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Auditor General for Wales

Radiology Services in Wales

WALES AUDIT OFFICE
SWYDDFA ARCHWILIO CYMRU

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Mae'r ddogfen hon hefyd ar gael yn Gymraeg.

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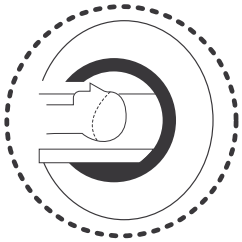
Summary report

Background

1 Radiology is a key diagnostic and interventional service used to help diagnose, monitor and treat disease and injuries.

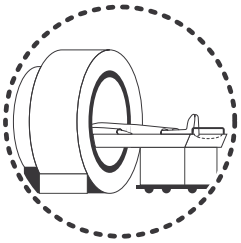
2 Hospital-based clinicians and general practitioners refer patients to radiology departments to undergo radiological examinations or to have images taken. Radiographers use sophisticated radiology equipment to produce differing types of images, depending on the issue being investigated. Exhibit 1 provides a summary of the key radiology techniques commonly used across the NHS.

Exhibit 1: key radiology imaging techniques



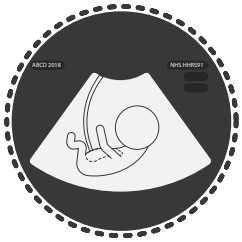
Computerised tomography (CT):

Uses X-rays and a computer to create detailed images of structures inside the body, including internal organs, blood vessels and bones. Patients lie on a bed that passes into a doughnut shaped scanner



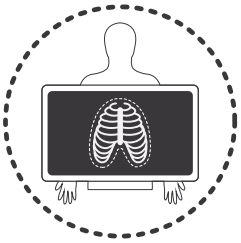
Magnetic resonance imaging (MRI):

Uses strong magnetic fields and radio waves to produce detailed images of the inside of the body. Can be used to examine almost any part of the body, including bones and joints, the heart and blood vessels, and internal organs, such as the liver. An MRI scanner is a large tube in which patients lie during the scan.



Ultrasound (US):

Uses high-frequency sound waves to create an image of a part of the inside of the body. Ultrasound probes gives off high-frequency sound waves. The sound waves bounce off different parts of the body, creating an "echo" that is picked up by the probe and turned into a moving image. This image is displayed on a monitor while the scan is carried out.



X-ray:

Uses radiation to pass through the body, the energy from X-rays is absorbed at different rates by parts of the body. X-rays are mainly used to look at bones and joints, but can also be used to detect problems affecting soft tissue, such as heart problems and tumours.

Source: NHS Choices

3 Following an examination, a clinical radiologist[1] will view the resulting image or images, and produce a report, which provides an interpretation. Radiologists play a key role in the clinical management of a patient's condition, advising on, and selecting the best imaging technique to enable diagnosis and minimise radiation exposure. Interventional radiologists have a more direct role in treating patients, using minimally invasive procedures, aided by radiology imaging, to diagnose and treat various diseases.

4 Many clinical decisions about the management of a patient cannot be made without a radiologist's input into the diagnosis. Where rapid diagnostic testing is in place, this enables clinical decisions to be made quickly.

5 **The Future Delivery of Diagnostic Imaging Services in Wales** (2009)[2] report set out that demand for some types of radiology examinations was increasing by between 10% and 15% per year.

6 In 2010, the National Imaging Programme Board was created at the request of NHS Chief Executives, as the primary source of advice, knowledge and expertise for the planning of diagnostic radiology services in Wales. The National Imaging Programme Board, through NHS Chief Executives was given delegated authority for developing and implementing a programme of strategic work for radiology, and for adopting all-Wales standards and protocols for radiology services across Wales. Since then, although progress has been made at a national level, a number of significant challenges are yet to be fully addressed.

7 It is widely accepted that there are ongoing difficulties in recruiting general and specialist radiology staff. There are also concerns about the capability of radiology information systems to support the delivery of services. In addition, radiology equipment is expensive to purchase and maintain. Waiting time performance in the past five years suggests that the current capacity of radiology services is not sustainable.

8 The Wales Audit Office report on **NHS Waiting Times for Elective Care in Wales** (January 2015)[3] showed that waiting time targets for diagnostic tests were not being met. Similarly, the Wales Audit Office report **A Review of Orthopaedic Services** (June 2015)[4], showed that the long waiting times for radiology examinations was contributing to long waits for overall orthopaedic treatment.

1 In this report, reference made to radiologists, includes consultant radiologists, middle-grade doctors, specialist registrars and junior doctors. Where there is any variation from this, the report content will specify what the variation is, for example, 'consultant radiologists'.

2 Welsh Assembly Government, The Future of Diagnostic Imaging Services in Wales, 2009

3 Wales Audit Office, NHS Waiting Times for Elective Care in Wales, January 2015

4 Wales Audit Office, Orthopaedic Services, June 2015

9 Given the challenges, the Auditor General commenced a review of radiology services at all health boards in Wales in late 2016. The work examined each health board's arrangements to meet demand for radiology examinations and made recommendations for service improvements. We excluded therapeutic radiology from the review. Appendix 1 provides the audit approach and methodology used for this work.

10 During 2016-17, the Wales Audit Office conducted a value-for-money examination of the NHS Wales Informatics Service[5]. The review considered the implementation of key NHS information systems, including the implementation of RADIS[6] across Wales. The report highlighted that frontline staff are dissatisfied with the functionality of RADIS.

11 This report summarises the key messages from the Auditor General's local work on radiology services, and refers to the findings set out in the Auditor General's separate report on the NHS Wales Informatics Service where relevant.

Key findings

12 Waiting time targets for radiology examinations are currently being met and our work has shown that radiology services are generally well managed. However, rising demand, difficulties with recruitment and retention of staff, outdated and insufficient scanning equipment, along with IT weaknesses are putting services under pressure and point to the need for clear and targeted action to ensure that radiology services are able to cope with future demand.

13 Our key findings are set out further in the paragraphs below.

Despite increasing demand, diagnostic radiology examination waiting time targets are currently largely being met, however, some patients wait a long time for their examination results

14 Demand for radiology examinations is increasing each year, in particular for the most complex scanning techniques. The reasons for the increase in demand are numerous.

15 Where a GP or consultant decides that a patient is in need of a radiology examination, those referred as outpatients are added to a waiting list. Our review found that waiting lists are prioritised according to need, and all health boards review the appropriateness of the referral priority.

5 Wales Audit Office, Informatics systems in NHS Wales, January 2018

6 RADIS – Wales Radiology Information System.

16 Hospital inpatients with emergency health needs may need prompt access to radiology examinations. In normal working hours, hospitals set aside a small number of appointments to accommodate urgent inpatient cases. However, we found that out of hours access to radiology examinations for patients with urgent needs is variable. Whilst CT and X-ray examinations are available out of hours in most hospitals, MRI and US examinations are not.

17 There has been improvement in waiting time performance over the last five years, with a reduction in the number of patients waiting more than eight weeks for a radiology examination, supported by additional funding from the Welsh Government. Health boards have secured improvements in waiting times by outsourcing examinations to private sector mobile units and making use of unused capacity in other health boards.

18 Following a radiology examination, a report of the image is produced. Generally, reporting turnaround targets are met, however, some patients wait a long time for their results, and not all examinations are reported.

19 Whilst radiologists report most examinations, specially trained radiographers are able to report on less complex images. However, staff shortages were limiting health boards' ability to make greater use of radiographer reporting. As a result, health boards have relied on outsourcing reporting to help ensure timely turnaround of radiology reports.

Recruitment, retention and an ageing workforce are threatening the sustainability of the service and limiting health boards' ability to train staff

20 We found that all but one health board was struggling to recruit and retain radiologists and radiographers. Health boards have been increasingly reliant on using locum staff to bridge the gap caused by unfilled vacancies. At the same time, the radiology workforce is aging and at the time of our review, more than one third of radiologists and radiographers were aged 50 or over, and therefore, vacancy levels could increase without appropriate action.

21 To help address the reporting capacity shortfall, a National Academy has been set up to provide a training facility for trainee radiologists. The first cohort of trainees are due to commence training in September 2018.

22 We found that staffing shortages were limiting health boards' ability to train their staff, and all health boards were struggling to keep staff compliant with statutory and mandatory training modules.

Ageing and underutilised equipment are making it harder for health boards to meet demand and health boards do not have the staffing resources to extend opening hours

23 Comprehensive arrangements are required to ensure the maintenance and replacement of radiology equipment. Older imaging equipment is more expensive to maintain and has a greater risk of failure. At the time of our review, all health boards had equipment nearing the end of their lifespan. A capital replacement programme for radiology equipment requires significant funding, and as such, capital funding is provided on an all-Wales basis but not necessarily to the level needed to replace all out of date equipment. Since our review, the Welsh Government provided funding for additional radiology imaging equipment in 2016-2017 and 2017-18, and is working with health bodies to identify and prioritise further additional imaging investment over the period 2018-19 to 2020-21.

24 We found there was scope to increase the utilisation of scanning equipment in all health boards. However, additional radiology staffing would be required to achieve this. A further complication is that increasing operating hours would also lead to higher maintenance costs, and reduce equipment lifespans.

