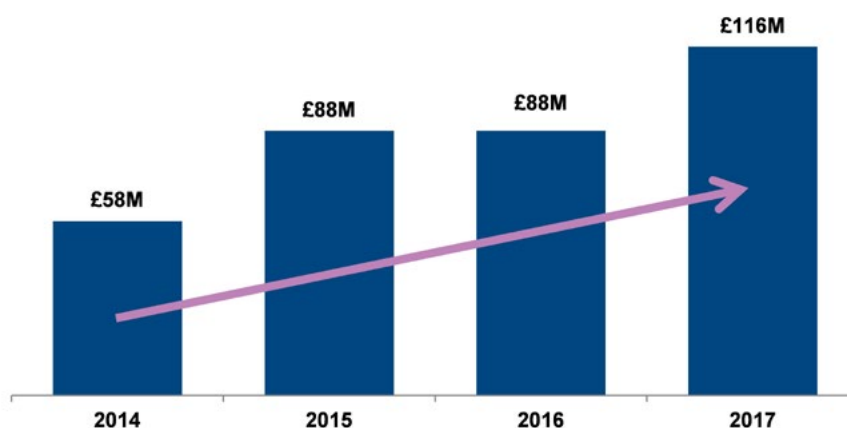


[\*Data for 2013 is not available due to the timing of the census being altered.]

Expenditure is incurred through both outsourcing (overnight and daytime outsourcing payments made to teleradiology companies), insourcing (additional payments to radiologists already contracted to the department/trust) and payments for *ad hoc* locums.

Data submitted by radiology departments collected through the RCR annual census since 2014 estimates this expenditure has doubled over three years, from £58 million in 2014 to £116 million in 2017. This increase is illustrated in Figure 12.

**Figure 12. UK radiology department outsourcing/insourcing estimated expenditure, 2014 to 2017**



The UK estimated expenditure of £116 million in 2017 is equivalent to the combined salaries of 1,343 full-time radiology consultants based on point five of the 2016–17 NHS consultant pay scale for England.<sup>1</sup>

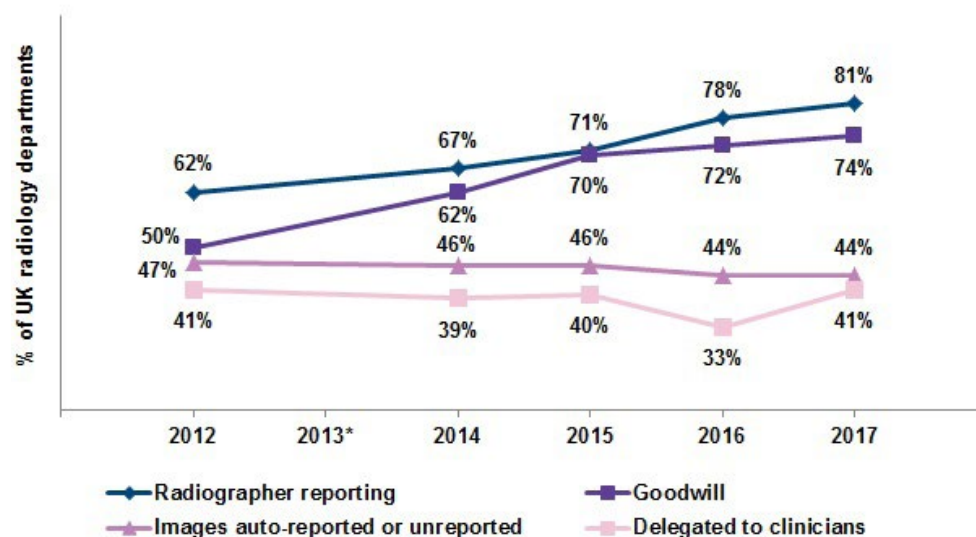
Table 14 shows the estimated expenditure across the four UK countries.

**Table 14. Radiology department outsourcing/insourcing estimated expenditure, 2014 and 2017**

Country	2014 estimated expenditure	2017 estimated expenditure
England	£47.0 million	£99.3 million
Northern Ireland	£5.2 million	£7.7 million
Scotland	£3.5 million	£4.0 million
Wales	£1.9 million	£4.9 million
UK total	£57.6 million	£115.9 million

Many radiology departments also relied on the methods shown in Figure 13 to manage shortfalls in reporting capacity in 2017. Between 2012 and 2017 there was an increase in radiographer reporting and consultant clinical radiologist unpaid overtime (goodwill).

