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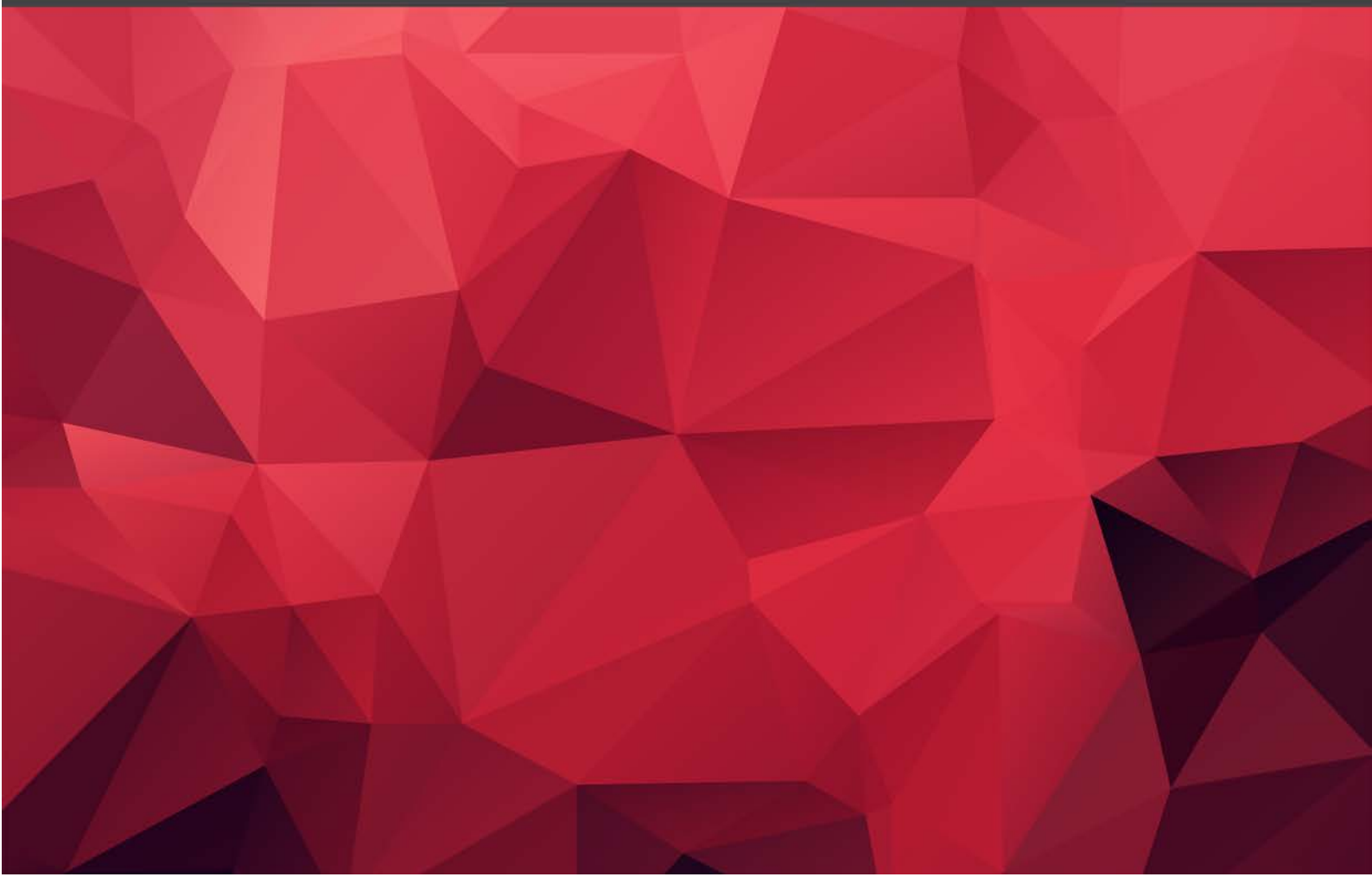

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The team who delivered the work comprised Tracey Davies, Katrina Febry, Philip Jones and Elaine Matthews.

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Radiography services provided by the Health Board are generally satisfactory, although there are challenges due to the long-term absence of a head of service and a fragile IT infrastructure, as well as opportunities to strengthen performance management.

Summary report

Background

1 Radiology is a key diagnostic and interventional service for the NHS and supports the full range of specialties in acute hospitals, primary care and community services. Hospital-based clinicians, including consultants, other doctors, and in agreed circumstances, non-medical practitioners, often refer patients for radiology imaging, as do general practitioners.

2 Diagnostic radiologists employ a range of different imaging techniques and sophisticated equipment to produce a wide range of high-quality images of patients. Images include plain x-ray, non-obstetric ultrasound (US) and computed tomography (CT) as well as sophisticated techniques such as magnetic resonance imaging (MRI).

3 Clinical radiologists[1] are doctors who use images to help diagnose, treat and manage medical conditions and diseases. They have a key role in the clinical management of a patient's condition, selecting the best imaging technique to enable diagnosis and minimise radiation exposure. Interventional radiologists have a more direct role in treating patients. They use radiological imagery to enable minimally invasive procedures, such as stopping life-threatening haemorrhages, and day-case procedures such as oesophageal stenting and angioplasty. All radiologists work as part of the multidisciplinary teams which manage patient care.

4 Rapid advances in technology and understanding about how the features of disease present themselves on diagnostic images have allowed imaging to be used at earlier stages of the diagnostic process. Similarly, changes in the characteristics of disease with treatment can be better detected, and imaging is frequently used to monitor progress. From the patient's point of view, early radiological detection can improve the outcome of treatment and prevent unnecessary pain and suffering. It can also reduce the scale and cost of treatment.

[1] In this report, where reference to radiologists is made, this includes consultant radiologists, middle-grade doctors, specialist registrars and junior doctors. Where there is any variation from this, the report content will specify that, eg consultant radiologists.

5 Demand for radiology services continues to increase year on year. The increase is driven by a number of factors, including demographic changes, new clinical guidelines, lower thresholds for scanning and referral, surveillance work for surviving patients, a growth in screening, and increasing image complexity.

6 **The Future Delivery of Diagnostic Imaging Services in Wales** (2009)[2] showed that demand for some types of imaging had been increasing by 10% to 15% per year. Recent reports by the Auditor General on **NHS Waiting Times for Elective Care in Wales** (January 2015)[3], and **Orthopaedic Services** (June 2015)[4] showed that the increasing demand for radiology services is resulting in long waits for radiological diagnostic procedures and that sustainable solutions were needed to address this.

7 The Welsh Government has introduced delivery plans to improve the treatment of major health conditions such as stroke[5], cancer[6] and heart disease[7]. The plans all highlight the importance of efficient and effective radiological services. The associated care pathways emphasise the need for rapid referral processes, rapid diagnostic testing at particular stages in the pathway, the right equipment and staff who are appropriately skilled.

8 While there is a need to deliver long-term solutions to manage and meet increasing demand for radiology services, there is general recognition that the UK consultant radiologist workforce is under significant pressure. In 2015, 9% of consultant radiologist posts in the UK were unfilled, with 7%[8] of Welsh consultant radiologist posts unfilled. For the period 2015 to 2020, 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 if the retirement age is 60, compared to 20% for the UK as a whole[9].

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

[3] Wales Audit Office, **Elective Care in Wales**, January 2015

[4] Wales Audit Office, **Orthopaedic Services**, June 2015

[5] Welsh Government, **Together for Health**, **Stroke Delivery Plan**, 2012

[6] Welsh Government, **Together for Health**, **Cancer Delivery Plan**, 2012

[7] Welsh Government, **Together for Health**, **A Heart Disease Delivery Plan**, 2013

[8] The Royal College of Radiologists, **Clinical radiology UK workforce census 2015 report**, 2016

[9] The Royal College of Radiologists, **Clinical radiology UK workforce census 2015 report**, 2016

9 The use of interventional radiology (IR) is growing. Such techniques rely on the use of radiological images to precisely target therapy. IR techniques can be used for both diagnostic and treatment purposes. The demand for these techniques is increasing and this places further pressure on already stretched radiology services' staffing resources. It is widely accepted by radiology professions that the numbers of interventional radiologists across Wales, similar to other parts of the UK, are too low. Within Wales, the National Imaging Programme Board (NIPB) has a programme of work which is considering interventional radiologist capacity and how it can be addressed.

10 The NIPB is the primary source of advice, knowledge and expertise for the planning of imaging services in Wales. It is made up of clinical and management representatives from organisations involved in the delivery of imaging services in Wales. In 2010 the NIPB 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 progress is being made at national level, a number of significant challenges are yet to be fully addressed. For example, there are ongoing difficulties in recruiting general and specialist radiology staff and concerns about the information systems that support radiology services.

11 Given the challenges set out above, the Auditor General decided that it was timely to undertake a review of radiology services across all health boards in Wales. The work examined the actions health boards are taking to address the growing demand for radiology services, and the extent to which these actions are providing sustainable and cost-effective solutions to the various challenges that exist. The review also examined key radiology imaging techniques, or modalities, as well as interventional radiology in acute settings. It excluded therapeutic radiology.