Wales-wide radiology IT system challenges and weaknesses in local IT infrastructures inhibit radiology services' efficiency

25 Our review found that the core radiology system, RADIS, was not fulfilling health boards' needs. Inadequacies in the system were causing difficulties for some health boards in planning and delivering radiology services and leading to inefficiencies. We also found that inadequacies in local IT infrastructures were also compounding inefficiencies.

26 At the time of our review, the absence of an e-referral system and weaknesses in Picture Archiving and Communications Systems (PACS) and voice recognition systems were creating inefficiencies in the planning and delivery of radiology services. However, since our review there has been phased implementation of electronic referrals as part of the wider rollout of the Welsh Clinical Portal.

Radiology services are well managed operationally but there is scope to strengthen board level scrutiny and the strategic planning of services

27 We found that strategic and operational planning of radiology services need strengthening in most health boards. Only three health boards undertook demand and capacity modelling. At the time of our review, only one health board had a specific, detailed financial plan for radiology.

28 Performance data and audit results help health boards to monitor and evaluate the performance of radiology services. However, we found that most health boards had opportunities to widen the range of radiology performance measures reported to their Boards and Committees. In addition, currently there is no standard radiology activity measurement. Health boards do not record radiology activity consistently across Wales. This makes it difficult to provide true comparisons of activity and performance between health boards.

29 Our review found that the operational management and accountability arrangements for radiology services were clear and appropriate. We found that nearly all health boards are taking positive steps to reduce inappropriate referrals, but signposting to local referral guidance could be improved. However, since our review, access to national referral guidance has improved.

30 Our review also found that not all health boards had an executive lead for radiology that was a member of the Board. The absence of an executive lead for radiology attending board meetings at some health boards may mean the opportunity to highlight and monitor emerging issues is missed.

31 Given the nature of some of the issues facing radiology services, action taken alone by health boards will not be enough to ensure the future sustainability of radiology services. National strategic planning is required to address the challenges facing radiology services. Since we reviewed radiology services across Wales, the Welsh Government established an Imaging Taskforce to develop and deliver a high-level **Imaging Statement of Intent**[7]. The aim of the Imaging Statement of Intent (the Statement of Intent) is to address the challenges facing diagnostic radiology services in Wales. In developing the Statement of Intent, the Imaging Taskforce took account of the findings from our local work. The Statement of Intent was published in March 2018. It contains a number of actions for NHS Wales to address.

7 Welsh Government, Imaging Statement of Intent, March 2018.

Key challenges and recommendations

32 The findings from our work identify a number of key challenges that face health boards, and require action both locally and nationally by NHS Wales, or locally by some or all health boards. These are set out in Exhibit 2.

Exhibit 2: key challenges that need to be addressed nationally and locally

Key challenges	National action required by NHS Wales	Local action required by some or all health boards
Workforce		
• Ensure that the level of trainee radiologists and radiographers is sufficient to address recruitment challenges and increasing demand.	✓	
• Ensure that opportunities to maximise the contributions that support staff and other professions can make to radiology services are identified and secured.		✓
• Ensure that health boards have radiology workforce plans, which identify the capacity and skill mix required to sustainably meet current and future radiology demand in a timely and safe way.		✓
Equipment		
• Ensure that there is a national coordinated approach to address equipment needs, with sufficient funding for the replacement of equipment and purchase of new technology to meet increasing demand and technology advances.	✓	
• Ensure that health boards have equipment replacement programmes, which set out priorities, requirements and associated costs.		✓

Key challenges	National action required by NHS Wales	Local action required by some or all health boards
Demand		
• Ensure that regional levels of current and future demand are known, to enable planning for additional capacity to be coordinated across regions.	✓	
• Ensure that health boards know the current and future demand for each referring specialties that takes account of changes, such as to patient pathways.		✓
• Ensure that health boards have action plans that detail how waiting times and reporting targets will be achieved in the short-term, and sustained in the future.		✓
• Ensure that health boards can demonstrate a value-based approach to radiology services by making better use of benchmarking information across Wales and the UK.		✓
ICT		
• Ensure that information systems are efficient and enable reliable management and performance information to be produced, and facilitate the appropriate sharing of patient information and images within and between health boards.	✓	
Management of services		
• Ensure that management accountability and strategic oversight is appropriate to drive service improvements.		✓
• Ensure that referral guidance provides sufficient information and is accessible to referring clinicians.		✓

Key challenges	National action required by NHS Wales	Local action required by some or all health boards
Quality		
• Ensure that common procedure codes are in place and used to ensure that workload is measured consistently with and between health boards.	✓	✓
• Ensure that common performance indicators are in place to drive the consistency of benchmarking and improvement of services.	✓	✓
• Ensure that appropriate and robust performance quality measures are in place, which includes the review of patient experiences and service quality reviews.		✓
• Ensure that appropriate monitoring arrangements are in place at board and committee level.		✓

Source: Wales Audit Office

33 Our local audit reports set out specific recommendations for health boards. All health boards have prepared management responses setting out the actions they are taking to address audit recommendations. Our local reports and the associated management responses are available on the Wales Audit Office website (www.audit.wales).

34 The challenges that require a national response align closely to the actions set out in the Statement of Intent. Consequently, we do not see value in repeating those actions in the form of recommendations here.

35 The Imaging Taskforce, in consultation with the public and stakeholders, is developing a national imaging implementation plan for NHS Wales to address the actions set out in the Statement of Intent. We therefore base our recommendations around ensuring that national implementation adequately addresses the challenges identified through our work and the Statement of Intent.

Recommendations

The national challenges facing radiology services across Wales are reflected in the Imaging Statement of Intent and appropriate action has been identified. However, delivery against these actions is reliant on a timely national imaging implementation plan being developed and acted upon.

R1 The Welsh Government, through the Imaging Taskforce, should ensure that the national imaging implementation plan addresses each of the actions set out in the Imaging Statement of Intent, and the key challenges highlighted in this report.

R2 The national implementation plan should include clear implementation dates to deliver action in the short to medium term, with clearly identified accountabilities for delivery.

R3 The Welsh Government should properly cost the implementation plan and ensure that the necessary resources are in place to support delivery.

R4 The Welsh Government should ensure the necessary arrangements are put in place to monitor delivery of the national implementation plan.

Part 1

Despite increasing demand, diagnostic radiology examination waiting time targets are currently largely being met, however, some patients wait a long time for their examination results

Demand for radiology imaging is increasing annually, and in particular for the most complex scans

1.1 The growing role of radiology in clinical care has led to increasing demand for radiological examinations. A number of factors drives the increase in demand. This includes demographic changes, new clinical guidelines, lower thresholds for referral, and advances in technology and understanding about how the features of disease present themselves on diagnostic images.

1.2 In Wales, the total number of diagnostic radiology examinations undertaken per year increased by 9% between 2013-14 and 2016-17[8] (Exhibit 3). In addition, scans are becoming more complex. The biggest percentage rise in volume for radiological examinations has been for CT and MRI imaging due to an increase in their role in the early diagnosis of many diseases. Between 2013-14 and 2016-17, the number of CT scans undertaken per year increased by 33% and the number of MRI scans increased by 28% (Exhibit 3). MRI and CT examinations are complex and can include multiple images, and therefore, per patient examination, are more labour-intensive for radiologists interpreting images than other examinations, such as X-rays.

Exhibit 3: increase in demand for CT, MRI, US and X-ray imaging between 2013-14 and 2016-17

	2013-14	2014-15	2015-16	2016-17	Percentage increase 2013-14 to 2016-17
CT	235,861	256,935	284,672	313,947	33%
MRI	97,929	109,506	119,066	126,335	29%
Plain film X-ray	1,291,395	1,279,348	1,299,609	1,281,067	-1%
Total ultrasound	409,363	419,378	444,540	468,361	14%
All others	120,532	143,956	144,203	153,941	28%
Total examinations	2,155,080	2,209,123	2,292,090	2,343,651	9%

Source: NHS Benchmarking Network

8 These figures are based on data provided by five health boards who participated in the NHS Benchmarking Network review of radiology services. Hywel Dda University Health Board and Powys Teaching Health Board did not participate.

1.3 The increase in demand for radiology examinations is not unique to Wales. In England between 2013 and 2016 the number of CT examinations increased by 33% and MRI examinations by 31%, equating to a mean annual growth of just over 10%[9].

Patients on waiting lists are prioritised according to clinical urgency, and emergency access for radiology examinations in normal working hours is good, but emergency access out of hours is variable

1.4 While most radiology departments offer some form of open access to patients referred to the department as outpatients, the extent of access varies and typically is limited to X-rays only. Where open access is not available, patients are placed on a waiting list. The referral should specify the degree of urgency. This ensures that the patients with the most critical needs are seen first. The referrer assigns the urgency.

1.5 All health boards operate three priority levels for outpatients: urgent, urgent suspected cancer and routine. Urgent referrals are prioritised and seen as soon as they can be accommodated.

1.6 In all health boards, radiologists or appropriately trained advanced practice radiographers review the priority of the referral using the clinical information provided by referrers. The priority of the referral may be amended following review. This system ensures waiting lists are based on clinical priority.

1.7 However, only two health boards operate a centralised waiting list within the health board. Five health boards have separate radiology waiting lists in different parts of the organisation. By maintaining more than one waiting list, health boards are failing to manage demand on an organisation-wide basis, with the result that some patients may wait longer than they would have if they had been on a single waiting list.

