![GIG NHS Cymru Wales logo] **Bwrdd Iechyd Prifysgol Hywel Dda University Health Board**

CYFARFOD BWRDD PRIFYSGOL IECHYD **UNIVERSITY HEALTH BOARD MEETING**

DYDDIAD Y CYFARFOD: **DATE OF MEETING:**	25 May 2023
TEITL YR ADRODDIAD: **TITLE OF REPORT:**	Radiology Informatics System Programme (RISP) Full Business Case (FBC)
CYFARWYDDWR ARWEINIOL: **LEAD DIRECTOR:**	Andrew Carruthers, Director of Operations
SWYDDOG ADRODD: **REPORTING OFFICER:**	Gail Roberts-Davies, Head of Radiology

Pwrpas yr Adroddiad (dewiswch fel yn addas) **Purpose of the Report** (select as appropriate)
Ar Gyfer Penderfyniad/For Decision

ADRODDIAD SCAA **SBAR REPORT**
Sefyllfa / Situation The Radiology Informatics System Procurement (RISP) Programme was set up in 2019 to procure and modernise a replacement Picture Archiving & Communication System (PACS), Radiology Informatics system (RIS) and Patient Dose Monitoring System (PDMS) for all health boards in Wales. The Programme is supported by a small Programme Management Office comprising of seven staff, that was hosted by the NHS Collaborative until 1 January 2023, when it transferred to Digital Health and Care Wales (DHCW). The RIS is used to record patient demographic details and manage the appointment process. Following the completion of an x-ray or scan, the images are stored in a digital format in PACS, which is then used to manage the clinical reporting process and to display the images and reports for clinicians outside of radiology to review. A full version of this report which included financials was presented to the Sustainable Resources Committee (SRC) as part of the in-committee session on 25th April 2023, the SRC support this project. Due to the commercially sensitive detail contained within this report it has been redacted for the Public Board, however the economic and financial models have been shared with the Board as part of the in-committee session. This report is being brought to the Board for approval to undertake the major RIS and PACS replacement project within Hywel Dda University Health Board (HDdUHB).
Cefndir / Background The current PACS, delivered by Fuji, has been operating since 2013. Depending on Fuji's agreement to extend assistance by an additional year, HDdUHB's contract with Fuji will end in either March 2025 or May 2026. The current RIS is a national system developed and supported by DHCW. Radiology services across the country are facing significant pressure in terms of patient demand, and it is essential that staff are supported by the right digital tools that will enable

them to work more efficiently. RISP provides the opportunity to not only procure replacement systems, but to also modernise and change the way radiology services are delivered across Wales.

An Outline Business Case (OBC) for the RISP programme was signed off by all health boards in 2022. The Full Business Case (FBC) will be taken to all executive boards by the end of May 2023, a redacted version of the FBC is attached at Appendix 1.

In January 2023, all health boards endorsed a recommendation that Philips be awarded a contract for PACS, RIS and PDMS for a period of five years, with an option to extend for a further two years, in annual increments starting in 2024.

Asesiad / Assessment

KEY RISKS/MATTERS FOR ESCALATION TO BOARD/COMMITTEE

- There are challenging implementation timelines for the Programme. Initial discussions with health boards have indicated that these timescales are highly ambitious and raised concern that these will not be met. Any delay in sign off of the FBC will delay when the new contract can be signed. This is of particular importance as there is only a finite amount of time that the incumbent supplier (Fuji), can contractually continue to deliver the existing service.

- Before Philips sign the Master Services Agreement (MSA), all health boards must sign deployment orders for a minimum of 5 years. The deployment order will set out the timescales for local implementation, equipment requested per health board and associated costs. Philips will not commence work until all health boards have signed their deployment orders.

- As the Philips solution will be cloud based, infrastructure costs (Public Sector Broadband Aggregation (PSBA), which connect Welsh public sector organisations to a private, secure, Wide Area Network) have been included in the FBC. These costs have been estimated by each health board, and there is now the opportunity to review and potentially reduce these costs in line with the now known, Philips requirements.

- There is a risk that integration between existing and new systems takes longer than anticipated, noting the complexity of replacing and integrating both PACS and RIS systems simultaneously. Implementation needs to be completed before the end date of the existing Fuji contract, or the end of the termination assistance clause if Fuji agree. Implementation dates for each health board were identified at the OBC stage. However, these need to be confirmed and agreed with Philips so that they can be signed off and included in the deployment orders. There are penalties in the contract that could be applied if either party fails to meet specific deadlines. Locally within the health board Radiology and Digital services are working together to form a local implementation programme board to oversee all aspects of the timely implementation of this project.

- When the current PACS agreement with Fuji ends, Fuji may remove some computerised and digital radiology hardware components that are not within the scope of the RISP Programme. This is the responsibility of individual health boards, however the national RISP team, in partnership with the National Imaging Programme, will support health boards through this transition. This presents an opportunity to modernise service delivery but also a cost pressure in terms of capital required for replacement. The £12.1M of capital funding from Welsh Government investment for equipment over the 2021-2022 and 2022-2023 financial years has significantly helped HDdUHB replace aged, computerised radiology equipment with modern digital systems. However, within

HDdUHB, we still have 4 areas where the less modern computerised units exist, these are at Llandovery and Tenby Hospitals as well as the A&E X-ray room at Bronglais and a general X-ray room at Withybush Hospital. The Head of Radiology is working with RISP board to fully appraise the options to ensure service continuity. Currently the cost of providing a potential solution to this risk has been estimated as £195K to enable the current x-ray units to continue to operate, however it must be noted that the majority of these units are aged and require replacement. This risk has been raised as directorate level risk 1606.

- Following feedback at national implementation meetings held with all health boards, it was identified that additional resources are required to support local implementation. Local implementation will be supported by the Programme's PMO, however health boards will also receive dedicated funding for the following posts, for which they will be responsible for recruiting and employing/back filling these roles:

  o 1 x FTE dedicated (band 7) project manager for 12 months

  o 1 x FTE IT support (band 6) for 3-6 months

  o 1 x FTE PACS/RIS support (band 7) for 3-6 months

  The suggested additional resources have been discussed locally and have been deemed insufficient and does not fit with the local need. The local need has been assessed as a minimum to be the following and so will be an additional cost:

  o 1 x FTE dedicated (band 7) project manager for 24 months

  o 1 x FTE IT support (band 6) for 12 months

  o 2 x FTE PACS/RIS support (band 4) for 24 months

  The additional project support is calculated to be an additional £188K to that included in the Hywel Dda costs.

Economic Case-All Wales
As part of the Economic Case in the FBC, the cost benefit analysis undertaken at OBC was updated to reflect the results of the procurement process and updated cost and benefit assumptions. The results demonstrate that the Preferred Option identified at OBC, which involves procuring a seamless end-to-end solution to replace the existing PACS and RIS systems, continues to offer optimal value for public money since it will result in a Net Present Cost over a 10-year appraisal period. This represents an incremental improvement compared to Business as Usual or Net Present Social Value of £m and a Benefit Cost Ratio of 1.1 (i.e., every £1 of incremental cost will realise £1.10 of incremental benefits).

The updated benefits analysis confirmed that investment in RISP will deliver a range of financial and non-financial benefits due to more streamlined workforce, increased automation, greater accuracy and reliability, and reduced reliance on paper-based systems. This will result in benefits such as productivity gains worth £2.2m due to reduced need for manual interventions to manage activities such as referrals, reporting and providing MDT images. It should be noted that these are not expected to be cash releasing. The benefits of this investment can be seen in the following table:

No	Investment Objective	Benefit ID	Benefit
RISP-IO1	To integrate Picture Archive and Communication System (PACS), Patient Dose Management System (PDMS) and Radiology Information System (RIS) systems into one single solution (with the ability for further integration with ETR and results acknowledgement systems) that all Health Boards and Trusts implement in Wales by 2026	B03	Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outcomes)
		B08	Reduced lost time waiting for system to respond
		B22	Contributes to reduced inequalities
RISP-IO2	To improve and optimise patient care by reducing the number of incidents caused due to missing/insufficient clinical information/reports, resulting in fewer misinterpretations and delayed diagnoses, by providing an integrated imaging patient record across Wales for all Health Boards and Trusts in Wales by 2026	B01	Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outcomes)
		B06	Reduced risk of missing urgent diagnosis
		B19	Earlier diagnosis and improved clinical decision-making leads to better patient outcomes
		B20	Improved Patient Experience
RISP-IO3	To reduce the number of administrative resources required to support cross-boundary patient pathways, because of shared access for imaging and reporting, 12 months after contract commencement in a health board area	B02	Reduced manual intervention to manage referrals
		B04	Reduced manual intervention for reporting and acknowledgement
		B05	Reduced reporting costs
		B07	Reduced manual intervention to review lists
		B09	Reduced risk of repeat examinations and inappropriate radiation dosage
		B10	Effective and efficient MDT meetings supporting cross Health Board boundary workings and streamlining patient care
		B15	Improved strategic planning / better demand management
		B21	Improved workforce experience
RISP-IO4	To reduce the carbon footprint of PACS and RIS systems by decreasing the use of paper-based systems for referring and reporting in radiology and utilising fewer devices that have higher energy consumption across all Health Boards and Trusts in Wales by 2026	B11	Reduced reliance on paper-based systems leading to paper, printing, and manual storage cost savings
		B12	Reduced reliance on paper-based systems leading to reduced manual intervention
		B28	Greener energy as a result of cloud-based system
		B29	Greater energy efficiency as a result of cloud-based system
		B30	Reduced number of devices
RISP-IO5	To reduce the number of repeat examinations and hence inappropriate radiation dosage for patients, through improved access to imaging information and a standardised data sharing and recording process, by all Health Boards and Trusts in Wales by 2026	B13	Reduced risk of errors
		B14	Streamlined and reduced training requirements
		B16	Improved accuracy of referral codes
		B17	Increased ability for optimisation between patients or devices
		B18	Reduced amount of unreliable/unusable data leading to increased sample size of dose audits
		B23	Improved ability to accurately and frequently access radiation dosage to evidence statutory compliance
		B24	Increased compliance for recording dosage in PDMS vs manual entry
		B25	Increased accuracy of patient dose record
		B26	Improved personalisation of dose assessments
		B27	Reduced amount of unreliable/unusable data leading to increased sample size of dose audits

Financial Case

As outlined in the Economic and Commercial Cases, the preferred option involves procuring a seamless end-to-end solution from the Preferred Bidder which will replace the existing PACS and RIS systems. The Financial Case outlines the costs involved in procuring and implementing the solution as well as the resulting ongoing costs. In summary, based on the tendered costs from the Preferred Bidder and updated programme costs, delivery of the preferred option requires capital investment of £25.9m and non-recurring revenue funding of £2.1m.

Overview - Capital Requirements- Whole Project Costs

Capital funding of £25.9m is requested from Welsh Government to invest in the Preferred Bidder's initial solution charges as well as capitalisable programme resource and local infrastructure requirements. This assumes that VAT is not recoverable on either the solution charges or the infrastructure costs.

This is a £5.3m increase on the £20.6m capital funding committed by Welsh Government at OBC as a result of:

- £1.7m additional Programme resource requirements that have been identified to ensure a robust implementation programme is in place to deliver the programme.

- £3.6m additional local infrastructure costs (including VAT) that have been identified to ensure the appropriate infrastructure is in place to support the preferred solution.

Overview - Non-recurring Revenue Requirements

One-off revenue funding of £4.3m is required to invest in programme resource that cannot be capitalised during the 3-year implementation period. This includes:

- £2.1m requested from Welsh Government, which is a £0.9m increase on the £1.2m committed at OBC.

- £2.2m HB contribution during 2023/24 to 2025/26. Given that health boards have already contributed £0.7m during 2022/23, this represents a £0.9m increase on the £2.1m identified at OBC.

Overview - Ongoing Revenue Implications

As outlined at OBC, there are minimal revenue implications for health boards since the current PACS/WRIS costs of £m p.a. will cover both the ongoing solution service charges of £m and the infrastructure revenue costs of £m p.a. There will however be a cost pressure during 2024/25 and 2025/26 of £m due to double running of the existing systems and implementing the local infrastructure. It should be noted that this may be reduced depending on phasing of infrastructure costs.

Respective Costs for Hywel Dda

Solution costs are based on tendered costs submitted by the preferred bidder. The preferred bidder has allocated these costs as follows:

- **Initial Charges:** Includes initial investment in hardware and software, professional services for testing, training, project management, data migration and implementation during the implementation period (2024/25 – 2025/26). Current assumption is that VAT is not recoverable on the initial charges although this is under investigation.
- **Service Charges:** Includes ongoing annual maintenance and support during the term of the contract.

Costs have been allocated to health boards based on the contract value apportionment and stable operation dates provided to the preferred bidder as part of the procurement process. It is anticipated that the current baseline costs will continue until each health board's stable operation date for the new system plus one month of dual running costs. The table below shows the stable operation date for HDdUHB and the number of months that the current PACS/WRIS costs are incurred during the three-year implementation period.

As a result, the following total costs are included in the 10-year appraisal period for the existing PACS/RIS system.

	Stable Operation Date	Number of months of current PACS/WRIS costs incurred during implementation period		
		2023/24	2024/25	2025/26
Hywel Dda UHB	Feb-25	12	11	0

Infrastructure

Local infrastructure costs are based on estimated capital and revenue costs for Public Sector Broadband Aggregation (PSBA) networks, network switches and firewalls. Costs have been allocated to health boards based on actual requirements. The FBC includes new hardware, including workstations for each health board.

The resulting costs for Hywel Dda demonstrates an overall cost benefit of £833,078 to HDdUHB. The 10 year benefit quoted does not include the cost pressures resulting from the additional staffing requirement for the implementation team or the costs associated with the legacy equipment requirements discussed earlier (approximately £383K in total).

Argymhelliad / Recommendation

The Board is requested to receive assurance from the report and provide a decision to progress the RISP replacement in HDdUHB, whilst noting the matters brought to the attention of the Board.