12 We undertook the fieldwork at Powys Teaching Health Board (the Health Board) between June 2016 and August 2016. Appendix 1 provides more details of the audit approach and methodology.

13 In addition to this local audit work at the Health Board, the Auditor General for Wales is conducting a value-for-money examination of the NHS Wales Informatics Service, which will, amongst other things, look at the implementation of RADIS[10] and PACS[11] across Wales. The findings from that work are due to be published in late spring 2017.

Contextual information

14 The Health Board provides radiology services of plain x-ray and ultrasound. The Health Board employs radiographers to provide x-rays using equipment situated in six of its community hospitals. Non-obstetric ultrasound is available in four of its

[10] RADIS – Wales Radiology Information System

[11] PACS – Picture Archiving and Communications System

community hospitals and is undertaken by sonographers commissioned from other health boards.

15 Other imaging and interventional procedures, such as MRI and CT scans, as well as x-ray and ultrasound reporting are commissioned by the Health Board from a range of providers in neighbouring health boards in Wales and NHS trusts in England[12]. Commissioning arrangements are through service level agreements which covers a range of services including professional support for the radiographers, radiation protection and IT services to store and send images.

16 The Health Board undertook two pilots to provide mobile MRI scans to patients in Powys: the first in the south of the county in March and April 2015 followed by one in the north of the county in February 2016. The Health Board does not currently provide MRI scans in Powys.

17 This review focuses on imaging services provided by the Health Board (x-ray and non-diagnostic ultrasound). Where relevant, the report also makes reference to our reports on radiology services (ultrasound, MRI and CT) at health boards providing services to Powys patients.

Our main findings

18 Overall, we concluded that radiography services provided by the Health Board are generally satisfactory, although there are challenges due to the long-term absence of a head of service and a fragile IT infrastructure, as well as opportunities to strengthen performance management.

Exhibit 1: our main findings

19 Table detailing our main findings.

Our main findings
Patient satisfaction levels are high and access to x-ray and ultrasound is good although there are delays reporting images: • patients have good access to in-hours x-ray and ultrasound services in community hospitals in Powys; • all patients are seen within the eight-week target for non-obstetric ultrasound following increased investment in the service; • reporting times are generally within acceptable limits; • clinical performance is regularly audited and discussed with staff although audits of demand have not been undertaken; and • patient satisfaction with services provided in Powys is high and processes for reporting incidents have recently been updated.

[12] Abertawe Bro Morgannwg UHB, Aneurin Bevan UHB, Betsi Cadwaladr UHB, Cwm Taf UHB, Hywel Dda UHB, Wye Valley NHS Trust, Robert Jones & Agnes Hunt Orthopaedic Hospital NHS Foundation Trust and Shrewsbury and Telford Hospital NHS Trust.

Our main findings
Referrals are well managed and there have not been problems recruiting operational staff although a significant proportion of staff are potentially within five years of retirement: • demand for diagnostic radiology is increasing year on year; • referral guidance is in place and the service takes positive steps to reduce inappropriate referrals; • the Health Board has a stable operational workforce and has not experienced difficulties with recruitment but a significant proportion of staff are potentially within five years of retirement; and • while staff are undertaking regular appraisals and have personal development plans, compliance with mandatory training is below target.
Equipment will soon be updated, but leadership, performance monitoring and information infrastructure need addressing as part of the Health Board's plans to transform diagnostic services: • the Health Board is at an early stages developing its diagnostic strategy as part of its wider ambitions to bring more services closer to home; • managerial accountability is clear at service level although the absence of a head of service means some responsibilities remain uncovered; • radiology is represented on key committees for performance and quality and safety; • during the last two years the radiography budget has not changed and the service has underspent on its budget; • the Welsh Government has allocated capital funding to modernise x-ray and ultrasound facilities; • there are different radiology systems in use across the Health Board and, while they all generally work well, the Health Board's IT infrastructure is fragile; and • waiting time breaches is the only performance information received by the Board on radiology services.

Recommendations

20 As a result of this work, we have made a number of recommendations which are set out in Exhibit 2.

Exhibit 2: recommendations

Table outlining our recommendations to the Health Board

Factors affecting patient experience	
R1	Develop an action plan detailing how delays with reporting will be addressed sustainably.

Demand and capacity issues affecting service performance	
R2	Review the Wales Audit Office reports on radiology services for health boards providing MRI, CT and ultrasound to understand access and reporting issues to inform commissioning discussions with provider hospitals.
R3	The Health Board needs to identify the scale of the rising demand for all forms of diagnostic imaging, including MRI and CT scanning, and how it intends to meet it as part of the development of its strategic plan for diagnostic services for the population of Powys for the next five years.
R4	Over the next year, increase mandatory training rates for all radiology staff to at least the Health Board target of 85%.
Extent to which radiology services are well managed	
R5	Strengthen performance management by widening the range of performance measures aligned to the business and service objectives to include aspects such as delays with reporting.

Detailed report

Patient satisfaction levels are high and access to x-ray and ultrasound is good although there are delays reporting images

Patients have good access to in-hours x-ray and ultrasound services in community hospitals in Powys

21 Open-access services[13] are widely recognised as a means to reduce the time it takes for patients to access imaging. However, the approach can lead to demand management challenges, particularly when used for more complex imaging. It also has the potential to raise patient expectations and encourage over testing. For example, if a patient with lower back pain has an x-ray, it will not improve their condition. They may insist that the GP refers them for an x-ray because they feel as though something is being done for them. The decision to refer may not be supported when the radiology department or other referral screening service reviews the request. This can lead to a tension between patient expectations and the correct professional response.

22 While most radiology departments offer some form of open access to services, the extent of access varies. Typically it is limited to plain x-ray only, such as a chest x-ray. If the referring medical professional has determined that a plain film x-ray is necessary, they complete a request form which the patient takes to the radiology department during opening times to receive, if appropriate, the requested x-ray.

23 Patients requiring a simple plain film x-ray are given a request form by their GP or a non-medical referrer, such as those based in the Minor Injury Units (MIU). The Health Board has a telephone booking system in North Powys which the patient calls and their request is assessed and a priority level given. Brecon Hospital does not offer open access, but the Health Board told us that they always work closely with local GPs to accept patients immediately if they ring the Health Board to discuss the need for urgency. Access to x-ray is usually good and they can accommodate patients on the same day if urgent or within three days if routine. We were told that all urgent patients can usually be accommodated promptly in the x-ray departments, with the longest waits being on a Monday morning.

24 Where open access is not available, for example, for more complex imaging, the referral should specify the degree of urgency. Typically, referrals are classed as urgent (outpatient) or routine priority (outpatient). This ensures that the patients with the most critical needs are seen first. The Health Board uses four referral categories to assign clinical priority: urgent, urgent suspected cancer, routine and ‘other’. Other is defined as when an examination does not need to be done within two weeks, but should not wait seven to eight weeks on routine lists. Patients

[13] Where an open-access service is provided, a GP can refer a patient to be seen that day by the relevant x-ray department.

usually have to wait for ultrasound and all ultrasound requests are vetted as to whether patients can wait two weeks or more.

25 Patients with emergency health needs may need access to prompt radiology diagnostics and care outside standard radiology working hours. Exhibit 3 shows that Powys only has one hospital with a seven-day service for x-ray (Brecon) with all other hospitals open five days apart from Machynlleth which provides x-rays on one day a week. Patients who need an urgent x-ray or other diagnostic outside of these hours will attend a hospital outside of Powys as part of the unscheduled care pathway. The Health Board told us that a true open access service and a widening of out-of-hours provision could be accommodated in the future if demand is evident.

Exhibit 3: locations for x-ray and non-obstetric ultrasound in Powys community hospitals

Table showing location and availability of x-ray and non-obstetric ultrasound

Community hospital	X-ray	Non-obstetric ultrasound
Brecon War Memorial Hospital	7 days	2 days
Bro Ddyfi Community Hospital (Machynlleth)	One day	Not available
Llandrindod Wells Hospital	5 days	Not available
Montgomery County Infirmary (Newtown)	5 days	One day
Victoria Memorial Hospital (Welshpool)	5 days	2.5 days
Ystradgynlais Community Hospital	5 days	2 days

Source: Powys Teaching Health Board

26 As a result of the delays with accessing diagnostic services in the south of the county, the Health Board carried out a pilot of mobile provision of MRI scans at Bronllys Hospital in March and April 2015. The objectives were to see if a mobile MRI scanner could reduce waiting times and provide MRI scans closer to home. GPs and visiting consultants in the South Locality made referrals for simple orthopaedic scans. The Health Board reported positively on the evaluation. Since Cwm Taf UHB offered additional MRIs as part of the diagnostic hub development, the Health Board is now sending patients to Merthyr instead of Abergavenny, and has made no decision on future mobile MRI provision.