1.8 Inpatients with emergency health needs may need prompt access to a radiology examination both within and outside of normal working hours. During normal working hours, all health boards told us they set aside a small number of appointments to accommodate emergency inpatient referrals, based on historic demand. However, the unpredictable nature of emergency demand means that sometimes, too much or too little time is allowed in the appointment timetable.

9 NHS England, Diagnostic Imaging Dataset (accessed 24 August 2017).

1.9 Out of hours provision is based on staff working on call rotas. At the time of our review, access to out of hours examinations for inpatients with urgent healthcare needs was variable across health boards. CT scans and X-rays were available out of hours at the majority of hospital sites, and at least one hospital site at each health board provided cover. However, out of hours MRI scans and US scans were not available in three health boards.

The percentage of patients waiting more than eight weeks for an examination has fallen in the last five years, waiting time performance has been helped by securing additional scanning capacity from the private sector

1.10 All NHS bodies in Wales are required to comply with the Welsh Government diagnostic waiting times target which states that no patients should wait more than eight weeks to receive their diagnostic test[10].

1.11 Since 2009, waiting times for radiology examinations have also formed part of the referral to treatment target[11], where the referral for radiology has been made as part of the patient pathway. Health boards in Wales are required to ensure that 95% of all patients waiting for elective treatment receive their treatment within 26 weeks from the point at which the referral was received. For many of these patients, diagnostic tests help decide which treatment is the best option.

1.12 In March 2018, there were no patients waiting more than eight weeks for a diagnostic radiology examination at three health boards. However, there were patients waiting more than eight weeks for a radiology examination at Aneurin Bevan, Betsi Cadwaladr and Cardiff and Vale University Health Boards, and Powys Teaching Health Board[12]. Exhibit 4 provides the number of patients that had been waiting more than eight weeks at the time of our review, and in March 2013 and March 2018.

10 The diagnostic waiting time target applies to all radiology examinations including MRI, CT, and non-obstetric US, fluoroscopy, barium enema, and nuclear medicine. The Welsh Government target does not include X-rays.

11 Welsh Health Circular (2007) 014 – Access 2009 – Referral to Treatment Time Measurement, Welsh Health Circular (2007) 051 – 2009 Access – Delivering a 26 Week Patient Pathway – Integrated Delivery and Implementation Plan and Welsh Health Circular (2007) 075 – 2009 Access Project – Supplementary Guidance for Implementing 26-Week Patient Pathways.

12 Abertawe Bro Morgannwg, Betsi Cadwaladr, Hywel Dda University Health Boards and Powys Teaching Health Board. Powys Teaching Health Board provides plain X-ray and US examinations only, other imaging and interventional procedures are commissioned from a range of providers in neighbouring health boards in Wales and NHS trusts in England.

Exhibit 4: all-Wales waiting times for CT, MRI and non-obstetric US scans[1]

		Total number of patients waiting for an examination					
		Up to 8 weeks	Over 8 weeks and up to 14 weeks	Over 14 weeks and up to 24 weeks	Over 24 weeks	Total waiting	Percentage of patients waiting more than 8 weeks
CT scan	March 2013	6,777	159	61	5	7,002	3%
	August 2016[2]	7,301	63	51	11	7,426	2%
	March 2018	8,054	9	1	1	8,065	0%
MRI scan	March 2013	11,087	2,520	2,241	278	16,126	31%
	August 2016[2]	11,662	913	66	163	12,804	9%
	March 2018	10,662	121	59	62	10,904	2%
Non-obstetric US scan	March 2013	19,454	3,110	867	7	23,438	17%
	August 2016[2]	18,944	1,999	626	133	21,702	13%
	March 2018	20,097	13	0	0	20,110	0%

Notes:

1 Waiting time targets do not apply to X-rays as most health boards provide open access for X-ray examinations.

2 Waiting time data reported in our local reports.

Source: Diagnostic and Therapy Services Waiting Times, Stats Wales, May 2018

1.13 Exhibit 4 shows that waiting time performance has improved over the last five years, although there have been fluctuations in performance (Appendix 2). Generally, the month 12 performance has shown an improvement compared to the full year's performance in general. The improvement is a result of a concerted effort by health boards to meet waiting time targets, often funded with additional Welsh Government monies. Whilst the waiting time target applies all year around, performance monitoring tends to focus on the year-end performance as opposed to performance during the year.

1.14 Health boards have achieved reductions in waiting times for radiology examinations over the last five years by securing additional scanning capacity by outsourcing imaging to private sector mobile CT and MRI units, and utilising unused capacity in other health boards. In 2014, the Welsh Government provided £840,000 to radiology services across Wales to reduce the backlog of patients waiting more than eight weeks for an MRI examination[13]. Since then, health boards have funded initiatives to keep waiting times within the eight-week target by outsourcing examinations and increasing radiology opening hours.

Whilst average reporting turnaround targets were largely being met, some patients waited more than six months for results, and health boards were unable to make full use of their reporting capacity

1.15 A report outlining the interpretation of the image must be produced following a radiology examination. This report is then used to make further decisions about the ongoing care of the patient.

1.16 All examinations must be reported and provided to the referring clinician within a timeframe appropriate to the patient's clinical condition. The Welsh Reporting Standards for Radiology Services 2011 were produced in order to clarify previous guidance and regulations[14]. The Standards range from same-day to ten working days.

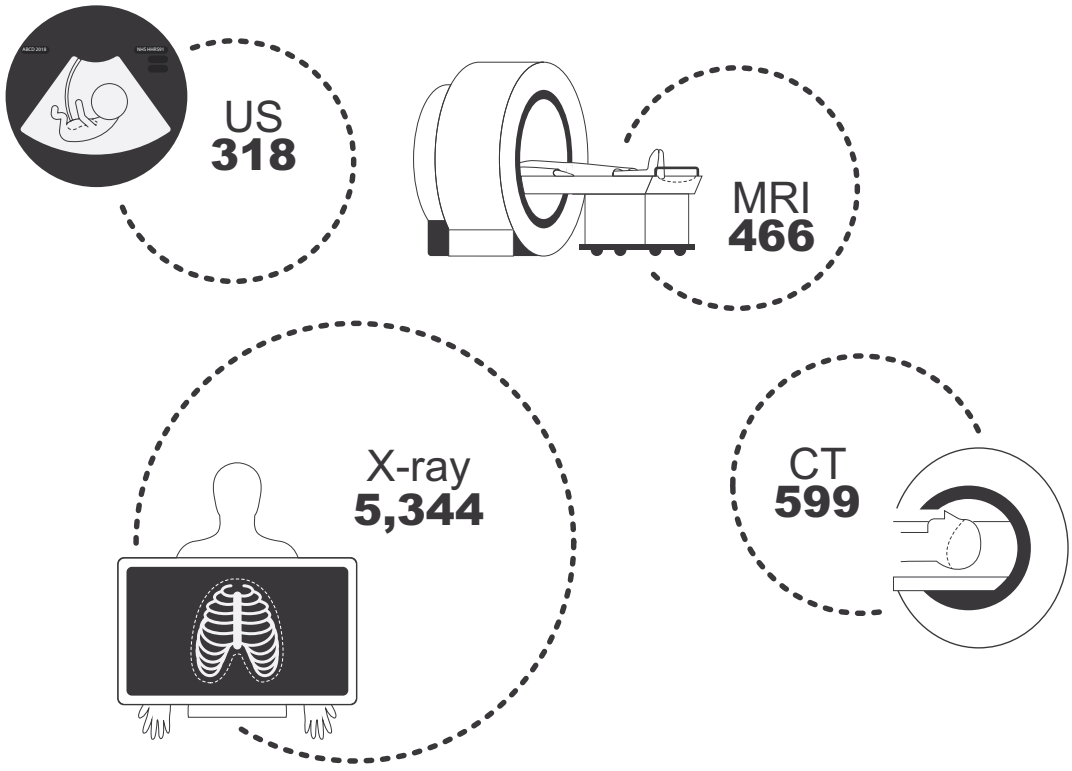
13 In January 2014, 41% (7,179) of patients waiting for an MRI had been waiting more than eight weeks, 1,463 patients had waited more than 24 weeks.

14 Produced by the Medical Imaging Sub-committee (a sub-group of the Welsh Scientific Advisory Committee). The Reporting Standards for Radiology Services 2011 set out that radiology should aim to provide reporting turnaround times appropriate to the type of referral as follows: urgent – immediately/same working day; inpatient – within one working day; accident and emergency – within one working day; GP – within three working days; and outpatient – within ten working days.

1.17 We asked health boards to provide the average and longest reporting times and the number of unreported examinations for CT, MRI, US and X-ray imaging by hospital. The type of referral (for example urgent, inpatient, GP) is not routinely available. The average reporting time between 1 April 2015 and 31 March 2016 for each type of scan was 10 days or less at all but one of the hospitals participating in the review[15]. However, local audit work found that some patients wait a long time for their scan to be reported. At the time of the audit, the longest report turnaround time was over six months. Exhibit 5 shows the number of unreported examinations at the end of March 2016. Whilst these represent less than 1% of the total examinations undertaken, they nonetheless show that a notable number of examinations have delayed reporting or are not reported at all, with associated quality of care risks to patients from delayed diagnosis and treatment.