**Figure 13. Additional methods used to manage shortfalls in reporting capacity – five-year trend**



[\*Data for 2013 is not available due to the timing of the census being altered.]

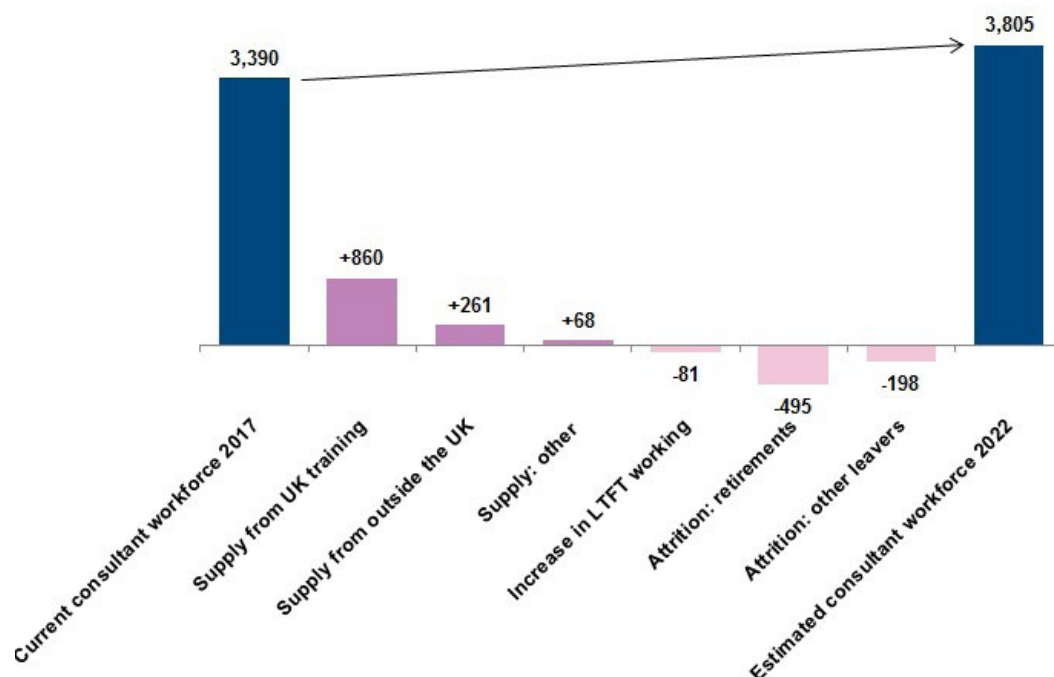
While Figure 13 shows the percentage of radiology departments reporting images as auto-reported or unreported has fallen slightly in the past two years from 46% to 44%, this level is concerning due to the potential for diagnoses to be missed or delayed.

Looking towards the next five years, the increase in demand observed in the last five years is expected to continue. There is potential that initiatives such as rapid diagnostic and assessment centres, new clinical pathways and expansions in cancer screening programmes could mean that future demand increases even more rapidly.