27 The Health Board also provided a mobile MRI service in the north of Powys in February 2016. The Health Board reported that this was undertaken to test

whether the Health Board could offer MRI services The patient feedback was excellent and very supportive. All images arrived in correct PACS format and reports were produced in a timely manner. It was a pilot and as such the referral pathway was not changed. Any future decisions on MRI provision will be taken as part of the development of the Health Board's diagnostic strategy.

28 Our radiology reports at other health boards provide information on patient access to radiology services including in-hours and out-of-hours provision for CT, MRI and ultrasound.

All patients are seen within the 8 week target for non-obstetric ultrasound following increased investment in the service

29 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. The diagnostic waiting time target applies to all radiological interventions including magnetic resonance imaging (MRI), computed tomography (CT), and non-obstetric ultrasound (US), fluoroscopy, barium enema, and nuclear medicine. The Welsh Government target does not apply to plain film x-rays.

30 Since 2009 waiting times for radiological tests have also formed part of the referral to treatment (RTT) target[14]. 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.

31 The all-Wales radiology waiting times[15] for consultant and GP consultant radiology referrals provides data collected by Welsh Government on waiting times for a range of diagnostic services. The Health Board collects waiting time data for its non-obstetric ultrasound service for Powys patients and submits it to NWIS.

32 Diagnostic ultrasound is provided on the Health Board's premises using its own equipment and carried out by visiting sonographers employed by neighbouring health boards in Wales and NHS trusts in England under service level agreements. In August 2016, 281 patients were waiting for a non-obstetric US scan at the Health Board, of which none were waiting over eight weeks (Exhibit 4).

[14] 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**

[15] **NWIS Diagnostic and Therapy Services Waiting Times** – NHS Wales Informatics Services (accessed via StatsWales on 30 Oct 2016)

Exhibit 4: non-obstetric US scan waiting times for August 2016

Table showing that the Health Board has no patients waiting over eight weeks for an US scan compared to the all-Wales figure of 13%.

Total number of patients waiting for a non-obstetric US scan

	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
Brecon War Memorial Hospital	57	0	0	0	57	0%
Bro Ddyfi Community Hospital (Machynlleth)	31	0	0	0	31	0%
Montgomery County Infirmary (Newtown)	2	0	0	0	2	0%
Victoria Memorial Hospital (Welshpool)	103	0	0	0	103	0%
Ystradgynlais Community Hospital	88	0	0	0	88	0%
Total Powys Teaching Health Board	**281**	**0**	**0**	**0**	**281**	**0%**
Total All Wales[1]	**18,944**	**1,999**	**626**	**133**	**21,702**	**13%**

[1] All-Wales figures include all patients waiting for a diagnostic scan at Welsh health boards

Source: **Diagnostic and Therapy Services Waiting Times**, NHS Wales Informatics Services (accessed StatsWales, 30 October 2016).

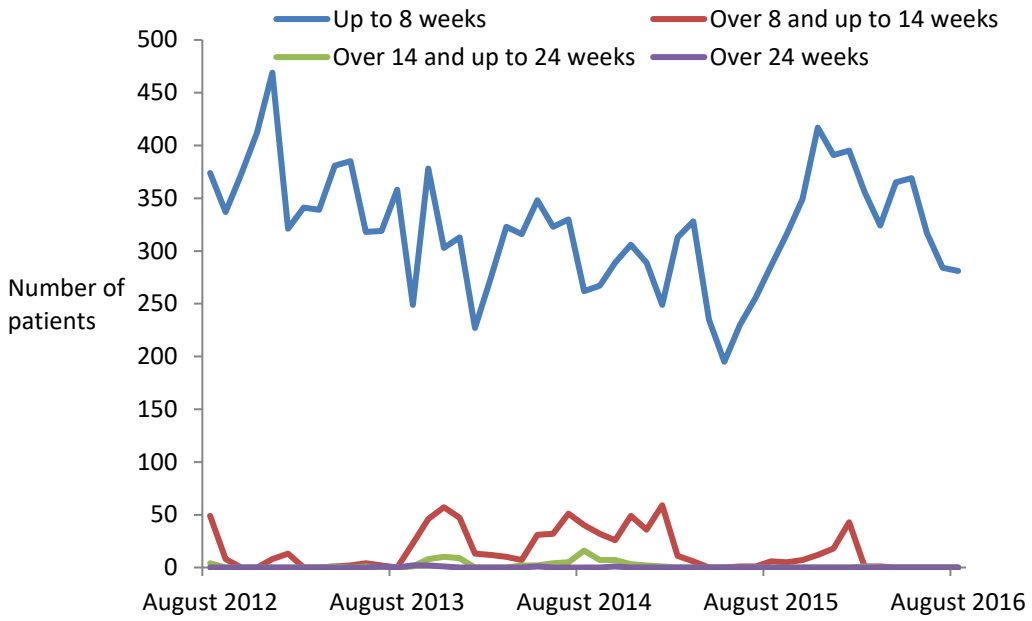
33 The total number of patients on the waiting list for a non-obstetric US scan at the Health Board decreased by 52% between August 2012 and August 2016, and the percentage of patients waiting more than eight weeks decreased from 12% to 0% (Exhibit 5). When waits start to increase the Health Board buys additional sessions

either in Powys or provided in other hospitals to increase the throughput of patients to get the waiting times down.

34 While the Health Board has ultrasound facilities at five of its hospitals, they are not being used to full capacity. This is due to the difficulties in procuring sonographers which is part of a national shortage although the Health Board is increasing the use of the facilities by midwives for antenatal screening.

Exhibit 5: non-obstetric US scan waiting times trend from August 2012 to August 2016

Graph showing the numbers of patients waiting for an US scan. While the service was not meeting the target during period during 2014 and 2015, the service has consistently met the eight week waiting times target during 2016.



Source: **Diagnostic and Therapy Services Waiting Times**, NHS Wales Informatics Services (accessed StatsWales, 30 October 2016)

35 Waits for diagnostics provided by the Health Board are discussed in the fortnightly Powys-wide meeting on waiting lists which includes discussion of progress against the target for RTT. If there is an issue it gets escalated to the Director of Primary and Community Care although it is rare for the Health Board to have breaches in radiology. When they had breaches for ultrasound in Ystradgynlais they were able to resolve them by bringing in extra resources to run additional sessions. The Health Board assured us that waiting times for non-obstetric ultrasound in North Powys are being effectively managed.

36 The Health Board does not report data on waiting times for Powys patients for diagnostics provided by other hospitals as in many instances they cannot be

disaggregated from the whole pathway of commissioned services. Our recent reports on radiology services in other health boards in Wales provide information on waiting times for patients accessing MRI, CT and ultrasound showing the hospitals where the eight-week targets are not being met.

Reporting times for images are generally within acceptable limits

37 Effective management of patient care requires timely reporting of radiology images, by a qualified authorised practitioner, generally a radiologist. The report is a record of the interpretation of the scan, used to make further decisions on the care of the patient. Any delays in reporting can adversely affect patient outcomes.

38 All images must be reported and provided to the referring clinician in appropriate time in accordance with the patient's needs and clinical condition. The Welsh Reporting Standards for Radiology Services 2011 (the Standards) were produced in order to clarify previous guidance and regulations. The Standards set out that radiology should aim to provide reporting turnaround times as follows:

- urgent – immediately/same working day
- inpatient – within one working day
- A&E – within one working day
- GP – within three working days
- outpatient – within ten working days

39 Reporting of all images, including those undertaken on Powys premises and elsewhere, is provided by radiologists and reporting radiographers who are employed in five other health boards and trusts through a service level agreement. The SLA for routine x-ray is five days although there is a quicker turnaround for unexpected findings. Ultrasound reports are completed straight after the image is carried out by the band 7 sonographers and faxed to the referrer if urgent. Exhibit 6 shows the hospitals that provide radiologist support and the size of the service.

Exhibit 6: reporting provided by other health boards and NHS trusts under service level agreements in place since 2012-13

Table showing that five different health boards or NHS trusts are contracted to provide 26,500 radiology reports in a year.

Community hospital	University Health Board/ NHS Trust	Number of x-ray reports a year in contract
Brecon War Memorial Hospital	Aneurin Bevan	5,000
Bro Ddyfi Community Hospital (Machynlleth)	Hywel Dda	1,000
Llandrindod Wells Hospital	Wye Valley	6,000
Montgomery County Infirmary (Newtown)	Betsi Cadwaladr	9,000 across both sites
Victoria Memorial Hospital (Welshpool)		
Ystradgynlais Community Hospital	Abertawe Bro Morgannwg	5,600
Total reports		26,600

Source: Powys Teaching Health Board, **2012-13 SLA Assessment**

40 We asked the Health Board about the turnaround times it was experiencing for x-ray and ultrasound reports. This information was provided for four hospitals. The data in Exhibit 7 shows that average turnaround times for reports provided by Betsi Cadwaladr UHB (Welshpool and Newtown) and Hywel Dda UHB (Machynlleth) are within three days while Abertawe Bro Morgannwg UHB (Ystradgynlais) average reporting time is four days.

Exhibit 7: average report turnaround time at the Health Board between 1 April 2015 and 31 March 2016

Table showing that the average report turnaround time ranges from two to four days for x-ray and 0 to one day for ultrasound.