Amcanion: (rhaid cwblhau) Objectives: (must be completed)	
Committee ToR Reference: Cyfeirnod Cylch Gorchwyl y Pwyllgor:	2.6 Regularly review contractual performance with key delivery partners.
Cyfeirnod Cofrestr Risg Datix a Sgôr Cyfredol: Datix Risk Register Reference and Score:	1606 (score 8)

Safon(au) Gofal ac Iechyd: Health and Care Standard(s):	2.9 Medical Devices, Equipment and Diagnostic Systems 3.4 Information Governance and Communications Technology 3.5 Record Keeping 5. Timely Care
Amcanion Strategol y BIP: UHB Strategic Objectives:	3. Striving to deliver and develop excellent services 5. Safe sustainable, accessible and kind care 6. Sustainable use of resources
Amcanion Cynllunio Planning Objectives	6K_22 workforce, clinical service and financial sustainability 5R_22 Digital Inclusion
Amcanion Llesiant BIP: UHB Well-being Objectives: Hyperlink to HDdUHB Well-being Objectives Annual Report 2018-2019	2. Develop a skilled and flexible workforce to meet the changing needs of the modern NHS

Gwybodaeth Ychwanegol: Further Information:	
Ar sail tystiolaeth: Evidence Base:	Redacted FBC at Appendix 1
Rhestr Termau: Glossary of Terms:	Included within the report
Partïon / Pwyllgorau â ymgynhorwyd ymlaen llaw y Pwyllgor Adnoddau Cynaliadwy: Parties / Committees consulted prior to In-Committee Sustainable Resources Committee:	RISP Programme Board Hywel Dda Digital Director and Deputy Digital Director Hywel Dda Finance Team

Effaith: (rhaid cwblhau) Impact: (must be completed)	
Ariannol / Gwerth am Arian: **Financial / Service:**	Included within Appendix 1
Ansawdd / Gofal Claf: **Quality / Patient Care:**	Included within Appendix 1
Gweithlu: **Workforce:**	Included within Appendix 1
Risg: **Risk:**	Included within Appendix 1
Cyfreithiol: **Legal:**	Included within Appendix 1
Enw Da: **Reputational:**	Included within Appendix 1
Gyfrinachedd: **Privacy:**	Included within Appendix 1

Cydraddoldeb: Equality:	Included within Appendix 1

Radiology Informatics System Programme

Full Business Case

Contents

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Revision History

Amended by	Version	Status	Date	Purpose of Change
Joao Martins	0.1	Draft	13/04/2023	Single document, all cases added. Document formatting
Joao Martins	0.2	Draft	14/04/2023	Small amendments
Gareth Cooke	1.0	Version 1	14/04/2023	Small amendments
Gareth Cooke	2.0	Version 2	18/04/2023	Updated section on local variations and considerations
Anouska Huggins	3.0	Version 3	25/04/2023	Updated to reflect Version 8.0 of the Financial Model
Gareth Cooke	4.0	Version 4	17/5/2023	Redacted commercial sensitive information

Reviewers

Date	Version	Name	Position
14/04/2023	1.0	Gareth Cooke	RISP Programme Lead
14/04/2023	0.2	John Collins	RISP SME
14/04/2023	0.2	Joao Martins	RISP Principal Project Manager

1. The Strategic Case

1.1 Introduction

The Radiology Informatics System Procurement (RISP) Programme was set up in 2019 to procure replacement PACS, RIS and PDMS systems for all health boards and trusts in Wales, due to the current PACS contract with FUJIFILM ending in 2023/2024 (DHCW provide the RIS). In addition to the procurement exercise, RISP provides the opportunity for national service improvement that will underpin future service delivery models that are based around the separation of acute and planned care facilities and the establishment of regional diagnostic centres. By delivering an "All Wales" view of the radiology record and ensuring that available functionality is not constrained by the setting in which care is being delivered RISP ensures that the ability to work across traditional organisational boundaries is embedded at the heart of the solution and will improve the quality of services delivered to patients and will help drive efficiency by reducing duplication, eliminating the requirement to manually request the transfer of imaging e.g. for regional MDT's or acute trauma or stroke care.

PACS refers to Picture Archiving and Communications System. Following an imaging procedure such as CT scan or X-ray examination, a PACS system stores images and the clinical reports in a digital system. RIS refers to Radiology Information System, which is a system which runs the "business" of imaging from scheduling patient examinations, room and modality utilisation and storing all the patients' imaging reports, records, and associated information.   A PDMS refers to Patient Dose Management System, which automatically gathers, stores and analyses information on patients' radiation exposure from medical imaging involving ionising radiation.

This Strategic Case sets out the context and the case for change, together with the objectives for the Programme. This case demonstrates how the RISP programme will deliver the vision of a seamless end-to-end electronic solution that enables the Radiology service to provide a high quality, safe and timely clinical imaging service for the population of Wales.

This Strategic Case will describe the main components of the RISP programme, the risks associated with its development and implementation and how they can be mitigated to ensure success.

1.2 The Strategic Context

Imaging is a crucial clinical diagnostic and surveillance tool to investigate, monitor, and treat diseases and injuries. It is integral to all clinical services -hospital-based clinicians and general practitioners refer patients to radiology departments to undergo a wide range of imaging examinations. The nature of technological development and advances in drug, surgical and medical technologies have meant that there is a key dependency on imaging investigations to deliver timely and accurate diagnoses and assessments, facilitating timely care. The data from these investigations are evaluated, analysed and reviewed by a clinical radiologist, radiographer, or sonographer to produce a clinical report, which the requesting clinician will use to guide the management of the patient.

Diagnostic radiology has evolved over the last century from the plain film x-ray to the modern suite of digital imaging services and different diagnostic procedures, which are integral to healthcare across Wales. Modern diagnostic imaging is vital to diagnosis and treatment in modern patient care. Radiology services have always been delivered from a wide range of healthcare settings in all Health Boards and Trusts across Wales; the anticipated future development of Regional Diagnostic Hubs will expand the range of services provided outside typical hospital environments. Imaging services provide a core diagnostic function, along with therapeutic interventional imaging, in delivering key patient pathways, including screening services, cardiac, stroke, cancer, orthopaedics and emergency care, which facilitates timely diagnosis for patients and facilitate quality patient outcomes.

Equitable access to a robust, quality, and timely imaging service and its output is vital for all clinicians to ensure optimal patient outcomes.

The diagram below illustrates key radiology techniques commonly used across the NHS.
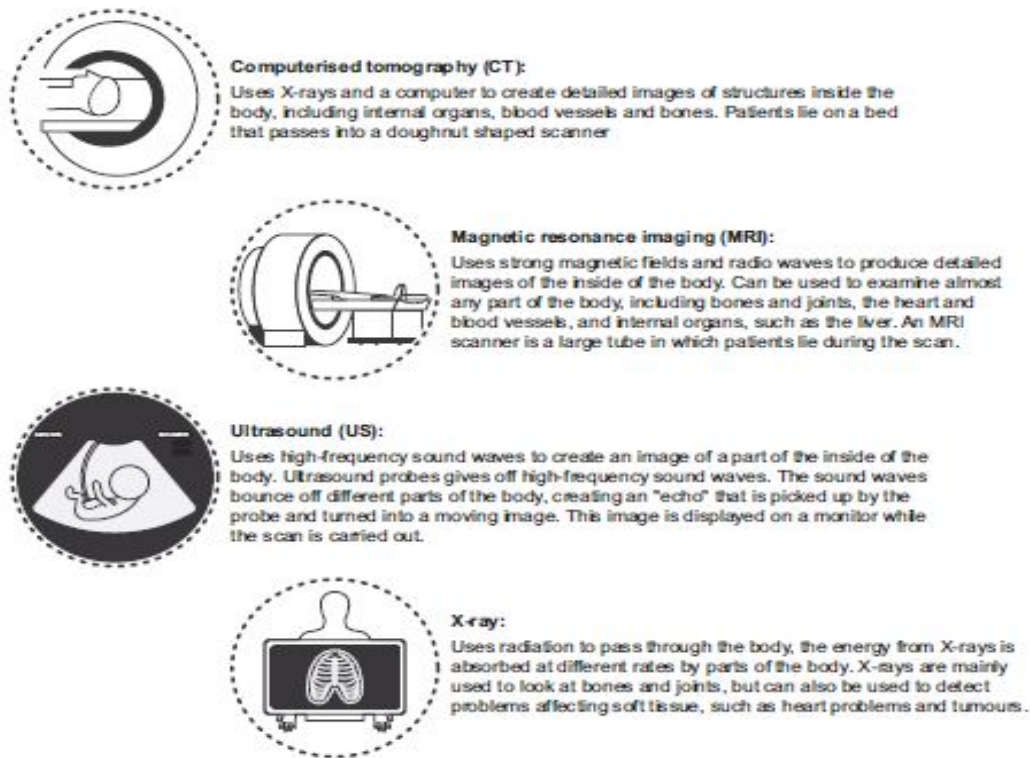
Computerised tomography (CT):
Uses X-rays and a computer to create detailed images of structures inside the body, including internal organs, blood vessels and bones. Patients lie on a bed that passes into a doughnut shaped scanner

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.

Diagram 1 – Illustration of key radiology techniques

1.3 Organisational Overview

The radiology service across Wales is delivered in several settings. Most radiology activity is provided through District General Hospitals and community sites at the University Health Boards (UHBs) and Trusts. Powys Teaching Health Board operates services from several community hospital sites with clinical and professional support from the adjacent UHBs and Trusts in England; Screening Services operate from fixed locations and several mobile units across the country. Imaging facilities are migrating outside of the secondary care setting based on the model of Community Diagnostic Centres. The rapid adoption of new portable technologies also allows Point of Care (POC) testing at patients' bedside or at home. The solution procured will need to recognise the current mix of rural and urban populations and locations where care is delivered in Wales whilst be able to facilitate and support future diagnostic delivery structures.

The main sites within each organisation are shown below:

- **Aneurin Bevan UHB:** The Grange University Hospital, the Royal Gwent Hospital, Nevill Hall Hospital and Ysbyty Ystrad Fawr;

- **Betsi Cadwaladr UHB**: Ysbyty Glan Clwyd, Wrexham Maelor Hospital and Ysbyty Gwynedd;

- **Cardiff and Vale UHB:** University Hospital of Wales and University Hospital Llandough;

- **Cwm Taf Morgannwg UHB:** Prince Charles Hospital, Royal Glamorgan Hospital; Princess of Wales Hospital;

- **Hywel Dda UHB:** Bronglais General Hospital, Glangwili General Hospital, Withybush General Hospital and Prince Phillip Hospital;

- **National Imaging Academy**

- **Powys Teaching Health Board**: Brecon War Memorial Hospital, Llandrindod Wells County War Memorial Hospital, Machynlleth Community Hospital, Montgomeryshire County Infirmary, Victoria Memorial Hospital, Ystradgynlais Community Hospital;

- **Public Health Wales Trust**: Breast Test Wales sites in Cardiff, Swansea, Llandudno, Wrexham;

- **Swansea Bay UHB:** Morriston Hospital, Neath Port Talbot Hospital, and Singleton Hospital;

- **Velindre University NHS Trust**, Velindre Cancer Centre.

1.4 Business Strategies & Reports

Several national strategies and reports inform this investment (see Appendix S1 for full list of reports), key ones include:

- A Healthier Wales: Our plan for health and social care (2018)
- The Imaging Statement of Intent (2018)
- Wales Audit Office Radiology Services Report (2018)
- Digital Architecture Review

The Well-being of Future Generations (Wales) Act 2015 requires public bodies in Wales to think about the long-term impact of their decisions, to work better with people, communities,

and each other, and to prevent persistent problems such as poverty, health inequalities and climate change. The purpose of the RISP Programme aligns to delivering the digital needs of A Healthier Wales - one of the seven core well-being goals of the Future Generations Act, and Welsh Government's long-term plan for Health and Social Care; the other well-being goals also resonate with our approach, but we have more to do.

Achieving real digital transformation of public services provides an opportunity to support the ways of working described in the Well-being of Future Generations (Wales) Act. RISP will support the joining up of digital public services to improve patient experience and positive outcomes, notably helping support Mission 6: data and collaboration within the Digital Strategy for Wales.

The recently published NHS Wales Decarbonisation Strategic Delivery Plan demonstrates how NHS Wales can play its part in the recovery and its commitment to the Wellbeing of Future Generations (Wales) Act 2015, which directs the Programme to consider long-term persistent problems such as poverty, health inequalities, and climate change. We will work with the appointed supplier to develop a low carbon approach to implementation and operation of the services and look to minimise reliance on paper-based documents and thereby reduce unnecessary waste. The RISP programme has identified several decarbonisation benefits, including greener energy, more efficient use of energy and reductions in consumables and travel that can be delivered because of the using cloud or large scale data centre -hosted systems, new hardware technologies and remote management and support services.

A Healthier Wales: Our plan for health and social care

A Healthier Wales, the Government's plan sets out a long-term vision of 'a whole system approach to health and social care', highlighting the need for better use of digital, data, and communication technologies.

The Imaging Statement of Intent (ISoI)

Key priority areas to support the development of modern, sustainable Imaging services are set out in the Imaging Statement of Intent published in March 2018 by Welsh Government.

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The statement is aligned to "A Healthier Wales" as it sets out clear objectives for radiology including the need for informatics systems to be secure with a robust IT infrastructure that operates pan-Wales.

The Wales Audit Office (WAO) Radiology Services Report

The WAO Radiology Services Report published in November 2018 summarises the key messages from the Auditor General's local work on radiology services. It highlights issues raised by the Health Boards around radiology informatics systems. The findings set out in the Auditor General's separate report on "Informatics Systems in NHS Wales " include:

- Wales-wide radiology IT system challenges and weaknesses in local IT infrastructures inhibit radiology services' efficiency.
- Radiology services are well managed operationally, but there is scope to strengthen board-level scrutiny and the strategic planning of services.

Digital Architecture Review

Welsh Government commissioned a review of digital delivery in Wales following the Public Accounts Committee report on "Informatics Systems in NHS Wales" published in November 2018. The Digital Architecture Review 'explored how digital systems are designed to work together ' across Wales.

RISP will align with these strategies by supporting efficient and effective clinical care and utilising vendor-agnostic and future-proof technologies to deliver the vision of "a seamless end-to-end electronic solution, from receipt of a referral to the delivery of a radiology report" (electronic test request, receipt of radiology referral to delivery and acknowledgement of radiology report) that will enable the transformation of imaging services and other critical areas of work.

Digital Strategy for Wales

The Digital Strategy for Wales aims to ensure people experience modern and efficient public services supported by effective and ethical use of data. The RISP programme will support this strategy by procuring an integrated system that will ensure information is easily transferred

and updated, allowing users to monitor the status of a patient going through diagnosis, treatment, and recovery pathways.