## 5. 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-year period, 2017 to 2022.

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



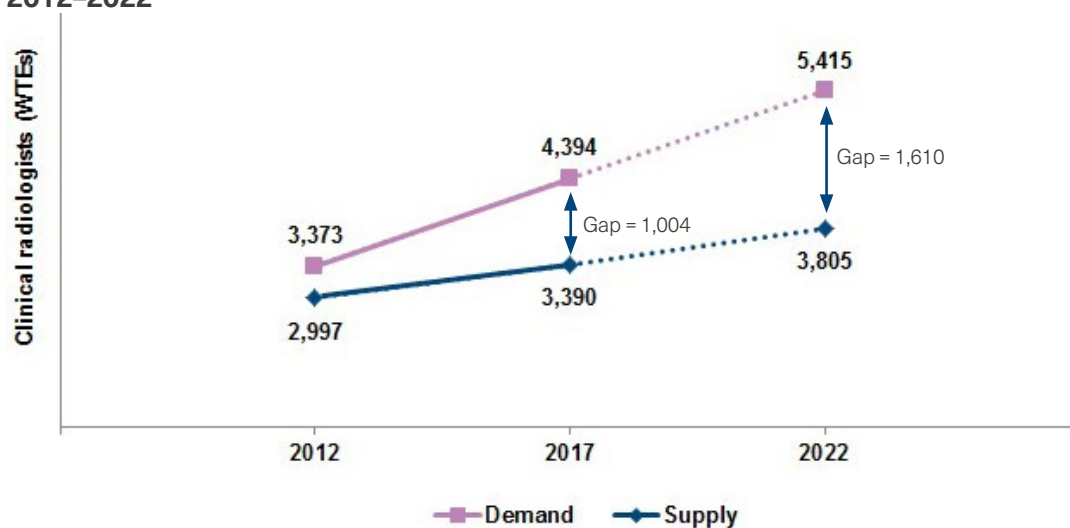
Based on the assumptions stated below, it is estimated that there will be 3,805 WTE consultant clinical radiologists in post in the UK in five years' time (2022).

Assumptions, next five years to 2022:

<b>Current consultant workforce (2017)</b>	<b>3,390 WTEs</b>	
Supply from UK training	+860 WTEs	(discussed in section 3.1)
Supply from outside the UK	+261 WTEs	(section 3.2)
Supply: other	+68 WTEs	(section 3.2)
Increase in LTFT working	-81 WTEs	(section 3.3)
Attrition: retirements	-495 WTEs	(section 3.4)
Attrition: other	-198 WTEs	(section 3.4)
<b>Estimated consultant workforce (2022)</b>	<b>3,805 WTEs</b>	

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

**Figure 15. UK consultant clinical radiologists (WTEs), estimated supply and demand, 2012–2022**



Assumptions, next five years to 2022:

2017 supply	3,390 WTEs
2022 supply (estimate)	3,805 WTEs (see Figure 14)
2017 demand (estimate)	4,394 WTEs (2017 supply + 1,004 WTEs)
2022 demand (estimate)	5,415 WTEs (in line with growth 2012 to 2017)

The roles of clinical and interventional radiologists are crucial for delivery of high-quality, safe and efficient patient-centred care. In 2017, the shortfall between clinical radiology capacity and demand is estimated at 1,000 full-time consultants. This shortfall rises to 1,600 by 2022. These shortfalls have been driven by a workload that has increased hugely in the past five years, and will continue to increase with further advances in imaging technology and interventional procedures.

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  18. NHS Getting It Right First Time. *Vascular surgery GIRFT Programme National Specialty Report*. London: Getting It Right First Time, 2018.
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## Appendix 1. Background and methodology

### Background and methodology

The RCR first carried out a workforce census in 2008 and has repeated the exercise ever since. The intention is to capture data relating primarily to the radiology workforce in the UK. More recently, the census has introduced new questions relating to departmental workload. This was seen to be necessary as workforce planning is only effective when the process considers both the supply (number of radiologists) and demand (represented by workload) elements.

The College recognises the importance of effective workforce planning. We therefore aim to collect accurate data on the composition of and demands made on the UK radiology workforce. The intention is that the College and stakeholder organisations use this data when contributing to the planning of the NHS workforce. This is an important consideration as radiologists perform a vital role in using their expertise to diagnose and treat serious diseases including cancer.

The census also intends to establish trend data relating to workforce and workload issues in radiology. A response rate of 100% since 2010 (with the exception of 2013 when a census was not carried out) has greatly helped in this endeavour.

### Census questions

The questions used for the census can be found in Appendix 2. The census focused on two related domains, workforce and workload.

- Workforce – information was collected on all consultant clinical radiologists in substantive posts, including their demographic details, work roles, professional activities and subspecialty interests. Information on unfilled posts in radiology departments was also collected.
- Workload – information was collected on whether radiology departments met their reporting requirements and the extent of out-of-hours radiology. A consequence of workload not being met in radiology departments, given the resources available, is outsourcing of work, including the reporting of images and scans, to commercial organisations. Expenditure on outsourcing has therefore been collected through the census.