	Average report turnaround time (days)	
	Plain x-ray	US
Brecon War Memorial Hospital	Not known	Not known
Bro Ddyfi Community Hospital (Machynlleth)	3	Not applicable
Llandrindod Wells Hospital	Not known	Not applicable
Montgomery County Infirmary (Newtown)	2	Not known
Victoria Memorial Hospital (Welshpool)	3	0
Ystradgynlais Community Hospital	4	1

Source: Wales Audit Office, **Health Board Survey**

41 The data in Exhibit 8 shows that the longest recorded waits for reports for plain x-ray were at Bro Ddyfi Hospital (52 days) and Ystradgynlais Hospital (49 days) which also had some long waits for ultrasound (35 days). These highlight that there have been some delays with radiology services provided by Hywel Dda University Health Board and Abertawe Bro Morgannwg University Health Board.

42 In addition, we were told that there are some issues with GPs saying they have not received electronic reports so the radiographers have to send them paper copies.

Exhibit 8: longest report turnaround time between 1 April 2015 and 31 March 2016

Table showing that the longest report turnaround time was 52 days for x-ray and 35 days for ultrasound.

	Longest[1] report turnaround time (days)	
	Plain x-ray	US
Brecon War Memorial Hospital	Not known	Not known
Bro Ddyfi Community Hospital (Machynlleth)	52	Not applicable
Llandrindod Wells Hospital	Not known	Not applicable
Montgomery County Infirmary (Newtown)	13	Not known
Victoria Memorial Hospital (Welshpool)	13	2
Ystradgynlais Community Hospital	49	35

[1] Longest report times exclude any obvious outliers

Source: Wales Audit Office, **Health Board Survey**

43 The data in Exhibit 9 shows the number of examinations not reported for more than 10 days since the examination date. Bro Ddyfi Hospital reported no issues with examinations not reported for more than 10 days by Hywel Dda University Health Board. Ystradgynlais Hospital had some examinations not reported by Abertawe Bro Morgannwg University Health Board for both x-ray (eight days) and ultrasound (13 days). Montgomery Hospital experienced some delays in their service from Betsi Cadwaladr University Health Board.

Exhibit 9: number of examinations not reported as at 31 March 2016

Table showing that the highest number of examinations not reported is 9 days for x-ray and 13 days for ultrasound.

	Number of examinations not reported[1]	
	Plain x-ray	US
Brecon War Memorial Hospital	Not known	Not known
Bro Ddyfi Community Hospital (Machynlleth)	0	Not applicable
Llandrindod Wells Hospital	Not known	Not applicable
Montgomery County Infirmary (Newtown)	9	Not known
Victoria Memorial Hospital (Welshpool)	6	1
Ystradgynlais Community Hospital	8	13

[1] Unreported examinations are those that have remained unreported more than 10 days since the examination date.

Source: Wales Audit Office, **Health Board Survey**

44 The Health Board did not provide us with data on timeliness of reporting images for all of their hospitals. This is of concern because Aneurin Bevan University Health Board and Wye Valley NHS Trust provide a large proportion of the total number of reports (41%). Information on reporting ultrasound was also not available for Montgomery Hospital (Betsi Cadwaladr University Health Board).

45 The delays for image reporting has featured on the Health Board's radiology risk register for a number of years with particular concerns with the service provided by Aneurin Bevan University Health Board and Abertawe Bro Morgannwg University Health Board. While the services provided by Hywel Dda Health Board have improved in recent months resulting in the risk being downgraded it still remains on the risk register due to the fragility of the service. We heard that delays in reporting can result in behaviour changes from referrers such as increasing the number of referrals categorised as urgent. Radiographers told us that they keep the GPs informed about any changes to reporting times by emailing the practice managers.

46 The Health Board informed us that they were content that reporting times are now generally within acceptable limits for all providers, although there do experience

issues from time to time. For example, while Aneurin Bevan University Health Board recently breached agreed timescales by a significant amount this has now been resolved. This conclusion is corroborated by our survey of radiographers: 2/8 said they had no problem with timeliness of radiologist support for reporting images; 4/8 experienced occasional problems; and 2/8 said reporting times are generally too long.

47 Extended practice radiographers receive extra training to interpret and report some types of images, typically less-complex scans, such as plain x-rays. For patients attending the emergency department and receiving a plain x-ray in normal hospital hours, the use of extended practice radiographers increases the likelihood that a report will be produced whilst the patient is still in the department. Where x-rays are reported by radiologists only, the formal report may not be produced until hours, and sometimes days, after the patient has left the hospital. In these instances, x-rays will be initially assessed by a clinician with no formal radiology training. The use of extended practice radiographers can help to reduce the number of patient recalls caused by initial incorrect x-ray interpretation. The Health Board purchases the service of one part-time qualified reporting radiographer for plain x-ray from Abertawe Bro Morgannwg for Ystradgynlais Hospital. We were told that this service works well.

48 All radiographers in North Powys provide preliminary clinical evaluation, known as ‘commenting’ as encouraged by the Society of Radiographers. This means that the patient is provided with an initial diagnosis at the time the x-ray image is taken. By making an initial evaluation, the radiographer helps GPs know if a patient needs to stay in Welshpool or go to a district general hospital out of county. The Health Board told us that audits carried out every three months show an accuracy rate of 85-100%.

49 To reduce concerns for the patient if they get a different diagnosis when the full report is available, Welshpool Hospital have adopted an x-ray form that they give to patients saying that when the image is reviewed by a radiologist they might get a different diagnosis. This helps patients to distinguish between an opinion and a diagnosis.

50 GPs at our focus groups raised a number of concerns about the timeliness of reporting for imaging provided in or out of county. GPs were particularly concerned that the patient is told they will get the result in five days so patient comes back to the GP for an appointment when the results are not yet available. GPs were also concerned that delays with reporting images lead to problems along the whole pathway.

51 Our reports on radiology services in other health boards in Wales provide data on reporting times, whether or not reporting time targets are met, and whether reporting is carried out by radiologists, other staff or through out-sourcing arrangements.

Clinical performance is regularly audited and discussed with staff although audits of demand have not been undertaken

52 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 (NDIF). The NDIF draws together a wide range of standards that apply and have relevance to radiology, such as waiting time targets, Healthcare Standards for Wales, and national delivery plans for specific conditions.

53 Radiology departments need to monitor clinical performance to ensure compliance with standards and maintain a clear programme of clinical audit. The Royal College of Radiologists' **Good Practice Guide for Clinical Radiologists** sets out good practice in relation to the design and delivery of clinical audit. This includes AuditLive, a tool which sets out a collection of audit templates, providing a framework identifying best practice in key stages of the audit cycle, covering over 100 radiology topics.

54 The Health Board's Clinical Audit Plan 2016-17 was reviewed by the Patient Experience, Quality and Safety Committee in May 2016. The plan contains two radiography audits planned for completion during the year. A recent progress report to the Committee in February 2017 stated that the audit of accuracy of radiographer's initial clinical evaluation was completed as planned in December 2016. The audit of request forms was to be completed in January 2017.

55 Our Health Board survey asked about regular reviews and audits across eight areas of service. We found that since April 2015:

- audits and regular reviews have been undertaken in three areas: appropriateness of referrals; appropriateness of urgent or out of hours referrals; and quality of written requests;
- regular reviews have been undertaken in three areas: accuracy of reporting; reporting turnaround times; and lost or late reports; and
- no reviews or audits have been undertaken in two areas: demand levels by day/day of week; demand levels by GPs/hospital staff.

56 Radiology staff must ensure they protect patients and staff members from the risks of radiation. The Ionising Radiation (Medical Exposure) Regulations 2000 (IR(ME)R), and subsequent amendment regulations in 2006 and 2011, provide a set of regulations for medical staff referring patients to radiology, those justifying the examination and those operating the equipment. Healthcare Inspectorate Wales (HIW) is responsible for monitoring compliance against IR(ME)R. Its most recent report at the Health Board was carried out in three hospitals[16] in September 2016 and reported to the Health Board in December 2016.

[16] Victoria Memorial Hospital, Welshpool; Brecon War Memorial Hospital; and Ystradgynlais Community Hospital.
http://hiw.org.uk/docs/hiw/inspectionreports/161216powysirmeren.pdf

57 The Health Board responded to the recommendations and HIW issued a letter in January 2017 stating that the Health Board's response provides sufficient assurance. The report and management response were discussed at the Patient Experience, Quality and Safety Committee in February 2017. The Committee was provided with assurance that all but one action had already been completed; the outstanding action, on the requirement for training for visiting operators and practitioners performing procedures on Health Board sites, has a completion date of the end of March 2017.

58 The Health Board's IR(ME)R inspection reported that they saw evidence that a number of audits had been carried out across the departments they visited. HIW were told that results of one of the audits were shared at the Annual Radiation Protection Committee to identify and share learning. The other two audits will be reported to the Radiography Team Meeting.

59 Our reports on radiology services at other health boards in Wales provide information on their programmes of clinical audit.