1.5 The Case for Change

Investment Objectives

The following investment objectives have been identified and agreed during discussions in workshops, presentations, and board meetings:

Table 1: Investment Objectives

No.	Investment Objectives
RISP-IO1	To integrate Picture Archive and Communication System (PACS), Patient Dose Management System (PDMS) and Radiology Information System (RIS) systems into one single solution (with the ability for further integration with ETR and results acknowledgement systems) that all Health Boards and Trusts implement in Wales by 2026
RISP-IO2	To improve and optimise patient care by reducing the number of incidents caused due to missing/insufficient clinical information/reports, resulting in fewer misinterpretations and delayed diagnoses, by providing an integrated imaging patient record across Wales for all Health Boards and Trusts in Wales by 2026
RISP-IO3	To reduce the number of administrative resources required to support cross-boundary patient pathways, because of shared access for imaging and reporting, 12 months after contract commencement in a health board area
RISP-IO4	To reduce the carbon footprint of PACS and RIS systems by decreasing the use of paper-based systems for referring and reporting in radiology and utilising fewer devices that have higher energy consumption across all Health Boards and Trusts in Wales by 2026
RISP-IO5	To reduce the number of repeat examinations and hence inappropriate radiation dosage for patients, through improved access to imaging information and a standardised data sharing and recording process, by all Health Boards and Trusts in Wales by 2026

Current position

Radiology services within the current Health Board and Trust structures and configuration tends to drive care delivery within the traditional organisational boundaries.

PACS and WRIS have been deployed in line with these boundaries, and subsequent changes to organisational arrangements have been made more difficult because of a siloed approach.

Delivering cross-organisational working with the current system is possible, but it isn't easy to configure and maintain. As a result, regional working is typically a low-volume, high-

maintenance, and time inefficient activity rather than a core component of our working arrangements.

Increasingly clinical care is delivered across organisational boundaries with, for example, regional MDTs for cancer and non-cancer diagnoses and cross-border referrals to England for tertiary services in stroke, cardiac and neurology, necessitating a more patient and pathway focussed approach to the delivery of digitally enabled clinical systems.

Challenges

- Increasing demand for Radiology services in the form of continuous growth in the number of referrals for CT scans, MRI scans (10% annually) etc., is outstripping scanning and reporting capacity, with the current workforce struggling to keep pace with the change.

- Capacity and demand mismatch results in the utilisation of locums, outsourcing and teleradiology services to deliver timely service. This has resulted in an accelerating cost pressure, and future projections indicate this situation will persist.

- The core Radiology IT system is not meeting health boards' and Trusts' needs to deliver seamless imaging care for patients, which is often delivered across health board boundaries. Further weaknesses are identified in local IT infrastructures that impact on performance and availability of the solutions.

- The lack of a national Radiology dataset hinders the collation of Radiology activity at a national level; this makes painting the national picture difficult and unnecessarily time-consuming.

These challenges illustrated above are expanded upon below:

Demand

There is ever-increasing justified demand for all imaging aimed at earlier diagnosis to improve outcomes; examples include earlier-stage cancer interventions & treatment modification, prevention of unnecessary exploratory surgery, and informing surgical planning to reduce postoperative morbidity and mortality risk with targeted intervention.

FBC V3 - 25 April 2023   Commercial-in-Confidence

Several factors drive this increase in demand, including demographic changes, new clinical guidelines, lower thresholds for referral, advances in technology and understanding how disease features present themselves on diagnostic images.

This increase in demand has meant that in 2019, not one health board in Wales could meet its reporting requirements within the internal reporting capacity available. Clinical Directors of radiology departments at six of the seven health boards (60%) in Wales indicated there were not enough radiologists in their department to deliver safe and effective patient care.[1]

Workforce

The lack of a sufficient radiology workforce is the biggest challenge both Welsh & UK radiology departments face. These shortages vary in severity between the different regions of Wales and negatively impact patient care. Demands for diagnostic imaging have continued to increase for many years and have been further exacerbated by the covid-19 pandemic. The expansion of the imaging workforce and a significant drive to change ways of working are vital to meet these increasing demands (Richards Report). Workforce effectiveness and productivity need to be maximised wherever possible, which is difficult to achieve with the current systems.

The Royal College of Radiologists (RCR) annual workforce survey highlights key concerns for Wales. It suggests Wales' radiologist workforce is understaffed by 38% - the most significant shortfall in any UK nation. It means Wales lags significantly behind the UK and the EU average for the number of radiologists per head of population- Wales has 7.8 radiologists per 100,000; the UK average is 8.6, and the EU average is 12.8. The RCR 2021 Workforce report identified that whilst there has been a steady growth in the UK Radiologist workforce over the last five years, the report highlights that Wales has had some of the slowest growth in the UK in terms of Consultant Radiologist numbers at only 2% per annum. This is further compounded by Wales having an older Clinical Radiology workforce, with the highest number due to retire in the next five years (23%). [Taken from page 23 of the 2021 census report.]

Wales also has the most severe radiologist shortage of any UK nation. If nothing improves, the Royal College of Radiologists (RCR) predicts the UK's 33% actual radiologist shortfall will hit 44% by 2025.

Over the past 5 years since 2016, there has been an increasing reliance on outsourcing and international recruitment, with a reduction of 6% in staff recruitment from the UK and the same % increase in recruitment from non-EEA countries. However, Radiology Service Managers in Wales currently report increasing difficulties in sourcing locum or agency staff, both medical and Radiographers. These difficulties increase for Organisations located in the West and those covering rural areas of Wales.

On patient safety, the College says 60% of Wales's imaging directors do not have enough consultants to keep patients safe. Wales also has the worst interventional radiology (radiologists undertaking procedures) provision of any UK nation, with 60% of health boards unable to provide 24/7 rotas or transfer arrangements for patients needing interventional care. In Wales, the vacancy rate in 2021 has dropped from 10% to 8%. However, it is important to note that vacancy data provides limited insight into the extent of workforce shortfalls. Vacancies do not reflect the entire shortfall as several factors, including budgets or a lack of suitable candidates, constrain vacancies. The effects of the pandemic have magnified these issues.

Waiting Times

The number of patients on radiology waiting lists has increased by 50% since December 2019, with almost 30% of patients waiting longer than 8 weeks at the end of October 2022. There is significant variation between Health Boards and modalities, and these delays and inequalities will likely persist without a more concerted effort to address them. Whilst RISP won't fundamentally eliminate workforce and equipment short falls by enabling a regional and national view of the patient record, supporting cross-organisational working, improving operational efficiency and providing insights that allow better decisions around resource allocation RISP will maximise the use of the available skills and resources.

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Morale

At the start of April 2020, the RCR polled 1,089 consultants around the UK about their feelings about working in the NHS post-Covid. 37 were from Wales, and of those:

- 41% felt demoralised (individuals)

- 43% intended to cut their hours

- 11% say they planned on leaving the NHS in the next 12 months – according to the RCR, this is three times the standard leaving rate.

RCR census 2021 identified that 98% of clinical directors are worried about morale, stress and burnout.

Table 2: Regional breakdown of RCR workforce data[2]

	All radiologists (consultants and trainees) per 100,000 EU average is 12.8	2020 consultant radiologist headcount	2020 full-time equivalent (FTE) consultant numbers	Increase in FTE consultants 2019-2020	2020 FTE % shortfall and consultant numbers needed to meet service and safety needs
UK	8.6	4,277	3,902	+ 170 (from 3,732)	33% (1939)
England	8.5	3,587	3,267	+ 146 (from 3,120)	34% (1675)
Scotland	9.1	354	324	+ 5 (from 319)	29% (130)
Wales	7.8	169	156	+ 0 (from 156)	38% (97)
Northern Ireland	11.1	168	156	+ 19 (from 137)	24% (48)

Table 3: Radiologists availability survey

	Hospital radiology managers who say they do not have enough consultants to provide safe care	Trusts/health boards without the radiologists or transfer arrangements to provide safe 24/7 interventional radiology services
UK	58%	47%
England	58%	47%

Scotland	65%	40%
Wales	60%	60%
Northern Ireland	33%	44%

Reporting Costs

To meet the rising demand for reporting, health boards are turning to insource (additional payment to contracted consultant radiologists to report outside of core contracted hours) and private sector outsourcing companies. Expenditure on outsourcing and insourcing has quadrupled since 2014 to an estimated £8.3 million in 2018 and is forecast to continue to rise. The RISP needs to support a seamless, undisrupted workflow to allow the clinical reporting of imaging to occur most efficiently, given workforce constraints.

RCR identified that in 2020/21, £178m was spent on insourcing, outsourcing and ad-hoc locums across the UK, the equivalent to 1,876 CR Consultant salaries (or half the entire current CR workforce). These short-term fixes are helping to manage workload, but demand for imaging in the UK continues to increase, and these measures will ultimately not be sustainable. For Wales, Health Education and Improvement Wales have again committed to funding 22 additional training places, but this won't be sufficient to meet demand, with there being an estimated shortfall of 77 consultants currently, rising to 146 by 2026.

Informatics

Radiology is a high throughput, capital-intensive service that requires an efficient and effective IT system to deliver an efficient radiology service that maximises the use of expensive equipment.

The diagram below illustrates a typical journey to and through the radiology service. Integration between the individual components of the RISP solution are key to delivering operational efficiency and maximising the use of available resources whilst integration with external systems e.g. referral solutions, clinical portals and results acknowledgement, underpin more efficient clinical pathways across clinical specialities.
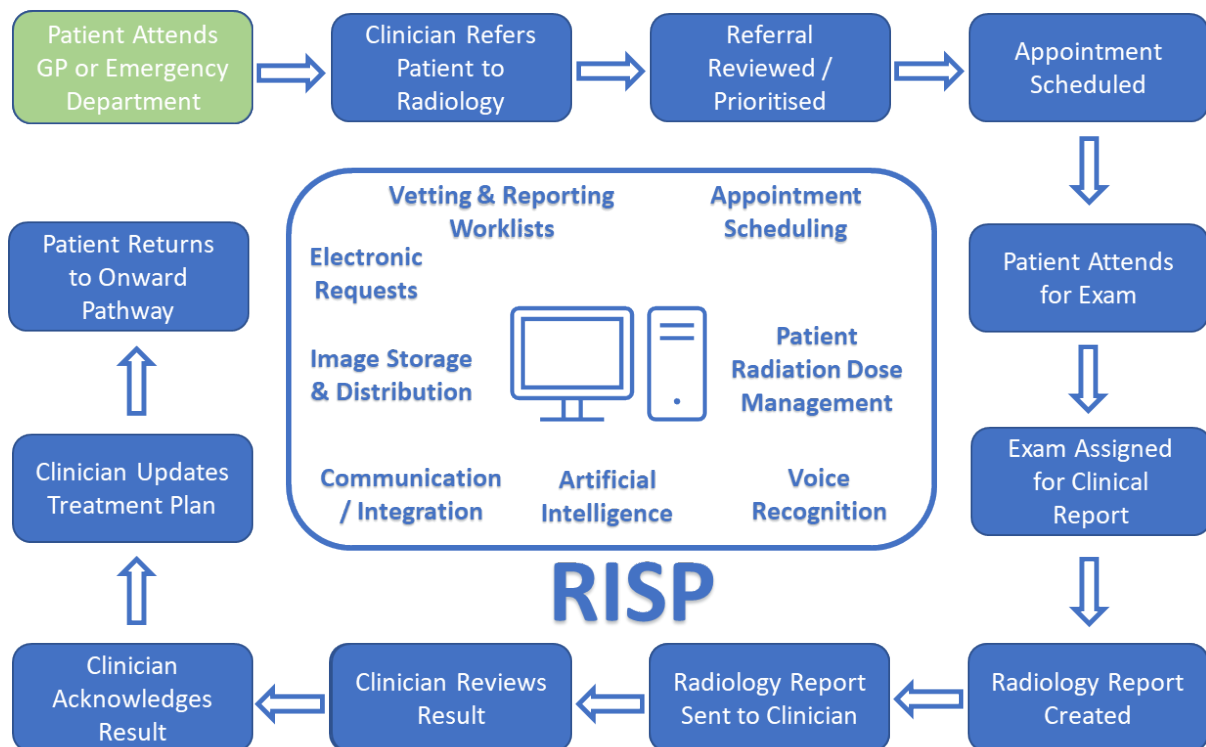
Diagram 2 - Typical clinical pathway to and through radiology

The current radiology IT systems neither enable service planning nationally nor provide the information needed to maximise the utilisation of available resources across NHS Wales health board boundaries. The current IT systems (PACS/ RIS):

- Are disparate with disjointed approaches to coding, administrative process, data collection and analysis and do not readily support strategic planning or service improvement.

- Do not facilitate cross-boundary working resulting in variation in the delivery of radiology services across NHS Wales health boards and trusts, leading to increased waiting time for scans or delays to reporting and diagnosis.

- Make it difficult to share patient information easily between health boards and trusts both within Wales and England, impacting acute/emergency care and MDTs and leading to inefficient care. Manual workarounds are in place to enable the correct information to be available for use in the right place at the right time; these are relatively inefficient and contribute to delays and increased clinical risk.

The Implications of Doing Nothing

The rationale for change:

> **Senior Consultant Radiologist:** "There are many examples across Health Boards of clinical risk to patients that have come to light through incident reports, serious incident investigation and external reviews. Lack of an integrated IT system means that **workarounds** and safety nets (where they exist like the example below) has become the **primary process,** a situation that is completely **unsatisfactory**."

> "A cancer patient had imaging in different hospitals. The radiologist reporting the scan in one hospital, compared to a previous study from that hospital and interpreted disease progression. Another scan within weeks was carried out on the same patient for a different reason in another hospital and the radiologist there, compared to a prior scan taken at that hospital, interpreted a response to treatment. Fortunately, this was picked up by an Oncologist in the MDT and was corrected."

> "It is essential the new Radiology Informatics System procurement addresses all these elements including a properly functioning electronic end to end system. To have an electronic referral and results alert system that works seamlessly with the new informatics system is absolutely integral to a properly functioning and safe solution".

This user story shows the fragmented nature of our current RIS/PACS systems arrangements.

1.6 Existing Arrangements

PACS National Agreement

A national agreement for the provision of PACS was established in 2012 following a two-year procurement process. The procurement process involved representatives of radiology, ICT, NWIS (now DHCW), legal, and procurement services.

FUJIFILM was selected as the contractor for PACS as part of a national agreement with other elements, including patient dose management (PDMS) as sub-contracted components. The radiology directorates at each health board/trust then used this agreement to establish local deployments of PACS as replacements for their legacy systems. The local deployments were set up to provide PACS for up to nine years; the agreement does not allow any further extensions to the local deployments after this initial period.