Exhibit 5: number of examinations not reported as at 31 March 2016 across Wales[1]

Total for hospitals participating in the review



Note:

1 Unreported examinations include those examinations that remain unreported more than 10 days since the examination date. The figures exclude Cardiff and Vale University Health Board and Powys Teaching Health Board.

Source: Wales Audit Office, Hospital Site Survey

15 One hospital told us that the average reporting time for X-rays was 16 days.

1.18 Whilst radiologists report most images, specially trained radiographers provide additional reporting capacity. Extended practice radiographers (EPRs) receive training to interpret and report some types of images, typically less complex scans, such as X-rays, and sonographers report US scans.

1.19 Whilst all health boards, with the exception of Powys Teaching Health Board, have invested in EPRs, at the time of our review shortages in the radiology workforce across Wales was making it difficult for health boards to utilise EPR reporting skills. Our review found that resourcing constraints in the radiologist workforce meant that opportunities to train and support EPRs were limited. Similarly, radiographer shortages has resulted in health boards being unable to release EPRs from undertaking examinations, to enable them to report images, resulting in reduced reporting capacity within health boards.

1.20 Radiologist staffing shortages and the resulting reduction in EPR reporting capacity led to the introduction in November 2014 of a national contract to provide additional, outsourced reporting capacity from the private sector. Radiology Reporting Online Limited was awarded a contract to provide reporting capacity across Wales. The contract was initially for a two-year period, with an option to extend the contract for an additional year. The contract value was £1.5 million (excluding VAT) for the initial two-year period. However, increasing demand, particularly for CT and MRI reporting, resulted in the service being used significantly more than predicted with the actual spend across the initial two-year contract being £3.5 million excluding VAT. The contract was subsequently extended until November 2019, at a cost of £11 million over the three-year extension. At the time of our review, outsourced reporting capacity bridged the gap created by staff shortages, but is not a sustainable solution for the long-term.

Part 2

Workforce challenges are threatening the sustainability of the service and limiting health boards' ability to train and appraise staff

All but one health board is struggling to recruit and retain radiology staff, resulting in a reliance on locums

2.1 Radiologist, radiographer and sonographer vacancy levels compound the ability to meet increasing demand for radiology examinations. On 31 March 2016, there were 112 full time equivalent (FTE) vacancies within radiology departments across four health boards in Wales (Exhibit 6).

Exhibit 6: number of radiology staff vacancies in Wales as at 31 March 2016[1]

	Radiologists	Radiographers/ sonographers	Other radiology staff[3]
Number of FTE vacancies	22	58	32
FTE vacancies as a percentage of the FTE establishment[2]	15%	9%	6%

Notes:

1 The figures are based on four health boards. Cardiff and Vale, Cwm Taf University Health Boards and Powys Teaching Health Board did not provide their vacancy levels.

2 The FTE staffing establishment is the level of staff that the Health Board has determined it needs to provide services and for which funding has been made available.

3 Other radiology staff includes staff such as nurses, scientific and technical staff, healthcare support workers and administrative staff.

Source: Wales Audit Office, Hospital Site Survey

2.2 Whilst vacancy levels were reasonably consistent across the health boards providing data, there were particularly high radiologist vacancy levels at Hywel Dda University Health Board with 42% of FTE establishment posts vacant. The relatively high vacancy rate for radiologists shown in Exhibit 6 creates particular challenges. Many radiologists specialise in a particular area, meaning that the loss of a single radiologist can have a big impact on a radiology department. For instance, at the time of our review there were two interventional radiologist posts in Cwm Taf University Health Board, however, only one was filled. The vacancy put the interventional radiology service under considerable pressure and resulted in restricted out of hours interventional radiology cover. Across Wales, there is a shortfall of consultant radiologists in interventional, breast, paediatric and nuclear radiology specialties. The level of radiologist vacancies is not unique to Wales. Across the UK, the number of unfilled consultant radiologist posts in 2016 was 9%, compared with 13% in Wales[16].

2.3 Whilst vacancy levels were high at the time of the audit, the age profile of staff working in radiology services creates further challenges in terms of retirement and succession planning. As at June 2018, 38% of consultant radiologists and 34% of radiographers and sonographers in Wales were aged 50 or over (Exhibit 7).

Exhibit 7: number and percentage of consultant radiologists and radiographers in Wales by age group as at June 2018

	Age					
	Under 39	**40–44**	**45–49**	**50–54**	**55–59**	**60+**
Consultant radiologists[1]	27	36	41	23	15	26
	(16%)	(21%)	(24%)	(14%)	(9%)	(15%)
Radiographers[2]	535	98	84	147	133	86
	(49%)	(9%)	(8%)	(14%)	(12%)	(8%)

Notes:

1 NHS workforce definition: staff with consultant grade code or job role working in radiology – note this includes both diagnostic and therapeutic radiologists.

2 NHS workforce definition: Staff bands 5–9 with a diagnostic radiography occupation code (S*F).

Source: NHS Wales Workforce, Education and Development Services, NHS workforce census data for June 2018

16 The Royal College of Radiologists, Clinical Radiology UK Workforce Census 2016 Report, 2017.

2.4 For the period 2016-2021, consultant workforce attrition due to retirement is likely to be higher in Wales than in any other part of the UK. Around 30% of consultants in Wales are expected to retire, compared to 22% for the UK as a whole (based on an assumed retirement age of 60)[16].

2.5 At the time of our review, all health boards, other than Cardiff & Vale University Health Board, told us that they found recruiting both radiologists and radiographers challenging. More than one health board told us that some adverts for radiology posts had received no suitably qualified applicants.

2.6 Our review found that health boards across Wales were making use of locum staff to bridge staffing gaps, although this was not successful in covering all the vacant posts with 35 FTE locums recruited compared to 112 FTE vacancies[17].

2.7 NHS Wales has experienced particular challenges in securing sufficient trainee radiologists and then retaining those staff in Wales. In 2015, compared to other parts of the UK, Wales had the lowest proportion of trainees to consultant radiologists; 25% in Wales compared to 38% across the UK[16], and NHS Wales has previously lost two out of every five trainees to England or countries outside of the UK[18].

2.8 In response to the challenges facing the radiology workforce, the National Imaging Programme Board developed a business case for a National Imaging Academy for Wales (the Academy) to be based in Bridgend. The Academy is a collaboration between health boards to provide a bespoke training facility for at least 20 trainee radiologists a year, with trainees splitting their time between the Academy and clinical placements in hospitals across South Wales. The Welsh Government has funded initial set up costs, and the health boards will meet the annual running costs. Initially, the Academy will train radiologists; however, later will also train enhanced practice radiographers, sonographers and other imaging professionals to report images.

16 The Royal College of Radiologists, Clinical Radiology UK Workforce Census 2016 Report, 2017.

17 The FTE of locums is based on the average FTE of locum use between 1 Oct 2015 and 31 March 2016, and FTE vacancy levels at 31 March 2016. Includes all staff groups, and is based on five health boards, Wales Audit Office, Hospital Site Survey.

18 NHS Wales, NHS Wales Health Collaborative Diagnostic Services Modernisation Programme, December 2015.

2.9 The Academy combines training and provides a reporting facility across Wales. The Academy is intended to address the recruitment challenges experienced across Wales, and may help to reduce the reliance on outsourced reporting in future years. However, whilst the Academy opened in 2018, it will take a number of years before the first trainees have completed their training. The first cohort of trainees have been recruited, and the full cohort of 22 trainers have been appointed to the Academy.

2.10 Whilst in the long-term the Academy should increase the number of trained radiologists in Wales, our local work found that radiology services were also planning to amend their staffing models to increase their reporting capacity. Health boards were planning to train more radiographers and other appropriate staff groups, such as cardiologists, to report examinations. Using a different staff mix to report examinations will help to reduce health boards' reliance on radiologists. In addition, we found that health boards were reviewing the skill mix of their staff to explore opportunities to make more use of non-professional grades, such as assistant practitioners, to help provide additional capacity for imaging (whilst working under supervision) to help bridge radiographer staffing shortages.

Operational pressures and staffing constraints are limiting health boards' ability to train staff

2.11 Annual staff appraisals and continuing professional development (CPD) reviews are an important part of ensuring that the quality of radiology services is maintained and that staff training needs are properly addressed. We asked health boards to provide us with the percentage of staff that had received an appraisal and a CPD review. Across Wales, at least 75% of radiologists, radiographers and other radiology staff had received an appraisal or a CPD in 2015-2016.

2.12 However, not all staff are compliant with statutory and training modules[19]. In 2015-2016, there was variation in the percentage compliance rates between staff groups and modules across health boards. One health board told us that only 48% of radiographers were compliant with Moving and Handling Training, and another health board told us that only 33% of radiographers were up to date with Information Compliance Training. Some health boards told us that they had been unable to maintain compliance with mandatory training and were struggling to achieve higher rates of annual appraisals and CPD reviews due to staffing constraints. Non-compliance with statutory and mandatory training could present a risk to staff members, patients and ultimately health boards.