Patient satisfaction with services provided in Powys is high and processes for reporting incidents have recently been updated

60 Radiology services must ensure that their practices are safe. For example, patients should always be offered appropriate radiological techniques which balance any inherent risks with the potential benefits from diagnosis and treatment. The service should ensure that patients receive the correct radiation dose, and staff should be monitored and protected so that they are not exposed to dangerous doses of radiation in the course of their work. Where errors or incidents are identified, health boards should act decisively and openly to learn lessons and prevent such incidents reoccurring.

61 In 2015-16, there were 12 reported incidents in diagnostic radiology departments across the Health Board, of which all were classed as either low severity or causing no harm to the patient. The Health Board's processes to report incidents using Datix are set out in Standard Operating Procedure J, Exposures Greater Than Intended/Unintended Doses and Near Misses. This procedure describes the circumstances when an incident must be reported and how, together with the information that needs to be submitted via the Health Board's electronic reporting system.

62 The recent IR(ME)R inspection reported that while the Health Board had a written procedure for reporting, recording and investigating incidents under IR(ME)R (Procedure J) it was not clear in all technical respects and did not include the process for reporting certain incidents to HIW. HIW recommended that the Health Board should make arrangements to review and revise the written procedure accordingly. The Health Board's response to the IR(ME)R recommendations states that they will take action to respond to this recommendation by devising a flowchart to clarify the reporting procedure and ensure that all relevant staff are made aware of it. This action was completed by 1 February 2017.

63 All reported incidents are discussed by the appropriate locality group, namely the Quality, Risk and Experience Group in the North Locality and the Quality, Patient Experience and Risk Group in the South Locality. Incidents are addressed and then lessons learned are shared at radiography team meetings. The Health Board's Patient Experience Group also reports on lessons learned from incidents. However, our survey of radiographers found that only half thought that there were good arrangements to respond to incidents and one told us that they were uncertain whether issues were actually acted upon.

64 Feedback from patients is a vital source of information for radiology services to understand and improve patient experience. The service collects patient experience feedback through a number of mechanisms that include:

- postcards located in the patient waiting areas of the x-ray departments;
- patient satisfaction questionnaire which was used for the MRI pilot; and
- HIW patient questionnaires distributed ahead of the IR(ME)R inspection plus interviews with patients attending at the time of the inspection.

65 Our survey of hospitals found that they received a total of 25 compliments during 2015-16 and no complaints. Local efforts to collect patient feedback have been undertaken in some of the hospitals:

- In July 2016, Ystradgynlais Hospital produced a report on their audit of patient experience based on postcards completed in the x-ray department during 2015-16. Patients were asked what they liked and disliked and the answers were wholly positive. The results were circulated to the Radiography Service, South Locality Team and Patient Experience Team.
- In Brecon War Memorial Hospital, we observed that postcards were readily available for patients in the x-ray waiting room but we were told that these were rarely filled in.
- In Welshpool we were told that while postcards are available in waiting areas, the patients are rarely waiting long enough to complete one.

66 The recent IR(ME)R report found all patients/carers who provided comments told HIW that they were very happy with the service they had received and praised the approach and attitude of the staff teams, the cleanliness of the departments and timeliness of being seen. Patients said they were treated with respect.

67 Patient experience information was collected in a systematic way during the MRI pilot using a patient satisfaction questionnaire. The pilot found that patient and referring doctor satisfaction rates were very high. Patients liked the location with its easy parking and the reduced waits accessing the service. The main concerns raised by a small number of patients were the level of noise or claustrophobia caused by the scanning process. This feedback could be used to support a mobile MRI service if the Health Board decides to make use of it in the future. The pilot also generated some areas for improvement that can be used to improve the patient experience of MRI in future.

68 The Health Board's Patient Experience Strategy 2016-2019 was issued in February 2016. The strategy provides a renewed commitment to learning from

patient experiences. Staff are expected to contribute to improving every patient and service users' experience of health and in some cases social care provision, by actively seeking meaningful feedback. The three year action plan contains mechanisms to collecting balanced feedback which the locality teams are taking forward.

69 We asked the Powys-based radiographers if they thought that their facilities were patient-focused and appropriate. All respondents agreed that they were. The IR(ME)R inspection also reported that facilities were clean and tidy with changing cubicles available that offered patients privacy should they need to change into gowns. The departments were clearly signposted and hospital staff were on hand to provide directions as needed.

70 Our reports at other health boards provide information on their processes for learning from patient experience, complaints and incidents and any concerns with the patient environment.

Referrals are well managed and there have not been problems recruiting operational staff although a significant proportion of staff are potentially within five years of retirement

Demand for diagnostic radiology is increasing year on year

71 The increasing role of radiology in clinical care has led to growing demand for radiological examinations, in particular for CT and MRI scans. Whilst figures are not available for Wales, the most recent data available for England shows that there was a 42% increase in the number of radiology examinations undertaken per year between 2003 (28.8 million scans) and 2014 (40.9 million scans)[17]. The Royal College of Radiologists has predicted that by 2022 the number of radiological examinations carried out in England will be around 62 million[18] per year driven by further innovation and demographic growth.

72 As well as the number of scans undertaken annually increasing, scans are also becoming more complex. The biggest percentage rise in volume for radiological examinations has been for CT and MRI scans as they play an increasing role in the early diagnosis of many diseases. The Royal College of Radiologists predicts that the biggest percentage increase in examinations up to 2022 is expected to be for MRI scans (from 2.7 million scans per year in 2014 to 7.8 million in 2022) and CT

[17] **Annual Imaging and Radiodiagnostics Data**, NHS England, 2014

[18] Royal College of Radiologists, **Information submitted to Health Education England workforce planning and education commission round 2015-16**

scans (5.2 million scans per year in 2014 to 12.3 million in 2022)[19]. MRI and CT scans are complex data examinations, which generally include multiple images, and therefore, per patient examination, are more labour-intensive for radiologists interpreting images than less-complex scan types, such as plain x-ray.

73 The Health Board's draft diagnostics strategy recognises that demand is increasing due to the changing demographic of its ageing population increasing demand upon the capacity of existing services. GPs in our focus groups said that demand is increasing due to rising expectations from patients and from changes in guidelines. Examples they raised were that:

- patients are asking GPs for MRI scans for lower back pain even though a consultant would be less likely to refer them for a scan; and
- the National Institute for Clinical Excellence (NICE) guidelines state that patients with a new and persistent cough for more than three weeks should see a doctor and ask for a chest x-ray.

74 Our radiology reports at other health boards provide information on increasing demand for ultrasound, CT and MRI services at the hospitals where Powys patients attend.

Referral guidance is in place and the service takes positive steps to reduce inappropriate referrals

75 GPs and consultants refer patients to radiology. Ensuring that patients are referred for the most appropriate diagnostic investigation depends on clear guidance and standards. Guidance should be based on the Royal College of Radiologists' iRefer[20] tool and support medical professionals referring patients to the service to select the most appropriate imaging investigation(s) or intervention for a given diagnostic or imaging problem. Each inappropriate investigative image performed is, in effect, an appointment slot wasted which adversely affects the service's ability to meet NHS waiting times targets and patient need in a timely way.

76 The Health Board's Standard Operational Procedures in Radiography, issued in August 2015, sets out the referral process for x-ray and ultrasound provided by the Health Board. The Health Board has endorsed the use of the Royal College of Radiologists Referral Guidelines Sixth Edition 2007. The Health Board has also adopted the national guidelines from the Royal College of Radiologists[21]. All medically qualified staff can make referrals without further training. Non-medical referrers are required to provide proof that they have undertaken appropriate

[19] Royal College of Radiologists, **Information submitted to Health Education England workforce planning and education commission round 2015-16**

[20] iRefer is a radiological investigation guidelines tool from The Royal College of Radiologists.

[21] **Royal College of Radiologists**, Making the best use of an Imaging Department, version 8, , 2012

training and that they are following local referral guidelines. These training requirements are set out in Appendix A of the Standard Operational Procedures.

77 Patients mainly access imaging services in the Health Board following a referral by their GP. Some non-medical referrals for imaging investigations are made by other healthcare professionals such as nurse practitioners based in the minor injuries units. Alternatively, patients are referred to a consultant who may then refer them for an image as part of a programme of diagnosis and treatment. GPs make a decision where to refer their patients depending on waiting list information they hold on local hospitals.

78 GPs and non-medical referrers complete a form for x-ray and diagnostic ultrasound referrals in the Health Board. GPs and the radiographers told us that established referrers know how to complete the forms as they have been in use for some time. Superintendent radiographers provide training to newly appointed nurse practitioners who have non-medical referrer status to ensure that forms are completed correctly. Referrers are encouraged to contact the radiographer directly in cases of uncertainty.

79 There are no electronic referral processes in place for x-ray or ultrasound. GPs told us they were unhappy that they could not make electronic referrals even though the GP patient administration system has the capacity to print out a referral with all the details. This results in the GP having to print out address stickers and write out referrals by hand, which increases the risk of errors.