All health boards now use the FUJIFILM solution and Trusts following a phased deployment, with Cardiff and Vale UHB and the National Imaging Academy Wales being the last to deploy.

NWIS (now DHCW) are the contracting authority and take overall responsibility for managing the contract. A PACS Service Management Board (PACS SMB) comprising representatives from DHCW and all health boards oversees the management of the service provided by FUJIFILM. Each deployment order holder's responsibility is to performance manage the service provided to them under the contract and feed this into the PACS SMB.

FUJIFILM provides all the support where it is the supplier's responsibility. The support is provided via the UK FUJIFILM medical support desk, with each issue being assigned a severity as set out in the contract and managed accordingly. Each health board and trust have its own PACS Manager and support staff to enable the service and systems to integrate and function with more comprehensive radiology resources.

Change requests are submitted to, and managed by, the FUJIFILM Business Relationship Manager under the change management process set out in the contract, but are largely determined between each HB/Trust and Fujifilm. This arrangement has meant that it has been difficult to coordinate and deploy some changes because of dependencies on local or national infrastructure, applications or resources.

The current contract includes provision for "Termination Assistance Services" (TAS) where the incumbent supplier continues to provide operational service and support along with additional support as required to enable a smooth transition to the new supplier solution. The termination assistance period can run to a maximum of 42 months after the normal contract end date. In May 2020 DHWC (then NWIS issued a single central termination notice to FUJIFILM, acting on behalf of the health boards and Trusts.

The planned deployment order end dates for each Health Board and Trust are shown in the diagram below. The timelines in Figure 3 reflect the maximum duration of the termination assistance periods exercised in May 2020.
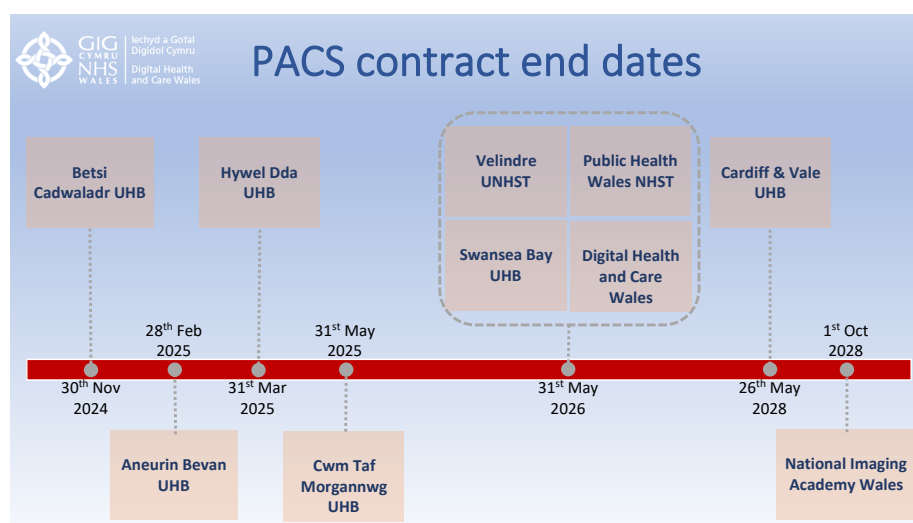

Diagram 3 – Contract End Dates

An extension of the Termination Assistance Services ("TAS") provision for the Deployment Order is required to support Data Migration and transfer to a new solution. Each Authority Party shall have the ability to extend the current Termination Assistance Service ("TAS") for a period of at least three (3) months, with the option for a further three (3) periods of three (3) months of Termination Assistance Services. For the avoidance of doubt, the Change Control Notice ("CCN") has the total effect of extending the Termination assistance period by up to twelve (12) months in total.

Welsh Radiology Information System (WRIS)

In Wales, the RIS is a national system developed and supported by Digital Health and Care Wales (DHCW). All Health Boards use WRIS, which supports the scheduling of radiology investigations, provides a clinical record of imaging performed on patients, including reports, and allows Health Boards to generate business reports and statistics on performance.

The transition activities from the current WRIS to the new RISP solution is likely to cover the pre-population of radiology data to ensure there are three years of data for the go live at each of the live 10 instances, migration of the existing 17 WRIS databases into the new solution as well as any cutover activities identified.

These cutover activities will also include decoupling WRIS from the DHCW electronic radiology requesting integrated solutions currently being rolled out across Wales. Consideration is also needed to determine if a complete national radiology dataset needs to be populated before the move to the new solution; this will involve teams from DHCW, including WRIS, Integration Services and the National Operational Database team. The exact requirements on the work required for DHCW to manage the move to the new RISP solution are yet to be determined, but the timescales and work needing to be undertaken means that many of the tasks will need to be carried out concurrently, resulting in an increased level of resources during this implementation period.

1.7 Local considerations

Whilst the RISP procurement focussed on a solution to be deployed across NHS Wales, there are a number of local considerations that have informed the functional requirements or the business case. These are outlined below:

Integration with locally developed applications:

Aneurin Bevan HB and Cardiff and Vale HB have invested in deploying a locally developed clinical portals and electronic requesting solutions. Integration of the RISP solution adopts a standards based approach and the requirements to integrate with the local solution is included within the scope of the programme. The detailed work plan will be described within the Health Boards own deployment order.

Cwm Taf Morgannwg / Swansea Bay boundary changes:

At OBC stage of the RISP programme the PACS contract baseline costs were still aligned to the predecessor organisations (Abertawe Bro Morgannwg and Cwm Taf). At FBC these baseline costs have been revised to reflect the expected configuration of the new solution as it will be deployed in the Health Boards. As such any cost impacts outlined in the financial case are made on a like for like basis.

Powys Deployment Order:

Under the current Fuji contract Powys do not hold their own deployment order- PACS costs for equipment and support are accommodated within the deployment orders that the neighbouring Health Boards hold with Fuji. The programme implementation plan assumes that Powys will hold their own deployment order for the new solution with Philips. It is anticipated that within their local implementation plan Powys will have four separate go live phases aligned to the go live dates for these Health Boards.

The radiology services at Llandrindod Wells are supported by Wye Valley NHS Trust (WVT). It is anticipated that these will be brought within the scope of the RISP solution but the discussions between Powys and WVT and the impact on their respective SLA's will need to be led by Powys rather than the RISP programme.

Powys has a number of service level agreements with the neighouring Health Boards and with Wye Valley NHS Trust to support their locally delivered radiology services but these SLA's do not identify all of the PACS costs and include reporting services. As such the baseline costs for Powys do not reflect the full cost of current solution for Powys and therefore accentuate the financial impact of the new solution and discussions regarding the impact of the transition to the Philips solution on the detail of the SLA's and any requirements for local PACS/RIS support arrangements within Powys are not within the scope of the RISP programme.

Hywel Dda Legacy PACS Archive:

Hywel Dda maintain a legacy PACS archive for digital mammography images. The demographic data within the archive is not aligned to a reliable index (RIS, PAS or eMPI) and

as such the data quality may be poor. It is likely that additional work will be required from the Health Board and from Philips to bring these records into alignment with the current patient index. The detailed requirements will need to be addressed within the Hywel Dda deployment order.

Swansea Bay Legacy RIS:

Swansea Bay UHB transitioned from a commercial RIS (RadCentre) to RadIS. Whilst the clinical report data was copied into WRRS so it could be made available for review the Health Board continues to maintain a contract with the supplier for access to the legacy system. The RISP programme data migration plan proposes to migrate all data from RIS/PACS instances into the new solution. The Health Board may need to consider whether it is still appropriate to migrate the RadCentre data and whether this will require additional support from the supplier or whether this can be achieved within their current commercial arrangements.

1.8 Business Needs Current & Future

Stakeholder Engagement

There has been significant engagement with the service with 270+ staff attending meetings, workshops and roadshow events held at all health boards and Trusts across Wales and latterly via Microsoft Teams.

The complete list of stakeholder groups engaged, and comments/ feedback received during this process are listed below and include but are not limited to:

Radiologists, Radiographers, Secondary and Primary Care Clinicians, Trainer/ Trainees, Radiology Managers, Administrative staff, Directors of Finance, Directors of Planning, Clinical Directors, Directors of Therapies & Health Sciences, PACS Managers, Informatics Leads, Medical Physics, DHCW and Welsh Government.

Business Needs

The key functional requirements from the engagements with the service has informed this Case. These include:

- "Single patient view" of the Radiology record

- Efficient reporting workflow

- Fully integrated advanced applications – 3D

- Intelligent worklists

- Fully integrated Speech solution

- Peer review solutions

- MDT solutions

- AI-enhanced workflow including clinical decision support

- Full audit trails

- Structured reporting templates

- Business Intelligence

1.9 Solution Scope

The RISP solution is intended to replace the systems currently supporting "Services within the 'footprint' of the current radiology service" includes systems and services that collectively deliver an end-to-end technical solution to support the modernisation of imaging services. The scope is designed to be the minimum required to deliver the programme objectives and benefits and meet the business requirements identified above. The core scope includes:

End-to-End Radiology Solution

A paperless end-to-end solution with functionality of Radiology Information System (RIS) and Picture Archiving and Communication System (PACS) from receipt of request to publishing of the result and receipt of acknowledgement. The solution must deliver an "All Wales" view of the radiology record for any patient irrespective of where the radiology "event" occurred. This is the best solution to meet the business needs of the service, support the delivery of the Imaging Statement of Intent and the recommendations from the Wales Audit Office Radiology Services Report.

Patient Dose Monitoring System (PDMS)

PDMS provide many tools to aid health boards in improving the quality and efficiency of imaging services as well as meeting their legislative requirements, such as those under the Ionising Radiation (Medical Exposures) Regulations 2017 (IR(ME)R 2017); examples include:

- Alerting healthcare professionals to radiation exposures which are of a level significantly greater than that intended or when Diagnostic Reference Levels (DRLs) are consistently exceeded.

- Providing valuable inputs into required quality assurance and optimisation processes potentially improves image quality or reduces radiation exposure for people with multiple imaging procedures.

- Offering substantial improvements in collection efficiency and quality and reducing time for analysis and reporting of radiation dose data compared with manual or semi-automated methods.

- Facilitating the management and harmonisation of imaging protocols and contrast media usage between devices (both within and between health boards)

- Enabling optimisation of equipment utilisation.

Electronic Test Requesting and Results Acknowledgement[3]

Electronic Test Requesting (ETR) systems are designed to enable clinicians to request Diagnostic Imaging (DI) procedures and receive updates on their progress using an IT system, replacing the need for conventional paper-based systems. It enables two-way electronic communication of patient information, clinical and diagnostic decision-making, the progress of the imaging procedure and the image report status progress between the referrer and the hospital radiology department. In Wales, the practice remains paper based.

In many Health Boards, results acknowledgement systems remain primarily manual processes, driven by paper/email, telephone and faxed based triggers tailored to meet local

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[3] Optional commercial electronic requesting system, if the WCP cannot be developed to meet the requirements of the Radiology service in line with programme timeline.

clinical needs. The current systems fail to close the diagnostics loop because no automated facility records a result acknowledgement within the RIS. Therefore, urgent, or unexpected findings are frequently escalated manually rather than electronically. The processes are tailored to local clinical demands. The recommendations of NPSA 16 are clear:

- Ensure that the radiological imaging reports of all patients are communicated to and received by the appropriate registered health professional and, where necessary, action is taken in a manner appropriate to their clinical urgency;

- Ensure registered health professionals design' safety net' procedures for their speciality;

- Make it clear to patients how and when they should expect to receive the results of a diagnostic test.

This Programme is an opportunity to address the NPSA 16 recommendations robustly with an electronic, auditable trail of results acknowledgement. This will also mitigate and decrease litigation claims where the analogue system of results acknowledgement has failed. One of the frustrations of the radiology service in Wales is the lack of progress in delivering an in-house electronic referral and results alert system for NHS Wales. There is despondency within the service at the lack of progress in the development of a national electronic requesting system being developed by DHCW to be delivered through the Welsh Clinical Portal (WCP).

Two Health Boards have developed a local solution for electronic requesting, but there is no integration with the WRIS, and the benefits gained are somewhat limited. Following a successful implementation of electronic requesting in Royal Glamorgan Hospital (CTMUHB), a wider rollout across the HB and across other health boards is underway.

The adoption process of e-requesting has been delayed primarily due to constraints within the health boards. However, a fully integrated requesting, notification and results acknowledgement system is essential to deliver the RISP programme's efficiency and patient safety benefits. The ETR programme still raises concerns for RISP- related to the timeline for deployment and adoption of the available functionality and integration of the solution with the newly procured RIS.

1.10 Benefits

The key benefits of delivering RISP include the following:

- Improved patient safety, with an electronic auditable trail from request to results acknowledgement. (NPSA 16 2007 and HSIB reports on failures to acknowledge and follow-up on radiological imaging reports)
- Reduced risk of repeat examinations and inappropriate radiation dosage.
- Effective and efficient MDT meetings supporting cross health board boundary workings and streamlining patient care.
- Improved imaging workflow, enabling timely delivery of service, and the ultimate output of an imaging examination, a report available to the clinical referrer anywhere.
- Enable cross-site and health board reporting to facilitate service transformation and support the work of the Imaging Essential Services Group.
- Improved data quality and analytics on a local and national level.
- Streamlined and reduced training requirements for system use
- Decarbonisation; the supplier has to meet standard ISO 14001.
- Investment in network infrastructure will provide additional capacity and security capabilities that will benefit future digital programmes for NHS Wales.

A Benefits Group has been established and has identified specific benefits and associated measures outlined in detail in the Economic and Management Cases. A mapping exercise was undertaken to align those identified benefits to the wider investment objectives.