19 The statutory and mandatory training modules are set out in the UK Core Skills and Training Framework. They are: Equality, Diversity and Human Rights; Health, Safety and Welfare; Fire Safety; Infection Prevention and Control; Moving and Handling; Safeguarding Adults; Safeguarding Children; Resuscitation; and Information Governance.

Part 3

Ageing and underutilised equipment is making it harder for health boards to meet demand, and health boards do not have the staffing resources to extend opening hours

3.1 Health boards must ensure their radiology equipment capacity and specifications meet increasing demand and advances in both clinical practice and technical sophistication.

All health boards have equipment nearing the end of their lifespan

3.2 Comprehensive arrangements are required for the maintenance and replacement of radiology imaging equipment. Older imaging equipment has a higher risk of failure and maintenance costs increase. Image quality also declines with age. Radiology equipment more than ten years old is typically considered to no longer be state of the art and technical advances render the equipment obsolete[20]. In addition, the lifespan of radiology imaging equipment shortens with increased use.

3.3 In November 2015, NHS Wales estimated that 87% of imaging department scanners would require replacement by 2017[21]. We asked health boards to provide us with the age of their CT, MRI and US scanners as at September 2016 (Exhibit 8).

Exhibit 8: age of CT, MRI and US imaging equipment across Wales as at September 2016[1]

		CT	MRI	US
Median scanner age (years):		5	7	4
Number of scanners:	aged up to 6 years	17	9	105
	aged between 6 and 10 years	6	7	9
	aged over 10 years	1	2	1
	total	**24**	**18**	**115**

Note:

1 Based on equipment in five health boards for CT and MRI scanners, and six for US scanners. Aneurin Bevan University Health Board did not provide data. Powys Teaching Health Board has US scanners, but no CT or MRI scanners.

Source: Wales Audit Office, Radiology Equipment Age Survey; and European Society of Radiology

20 The European Society of Radiology advocates that equipment aged: up to five years old reflects the current state of technology, and can be upgraded; between six and ten years old is fit to use if properly maintained, but require replacement strategies to be in place; and 11 or more years old requires replacement.

21 Diagnostic Service Programme NHS Wales, All Wales Gantry (MRI, CT, Gamma Camera and Ultrasound) Usage/Capacity, November 2015.

3.4 In September 2016, 17% of US scanners in Wales were six or more years old. However, 29% of CT scanners and 50% of MRI scanners were six or more years old. Our review identified two 13 year-old MRI scanners, and one 11 year-old CT scanner. Staff at all health boards identified ageing radiology equipment in need of replacement. One health board told us about an ageing CT scanner which regularly broke down (approximately every eight weeks). As the only CT scanner in that hospital, the regular disruption was affecting the care of critically ill patients and resulting in the cancellation of outpatient appointments. Since our local work, the CT scanner has been replaced.

3.5 It is essential that health boards have equipment replacement plans to identify how and when imaging equipment will be replaced. Our review found that whilst six health boards has a radiology equipment plan, all health boards were struggling to identify finances to replace and purchase additional radiology equipment.

3.6 MRI and CT scanners cost upwards of £800,000. Historically, health boards have relied on capital funding from the Welsh Government to buy replacement and additional radiology imaging equipment. In 2014, the Welsh Government provided funding for £8.5 million between five health boards to purchase new and replacement CT, MRI and mammography equipment.

3.7 At the end of 2016, the Welsh Government announced £16 million of funding to provide additional and replace out of date radiology imaging equipment. The funding was allocated across all health boards and Velindre NHS Trust for CT, MRI, mammography, US and X-ray equipment.

3.8 Since our review, the Welsh Government has provided a further £9 million for imaging equipment in health bodies, and to support the development of the Imaging Academy. The Welsh Government is working with NHS organisations to identify and prioritise further additional imaging investment over the period 2018-19 to 2020-21.

3.9 When replacing aging equipment, it is essential that health boards adequately plan for the installation of the new equipment. CT and MRI scanners are large, and the cost of installation can be as much as the cost of the scanner. Where a new scanner is required to replace existing equipment, the downtime can be considerable. In addition, where the new scanner is in addition to existing scanners, an extra room may be required to house the scanner, and this can cause considerable disruption and be costly. In 2016, two of the CT scanners financed by the Welsh Government in 2014 remained in storage because the health boards who were receiving them had struggled to identify finances to modify their buildings to install the equipment. Since our review, the two CT scanners have been put to use.

3.10 The Statement of Intent recognises that a national coordinated approach is needed to plan, identify and address imaging equipment needs. The Statement of Intent sets out that planning is required on a regional level with additional scanners providing extra capacity for regions, rather than a single health board. In 2016, the Welsh Government announced an additional £6 million for a Diagnostic Hub at the Royal Glamorgan Hospital (Cwm Taf University Health Board) which included funding for a replacement CT scanner and an additional MRI and CT scanner, to serve the needs of the South Wales area. The Diagnostic Hub opened in February 2018, and Cwm Taf University Health Board have reported that it provides additional capacity of approximately 7,200 MRI scans and 6,600 CT scans a year. A Regional Planning and Delivery Group established in October 2017, is overseeing the Diagnostic Hub and rollout of wider regional solutions across the South Central and East Wales region.

Whilst there are opportunities to increase imaging capacity with existing equipment by increasing the operating hours, this would have a significant impact on resourcing

3.11 One way for health boards to shorten waiting times for radiological examinations, particularly diagnostic radiography scans is to maximise the opening hours, and thus increase the number of available appointments. The longer the operating hours, the more patients can be seen; however, there are additional costs associated with this.

3.12 In 2014, NHS Wales undertook a review of the operating hours of CT, MRI and US scanners in Wales (Exhibit 9).

Exhibit 9: percentage usage of CT, MRI and US scanners in 2014, averaged across Wales, 2014

Type of scanner	Average number of operating hours per scanner per day		Percentage usage of equipment[1]
	Monday to Friday	Saturday to Sunday	
CT	8.7	0.7	52%
MRI	10.6	2.1	67%
US	7.7	0.0	46%

Note:

1 Based on the planned operating hours as a percentage of potential operating hours (seven days a week and 12 hours a day).

Source: NHS Wales, All-Wales Gantry Usage/Capacity Report, November 2015. Data based on the operating hours in 2014

3.13 In 2014, if all CT, MRI and US scanners across Wales had operated 12 hours a day and seven days a week, we estimate that it may have been possible to undertake at least an extra 1,340 CT examinations, 1,110 MRI examinations and 4,630 US examinations a week[22].

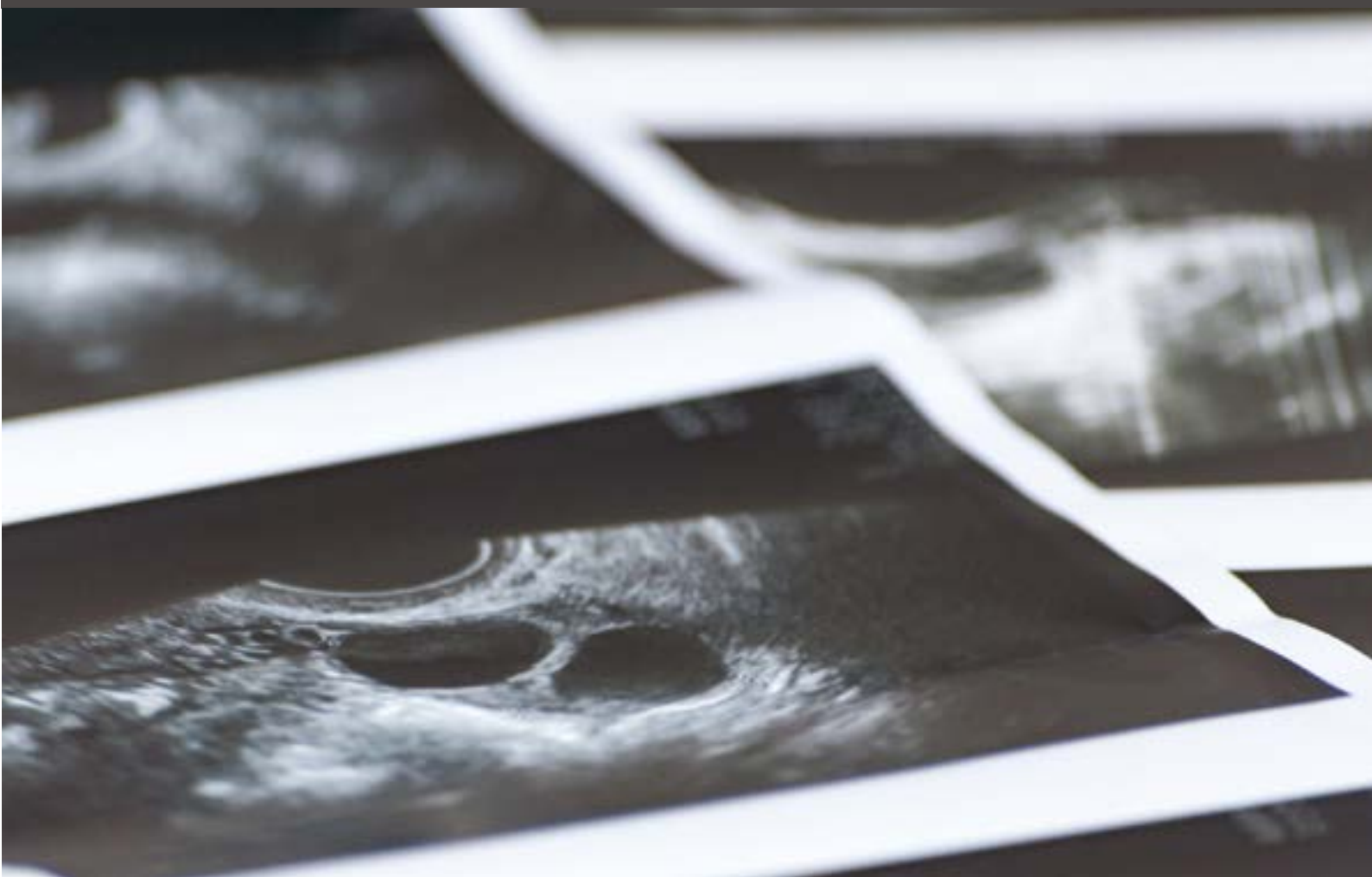
3.14 Since then, health boards have increased the number of operating hours of CT and MRI examinations on weekdays and weekends. Health boards have achieved the increase in operating hours largely by staff undertaking shift work. However, at the time of our review, only one health board was providing CT and MRI examinations for at least 12 hours a day over seven days a week at each hospital site. The standard operating hours across the other health boards varied. Out of 17 hospital sites surveyed, on weekdays, only seven provided CT examinations for 12 or more hours a day, and 10 provided MRI examinations for 12 or more hours a day. On weekends, only two hospital sites provided CT examinations for 12 hours a day and the same number provided MRI examinations for 12 hours a day (the same two hospitals). None of the hospitals provided US services 12 hours a day on weekdays or weekends, and only one hospital provided US examinations as standard on weekends.