80 As part of the mobile MRI pilot in the south of the county, the Health Board provided lead GPs from each practice with guidelines for referrals for direct access plus a learning session on best practice for diagnostic referrals provided by the Consultant Radiologist from Cwm Taf University Health Board. The Health Board facilitated further diagnostic sessions for all GPs so as to share this learning more broadly. GPs told us that they welcomed this training.

81 Once a referral is made a radiologist or appropriately trained radiographer will justify (review) the referral for its appropriateness and to determine whether there is a sufficient benefit to the patient. The process of justification helps to ensure that patients do not receive unnecessary exposure to radiation and that appointment slots are not wasted. Referrals may be declined or a more appropriate alternative investigation suggested. The Health Board's standard operating procedure D sets out the role of the radiographer to review referrals and the form to return to referrers setting out why this has been rejected.

82 Radiographers regularly undertake audits of request forms from non-medical referrers and GPs. The most recent audit set out in the Health Board's Clinical Audit Plan 2016-17 was planned to start in December 2016 and completed in January 2017. This is a re-audit to ensure compliance with the requirements of IR(ME)R. The audit will be reported to the Radiography Team Meeting.

83 Our reports on other health boards set out how they are addressing inappropriate referrals and what appointment booking arrangements they have in place for all the diagnostic services they provide. They also report on the risks of the different

paper-based referral systems that all hospitals are currently using. Electronic referrals could mitigate some of these risks and speed up the referral process although only one health board has immediate plans to introduce e-referrals.

The Health Board has a stable operational workforce and has not experienced difficulties with recruitment but a significant proportion of staff are potentially within five years of retirement

84 Radiologists, radiographers, nurses, technical and administrative staff work together to deliver imaging services. It is important to have the right number and skill mix of staff to deliver these services. The Health Board employs radiographers, nurses, technical and administrative staff in its radiography units. It does not employ radiologists or sonographers but buys in their services from other neighbouring health boards and NHS trusts.

85 Our review found that the full time equivalent (FTE) establishment[22] staffing level of radiographers at the Health Board decreased by 4.1% between 2012 and 2016, compared with an increase of 10.2% across Wales as set out in Exhibit 10.

Exhibit 10: FTE establishment of radiology staff trend at the Health Board from 2012 to 2016

Table showing there has been a small decrease in the numbers of radiographers in 2016.

	2012	2013	2014	2015	2016	Percentage change 2012-2016
Radiographers	8.1	8.5	8.9	8.2	7.7	-4.1%

Source: Wales Audit Office, **Radiology Health Board Survey**. Data is provided as at 31 March each year.

86 The Health Board reported that 79% of radiographers are aged 50 and over and potentially within five years of retirement (Exhibit 11). The Health Board did not report any concerns with the current establishment of radiographers although there are pressures on the service due to sickness absence. The Health Board recently recruited radiographers and did not have a problem attracting good quality staff.

[22] The 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.

Exhibit 11: number and percentage of radiographers by age as at June 2016

Table showing that compared to the all Wales figures, the Health Board has a much higher percentage of radiographers aged 50 and over, and none below the age of 45.

		Age					
		Under 39	40–44	45–49	50–54	55–59	60+
Radiographers[2]	Powys Teaching Health Board	0 (0%)	0 (0%)	3 (21%)	4 (29%)	6 (43%)	1 (7%)
	All Wales	**473 (45%)**	**106 (10%)**	**103 (10%)**	**170 (16%)**	**125 (12%)**	**74 (7%)**

[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 2016**, 2016

87 The Health Board commissions the services of two diagnostic sonographers to work on its premises from neighbouring health boards. While this arrangement works well, the Health Board is considering employing its own sonographer or training existing radiographers to carry out diagnostic ultrasound. One option would be for the Health Board to train its own radiographers/sonographers which would address the need to replace staff who plan to retire in a few years. The Health Board would need to address the clinical governance requirements before employing its own sonographers, as set out in the Guidelines for Professional Ultrasound Practice[23].

88 The Health Board's Therapy and Health Sciences Three Year Strategy 2015-18 says that they have a commitment to maximising skills of the workforce to ensure access to specialist services in rural areas. This includes developing advanced practitioner roles to support pathway redesign, eg reporting radiographers and sonographers. In our survey of radiographers we asked if they would be interested in developing advanced practitioner roles if they were on offer. Some told us that they may be interested in the future although for various reasons did not want to undertake it now.

[23] Society and College of Radiographers and British Medical Ultrasound Society, **Guidelines for Professional Ultrasound Practice**, December 2015.

89 Our radiology reports at other health boards highlight a range of issues with recruitment, staff shortages and a reliance on locums. They also provide information on the numbers of examinations undertaken per FTE radiologist and radiographer as a measure of the appropriateness of the number of staff in post to meet demand.

While staff are undertaking regular appraisals and have personal development plans, compliance with mandatory training is below target

90 Annual appraisals of staff performance, and continuing professional development reviews are an important part of ensuring that the quality of radiology services is maintained and that staff training needs are properly addressed.

91 All staff at the Health Board undertook an annual appraisal of their performance or received a personal development plan in 2015-16[24]. The Health Board keeps a register of all registered practitioners and operators engaged to carry out medical exposures, including the date the training was completed and the nature of the training undertaken.

92 Compliance with mandatory and statutory training set out in the UK Core Skills and Training Framework (nine core skills) is below target (Exhibit 12). The Health Board's target for compliance with mandatory training is 85% and the Health Board has an all staff compliance rate for statutory and mandatory training of 71.48%. However, radiographers are only meeting the 85% target for one out of the nine core skills. Of note is the low level of training in resuscitation and information governance.

[24] 100% of radiographers and 100% of other radiology staff received an appraisal of their performance. 92% of radiographers and 100% of other radiology staff had a personal development plan completed in 2015-16.

Exhibit 12: percentage of staff compliant with statutory and mandatory training modules, as at July 2016

Table showing that radiographers are not compliant with all statutory and mandatory training modules.

	Radiographers	Other radiology department staff
Equality, Diversity and Human Rights	83%	67%
Health, Safety and Welfare	83%	67%
Fire Safety	67%	83%
Infection Prevention and Control	92%	83%
Moving and Handling	75%	100%
Safeguarding Adults	67%	50%
Safeguarding Children	75%	67%
Resuscitation	42%	17%
Information Governance	33%	67%

Source: Wales Audit Office, **Radiology Health Board Survey**

93 Our reports on radiology services in other health boards contain information on rates for staff appraisal and training which highlight that in some areas training targets are not met and access to training is limited by staffing constraints.

Equipment will soon be updated, but leadership, performance monitoring and information infrastructure need addressing as part of the Health Board's plans to transform diagnostic services

The Health Board is at an early stage of developing its diagnostic strategy as part of its wider ambitions to bring more services closer to home

94 The Health Board should have a clear strategic plan. The plan should set out how it will meet current and future demand for radiology services. The Health Board will need to identify the scale of the rising demand for all forms of diagnostic imaging, including MRI and CT scanning, and how it intends to meet it as part of the

development of its strategic plan for diagnostic services for the population of Powys for the next five years.

95 Some radiology priorities are outlined within the Health Board's Integrated Medium Term Plan (IMTP) for 2016-2019 which support the Health Board's objective of 'Improved access to diagnostic assessment, treatment and rehabilitative services delivered locally'. The IMTP makes it clear that the Health Board's firm intention is to develop during 2016-17 a clear Diagnostics Strategy that looks at all modes of delivery and describes what can and should be provided to the population over the coming two to five years.

96 The Health Board started developing its diagnostic strategy in April 2016 as part of the Diagnostic Modernisation Project within the Primary and Community Care Delivery Programme. The aim is to develop and implement a diagnostic services strategy across the Health Board in order to provide in-county services for the people of Powys and support the development of all health services in the county. The project objectives are:

- To provide a quality assurance for diagnostic pathways
- To ensure appropriate referrals and reduce inappropriate referrals for diagnostic services
- To repatriate diagnostic services back into Powys where appropriate and in line with the strategy
- To commission remaining diagnostic activity as close to home as possible and retain good quality services through commissioned activity

97 The Diagnostic Modernisation Project and the plain film x-ray work stream will review and revise all the SLAs the Health Board currently holds with organisations providing diagnostic services.

98 The absence of a clear strategy for the Health Board's radiology service has limited its ability to set out sound operational plans. Each radiology service should have an agreed documented annual operational/delivery plan. The plan 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. Work is ongoing to develop these plans as part of the broader Health Board planning and commissioning processes through the IMTP and Health and Care Plan developments.

99 Radiology operational plans should be informed by service changes and developments in the wider organisation. Almost all clinical specialties rely heavily on radiology to help diagnose, treat or monitor disease or injury. Radiology staff should, therefore, be appropriately involved in any decision making on service developments that will lead to an increase in the number of patients referred for radiology imaging, such as new consultant posts, clinics and services.

100 Across Wales our review found that there was variation in the degree to which radiology teams were involved in decisions made outside of the team that impact on radiology services. In the Health Board, there is no Head of Radiography which has limited the involvement of radiography in service development although the

two Superintendent Radiographers have been involved in the development of the diagnostic strategy.