Table 4: Strategic Objectives Benefits Map

No	Investment Objective	Benefit ID	Benefit
RISP-IO1	To integrate Picture Archive and Communication System (PACS), Patient Dose Management System (PDMS) and Radiology Information System (RIS) systems into one single solution (with the ability for further integration with ETR and results acknowledgement systems) that all Health Boards and Trusts implement in Wales by 2026	B03	Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outcomes)
		B08	Reduced lost time waiting for system to respond
		B22	Contributes to reduced inequalities
RISP-IO2	To improve and optimise patient care by reducing the number of incidents caused due to missing/insufficient clinical information/reports, resulting in fewer misinterpretations and delayed diagnoses, by providing an integrated imaging patient record across Wales for all Health Boards and Trusts in Wales by 2026	B01	Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outcomes)
		B06	Reduced risk of missing urgent diagnosis
		B19	Earlier diagnosis and improved clinical decision-making leads to better patient outcomes
		B20	Improved Patient Experience
RISP-IO3	To reduce the number of administrative resources required to support cross-boundary patient pathways, because of shared access for imaging and reporting, 12 months after contract commencement in a health board area	B02	Reduced manual intervention to manage referrals
		B04	Reduced manual intervention for reporting and acknowledgement
		B05	Reduced reporting costs
		B07	Reduced manual intervention to review lists
		B09	Reduced risk of repeat examinations and inappropriate radiation dosage
		B10	Effective and efficient MDT meetings supporting cross Health Board boundary workings and streamlining patient care
		B15	Improved strategic planning / better demand management
		B21	Improved workforce experience
RISP-IO4	To reduce the carbon footprint of PACS and RIS systems by decreasing the use of paper-based systems for referring and reporting in radiology and utilising fewer devices that have higher energy consumption across all Health Boards and Trusts in Wales by 2026	B11	Reduced reliance on paper-based systems leading to paper, printing, and manual storage cost savings
		B12	Reduced reliance on paper-based systems leading to reduced manual intervention
		B28	Greener energy as a result of cloud-based system
		B29	Greater energy efficiency as a result of cloud-based system
		B30	Reduced number of devices
RISP-IO5	To reduce the number of repeat examinations and hence inappropriate radiation dosage for patients, through improved access to imaging information and a standardised data sharing and	B13	Reduced risk of errors
		B14	Streamlined and reduced training requirements
		B16	Improved accuracy of referral codes
		B17	Increased ability for optimisation between patients or devices

recording process, by all Health Boards and Trusts in Wales by 2026	B18	Reduced amount of unreliable/unusable data leading to increased sample size of dose audits	
	B23	Improved ability to accurately and frequently access radiation dosage to evidence statutory compliance	
	B24	Increased compliance for recording dosage in PDMS vs manual entry	
	B25	Increased accuracy of patient dose record	
	B26	Improved personalisation of dose assessments	
	B27	Reduced amount of unreliable/unusable data leading to increased sample size of dose audits	

1.11 Risks

This Strategic Case highlights the key risks relevant to successfully implementing RISP. The Programme will employ risk management techniques to monitor how risks materialise appropriately. This will support the aims of the Programme and help maximise value for money.

A programme risk register is used to record, and risk assess all Programme and project-level risks. Each risk is documented and evaluated based on the impact and likelihood to the Programme. The risks are discussed and updated monthly via the programmes Working Group, Programme Board and monthly risk rating meeting.

Key risks to the realisation of some of the benefits of the RISP programme:

COVID-19 recovery activity may impact the ability of HBs to release the required resources to join the procurement dialogue teams in Tranche 2. The impact of this could be delays in the procurement process.

Lack of certainty around the financial model associated with a possible cloud solution may mean it is not affordable for health boards. This could lead to delays in the procurement process.

Further slippage to procurement timescales caused by delays could impact the current FUJIFILM PACS contract end dates.

A complete list of Risks, Actions, Issues and Decisions can be found in Appendix M4.

1.12 Constraints

The Programme is subject to the following constraints:

- Lack of resources within DHCW to release staff to support the development of the FBC, the procurement, development, testing and training and to take forward the work.

- Limited financial resources available to the NHS for a new radiology system, to support the procurement and further implementation.

- The Capacity of the Imaging service to support the Programme, and the business change associated with moving to an entirely electronic workflow.

1.13 Dependencies

RISP is subject to the following dependencies that will be carefully monitored and managed throughout the lifespan of the Programme:

- The development of the WCP to deliver electronic requesting, results acknowledgement and notifications to meet radiology requirements in time for deployment of the new RISP.

- The approval of Welsh Government, health boards, trusts and professional bodies to this FBC.

1.14 Business Continuity Plans

The RISP solution is designed to meet a service availability with an uptime target of 99.99% and architected in such a way as to ensure there are no single points of failure. The Contractor will provide a business continuity (BC) solution to all Authority parties (excluding NIAW and PHW), which maintains key service elements if there are issues with the central core services. As a minimum, the BC solution will hold the last two years of clinical data for the Health Board and will allow them to continue to:

- Schedule, acquire and report on acute ED and inpatient requests;

- Acquire and report prebooked studies attending during the period of BC operation;

- Report studies acquired before the period of BC operation;

- Allow non-radiology clinicians to review any image stored within the BC solution; and

- Publish any results generated throughout the period of BC operation to external systems

In addition to the BC facilities, the Contractor will maintain an immutable copy of any clinical data to protect against delayed malware attacks or other data corruption and commit to undertake penetration testing and testing of BC and recovery procedures twice per year or after any significant upgrade or system reconfiguration.

To meet these requirements, the supplier will provide:

- Multiple geographically separated datacentres with high availability infrastructure and automated failover between the DCs,

- A third offline copy of data to protect against data corruption, and

- A local BC instance of RIS and PACS within each HB/Trust to ensure continuity of service if the services delivered from the central DC's are unavailable.

If the core services are unavailable to one of the HB's (e.g. if its PSBA connection is down), they will be able to continue with the majority of planned and unplanned care activity. Still, they will lose the ability to do so cross-HB work. Other HB's would still be able to see the entirety of the All Wales record until the affected HB went off line.

2. The Economic Case

2.1 Introduction

The purpose of the Economic Case in the FBC is to revisit the options following the results of the procurement process and confirm that the preferred option continues to offer optimal value for public money by:

- Identifying the procurement process and evaluation of Best and Final Offers (BAFOs).

- Revisiting the OBC Options to confirm they remain valid and outline any adjustments.

- Confirming the rankings remain unchanged by updating the Economic Appraisal with latest cost and benefit assumptions, including the results of the procurement process.

- Confirming the Preferred Option.

2.2 Revisiting the OBC Options

As part of the OBC, the Programme Board and key stakeholders identified a shortlist of options to appraise by using the Options Framework to identify and long list of options and test them against agreed criteria which included:

- Was the option likely to deliver the spending objectives and CSFs?

- Was the option likely to deliver sufficient benefits?

- Was the option practical and feasible?

- Was the option deliverable within the constraints of the project?

- Was the option deliverable without incurring an unacceptable degree of risk?

Following this review, the shortlist of options was approved by the Programme Board. The final shortlist of five options is presented below.

Table 5: Shortlist of Options

Options	Option 0 Business as Usual	Option 1 Do Minimum	Option 2 Preferred Way Forward A	Option 3 Preferred Way Forward B	Option 4 More Ambitious
Scope	Do nothing	PACS + PDMS + DHCW RIS	PACS + PDMS + Commercial RIS + ETR and results acknowledgment	PACS + PDMS + Commercial RIS + ETR and results acknowledgment	PACS + PDMS + RIS + ETR and results acknowledgment (+ options for other disciplines)
Technical Solution	Current solution ceases	National DHCW data centre	National supplier data hosted (either data centre or cloud hosted depending on provider)	National supplier data hosted (either data centre or cloud hosted depending on provider)	National supplier data hosted (either data centre or cloud hosted depending on provider)
Service Solution	N/A	Regional Deployment	Regional Deployment	National Deployment	National Deployment
Service Delivery	N/A	In House RIS with PACS + PDMS delivered with supplier full-service management	Supplier Full-Service Management which could be delivered by either: a. Managed Service Contract b. Contract for Service with Maintenance Support		
Implementation	N/A	Phased by Health Board			
Project Funding	N/A	Combination of capital and revenue funding via either a. Revenue funded fully managed service; or b. Capital funded NHS owned assets/Revenue funded support			

The next stage of the OBC involved evaluating the shortlisted options within the economic appraisal, the results are outlined in the table below.

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Table 6: OBC Economic Appraisal Results

	Option 0 Business as Usual	Option 1 Do Minimum	Option 2 Preferred Way Forward A	Option 3 Preferred Way Forward B	Option 4 More Ambitious
Capital costs	0	17,285	17,285	17,285	27,965
Revenue costs	61,140	68,942	67,570	67,570	96,676
Total costs	61,140	86,227	84,855	84,855	124,641
Expected risk value	16,144	141	141	281	141
Total risk adjusted costs	77,284	86,367	84,995	85,136	124,782
Benefits		-9,720	-9,720	-9,720	-9,720
Net Present Cost (Undiscounted)	77,284	76,647	75,275	75,416	115,062
Total discounted costs	68,561	76,526	75,377	75,508	109,331
Total discounted benefits	0	-7,917	-7,917	-7,917	-7,917
Net Present Cost (Discounted)	68,561	68,609	67,460	67,592	101,414
Incremental costs	0	-22,904	-21,755	-21,755	-55,709
Incremental benefits (including risk reduction)	0	22,856	22,856	22,725	22,856
Risk-adjusted Net Present Social Value	0	-48	1,101	969	-32,853
Benefit Cost Ratio	0.0	1.0	1.1	1.0	0.4
Rank	5	3	1	2	4

The following conclusions were reached based on these results and an analysis of non-financial factors:

- **Option 0 (Business as Usual):** Continuing with existing arrangements is not a feasible option as the current PACS contract ends during 2023/24 which poses a catastrophic risk to service continuity. It was included to provide a counterfactual to allow value for money of the other options.

- **Option 1 (Do Minimum):** This option involves continuing with the current DHCW developed and supported application; the Welsh RIS. A comprehensive evaluation was undertaken which confirmed that the commercial RIS scored significantly higher than the DHCW RIS option largely due to available capacity to develop and deploy the additional functionality which posed a risk to timelines and the ability to hold commercial suppliers to account for any failure in an end-to-end solution. Furthermore, the economic appraisal demonstrated that the increased costs of delivering this option would reduce value for money.

- **Options 2 and 3 (Preferred Way Forward):** The preferred way option offered the best value for money since it results in the lowest Net Present Cost and an incremental Benefit Cost Ratio of between 1.0 – 1.1 when compared to the counterfactual (Business as Usual option). The variance between Option 2 (delivering the programme via a regional deployment) and Option 3 (delivering the programme via a national deployment) was found to be immaterial, therefore it was agreed that the final implementation arrangements would be determined based on the final procured solution.

- **Option 4 (More Ambitious):** This option would offer opportunities to incorporate other disciplines. However, as well as a high degree of uncertainty about the likely costs and benefits of this, it is anticipated that this would significantly elongate timelines and risk deployment of a PACS replacement. The increased revenue costs would significantly reduce the value for money.

Therefore Options 2 and 3 were combined and carried forward as the Preferred Option and it was recommended that Options 1 and 4 be discounted on the basis of low value for money and risks to timescales.

2.3 The Procurement Process

Following approval of the OBC, the work commenced to procure the preferred option. The procurement process was undertaken as per the procurement strategy, route and evaluation that was outlined in the Commercial Case of the OBC. The FBC Commercial Case outlines in detail the most economically advantageous tender and sets out the commercial and contractual arrangements that have been negotiated.

2.4 The FBC Economic Appraisal

The HMT Green Book guidance suggests it is only necessary to conduct a full cost benefit analysis on all shortlisted options considered at OBC stage if it is proportionate to do so.

The alternative short-listed options outlined in section 1.2 were re-visited and it was concluded that:

- **Option 1 (Do Minimum):** The conclusions reached in the OBC in terms of this option being discounted because of low value for money and increased timescales remain valid. In fact, costs and timescales would likely increase given the time that has passed since the OBC which would reduce value for money even further and is no longer considered a feasible option.

- **Option 4 (More Ambitious):** The conclusions reached in the OBC in terms of this option being discounted because of low value for money and high degree of uncertainty. In fact, costs and timescales would likely increase given the time that has passed since the OBC which would reduce value for money even further and is no longer considered a feasible option.

As it was anticipated that these assumptions remain largely unchanged since the OBC, it was deemed that it would be disproportionate to revisit the cost benefit analysis for these options, particularly since neither are thought to be feasible any longer given the time that has passed since the OBC.

It was therefore concluded that it would be sufficient to conduct an appraisal of the Preferred Option compared to the baseline counterfactual.

Cost Assumptions

Costs have been updated for the FBC following negotiations with suppliers, selection of the Preferred Bidder and a more developed understanding of other costs.

The calculations and assumptions behind these costs are provided in the Financial Case and are summarised below.

Baseline costs

Baseline costs have been updated to reflect Baseline costs are estimated based on the Financial Commercial paper from February 21 which identified revenue costs for PACS and WRIS of £. These have been uplifted to 2023/24 prices using the HM Treasury GDP Deflator.

Table 7: Baseline Costs

	Total £'000
PACS	
WRIS	
Total Baseline Costs	

Capital Costs

Capital costs have been calculated based on the Preferred Bidder's initial solution charges as well as capitalisable programme resource and local infrastructure requirements. For the purposes of the Economic Case these exclude VAT.

Table 8: Capital Costs

	Option 0 - BAU £'000	Option 1 - Preferred £'000
Solution - Supplier Initial Charges	0	
Programme Resource Plan	0	
Local Infrastructure Costs	0	
Total capital costs excluding VAT	0	

Transitional Costs

Non-recurring revenue costs have been calculated based programme resource requirements for roles that cannot be capitalised during the 3-year implementation period.

Table 9: Transitional Costs

	Option 0 - BAU £'000	Option 1 - Preferred £'000
Programme Resource Plan	0	
Total transitional costs	0	

Recurring Revenue Costs

Ongoing revenue costs have been calculated based on the following assumptions:

- Current PACS and WRIS costs of £m p.a. will continue until each Health Board's stable operation date for the new system plus one month of dual running costs.

- Annual service charges of £m p.a. for the new solution are based on tendered costs submitted by the Preferred Bidder, which will be incurred from each Health Board's stable operation date (as outlined in the Financial Case).

- For the purposes of the 10-year appraisal period, it is assumed that the average annual service charge costs will continue at the same level following the contract end date at each Health Board.

- Ongoing revenue consequences of £0.9m p.a. related to investment in local infrastructure is assumed to be incurred from the beginning of 2024/25.

- Ongoing revenue consequences of £0.15m p.a. related to ongoing support for integration is assumed to be incurred from the beginning of 2026/27.

The resulting total revenue costs during the 10-year appraisal period are provided in the table below.