22 The time an examination takes depends on the nature of the examination required. CT examinations can take between 10 and 45 minutes, MRI examinations between 15 and 90 minutes, and US examinations between 15 and 30 minutes. Therefore, our estimation is based on a CT examination length of 45 minutes, 90 minutes for MRIs and 30 minutes for a US examination.

3.15 However, extending operating hours is not a simple option for increasing capacity. Extending operating hours would require additional staff, meaning additional cost, and at a time when health boards are already finding it challenging to fill existing vacancies (paragraph 2.2). In addition, higher rates of equipment use results in shortened equipment lifespans, and potentially higher maintenance costs (paragraph 3.2).

Part 4

Wales-wide radiology IT system challenges and weaknesses in local IT infrastructure inhibit radiology services' efficiency



The core radiology management system is not serving health boards' needs, and this is further impeded by weaknesses in local IT infrastructures

4.1 Having effective ICT systems plays a central role in delivering efficient radiology services. In Wales, the Radiology Information System (RADIS) is a national system developed and run by NHS Wales Informatics Service. All health boards use RADIS. RADIS supports the scheduling of radiology investigations, provides a clinical record of scans received by patients and allows health boards to generate reports and statistics on performance. Other systems link to RADIS to provide additional functionality; these different systems must integrate with each other to ensure that information easily transfers and updates between systems.

4.2 Our review found that across Wales, health boards had mixed views on RADIS. Despite RADIS 2 being rolled out in 2005, at the time of our review three health boards were running separate instances[23] of RADIS, and a further two health boards were using a mixture of RADIS and alternative core radiology systems. Having numerous instances of RADIS or alternative systems, is a consequence of NHS reorganisation during the latter half of the 2000s. Hospitals that were part of separate organisations are now part of the same health board, but the separate infrastructure remains in place in some areas. Work is ongoing to provide a single instance of RADIS in all health boards.

4.3 Having separate instances of RADIS is time consuming for clinicians and makes it difficult to plan and deliver services across the whole health board. For example, if a patient has a scan in one hospital, another hospital in the same health board will not have a record of it. Having multiple instances of RADIS also makes it difficult to retrieve management information, as this has to be done separately for each instance and then consolidated into one report manually.

23 An 'instance' refers to a separate database that is specific to a particular location. It is used in order to differentiate from 'versions', which refer to updates and upgrades. For example, two hospitals could have the same version of RADIS, ie they are both equally up to date, but they would still have separate instances because staff in one hospital would not be able to access the records held in the other. Separate instances mean that clinicians cannot access patient information across administrative or geographical boundaries.

4.4 Whilst, some health boards told us they felt that RADIS is adequate in terms of patient scheduling, clinical reporting and management reporting, other health boards expressed doubts in the reliability of the reports produced, and said that they were unable to create bespoke reports in-house. In addition, health boards expressed concerns that RADIS does not integrate with other systems in use by health boards, meaning that changes to information in RADIS had to be updated manually in other systems.

The current absence of a fully functional e-referral system and weaknesses in picture archiving systems and voice recognition systems are creating inefficiencies in the service

4.5 In addition to the core radiology system, other systems are required for each stage of the patient journey, including electronic referrals, archiving of images and providing a record of the report.

4.6 Electronic requesting systems can enable clinicians referring patients for diagnostic imaging to request and receive updates and the outcomes of radiology requests quickly. At the time of our review, the functionality of request software was generally limited to providing a template for a request, which then has to be emailed to the radiology service. The absence of an e-referral system across Wales means that the vast majority of referrals are paper based. Paper based referrals can be problematic, creating more administration because all referral forms have to be scanned and there is the risk that sections are not fully completed or legible.

4.7 Once the examination has been undertaken, radiologists create a report to record their interpretation of the image. When reporting on images, radiologists can choose to use voice-activated dictation systems to record their report. Across Wales, health boards were generally dissatisfied with voice-activation dictation systems. Whilst some health boards used the dictation software built into RADIS, others were using alternative systems. Staff in some health boards indicated that IT network weaknesses meant that dictation systems were prone to freezing and timing out. The consequence of dictation software timing out is that all reports dictated in a session are lost and need to be repeated, leading to frustration and inefficient working.

4.8 All images must be archived. Picture Archiving and Communications Systems (PACS) acquire and archive radiology images, and enables the safe distribution of the image to other health professionals[24]. The report of the image (stored on RADIS) and the scan image (stored on PACS) together comprise the clinical record of the image. Whilst we found that health boards were generally satisfied with their PACS, there was variation in accessibility to PACS images. All health boards told us that radiologists and other hospital staff working within the health board could access images. However, not all radiologists can access PACS images remotely out of hours, and access for GPs and other NHS staff working in other locations was limited.

4.9 Work is ongoing to roll out the full functionality of the Welsh Clinical Portal across Wales. The Welsh Clinical Portal is a digital workspace, which allows the sharing of medical information between professionals securely. When fully functional, the system will provide an electronic platform for sharing information across Wales, including test results and allow electronic patient referrals. The system is being rolled out in a phased approach, with health boards implementing the different elements of the system in a timeframe that is manageable for the individual organisation. The Welsh Government has formed a Welsh Technical Standards Board to support the creation and maintenance of a catalogue of standards and requirements to enable integration and interoperability across all health and care systems in a consistent and secure manner.

4.10 The Statement of Intent has set out a vision for high quality radiology informatics systems to be developed with a secure IT infrastructure that operates across Wales. The vision is for systems that allow electronic referrals, review, processing and reporting through standardised software and that are interoperable, to allow the safe transfer of care between hospitals and allow imaging sharing across Wales.

24 A third party, Fujifilm, provides PACS. Fujifilm supplies hardware and software to health boards for the provision of PACS services, including voice recognition and full disaster recovery solutions. Each health board provides the necessary infrastructure to run those services, including networks and server space.

Part 5

Radiology services are well managed operationally but there is scope to strengthen board level scrutiny and the strategic planning of services

Most health boards need to strengthen strategic and operational planning

5.1 Health boards should clearly set out their strategy for meeting current and future demand for radiology services. Service changes and developments in the wider organisation should inform radiology operational plans. Almost all clinical specialties rely heavily on radiology to help diagnose, treat or monitor disease or injury. When health boards are planning service changes that may lead to an increase to the number of patients referred for radiology imaging, they must ensure that they adequately consider the impact on radiology departments.

5.2 At the time of our review, only three health boards undertook demand and capacity modelling. Across Wales, our review found that there was variation in the degree to which radiology teams were involved in decisions about service changes that affected radiology services.

5.3 Each radiology service should have an agreed documented annual operational delivery plan. The operational plan(s) should clearly identify service demand, the workforce and equipment capacity required to meet this demand as well as the finances available and required to deliver the service safely, efficiently and effectively. Our review found that whilst one health board had a five-year strategic plan, four health boards did not. Four health boards did not have operational plans, and two health boards had neither a strategic nor an operational plan. Not all health boards had clearly set out their workforce needs. Only one health board had a specific, detailed financial plan for radiology, with other health boards financial planning being informed by the previous year's expenditure. Our local work found financial expenditure in four health boards exceeded the budgeted expenditure, which may be a symptom of the absence of adequate financial planning.

Nearly all health boards are taking positive steps to reduce inappropriate referrals, however, signposting to local referral guidance could be improved

5.4 GPs and consultants refer patients to radiology. Ensuring that patients are referred for the most appropriate diagnostic investigation depends on clear guidance and standards. Each inappropriate investigative image performed is, in effect, an example of valuable NHS resources being wasted. Encouragingly, all health boards told us that they return inappropriate referrals to consultants with an explanation for the refusal. In addition, six health boards regularly undertake audits to highlight patterns of inappropriate referrals.