### Collection of data and response rate

Clinical directors and workforce leads of all 198 NHS radiology departments in the UK were asked to provide information for the 2017 census. As with previous RCR censuses, a 100% response rate was achieved for 2017.

The data collection process was through a secure website. Respondents – clinical directors and workforce leads of radiology departments – were emailed a link and asked to provide data to reflect their workforce at the census date of 1 September 2017. Information on departmental activity and spending was sought based on the 12 month period to 31 March 2017.

### Presentation of results

Information collected on the workforce was verified against that from previous censuses and the RCR membership database. Where discrepancies and outliers were identified clarification was sought from census respondents.

The workforce figures in this report are given as headcount, unless otherwise stated. Where WTE figures are used, the calculation conforms to the current NHS convention of excluding programmed activities (PAs) that exceed ten. One of the intentions of the RCR censuses is to identify trends over time. Where appropriate, this report includes information from previous censuses, mainly 2012, to allow a five-year comparison to be made with the 2017 information.

Data is processed by the RCR in accordance with UK data protection legislation.

Queries regarding this report should be sent to: [census@rcr.ac.uk](mailto:census@rcr.ac.uk)

## Appendix 2. Census questions

\*Indicates a mandatory field

### Stage 1: Data protection

I have read and accept The Royal College of Radiologists' Data Protection Guidelines in respect of the census data. [Tick box]\*

### Stage 2: Organisational details

The details below are based on information entered in the 2016 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.

2.1 Radiology department(s)\*

2.2 Trust/health board\*

2.3 Census contact – full name (person nominated to complete the census on behalf of the department/s)\*

2.4 Census contact – email\*

2.5 Census contact – tel no.\*

2.6 Are the clinical director details the same as the census contact details? \* (if 'yes' proceed to stage 3, if 'no' enter name, email and telephone number)

### Stage 3: Staff details

3.1 Please provide details of the following consultant and staff grade clinical radiologists, employed in your radiology department(s), as of 1 September 2017:

- Consultant clinical radiologists
- Associate specialists
- Specialty doctors
- Trust grade staff
- Clinical assistants
- Research fellows (new category)

Please include:

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

Please do not include trainees.

3.1 Forename\*

3.2 Surname\*

3.3 Gender (male/female/not stated)\*

3.4 Grade\* (drop-down list includes the following)

- Academic post (University contract)
- Mixed NHS/academic – part NHS/research-funded (NHS contract)
- NHS consultant (NHS contract)
- Research fellow
- Staff grade or equivalent
- Other



- 3.5 Direct clinical care PAs\* (All patient-led activities to be counted as DCC) Please enter number to one decimal place.
- 3.6 Supporting Professional Activities PAs\* (All non-DCC and non-training-only PAs to be counted as SPAs).
- 3.7 Training only PAs
- 3.8 Total PAs (This box is auto-filled with the total of the above three fields)
- 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\* (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
- 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)
- Obtained primary medical qualification in the UK? (drop-down list: yes/no/unknown)
  - Completed a UK radiology training programme? (drop-down list: yes/no/unknown)
  - Previously been in a substantive consultant post? (drop-down list: yes/no/unknown)
  - Period employed as locum up to 1 September 2017 (drop-down list)  
1–3 months; 4–6 months; 7–9 months; 10–12 month; >12 months
  - Expected duration of locum period from 1 September 2017 (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 vacant/unfilled post
    - Maternity cover
    - Other
- 3.13 Expected to retire by 31 August 2018 (tick box, if not ticked proceed to the next question)
- Post retirement (drop-down list)
    - No immediate plan to return to work
    - Will return with reduced PAs/LTFT
    - Unknown
- 3.14 Left since 31 March 2016 (tick box, if not ticked proceed to the next question)
- Reason for leaving (drop-down list)
    - Moved to another NHS post
    - Resigned from the NHS
    - Retired from the NHS
    - Other

## Stage 4a: Unfilled permanent posts

Please enter all funded unfilled permanent clinical radiology posts in your radiology department(s) as of 1 September 2017 using the 'Add post' button.

Please include vacancies for consultants, research fellows, associate specialists, specialty doctors, trust grades and clinical assistants.

Please include vacant posts even if currently filled by a locum.