Table 10: Total revenue costs

	Option 0 - BAU £'000	Option 1 - Preferred £'000
Current PACS Costs		
Current WRIS Costs		

	Option 0 - BAU £'000	Option 1 - Preferred £'000
Solution - Supplier Service Charges	0	
Solution - Extend Supplier Service Charges	0	
Local Infrastructure Costs	0	8,047
Ongoing Support for Integration	0	1,050
Total revenue costs (10-year period)		
Equivalent Annual Costs		

Benefits assumptions

As part of the OBC, the main benefits were identified and measures established, and a Benefits Group established agreed to collect baseline data and agree targets and methods of monitoring. The resulting benefits analysis is provided in the table overleaf.

Commercial-in-Confidence

Table 11: Benefits Analysis

ID	Description	Measure	Target Improvement	Value £'000	Assumptions
More streamlined workflow					
B01	Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outcomes)	Average time from request to receipt of referral	Reduce from average of 4.6 days to within 1 day	Unmonetised	The introduction of RISP will improve the end-to end process
B03	Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outcomes)	Average time from receipt of referral to report availability	Reduce from average of 9.2 days to within 1 day	Unmonetised	The introduction of RISP would improve the end-to end process
B15	Improved strategic planning / better demand management	Not easily measurable	Qualitative	Unmonetised	Electronic vetting should streamline the workflow and automate rules but will still require some level of manual intervention to review and schedule. Multiple factors that may impact on this average time taken such as the number of occasions when appointments need to be vetted before being booked and the number of walk-in cases make it difficult to set an achievable target improvement that is directly impacted by the investment in RISP.
Increased accuracy					
B06	Reduced risk of missing urgent diagnosis	Not easily measurable	Qualitative	N/A	Information from claims managers was found not to be a suitable measure due to the variability.
B13	Reduced risk of errors	Number of obsoleted reports	Reduce by 80%	Unmonetised	A major benefit of RISP will be that it will prevent errors in the digital dictation system reporting against an incorrect patient. However, this would not be eradicated completely as there may be other reasons for a report being obsoleted.
Greater System Reliability					
B08	Reduced lost time waiting for system to respond	Number of Severity 1 and 2 incidents	Qualitative	N/A	Not easily measurable

ID	Description	Measure	Target Improvement	Value £'000	Assumptions
Improved productivity					
B02	Reduced manual intervention to manage referrals	Time spent on request handling	80% reduction in time spent manually transcribing requests	£852k p.a.	It is reasonable to expect RISP will result in a minimal amount of time spent manually transcribing requests into RIS since there will be very few paper requests received, although it should be recognised that the rest of the 'request handling' process, such as appointment scheduling, would only see marginal improvement. On average takes around 2 minutes per request, applying to around 1.9m requests p.a. which are currently managed manually
B04	Reduced manual intervention for reporting and acknowledgement	Time spent on process for the acknowledgement of urgent referrals	50% improvement	£65k p.a.	Currently increased time spent on the process for the acknowledgement of urgent referrals due to the need for printing. ABUHB already has an electronic process in place which has reduced the amount of manual printing requirements significantly. It is anticipated that 2/3 of referrals are printed (the remaining 1/3 being GP referrals which are typically not printed). There are other factors other than just RISP contributing to this improvement, therefore a target reduction of 50% was reasonable.
B05	Reduced reporting costs	Average time between subsequent reports	Between 1% - 5% improvement	£1,127k	Current average 26.7 minutes between subsequent reports. Exact level of improvement difficult to measure and would be relatively small. Therefore, range of scenarios have been modelled to estimate the impact of between 1% to 5% improvement. Prudent estimate has been made at 1%.
Workforce Benefits					

ID	Description	Measure	Target Improvement	Value £'000	Assumptions
B21	Improved workforce experience	Not easily measurable	Qualitative	N/A	Multiple factors impacting staff satisfaction so not easily measurable
Cost Reduction Benefits					
B11	Reduced reliance on paper-based systems leading to paper, printing and manual storage cost savings	Expenditure on paper, printing and manual storage	80% improvement	£11k p.a.	
Patient Safety Benefits					
B09	Reduced risk of repeat examinations and inappropriate radiation dosage	Number of significant accidental and unintended exposures as a result of repeat imaging in a 2-3 year period	10% improvement	Unmonetised	10% improvement target to reflect direct impact on proportion of events (i.e. alert so not imaging people who have already had imaging)
B23	Improved ability to accurately and frequently access radiation dosage to evidence statutory compliance	Time saved manual vs automated audits	80% improvement	£19k p.a.	Based on BCU baseline of 2 weeks spent on audits p.a.
B24	Increased compliance for recording dosage in PDMS vs manual entry	Number of times dosage not recorded	80% improvement	Unmonetised	Currently not recorded in 7% of cases. Will be mandated in functional requirements so would largely be eradicated but there may be some circumstances where booked a procedure with radiated dose but scan abandoned.
B25	Increased accuracy of patient dose record	Not easily measurable	Qualitative	N/A	
B26	Improved personalisation of dose assessments	Time spent dealing with patients flagged for skin injury review	75% improvement	£5k p.a.	Average of 30 p.a. as reasonable baseline for number of patients flagged for skin injury review based on BCU and C&V actuals. It is estimated that currently 2 hours per patient are spent on this which it is estimated could be reduced to 0.5 hours per patient.

ID	Description	Measure	Target Improvement	Value £'000	Assumptions
B27	Reduced amount of unreliable/unusable data leading to increased sample size of dose audits / B18 - Reduced amount of unreliable/unusable data leading to increased sample size of dose audits	Amount of data 'thrown out'	Target to reduce to 5%		Currently 19% of data 'thrown out'. Target improvement to reduce down to 5% (some manual input errors will remain)
B17	Increased ability for optimisation between patients or devices	Not easily measurable	Qualitative	N/A	
Patient Outcome Benefits					
B10	Effective and efficient MDT meetings supporting cross Health Board boundary workings and streamlining patient care	Time spent managing images for MDTs	Save 2 minutes per number of transfers	£113k p.a.	Baseline data includes both PACS and IEP data. RISP will significantly reduce the time spent on this since images will be automatically visible to all sites across NHS Wales with no need for transfers. This will improve cross-site functionality and ensure images are easy to access for MDTs, reducing the risk that MDTs may be delayed as a result of images not being available. Indicative calculation for the scale of this benefit is to assume each transfer currently takes Radiology circa. 2 minutes (in addition to the time spent in clinics having to chase missing images) multiplied by the number of transfers within NHS Wales each year.
B19	Earlier diagnosis and improved clinical decision-making leads to better patient outcomes	Not easily measurable	Qualitative	N/A	It has not been possible to identify the number of patients not discussed at MDTs as a result of not having images available (links to B10)
B20	Improved patient experience	Not easily measurable	Qualitative	N/A	
B22	Reduced inequalities	Not easily measurable	Qualitative	N/A	Combination of B01 and B03 but reported in relation to the benefit to the patient rather than NHS Wales. Availability of reports from all locations would reduce the burden across health boards due to reporting on

ID	Description	Measure	Target Improvement	Value £'000	Assumptions
					backlogs from elsewhere in Wales. This would reduce the variance.
Environmental Benefits					
B28	Greener energy and greater efficiency as a result of cloud-based system	Not easily measurable	Qualitative	N/A	Not easily measurable
B31	Reduced reliance on paper based systems leading to paper savings	Paper usage	80% reduction	N/A	In line with B11

Expected Risk Value

The risks for each option have been assessed and, as far as possible, quantified and expressed in monetary equivalent terms, comprising:

- Existing system is no longer supported.

- Infrastructure does not support supplier solution.

These risks have been quantified by calculating an 'expected value'. This provides a single value for the expected impact of all risks. It is calculated by multiplying the likelihood of the risk occurring (probability) by the cost of addressing the risk (impact) and summing the results for all risks and outcomes.
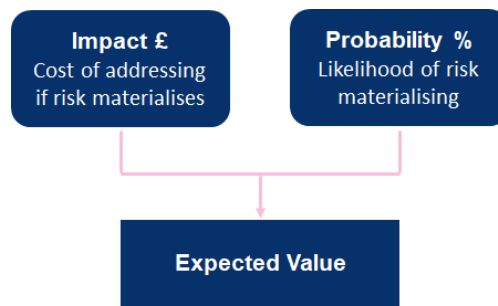

Diagram 4 - Risk quantification approach using single-point probability analysis

The assumptions included to assess the impact and probability of these risks are outlined in the tables below.

Table 12: Risk assumptions

	Option 0 - BAU £'000	Option 1 - Preferred £'000
R1: Existing system no longer supported		
Risk	**System performance deteriorates and ultimately fails impacting on local business continuity**	
Consequence	**Mitigation would involve upgrading PACS**	
Impact	Cost of investing in new PACS (uplifted to 23/24 prices)	No impact – mitigated by investment in new system
Probability	**95%**	**0%**
Timescales	Year 2	
Risk Value £'000		**0**
R2: Existing system no longer supported		
Risk	**Delivery delayed**	

	Option 0 - BAU £'000	Option 1 - Preferred £'000
Consequence	Increased programme costs and extended double running	
Impact	N/A	Delay of between 12-24 months x Programme Cost per month
Probability	0%	10%
Timescales		Year 2
Risk Value £'000	0	299

Economic Appraisal Results

The indicative assumptions above have been incorporated into a discounted cash flow for each of the options, using DHSC's Comprehensive Investment Appraisal (CIA) model, to support the appraisal of overall value for money and cost-benefit analysis of the shortlisted options.

In line with HMT Green Book requirements:

- Costs, benefits, and risks are calculated over a 10-year appraisal period based on the timeline used within the Preferred Bidder's submission.

- Year 0 is 2023/24.

- Costs and benefits use real base year prices – all costs are expressed at 2023/24 prices in line with the baseline costs.

- The following costs are excluded from the economic appraisal:

- Exchequer 'transfer' payments, such as VAT.

- General inflation.

- Sunk costs.

- Non-cash items such as depreciation and impairments.

- A discount rate of 3.5% is applied.

The economic summary from the CIA model is shown in the table overleaf.

Table 13: FBC Economic Appraisal Results

	Option 0 - BAU £'000	Option 1 - Preferred £'000
Capital costs		
Revenue costs		
Total costs		
Expected risk value		
Total risk adjusted costs		
Benefits		
Net Present Cost (Undiscounted)		
Total discounted costs		
Total discounted benefits		
Net Present Cost (Discounted)		
Incremental costs	0	-26,968
Incremental benefits (including risk reduction)	0	30,419
Risk-adjusted Net Present Social Value	0	3,451
Benefit Cost Ratio	0.0	1.1
Rank	2	1

This demonstrates that the preferred option continues to offer value for money, delivering a lower discounted Net Present Cost of £m over a 10-year appraisal period, which is £m lower than the Business-as-Usual position. It delivers an incremental Benefit Cost Ratio of 1.1 i.e. £1.10 of monetisable benefits is delivered for every £1.00 of incremental costs.

Sensitivity Analysis

A sensitivity analysis has been undertaken on these results in the form of switching analysis which tests the degree to which costs and benefits would need to change to affect the ranking of options. The result of this testing is provided in the table below.

Table 14: Switching Analysis

	Option 0 - BAU	Option 1 - Preferred
Total discounted costs	-15.96%	0.00%
Total discounted benefits	N/A	0.00%
Net Present Cost (Discounted)	**-15.96%**	**0.00%**

This demonstrates that the costs would need to reduce by 15.96% for the Business-as-Usual position to outrank the preferred option. This equates to delivery of the same level of benefits as the preferred option with no investment and so is not feasible.

In addition, several scenarios were run to estimate the impact on the value for money of the preferred option.

Table 15: Sensitivity Analysis

	Incremental NPSV £'000	BCR
Economic appraisal results	3,451	1.1
Scenario 1: Capital increases by 10%	1,228	1.0
Scenario 2: Revenue increases by 10%	145	1.0
Scenario 3: Benefits reduce by 25%	309	1.0
Scenario 4: BAU risk reduced by 25%	1,111	1.0

This demonstrates that even with some relatively significant changes to key assumptions, the preferred option would continue to offer reasonable value for money with a lower Net Present Cost (higher incremental Net Present Social Value) than the Business-as-Usual option.

Therefore, it can be concluded that the value for money of the preferred option is not particularly sensitive to changes in assumptions.

2.5 Summary of Options Appraisal Results

The cost benefit analysis demonstrates that the Preferred Option continues to offer optimal value for public money, following the results of the procurement process and development of more detailed cost and benefits analysis.

It will result in a Net Present Cost of £m over a 10-year appraisal period. This represents an improvement compared to Business as Usual or Net Present Social Value of £m and a Benefit Cost Ratio of 1.1 (i.e. every £1 of incremental cost will realise £1.10 of incremental benefits)

Investment in RISP will deliver a range of financial and non-financial benefits due to more streamlined workforce, increased automation, greater accuracy and reliability, and reduced reliance on paper-based systems. This will result in benefits such as:

- Improved patient safety due to the more accurate records which will reduce the risk of repeat examinations and inappropriate radiation dosage and better support personalisation of dose assessments.

- Contribution to earlier diagnosis leading to better patient experience and outcomes due to reduced turnaround time from referrals to reporting, and more effective MDT working.

- Improved workforce experience and greater staff satisfaction due to more efficient and effective ways of working.

- Productivity gains worth £2.2m due to reduced need for manual interventions to manage activities such as referrals, reporting and providing MDT images. It should be noted that these are not expected to be cash releasing.

- Use of cloud-based system leading to greener and more efficient use of energy.

The commercial case considers the commercial feasibility of the award recommendation.

3.1 Procurement Scope

Based on an assessment of the current solutions available in this market, the procurement approach envisaged a single "Contractor"-provided service with that Contractor taking prime responsibility for all in-scope aspects of the solution, including the contracting and management of any other required contractors as Sub-contractors to the Contractor.

The service requirement includes the following key components:

- An End-to-End Radiology Solution – A modular paperless end-to-end solution which will include the Radiology Information System (RIS) and Picture Archiving and Communication System (PACS) functionality to support an electronic workflow from "receipt of request to publishing of the result and receipt of acknowledgement"

- A Patient Dose Monitoring System (PDMS)

- Electronic requesting and results acknowledgement as an 'optional' service in the event that the Welsh Clinical Portal (WCP) cannot be developed to meet the requirements of the Imaging services in line with the programme's timeline

- The contract will be for a managed service, with the Contractor responsible for all aspects of the solution and its ongoing performance over the life of the contract

The successfully procured service includes the totality of the deliverables as set out in the Schedule 2.1 – 'The Authority's Requirements' and associated contract schedules.