5.5 All health boards use the Royal College of Radiologists' iRefer[25] guidance although at the time of our review, some consultants told us they found it difficult to access iRefer guidance. Since our review, iRefer has been made available via the NHS Wales e-library, providing access to all Welsh NHS professionals.

5.6 Most health boards had also developed supplementary local guidance. Although in the sample of consultants we interviewed many said that they were unaware of local guidance highlighting a need for better signposting and awareness raising in respect of these documents.

All health boards review the clinical performance of their radiology service, although there are opportunities to increase the range of reviews undertaken

5.7 Radiology services must ensure that clinical performance always meets the appropriate standards for patient treatment and care. They need to comply with the **National Diagnostic Imaging Framework**[26] and monitor clinical performance to ensure compliance. Radiology services must ensure that their practices are safe and comply with the Ionising Radiation Regulations 2017 and the Ionising Radiation (Medical Exposure) Regulations 2017.

5.8 At the time of our review, all health boards had good arrangements in place to learn from incidents, errors and complaints, and the reporting of incidents is encouraged. All health boards had a regular programme of audits to assess service quality, however, there were opportunities for all health boards to increase the range of audits they undertook (Exhibit 10).

25 iRefer is a radiological investigation guidelines tool from The Royal College of Radiologists.

26 Welsh Government, National Diagnostic Imaging Framework, 2009

Exhibit 10: number of health boards undertaking regular audits of quality and clinical performance

	Number of health boards undertaking regular audits[1]
Appropriateness of referrals	6
Appropriateness or urgent and/or out of hours referrals	5
Quality of written requests	5
Demand levels by time of day/day of week	4
Demand levels by GPs/hospitals	6
Accuracy of reporting	7
Reporting turnaround times	6
Lost and late reports	3

Note:

1. Health boards were asked to indicate whether they undertake the audits listed in the review.

Source: Wales Audit Office, Health Board Survey

5.9 Whilst five health boards regularly undertook patient experience surveys, the other two health boards did not and should review arrangements to learn from patient experiences.

5.10 The Imaging Services Accreditation Scheme (ISAS) is a patient-focused accreditation scheme that helps imaging services to manage the quality of their services and make continuous improvements. In Wales, the National Imaging Programme Board is overseeing the introduction of ISAS. However, progress at individual health bodies has been limited by a lack of staff resources to enable coordination of the work associated with the accreditation process. Since our review, Betsi Cadwaladr University Health Board commenced a two-year pilot exercise to attain ISAS accreditation. The exercise will be used to identify how best to roll out ISAS across Wales.

In most health boards we identified opportunities to widen the range of operational performance measures reported

5.11 Effective monitoring and scrutiny of radiology service performance is important in assessing if the service is delivering its organisational goals and objectives, and identifying the need for remedial action. Health boards should use performance data and audit results to monitor and evaluate the performance of their radiology departments. Performance monitoring and review should take place at all levels within the organisation, from operational level to board level.

5.12 Our review found that whilst all health boards regularly review performance information about their radiology services, there was variation in the range of performance information reported. All health boards regularly viewed radiology waiting times data and incidents data. Most health boards regularly reviewed a range of workforce performance measures on appraisal and compliance with training rates, sickness levels, and planned versus actual staffing levels. However, not all health boards reported key information such as capacity versus demand and reporting turnaround times. All heath boards had scope to further develop the range of performance measures to support business reports by reviewing existing measures and identifying gaps.

5.13 Five[27] health boards in Wales are members of the radiology NHS Benchmarking Network (NHSBN). The NHSBN undertakes an annual radiology survey of approximately 85 radiology departments across the UK. The survey collects data and allows participants to compare a range of measures relating to staffing and activity levels. Despite the range of information available, the use of benchmarking comparative data in business reports was limited across health boards.

5.14 One of the challenges for health boards when comparing their performance with other health boards is the absence of a standardised radiology activity measurement. When measuring radiology activity, care is needed to ensure that comparisons are like for like. A single image may count as one unit of activity. However, where a patient receives complex or multiple images this may count as one or more units of activities depending on a health board's view.

27 Hywel Dda University Health Board told us it does not participate in the network because it does not have the administrative capacity to complete data collection returns. Powys Teaching Health Board does not participate because comparative data for the health board is limited due to the differences in the radiology service.

5.15 In the absence of standard activity count, the medical classification system, the Systematised Nomenclature of Medicine Clinical Terms (SNOMEDCT), has enabled some activity measurement. SNOMEDCT in an international classification system that allows clinical data to be recorded in a consistent way, as it uses a standardised set of clinical terminology and codes. NHS England is adopting SNOMEDCT as the universal classification and terminology for all health organisations and for all aspects of health. In Wales, SNOMEDCT has only been adopted in radiology and a small number of other specialties. SNOMEDCT automatically applies multiplication for some activities depending on the coding applied. However, comparisons of activity between radiology departments has to be treated with caution as any count of activity is reliant on organisations recording activity using SNOMEDCT consistently. At the time of the audit that was not the case in Wales, meaning that even with SNOMEDCT in place, there were still difficulties in obtaining meaningful comparisons of activity.

5.16 The Statement of Intent indicated that improving radiology informatics systems must incorporate common international procedure codes to improve benchmarking of radiology services. In addition, the Statement of Intent has set out that a common set of performance indicators will be developed to broaden the range of information collated to drive the improvement of quality and consistency of radiology services.

In most health boards, operational management and accountability arrangements are clear

5.17 Effective leadership and clear lines of accountability are vital components of any healthcare service. Radiology is a complex service, which comprises radiologists, radiographers and nursing staff working together to produce and interpret images. For a health board to deliver effective radiology services, it needs leadership, and an operational and professional management structure with clear lines of accountability.

5.18 Radiology team structures and lines of accountability differ in each health board. Generally, our review found that the operational management and accountability arrangements were clear.

Health boards could do more to proactively make their boards aware of the issues effecting radiology services

5.19 Our review found that there was variation across health boards in the degree to which radiology services are represented at board level. Not all health boards had an executive lead for radiology that was a member of the Board. However, our local work found that service managers were invited to provide updates on radiology issues and risks at board committees (and board meetings where appropriate). Whilst this ensures that risks and challenges are highlighted to Boards and Committees when required, the absence of an executive lead for radiology attending board meetings at some health boards may mean the opportunity to highlight and monitor emerging issues is missed.

5.20 The Welsh Government has published a Statement of Intent in response to challenges being faced by radiology services.

5.21 The Welsh Government's Future Delivery of Diagnostic Imaging Services in Wales and the National Diagnostic Imaging Framework provided a set of measures to be taken forward at local, regional and national level to improve radiology services. The National Imaging Programme Board was established in 2010 to take action at an all-Wales level, and comprises clinical and management representatives from organisations involved in the delivery of imaging services in NHS Wales.

5.22 The National Imaging Programme Board was given delegated authority for developing and implementing a programme of strategic work for radiology through to 2016, and for adopting all-Wales standards and protocols for imaging services in NHS Wales. Although the National Imaging Programme Board has made progress, most notably the progress made in setting up the Academy, there remain significant challenges that require strategic input from the Welsh Government.

5.23 In March 2018, the Cabinet Secretary for Health and Social Services published a high-level Imaging Statement of Intent for radiology services. The Imaging Taskforce is developing a national implementation plan to address the actions set out in the Statement of Intent, and the Taskforce is due to report back to the Cabinet Secretary in summer 2018.

5.24 The Statement of Intent addresses many of the challenges identified through our local audit work and summarised in this report, including:

a Workforce (paragraphs 2.8 to 2.10)

b Equipment (paragraph 3.9)

c Information systems (paragraph 4.10)

d Consistent activity recording (paragraph 5.16)

e Performance indicators (paragraph 5.16)

Appendices

Appendix 1 – Methodology

Appendix 2 – Five-year waiting times trends

Appendix 1 – Methodology

We undertook our review of radiology services at all major hospital sites that provide a range of radiology imaging, including CT and MRI examinations. In Powys Teaching Health Board, we undertook the review at the six hospitals providing X-ray and US examinations[28]. Exhibit 11 provides the hospital sites included in the review.

Exhibit 11: hospital sites that were included in our review

Health Board	Hospital sites included in the review
Abertawe Bro Morgannwg University Health Board	• Morriston Hospital • Neath Port Talbot Hospital • Princess of Wales Hospital • Singleton Hospital
Aneurin Bevan University Health Board	• Nevill Hall Hospital • Royal Gwent Hospital
Betsi Cadwaladr University Health Board	• Glan Clwyd Hospital • Wrexham Maelor Hospital • Ysbyty Gwynedd
Cardiff and Vale University Health Board	• University Hospital Llandough • University Hospital of Wales
Cwm Taf University Health Board	• Prince Charles Hospital • Royal Glamorgan Hospital
Hywel Dda University Health Board	• Bronglais General Hospital • Glangwili General Hospital • Prince Philip Hospital • Withybush General Hospital

28 Powys Teaching Health Board commissions other imaging and interventional procedures, such as MRI and CT scans as well as X-ray and US reporting from a range of providers in neighbouring health boards in Wales and NHS trusts in England. Commissioning arrangements are through service level agreements which cover a range of services including professional support for the radiographers, radiation protection and IT services to archive and share images with health professionals.