101 Our radiology reports at other health boards provide information on strategic planning for diagnostic services. These reports show that all health boards are at an early stage in planning for the future direction of their diagnostic services.

Managerial accountability is clear at service level although the absence of a head of service means some responsibilities remain uncovered

102 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 clear executive leadership, a designated overarching service lead, and a clear operational and professional management structure with clear lines of accountability. It also needs to have sufficient capacity to meet service demand and need in a safe and effective way.

103 The radiology service is operationally managed within the Primary, Community and Mental Health Directorate while professional management is provided through the Directorate of Therapies and Health Sciences. The Health Board's Lead Therapist is responsible for radiography although she is not a radiographer.

104 The Health Board has struggled for a number of years to recruit and retain a professional head of radiography. The post is currently vacant although the Health Board has tried to fill the post since the previous incumbent left in 2015. Alternative arrangements to provide professional support are in place from neighbouring health boards but the lack of a locally employed head is causing difficulties. The recently reported IR(ME)R inspection raised concerns with this arrangement and has recommended that the Health Board provides HIW with an update on the progress in appointing a Professional Head of Radiography and details of how the responsibilities associated with this position are being effectively fulfilled in the interim period. This problem was exacerbated due to a 12-month vacancy in the Executive Director of Therapies and Health Sciences although this post was filled in September 2016.

105 Arrangements for the service below the Head of Radiography are clear. The two Superintendent Radiographers are responsible for the radiographer staff teams based in the north and the south localities. Our survey of radiographers found that they were clear about the arrangements within their local teams but not above it. Radiographers raised concerns that they did not have arrangements in place to cover superintendent absences, highlighting the fragility of the arrangements.

106 Our radiology reports for other health boards set out the differing managerial arrangements.

Radiology is represented on key committees for performance and quality and safety

107 If radiology is to have sufficient profile within the Health Board, radiology staff should have a regular presence on key Health Board committees such as the Patient Experience, Quality and Safety Committee and Workforce and Organisation Development Committee. The Director of Therapies and Health Sciences as the professional lead for the radiographers is a regular attendee at both committees.

108 Across Wales, we found variation in the degree of radiology team representation on key board committees. We found that the radiology service was represented on the key board committees at locality level by the Head of Therapies because the Health Board has been unable to recruit a Head of Radiography.

109 Radiology should feature sufficiently often on committee agendas to help ensure wider awareness of the service and its issues. The Finance, Planning and Performance Committee in November 2016 reported on eight-week waits for diagnostics. It highlighted that the Health Board has met the target for the last six months with no patients breaching eight weeks.

110 The Patient Experience, Quality and Safety Committee in February 2017 received the recent IR(ME)R report and management response which highlighted the activities of the radiography services in Powys. The Committee has also scheduled the Medical Exposure Committee Annual Report on its annual programme of business.

111 Our radiology reports at other health boards highlight the different levels of engagement of radiology staff on key committees.

During the last two years the radiography budget has not changed and the service has underspent on its budget

112 Ongoing financial monitoring is necessary for radiology services to ensure that the service is operating within budget, to anticipate potential budget overspend, and to take remedial action where necessary. Exhibit 13 shows that the budget for radiology services for 2015-16 was the same as for 2014-15 while expenditure shows an underspend of £75,000 in 2014-15 and £113,000 in 2015-16.

Exhibit 13: radiology service budget comparison with expenditure (£ million) 2014-15 and 2015-16

Table showing variance between radiology service budget and actual expenditure. In both 2014-15 and 2015-16, expenditure was less than the allocated budget.

		2014-15	2015-16
Health Board	Budget (£ million)	2.111	2.112
	Expenditure (£ million)	2.036	1.999
	Variance	-3.6%	-5.4%

Source: Wales Audit Office, **Radiology Health Board Survey**

113 Cost savings are included as part of the overall budget allocation for radiography. The budget holders are responsible for achieving these savings and financial monitoring is undertaken at locality level.

114 Our radiology reports at other health boards set out their financial challenges and difficulties achieving cost improvement plans.

The Welsh Government has allocated capital funding to modernise x-ray and ultrasound facilities

115 NHS bodies need to have comprehensive arrangements in place for the maintenance and replacement of radiology imaging equipment. Older imaging equipment has a higher risk of failure and maintenance costs increase, and the image quality declines with age. Radiology equipment more than ten years old is typically considered to no longer be state of the art and technical advances will render the equipment obsolete. The lifespan of equipment shortens with increased use.

116 The Health Board has a current equipment replacement programme. It was initiated in 2007 as part of a 'Strategic Review of Diagnostic Equipment' undertaken by Welsh Health Estates. The contents were updated in 2015 although it contains no detail other than the date equipment is due to be replaced. The programme showed that ultrasound and x-ray equipment at all hospitals would need replacing by 2017-18, other than Welshpool which had new x-ray equipment and associated estates works carried out in 2014-15.

117 The European Society of Radiology[25] advocates that equipment aged:

- up to five years old reflects the current state of technology, and can be upgraded;

[25] European Society of Radiology, **Renewal of Radiological Equipment**, September 2014

- 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.

118 In November 2015, NHS Wales anticipated that 87% of imaging department scanners would require replacement across Wales by 2017[26]. Exhibit 14 shows that all the scanners in the Health Board were five years old or less.

Exhibit 14: age of US equipment at the Health Board as at September 2016

Table showing that the Health Board's scanners were all within the acceptable range for equipment life expectancy with none older than five years compared to seven years' average device life expectancy for high utilisation.

	Location	US
Age of scanners at the Health Board (years)[1]	Brecon War Memorial Hospital	5
	Llandrindod Wells County War Memorial Hospital	3
	Montgomery County Infirmary	3
	Victoria Memorial Hospital	4
	Ystradgynlais Community Hospital	3
Average device life expectancy based on utilisation (years)	High	7
	Mid	8
	Low	9

[1] Where there are more than five scanners, the average age has been provided.

Source: Wales Audit Office, **Radiology Equipment Age Survey**; and European Society of Radiology, **Renewal of Radiological Equipment**, September 2014 (average device life expectancy)

119 There was no capital expenditure on x-ray or ultrasound equipment during 2015-16. For 2016-17, the Health Board submitted a bid to the Welsh Government for the equipment and infrastructure works identified in the table in Exhibit 15 related to x-ray and ultrasound. The total overall bid amounted to the sum of £680,000. The bid was successful and funding for the full £680,000 was confirmed on 26 August 2016. The Director of Planning and Performance told the Finance, Planning and Performance Committee in January 2017 that work on these projects is progressing to plan. The Capital Programme is the responsibility of the Director of Planning and Performance and is monitored by the Capital and Estates Improvement Board.

[26] Diagnostic Service Programme NHS Wales, **All Wales Gantry (MRI, CT, Gamma Camera and Ultrasound) Usage/Capacity**, November 2015

Exhibit 15: capital expenditure for x-ray and ultrasound equipment and related works 2016-17

Table showing where the £680,000 capital investment in x-ray and ultrasound will be spent.

Hospital	Equipment	Detail	Replacement due date	Cost £'000
Brecon War Memorial Hospital	Ultrasound Machine	Direct Replacement	2016-17	£80
Victoria Memorial Hospital, Welshpool	Ultrasound Machine	Direct Replacement	2016-17	£80
Montgomery County Infirmary, Newtown	Ultrasound Machine	Direct Replacement	2017-18	£80
Llandrindod Wells Memorial Hospital	Ultrasound Machine	Ante-Natal Compatible	N/A	£80
Montgomery County Infirmary, Newtown	X-Ray Machine	Direct Replacement	2012-13	£80
	X-Ray Room Refurbishment	Infrastructure		£100
Ystradgynlais Community Hospital	X-Ray Machine	Direct Replacement	2014-15	£80
	X-Ray Room Refurbishment	Infrastructure		£100
Total				**£680**

Source: Powys Teaching Health Board, **Capital Programme 2016, Report of Director of Planning & Performance to the Finance, Planning and Performance Committee,** September 2016 and Equipment Replacement Programme update, June 2015.

120 Our radiology reports at other health boards have a section on the number of scanners per head of population. They provide information on how well the health boards are optimising usage of CT and MRI capacity. The reports also provide information on their equipment replacement programmes.

There are different radiology systems in use across the Health Board and, while they all generally work well, the Health Board's IT infrastructure is fragile

121 Having effective IT systems plays a central role in delivering efficient radiology services. In Wales, the Radiology Information System (RADIS) is a national system created and run by NHS Wales Informatics Service. It is used by all health boards.

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 well with each other to ensure that information easily transfers and updates between systems.

122 Our review found that across Wales, health boards have mixed views on RADIS. Some health boards told us they felt that RADIS is adequate in terms of patient scheduling, clinical reporting and management reporting. However, some health boards expressed concerns that RADIS does not integrate with other systems in use by health boards, and also about the quality of the management reporting, limitations of the clinical reporting and management reporting functions.