The Authority's Requirements includes an option for the provision of electronic test requesting, results acknowledgement and notification. This is included in the Service Catalogue.

The service will provide a national application that will integrate with the national technical architecture to provide a seamless solution from requesting of procedure to results acknowledgment and notification.

3.2 Procurement Regulations

As NHS Wales organisations are public sector bodies; all NHS Wales procurements must comply with Standing Financial Instructions and the Public Contracts Regulations 2015 (PCR2015).

On 1st April 2021, the NHS Wales Informatics Service (NWIS) transitioned to the new Special Health Authority, Digital Health and Care Wales (DHCW), which is the Contracting Authority for the purposes of this procurement.

Approval to proceed with any contract will be governed by the authorisation of a Full Business Case (FBC), of which this document forms a part, by the Welsh Government.

3.3 Procurement Strategy

Purpose of the Procurement Strategy

The purpose of the Procurement Strategy was to set out in a formalised manner the key aspects of the procurement of the Radiology Informatics Solution. It was a high-level document that stated the programme's approach to its procurement activities, its objectives, and key initiatives. The document provided general information on expenditure, procurement structures, and regulatory considerations and contained a statement of its commitment to developing good working relationships and dealing fairly with all potential suppliers. This strategy was developed along with the outline business case and defined the approach to be adopted by the Procurement Project.

An effective procurement strategy is based upon a shared understanding of the role and purpose of the procurement process.

The Procurement Strategy formed an important part of the audit trail for procurement setting out the intentions of the Contracting Authority in advance of the commencement of the formal process.

Prior to the publication of the Contract Notice, DHCW are mandated under its Standing Financial Instructions (SFI's), to Notify Welsh Government of the intended Contract and the

procurement process that will be undertaken. Until the Procurement Strategy was officially "Noted" by Welsh Government, the procurement process could not commence.

Objectives of the Procurement

The principal aim of the procurement is to procure a Radiology Informatics Service to replace the existing legacy solution/s and to provide a service that meets current and future requirements.

The objectives of the procurement are to ensure that the new Radiology Informatics Service will:

- Deliver safe and effective clinical outcomes for patients

- Procure a solution and associated support

- Meet the identified functional characteristics and requirements

- Provide options for additional functional and/or technical capabilities over the contract term (future proofing the solution)

- Offer value for money over its lifetime

- Be "best in class" (where technically, clinically, and financially feasible)

- Be fully interoperable with other national solutions

- Provide the requisite business management functionality as well as clinical functionality

- Meet the investment objectives and critical success factors as set out in the business case

- Contribute to the delivery of the national information and business strategies in accordance with Welsh Government strategies for health

- Be implemented in a fully supported manner within the required timescale for migration off the existing legacy solution(s)

Single Contractor versus Multiple Contractor

Based on an initial assessment of the current solutions available in this market, the procurement approach envisaged a single "Prime" Contractor-provided solution with that Contractor taking full contractual responsibility for all in-scope aspects of the requirement, including those delivered by any Sub-contractors under the contract.

In line with the Welsh Government preference of "*Cloud first*", consideration for any new investments explored and gave due consideration to this approach but not to the detriment of any clinical services. However, it was anticipated that any hosting of the major Solution components would be provisioned by the Contractor via private or public cloud hosting services. The scope, architecture and options bidders offered were explored as part of the competitive procurement process to ensure performance, functionality, efficiency, and security requirements of NHS Wales have been fully met.

Given the scope and scale of this project, potential suppliers are unable to supply all components and services to fulfil the Solution other than through the use of subcontractors, which the Authority allowed as part of their Bids, subject to said Contractor(s) entering into appropriate subcontracts, including taking full responsibility for the performance of any subcontracted services, i.e. operating as a "Prime Contractor" to the Authority for any and all aspects of their contracted solution. Procuring the solution from a single Prime Contractor achieves:

- A full and seamless end-to-end service, i.e. a managed "Service"

- Flexibility in bringing about business change driving the requirements for the Service and its development within clinically and operationally appropriate timescales.

- Clear responsibility for integration and end-to-end delivery of the service. This approach removes the risk of "boundary disputes"[4] with any other suppliers supporting the Service.

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[4] Boundary disputes means which contractual party is contractually obligated to deliver against the requirements in question

Contract Duration

The length of contract for the RISP Procurement is tailored to give best value for money for the project. The agreed contract period will:

- Allow sufficient time to exit off the legacy agreements and transition onto any new solution.

- Allow for adequate flexibility for the Authority during the investment life.

- Attract a sufficient range of bidders for the project.

- Enable a viable return on any investment.

- Ensure continuity of support as a minimum to achieve the potential short to medium term aims of the Programme.

The Contract Notice, published through the UK e-Notification service, stated the duration of the Contract to be for a period of nine (9) years in total with each Authority Party (health board/trust/Special Health Authority, etc.) entering into Deployment Orders with a term of no less than sixty-two (62) months, that being five (5) years and two (2) months, the latter allowing for two (2) months local implementation, followed by a period of five (5) years operational service. All Deployment Orders shall have the option to be extended by a period of up to two (2) years per Deployment Order. Please see Appendix C1 for the indicative implementation plan and roll out across NHS Wales.

Procurement analysis and prior experience of national IT system implementations suggest that the complexity involved with delivering an All-Wales solution and standardising technical processes across organisational boundaries requires a longer-term contract.

Additionally, the expected business criticality of this procurement to NHS Wales lends itself to the stability that a longer contract provides. Finally, the solution may need to flex, in terms of user volumes and data types, but will not materially change its scope. There needs to be flexibility in terms of:

- Extending the initial term of the contract flexibly in order to adapt to the needs of the service.

- Planning for an overlap period between the existing contractor and any new Contractor of at least twelve (12) months to ensure a seamless transition.

- Expanding the scope of the Service to allow more users, data types/flows to be deployed under the contract and/or provide the ability to respond to technical development opportunities, using the same contractual model and performance assumptions.

Value for money has been tested and explored on various options during the procurement phase.

Contracting Approach

The contract form of Agreement is a Master Services Agreement, based on an amended form of the IT Services Contract having regard to the Crown Commercial Services and other best practice guidance of Information Management & Technology (IM&T) procurement.

Advice was sought on the construction of the draft contract using the NHS Wales appropriately commissioned specialist advisers for commercial, legal, and technical aspects. Each NHS Wales participating organisation "Authority Party" will "call off" their requirements from the contract "the Agreement" and via this process will execute their own "Deployment Orders" with the Contractor. All Deployment Orders will be managed centrally in line with the "Once for Wales" approach.

Appropriate internal governance arrangements have been established to ensure that all Authority Parties agree and commit to the implementation plan and other Authority Responsibilities within the Contract, including the payment terms.

Procurement Route

On 31 December 2020, the Transition period for the United Kingdom (UK) ended and the UK left the EU Single Market and Customs Union. The UK Government has published a Green Paper 'Transforming Public Procurement' which details many of the changes that they propose to make to the current procurement framework including consolidating the Public Contract Regulations, the Utilities Contract Regulations, the Concession Contract Regulations

and the Defence and Security Public Contract Regulations into a single set of regulations specifically designed for the UK market and priorities.

However, at the time of writing this commercial case, public bodies must continue to comply with the Public Contracts Regulations 2015, with minor modifications including the requirement to place an advertisement through the UK e-Notification service. Under these regulations there are potentially several alternative procurement routes open to the project which meet this requirement:

- Procurement under an existing Framework Agreement

- Open Procedure

- Restricted Procedure

- Competitive Dialogue Procedure

Following an evaluation of alternative procurement routes (see Appendix C2), it was recommended that this requirement was procured under the Public Procurement Directives 2015 Competitive Dialogue Procedure. This procedure, according to the Public Contracts Regulations 2015, should be used in the case of particularly complex contracts, where purchasers may be aware of their needs but not know in advance, what the best technical, legal, or financial solution for satisfying those needs are.

The RISP Programme was keen to explore a range of technical solutions, in conjunction with bidders, including the introduction of new and potentially innovative solutions, as well as ensuring that the most appropriate commercial deal is secured, and therefore considered the Competitive Dialogue appropriate for this requirement.

Procurement Approach

The following is an outline of the basic procurement approach, which was developed further in a more detailed Procurement Plan:

- **Bidder engagement and market assessment** commenced to validate the proposed approach and test for an adequate level of interest, capability, and capacity to deliver the requirements. Whilst a preliminary engagement was undertaken, further

presentation days were required closer to the commencement of the formal procurement process. The approach was supported through advertisements on national platforms and via the use of social media. Such events were managed formally in line with the spirit of procurement regulations.

- **A RISP Procurement Team** was established with defined members and Terms of Reference.

- **Procurement training and awareness sessions** for key staff on an ongoing basis throughout the Competitive Dialogue process was a requirement. Initial briefing sessions set the scene for ongoing training allowing the RISP Evaluation Team to ascertain the level of experience of this type of procurement and the amount of additional training that will be required. The team augmented the training with ongoing advice and attendance at key meetings during the procurement process.

- **Contract Notice:** A Contract Notice was placed through the UK e-Notification service under the Competitive Dialogue Procedure. At this stage, key documentation also needed to be finalised and published to enable bidders to make an informed decision regarding their participation.

- **Prequalification:** Screening of Bidder Qualification Information was undertaken with the pre-qualification information received from bidders within thirty (35) days of the issue of the Notice (in accordance with the statutory timescale of thirty (30) days for the Notice). Assessment of pre-qualification information (which included details of previous relevant experience as well as financial and technical capability and capacity questions). From this exercise, a long list of five (5) bidding "Prime" Contractors were invited to participate in dialogue.

- **An Invitation to Participate in Dialogue (ITPD)** was issued to the long-listed Bidders. The ITPD required bidder responses to the Authority Requirements, pricing refinement, Contract Terms and Conditions and Draft Contract Schedules, detailed adherence to the Key Commercial Principles governing the procurement and participation in user evaluations.

- **ITPD Evaluation**: ITPD responses were evaluated to arrive at a short list of bidders. From this exercise, a short list of three (3) bidders were invited to participate in the detailed dialogue process with Authority representatives on the full set of contract schedules.

- **Detailed Dialogue:** A second stage of dialogue with shortlisted bidders was then conducted to finalise draft contract offers and identify the commercial terms on which the solution would be provided. The draft contracts are based on an amended version of the Crown Commercial Service (CCS) standard form IM&T contract. This stage commenced with site visits to other Bidder customers, the arrangements were defined and arranged by the Authority. Following this, detailed dialogue took place with each Bidder over two (2) "rounds", per workstream ('Functional', 'Technical', 'Implementation & Service' and 'Commercial, Legal & Financial'), each comprised of the following:

    o Receipt of the Bidder's mark-up on each part of the Agreement,

    o Review by Authority representatives,

    o Discussion with Bidders to seek clarification on submissions and providing Authority feedback on said submission and,

    o Evolution of the Authority's contract documentation identifying any changes made. At the end of this detailed dialogue stage, all shortlisted Bidders with compliant offers were taken forward to the Invitation to the ISFT (Invitation to Submit Final Tender) stage to maintain competition in the process and ensure that the Authority's options were not restricted prematurely.

- **Trial Invitation to Submit Final Tender** was issued to assess the readiness of bidders to proceed to the final ISFT stage. Submissions were not formally evaluated but were reviewed and, feedback was provided where necessary, to ensure compliance, completeness, and appropriate understanding of the Authority's requirements.

- **Invitation to Submit Final Tender (ISFT)** is the stage at which bidders provided their final tender for the Services.

- **Final Tenders** were then evaluated, and a most favoured tender was selected based on the most economically advantageous tender, which was calculated in accordance with agreed weightings for the functional/technical requirements and price.

Subject to clarifications and minor refinements concerning the final tender submission, if required, and approval of the Full Business Case, a contract will be awarded to the bidder with the most economically advantageous tender, executed, and come into force following the ten-day standstill period. The Award Notice will be placed within forty-eight (48) days of the award decision.

Selection and Evaluation

Selection and evaluation criteria guided the evaluation at the three (3) stages of the procurement:

- Bidder Qualification Information – Pre-Qualification Questionnaire (PQQ) and Single Procurement Document (SPD) responses, to select the longlisted bidders

- Invitation to Participate in Dialogue (ITPD) Responses (Dialogue Stage), to select the shortlisted bidders

- Invitation to Submit Final Tenders (ISFT) (at the end of the Detailed Dialogue Stage)

In accordance with PCR 2015, all key documents for the procurement were issued at the start of the procurement, including evaluation criteria for the PQQ/SPD, ITPD and ISFT stages. All evaluation approaches highlighted the criteria and weightings to be used and the methodology for scoring and assessment across the whole procurement.

Contract Award

On conclusion of the ISFT phase and final evaluation of the ISFT responses, a recommendation has been made on the Most Economically Advantageous Tender (MEAT), which has been calculated in accordance with the agreed weightings for functional/technical requirements and price. This recommendation has been recorded in a final evaluation report, which sets out the basis for the award decision and has been signed via the agreed governance process.

Any award is subject to a mandatory ten (10) day standstill period at which time all bidders have been informed of the outcome of the procurement process and the relative advantages of the successful bidder.

Final award is subject to subsequent approvals by the RISP Programme Board and all health boards, trusts and Special Health Authorities (where appropriate), Full Business Case Approval by Welsh Government and notification being provided from the Welsh Government Minister for Health and Social Services. Upon acceptance by the DHCW Board, as the Contracting Authority, the Agreement can then be executed upon signature by the DHCW Chief Executive and the successful Bidder.

Unsuccessful Bidders will be offered an opportunity for a full debrief following the formal decision being ratified and approved.

Following the completion of the formal award process a Contract Award Notice will be placed through the UK e-Notification Service.

3.4 Required Services, Outputs and Timescales

Required Services

The principal aim of the procurement is to procure a Radiology Informatics Service to replace the existing legacy solutions and to provide a service that meets current and future requirements.

The service requirement included the:

- Provision, ongoing development, upgrade and maintenance of an All- Wales Radiology Informatics Service (RIS).

- Provision, ongoing development, upgrade and maintenance of an All- Wales Picture Archiving and Communications System (PACS).

- Provision, ongoing development, upgrade and maintenance of an All- Wales Patient Dose Management System (PDMS).

- Provision, ongoing development, upgrade and maintenance of an Electronic Test Requesting System (ETR) for radiology including integrated decision support tools

relevant to radiology referral pathways. Included as an <u>optional</u> requirement within the procurement scope.