Health Board	Hospital sites included in the review
Powys Teaching Health Board	• Brecon War Memorial Hospital • Llandrindod Wells County War Memorial Hospital • Machynlleth Community Hospital • Montgomery County Infirmary • Victoria Memorial Hospital • Ystradgynlais Community Hospital

Our methodology is provided in Exhibit 12.

Exhibit 12: audit approach

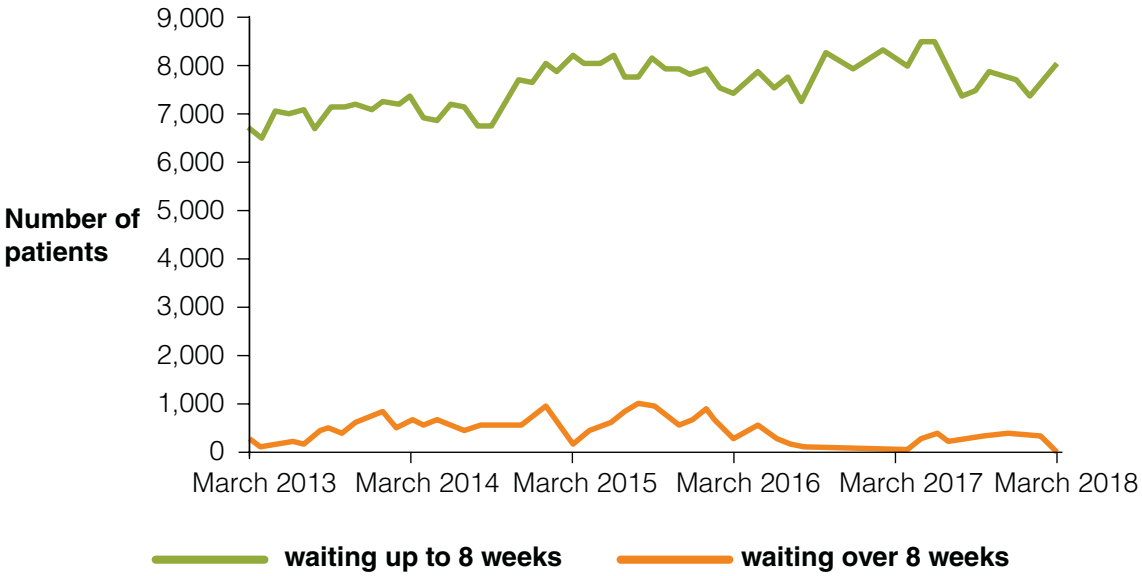
Method	Detail
Information and data collection	We used health board and hospital-site level data collection forms to capture data and information on radiology services. We also utilised data and information from a number of other sources, including: • NHS Benchmarking Network radiology 2015 and 2016 data collection (data collection period 2 May to 8 July 2016); • The All Wales Equipment Capacity Report, NHS Wales Health Collaborative (December 2015); • Stats Wales: Radiology Diagnostic Waiting Times; and • National Reporting and Learning System (NRLS) data: Patient safety incidents.

Method	Detail
Document request	We requested and reviewed documents from each health board, including: • terms of reference and membership of health boards' main radiology groups, together with a sample of minutes from the previous meetings; • examples of condition pathway documents (for stroke, cancer or heart disease) illustrating radiology service provision requirements; • relevant radiology papers to board and committees along with operational papers including safety reports; • examples of each health boards' main radiology service performance reports or performance scorecards from the past six months; • the most recent financial reports showing progress towards the savings/cost improvement plan; • health boards' radiology equipment replacement plans; • health boards' radiology risk registers; • guidance provided to hospital referrers and GPs on expectations when referring patients to the service; and • examples of any work carried out by health boards over the past two years to measure radiology patient experience.
Interviews	We interviewed staff at each health board including: • the Radiology Directorate Manager; • the Radiology Clinical Director; and • a sample of consultants selected by health boards from Surgery, Medicine, Accident and Emergency and Anaesthetics specialties.
Focus groups	We carried out focus groups at each health board of: • Radiographer Senior Leads at each main hospital site; and • GP Locality Leads.

Appendix 2 – Five-year waiting times trends

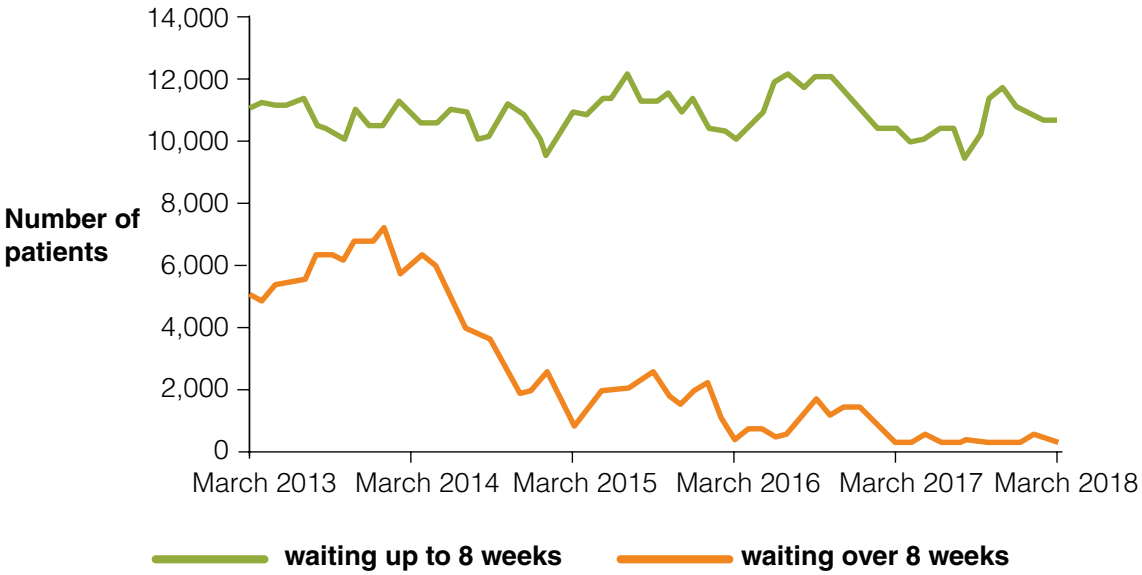
Exhibits 13, 14 and 15 provide the numbers of patients waiting up to eight weeks and more than eight weeks for CT, MRI and US examinations between March 2013 and March 2018.

Exhibit 13: all-Wales CT waiting times trend March 2013 to March 2018



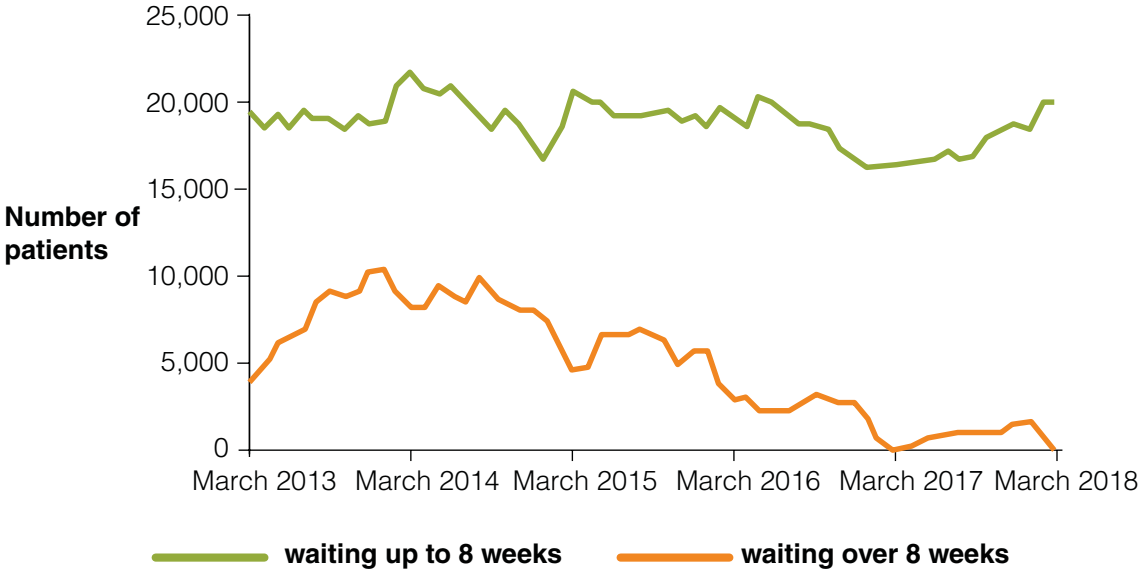
Source: Diagnostic and Therapy Services Waiting Times, Stats Wales, May 2018

Exhibit 14: all-Wales MRI waiting times trend March 2013 to March 2018



Source: Diagnostic and Therapy Services Waiting Times, Stats Wales, May 2018

Exhibit 15: all-Wales non-obstetric US waiting times trend March 2013 to March 2018



Source: Diagnostic and Therapy Services Waiting Times, Stats Wales, May 2018

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