123 Electronic requesting systems can enable clinicians referring patients for diagnostic imaging to request and receive updates and the outcomes of radiology requests quickly. In Wales, the functionality of request software is generally limited to providing a template for a request which then has to be emailed to the radiology service.

124 All health boards use Picture Archiving and Communications Systems (PACS). PACS software acquires and archives radiology images electronically, and enables the safe distribution of the image with other health professionals[27]. The report and the scan image together comprise the clinical record of the image. When reporting on images, radiologists can choose to use voice-activated dictation systems to record their report.

125 The Health Board's radiography services use different systems depending on where in the county they are located and which hospital provides their radiologist services. The Health Board's core radiology systems are: RADIS in the North (Welshpool, Newtown and Machynlleth) and Brecon; Carestream in Llandrindod Wells; and Radcare in Ystradgynlais. All sites are linked to PACS systems based in the neighbouring district general hospital.

126 The Health Board expressed concern that there are different versions of RADIS in use across Powys. In the North, the radiographers said that RADIS generally works well allowing electronic transfer of images to the radiologist in Wrexham. The Health Board and Betsi Cadwaladr Health Board have an image exchange portal in place, which means that they can send the image anywhere regardless of which PACS system is used. The radiographers can send their images to some hospitals but not all. Many patients who have an initial x-ray in Welshpool Hospital will go to the fracture clinic at Wrexham so the image will need to be sent on.

127 Our survey of radiographers found that while most had no problems with RADIS software and PACS, one reported problems due to old versions of software, the

[27] PACS is provided by a third party, Fujifilm. 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.

continuing use of Windows XP and networking problems across the Health Board[28]. While we heard that RADIS generally works well, problems do occur because the Health Board's IM&T infrastructure is fragile. In addition, the Health Board only has one support person who knows RADIS, which can result in difficulties accessing support if they are not available. The lack of specialised radiological system support is listed as a risk on the departmental risk register and while funding for a clinical support person has been requested it has not been provided.

128 Our radiology reports at other health boards highlight concerns with radiology information systems and underlying IM&T infrastructure.

Waiting time breaches is the only performance information received by the Board on radiology services

129 Effective monitoring and scrutiny of radiology service performance is important in assessing if the service is supporting delivery of the organisational goals and objectives, and identifying the need to take remedial action. Health boards should use performance data and audit results to monitor and evaluate outcomes delivery and the performance of the radiology departments. Performance monitoring and review should take place at all levels within the organisation, from the operational level up to board level. Performance should be analysed, assessed and monitored at an operational level and reported to and scrutinised by relevant health board committees and the board.

130 Benchmarking enables health organisations to improve performance through comparison with other similar organisations. One source of comparative data that heath boards can have access to is NHS Benchmarking Network (NHSBN) radiology data. The NHSBN collects and analyses radiology data from health organisations across the UK annually and publishes an analysis of its findings. All health boards and trusts in Wales are members of the NHSBN but not all participate in each audit.[29] The Health Board does not participate in the NHSBN radiology audit as they do not provide the full range of imaging services. However, this means that the Health Board cannot compare its performance with that of other healthcare organisations.

131 The total number of diagnostic patients and the number of patients breaching the eight-week target for a specified diagnostic in the Health Board's hospitals is

[28] At the time of our review, the Health Board had not upgraded from Windows XP to Windows 7, and thus, due to compatibility issues, had to use an older version of PACs, until the upgrade was complete.

[29] Hywel Dda University Health Board and Powys Teaching Health Board do not participate or provide data to the radiology module.

reported as a part of the Health Board's integrated performance report (IPR)[30]. The IPR also provides data on the number of patients waiting more than eight weeks at all health boards in Wales although they do not have any indication of the number of Powys patients affected. The IPR is reviewed at each meeting of the Finance, Planning and Performance Committee and they have not breached the target since March 2016.

132 From the information received from the Health Board it is not clear if any other performance information is reported about the radiology service. Other areas that could be reported are reporting times, overall activity levels and number of patients who do not attend appointments (DNAs).

133 Our radiology reports at other health boards provide information on how they are reporting and monitoring radiology performance.

[30] The integrated performance report sets out the Health Board's performance against the Welsh Government's NHS Outcomes Framework 2016-17 targets and measures and progress on the implementation of the Integrated Medium Term Plan.

Appendix 1

Audit approach

We carried out a number of audit activities between June 2016 and September 2016. Details of these are set out below.

Exhibit 16: audit approach

Table outlining audit approach used for this review.

Method	Detail
Information and data collection	We used health-board-level and hospital-site-level survey forms to capture data and information on radiology services, which were completed by the Health Board. We also utilised data and information from a number of other sources, including: • Stats Wales: Radiology Diagnostic Waiting Times • National Reporting and Learning System (NRLS) data: Patient safety incidents • HIW IR(ME)R (Ionising Radiation (Medical Exposure) Regulations): diagnostic incidents by health board between 2010 and 2016
Document request	We requested and reviewed documents from the Health Board including: • terms of reference and membership of the Health Board's main radiology group, 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 the board and committees along with operational papers including safety reports; • examples of the Health Board's main radiology service performance reports or performance scorecards from the past six months; • the most recent financial report showing progress towards the savings/cost improvement plan; • the radiology equipment replacement plan; • the radiology risk register; • guidance provided to hospital referrers and GPs on expectations when referring patients to the service; and • examples of any work carried out over the past two years to measure radiology patient experience.

Method	Detail
Interviews	We interviewed a small number of staff: • Lead Therapist • superintendent radiographers • locality general managers
Focus groups	We carried out focus groups with GP leads and Health Board managers in the North, Mid and South clusters.
Survey	We undertook a survey of radiographers.

Appendix 2

The Health Board's management response to the recommendations

The following table sets out the recommendations from the report and the management response.

Exhibit 17: The Health Board's management response to the recommendations:

Ref	Recommendation	Intended outcome/ benefit	High priority (yes/no)	Accepted (yes/no)	Management response	Completion date	Responsible officer
R1	Develop an action plan detailing how delays with reporting will be addressed sustainably.	To ensure reports are provided within agreed timescales so that patients receive imaging results in a timely way.	Yes	Yes	The Primary and Community Care Project Board oversees the Diagnostic Project. The plain x-ray workstream will review all the SLAs to identifying reporting issues – a summary of findings will form the basis for dialogue and changes to future SLAs with provider organisations.	April 2018 The review will inform revised SLAs with commissioning and provider organisations.	Plain x-ray Workstream Lead – Neville Davies, Team Leader (South)

Ref	Recommendation	Intended outcome/ benefit	High priority (yes/no)	Accepted (yes/no)	Management response	Completion date	Responsible officer
R2	Review the Wales Audit Office reports on radiology services for Health Boards providing MRI, CT and ultrasound to understand access and reporting issues to inform commissioning discussions with provider hospitals.	Better understanding of the services in the provider Health Boards to inform the diagnostic strategy development.	Yes	Yes	Issues to be reviewed and form part of discussions with provider hospitals. This will be incorporated into the current draft Diagnostic Strategy.	September 2017	Lorraine Haynes, Operational Lead, Lead Therapist (South)
R3	The Health Board needs to identify the scale of the rising demand for all forms of diagnostic imaging, including MRI and CT scanning, and how it intends to meet it as part of the development of its strategic plan for diagnostic services for the population of Powys for the next five years.	Improved understanding of the totality of potential extra demand and impact on diagnostic strategy development.	Yes	Yes	Plain x-ray workstream to identifying business intelligence needs. The next stage is to establish an MRI, CT scanning workstream under the Diagnostic Project. Lead Therapist (South) to lead demand analysis as Operational Lead.	September 2017	Lorraine Haynes, Operational Lead, Lead Therapist (South)

Ref	Recommendation	Intended outcome/ benefit	High priority (yes/no)	Accepted (yes/no)	Management response	Completion date	Responsible officer
R4	Over the next year, increase mandatory training rates for all radiology staff to at least the Health Board target of 85%.	Better trained staff and improved patient safety. Helping to meet corporate mandatory training target.	Yes	Yes	As at 06/04/2017 the compliance rate is 71.47%. Manual handling training is not available until May 2017. Other classroom training is currently unavailable on ESR. Teams are completing all training that is currently available. Team Leads are actively monitoring.	April 2018	North: Rachel Pritchard, Team Leader Vic Deakins, Lead Therapists North South: Neville Davies, team Leader Lorraine Haynes, Lead Therapist

Ref	Recommendation	Intended outcome/ benefit	High priority (yes/no)	Accepted (yes/no)	Management response	Completion date	Responsible officer
R5	Strengthen performance management by widening the range of performance measures aligned to the business and service objectives to include such as delays with reporting.	Improved understanding of service performance to inform and support continuous improvement.	Yes	Yes	Lead Therapists (North & South) to establish performance measures working with clinic leads and professional advisors (once current draft SLAs and honorary contracts are confirmed). Performance measures will be reported via the directorate reviews and at Locality Management Teams.	April 2018	Vic Deakins and Lorraine Haynes, Lead Therapists (North & South) with Professional Advisors (SLAs – Betsi Cadwaladr University and Cwm Taf)

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