Please do not include trainee vacancies.

### 4.1 Unfilled post status (drop down list)

- 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

- Academic post (University contract)
- Mixed NHS/academic – part NHS/research-funded (NHS contract)
- NHS consultant (NHS contract)
- Research fellow
- Staff grade or equivalent
- Other

### 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
- Medical education
- Research
- 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)

4.8 Locum filled? (Tick box – if not ticked proceed to next stage)

- Period filled by locum (to the nearest month) (drop-down list: 1 month, 1 month ... 12+ months, don't know)

## Section 4b: Recruitment

4.9 Has your department tried to recruit candidates from outside the UK in the 12-month period ending 1 September 2017? (Drop-down list: yes/no/don't know) (If 'no' or 'don't know' proceed to the next question)

- If yes, was this successful? (drop-down list)
  - Yes
  - Yes but not in all instances
  - No
  - Don't know

4.10 Please make any additional comments relating to recruitment from outside the UK in the last 12 months in the box below.

## Stage 5a: Workforce capacity

Please note that references to 'department' means all departments/hospitals that your census submission relates to.

5.1 Were all reporting requirements met by the department's radiology staff within their contractual hours (in the 12 months ending 31 March 2017)? \* (drop-down list)

- Yes (proceed to the next question)
- No (Please indicate how your department addressed any shortfalls in reporting requirements – check 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
  - Other (please specify) (free-text box appears when this option is chosen)

5.2 What was the total department spend on additional radiology services (in the 12 months ending 31 March 2017)? Include: Outsourcing to teleradiology companies (daytime and overnight) AND additional payments to contracted radiologists (and other trust staff).\*

5.3 What was the total department spend to provide out of hours radiology (in the 12 months ending 31 March 2017)?\*

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 (DCC or SPA) are lost due to compensatory arrangements following out of hours working?\*

5.6 In total, how many radiologist sessions were lost in your department due to illness during the 12-month period ending 31 March 2017?\*

### Stage 5b: Additional questions

5.7 How many Administration of Radioactive Substances Advisory Committee (ARSAC) license holders worked for your radiology department(s) as of 1 September 2017? The data below are entries from 2016. Please update accordingly.

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

### Stage 6: Final comments

6.1 Please provide feedback relevant to the objectives of the census in making the case to the public bodies for an increase in radiology training numbers and resources.

6.2 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.

### Appendix 3. Census completions

Thank you to the radiology departments in the following trusts and health boards for completing the 2017 census:

#### England – East Midlands

Chesterfield Royal Hospital NHS Foundation Trust  
Derby Hospitals 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  
Colchester Hospital University NHS Foundation Trust  
East and North Hertfordshire NHS Trust  
Hinchingbrooke Health Care NHS Trust  
Ipswich Hospital NHS 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  
Papworth Hospital NHS Foundation Trust  
Peterborough City Hospital  
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 Marsden NHS Foundation Trust  
Royal National Orthopaedic Hospital NHS Trust  
St George's University Hospitals NHS Foundation Trust  
The Hillingdon Hospitals NHS Foundation Trust  
University College London Hospitals NHS Foundation Trust  
Whittington Hospital 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 Acute Hospitals NHS 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

Central Manchester University Hospitals 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

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 HNS 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 Turnbridge 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 Bournemouth and Christchurch Hospitals NHS Foundation Trusts

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

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 Children's Hospital NHS Foundation Trust

Birmingham Women's Healthcare NHS Trust

Burton Hospitals NHS Foundation Trust

Dudley Group of Hospitals NHS Foundation Trust

George Eliot Hospital NHS Trust

Heart of England NHS Foundation Trust  
Robert Jones and Agnes Hunt Orthopaedic  
Hospital NHS Trust  
Royal Orthopaedic Hospital NHS Foundation Trust  
Royal Wolverhampton Hospitals NHS Trust  
Sandwell and West Birmingham Hospitals NHS  
Trust  
Shrewsbury and Telford Hospital NHS Trust  
South Warwickshire NHS Foundation Trust  
University Hospital Birmingham NHS Foundation  
Trust  
University Hospital of North Midlands NHS Trust  
University Hospitals Coventry and Warwickshire  
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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