- Deployment of the solution across the multiple organisations that comprise NHS Wales, including, but not limited to, other nationally hosted organisations.

- Any advanced image manipulation and analysis applications that may be required.

- Contractor managed hardware and software environments:

  o Hosted in non-NHS Wales owned or contracted data centres, public or private Cloud, subject to NHS and Welsh Government security requirements.

  o Using the Welsh Public Sector Broadband Aggregation (PSBA) for wide area networking to health boards and trusts.

- Business intelligence and reporting tools.

Timescales

Following the Welsh Government approval of the OBC, the Contract Notice was published in December 2021. The design and development of the new service under the proposed contract took account of the migration/exit off the legacy solutions and in accordance with the RISP Programme Plan. The aim is to complete the full implementation by April 2025, subject to detailed negotiations with the successful Contractor and the commitment of the local health boards. Further details are provided in the Management Case.

The table below shows the high-level timescales for the five (5) Tranches of the RISP Programme:

Table 16: RISP Programme Timescales

Tranche 1	Tranche 2	Tranche 3	Tranche 4	Tranche 5
Pre-Procurement	Procurement	Configuration and Integration	Deployment	Ongoing Contract Management
Jun 2019 – Dec 2021	Jan 2022 – Apr 2023	May 2023 – Apr 2024	May 2024 – Jun 2025	Jul 2025 Onwards
• Programme definition • Outline business case • Procurement documentation	• Procurement • Full business case	• Config and testing • Systems integration • Data migration	• Implementation • Handover	• Business as usual

3.5 Risk Apportionment

While the RISP Programme adhered to the general principle that risks should be passed to the party best able to manage them, a formal risk apportionment exercise was considered as not required for this programme.

3.6 Payment Mechanisms

Charging mechanisms will depend on many factors, one important aspect being the phased deployment of the new Service which is expected to occur over a twelve (12) month period. The implications of this are that each health board and trust will only start paying for the Service once they start using it. This therefore required the Master Services Agreement to be flexible, given that the actual dates for when the Service will commence in some health boards may not end up being the same as the estimated dates currently identified. The selection of a Master Services Agreement specifically supported Service roll out over multiple organisations, with health boards entering into their own Deployment Orders, each of which has the potential to determine local timescales and resources.

3.7 Key Contractual Issues

The development of the Contract was undertaken as part of the Competitive Dialogue process with the short-listed bidders on the basis of an appropriately amended form of the Crown

Commercial Services (CCS) standard IM&T Agreement and taking account of lessons learned from other similar initiatives. Key aspects of the contractual relationship that the RISP programme is seeking to achieve have been reflected in the contract as follows:

- Value for Money (VfM) – the procurement was underpinned by a financial model that provided transparency and certainty around costs for key System and service elements. These costs have been considered alongside how well the System design meets the clinical & technical requirements. The aim was to secure the optimum combination of whole-of-life costs and quality (or fitness for purpose) of the System and services to meet NHS Wales requirements. A key contractual issue when considering the VfM is how risks are allocated between the supplier and NHS Wales.

- Ownership of assets by the Contracting Authority have been driven by the design of the Solution that best meets the clinical & technical requirements to deliver the optimum service solution. There may be additional service benefits to be gained from some ownership of assets and/or improvement in the overall affordability for the Contracting Authority, for this contract any assets owned by NHS Wales have been reflected on the balance sheet of those Authority Parties receiving the Service and/ or where ownership and control of the asset resides.

- Intellectual Property Rights (IPR) – The IPR from the application and the interfaces was not envisaged to have significant value for the Contracting Authority and was not pursued in the contract.

- Warranties and guarantees – this is a high cost deal and the perceivable risk of loss (of the Service) is moderate, given its intended use by all the NHS in Wales. These have been pursued within the contract.

3.8 Accounting Treatment

Accountancy treatment is set out in the Financial Case. The classification of items of cost as capital and revenue have been informed by the Bidder Solution designs as part of the procurement process. This was an iterative process seeking detail through clarification with Bidders, with the accounting classifications that emerge reflected in the Financial Case of the FBC.

The Accounting treatment and Funding model depended on the preferred contract model and the outcome of the procurement process.

The three (3) procurement models that have been considered:

- **Traditional purchase and service support model**: In this model the RISP solutions are purchased outright as capital assets and the hardware and software owned by NHS Wales. The supplier implements the system, but once implemented it would be managed by NHS Wales (i.e., RIS/PACS Administration) with the supplier providing technical & service support under a contract arrangement requiring recurrent revenue funding. The service support contract would still include all the same management responsibilities, KPI's, service credit regimes etc as a Managed Service Provider model.

- **Managed Service Provider model**: In this model, NHS Wales purchases a "service" from the supplier. The supplier then implements and manages the system with charges based on fee-per-service arrangements. NHS Wales does not own the hardware or software. This model moves most of the capital acquisition costs into recurrent revenue budget, spreading that expenditure across the life of the system.

- **Hybrid Managed Service Provider model**: The extent of the Hybrid Managed Service Provider model may be limited. For example, NHS Wales having ownership of an All Wales Enterprise License for the RISP Software and some infrastructure either located in NHS organisations and/or an NHS Data Centre, but with the supplier taking responsibility for management and ongoing service support. As with the Traditional purchase and service support model this would involve capital and revenue accounting treatment of costs and associated funding.

Capitalisation of Salaries

In accordance with IFRS16 only those direct attributable labour costs (employee benefits) that relate to the time spent by employees involved in the acquisition, construction, development and commissioning of the infrastructure and system will be capitalised. The relevant proportion of internal costs relating to staff have also been included within the cost of the asset.

Capitalisation of Interface Development

Costs relating to interface acquisition, development and commissioning required for the specified operational running of the system will be capitalised. Ongoing support and maintenance will be expensed as appropriate via the relevant income and expenditure accounts.

Cloud Delivered Services

This procurement is contracting for Services through a primarily Cloud delivered service, i.e. not relying on elements of the Service being delivered through NHS Wales data centres.

IFRS standards do not contain explicit guidance on accounting for cloud computing arrangements or costs to implement. NHS Wales will need to apply judgement to account for these arrangements and may need to apply various IFRS standards, including IFRS 16 Leases, IAS 38 Intangible Assets, and IAS 16 Property, Plant and Equipment to account for the costs.

NHS Wales will need to evaluate whether the rights granted in a cloud computing arrangement are within the scope of IAS 38 Intangible Assets or IFRS 16 Leases. Otherwise, the arrangement is generally a managed service contract and accounted for as revenue expenditure:

- Significant judgement will be required to determine whether a cloud computing arrangement that is not a lease provides NHS Wales with a resource that it can control i.e., an intangible asset

- If the cloud computing arrangement includes an intangible asset in the scope of IAS 38, NHS Wales should apply the guidance in IAS 38 to evaluate whether to capitalise or expense implementation costs

- If the cloud computing arrangement does not include an intangible asset and does not contain a lease, NHS Wales should expense implementation costs unless they can be capitalised under other IFRS standards.

In line with the Welsh Government preference for "Cloud first", through the competitive dialogue process the project team have given due consideration to this preference, but not to the detriment of any clinical solution requirements.

Current Assessment of Capital and Revenue Accounting

There has been consultation with NHS Finance colleagues through the Deputy Director of Finance Group and an initial assessment of accounting treatment has been carried out which has confirmed that there is likely to be a requirement for both capital and revenue accounting and funding.

The Solution cost, based on the Bidder's ISFT submission, and funding requirements are set out in the Financial Case. The cost estimate and classification of costs as capital and revenue has been informed by the initial market soundings undertaken in January 2021 and responses to PIN in May 2021.

The project team will further assess the various IFRS standards with finance experts and agree a final accounting treatment once the details of the proposed Solution have been confirmed.

It is envisaged that any NHS Wales owned assets underpinning delivery of the service will be recorded on the balance sheet of the Digital Health and Care Wales (DHCW) and the relevant NHS body based on an assessment of ownership and control of the asset, those NHS Bodies receiving the service and Welsh Government requirement.

A letter supporting the balance sheet conclusion was provided by the Deputy Director of Finance Group together with audit review.

Value Added Tax (VAT)

Initial advice was sought from one of the NHS Wales VAT advisors as to the possible VAT accounting treatment for the RISP procurement in order to ascertain the likely VAT treatment of the contract. Initial review of VAT guidance would suggest:

In relation to SaaS and Cloud Services, the current HMRC view still seems to go back to the question - is the solution as a whole something that can be demonstrated to be 'to the

specification of' NHS Wales? If NHS Wales can demonstrate that the answer to this question is yes, as appears to be the case for other PACS Solutions the costs should be VAT recoverable.

This assessment can be a bit subjective as HMRC's view is that the solution should have no application elsewhere however, they do also see that some software solutions are not entirely stand alone and integrate into a number of other solutions so that can complicate matters as to what really is the entire solution.

For the purposes of the Business Case, it was assumed that all capital costs (excluding capitalised staff) are not deemed VAT recoverable. Whilst ongoing service provision, support and maintenance will be VAT recoverable as per COS Heading 14 – Computer services supplied to the specification of the recipient.

This assumption regarding VAT accounting will be confirmed with NHS Wales VAT Advisors as the procurement concludes and the design of the solution and contract terms are finalised.

3.9 Personnel Implications (including TUPE)

A Senior Project Manager has been appointed to lead the Procurement Project working to the RISP Programme Lead. The Project Manager will manage the procurement and contract award process, working with the Procurement Lead allocated by DHCW Commercial Services and specialist advice as required. An estimate of costs for the external specialist advisers has been included in the costs for the economic analysis.

Specific individuals have been involved across multiple activities and undertaken more than one role in order to ensure consistency and assist in securing an appropriately robust outcome. The combined staff and consultancy team covered the following roles for the procurement:

- **RISP Programme Team:** Comprising the Senior Responsible Owner, Clinical Lead, Programme Lead, the RISP Programme Management Office (PMO) and Subject Matter Experts.

- **RISP Procurement Project (RPP) Team:** A full time RPP Project Manager will be appointed to manage the project and deliver the planned outputs as expected within

quality, time, and budget constraints. The RPP Project Manager will report to the RISP Senior Programme Manager and be supported by the RISP PMO.

- **Legal Advisers:** RISP utilised DHCW's legal services partner, Blake Morgan LLP to provide the required legal advice, with support including assistance with Contract drafting and contractual discussions with Bidders.

- **Commercial Advisor**: This resource was secured under an existing DHCW contract with In-form Solutions Limited, who has led a number of competitive dialogues for NHS Wales.

- **Radiology Informatics Subject Matter Experts:** Radiology specialists, who understand the requirements for the new system and are experienced with the procurement of the extant solution, have informed the specification of requirements and acted as a link to other subject matter experts from the range of disciplines within the scope of the project.

- **Financial Expert:** A financial expert assisted with the financial modelling required for this project.

- **DHCW Procurement Team:** Comprising two (2) full time staff, including administrative support for the procurement.

Specialist teams were created, as required at key stages during the procurement process, to provide the specific skills and expertise required to support the procurement, including:

- **Requirements Definition Teams**: Specifying the service and technical requirements to be delivered by the new system utilising Radiology Subject Matter Experts (SMEs), DHCW technical experts and IT experts from across NHS Wales.

- **RISP Procurement Team**: Screening the PQQ/SPD responses, score responses against the ITPD and evaluate the final tenders.

- **RISP Dialogue Team**: To negotiate the draft Contracts including representation from the Evaluation Team, Commercial, Legal and Technical Advisers.

It is not expected that any activities will fall under TUPE – Transfer of Undertakings (Protection of Employment) Regulations 1981.

4. The Financial Case

4.1 Introduction

The purpose of the Financial Case is to outline the financial implications of the preferred option and confirm it remains affordable when considering the final cost of delivery for the project, following negotiations with suppliers and a more developed understanding of other costs, benefits and risks.

As such it sets out updated capital requirements and revenue consequences of the proposed scheme, along with final underpinning assumptions. It outlines anticipated funding arrangements and presents the impact on the NHS Wales organisations' financial statements.

As outlined in the Economic and Commercial Cases, the preferred option involves procuring a seamless end-to-end solution from the Preferred Bidder which will replace the existing PACS and WRIS systems. The Financial Case outlines the costs involved in procuring and implementing the solution as well as the resulting ongoing costs.

4.2 Overview

In summary, based on the tendered costs from the Preferred Bidder and updated programme costs, delivery of the preferred option requires capital investment of £25.9m and non-recurring revenue funding of £2.1m from Welsh Government.

Overview - Capital Requirements

Capital funding of £25.9m is requested from Welsh Government to invest in the Preferred Bidder's initial solution charges as well as capitalisable programme resource and local infrastructure requirements. This assumes that VAT is not recoverable on either the solution charges or the infrastructure costs.

This is a £5.3m increase on the £20.6m capital funding committed by Welsh Government at OBC as a result of:

- £1.7m additional Programme resource requirements that have been identified to ensure a robust implementation programme is in place to deliver the programme.

£3.6m additional local infrastructure costs (including VAT) that have been identified to ensure the appropriate infrastructure is in place to support the preferred solution.

Overview - Non-recurring Revenue Requirements

One-off revenue funding of £4.3m is required to invest in programme resource that cannot be capitalised during the 3-year implementation period.

This includes:

- £2.1m requested from Welsh Government, which is a £0.9m increase on the £1.2m committed at OBC.

- £2.2m Health Board contribution during 2023/24 to 2025/26. Given that Health Boards have already contributed £0.7m during 2022/23 (not included in the figures above), this represents a £0.9m increase on the £2.1m identified at OBC.

Overview - Ongoing Revenue Implications

As outlined at OBC, there are minimal revenue implications for Health Boards since the current PACS/WRIS costs of £m p.a. will cover the ongoing solution service charges of £m, the infrastructure revenue costs of £0.9m p.a. and the ongoing support for integration of £0.2m p.a.

There will however be a cost pressure during 2024/25 and 2025/26 of £m due to double running of the existing systems and implementing the local infrastructure. It should be noted that this may be reduced depending on phasing of infrastructure costs.

The following sections outline the main assumptions behind these numbers.

4.3 Accounting Treatment and Value Added Tax (VAT)

The financial schedules reflect the appropriate financial treatment in accordance with standard NHS reporting rules, however it should be noted:

4.4 Capitalisation

Capitalisation of Salaries

In accordance with IAS 16 only those direct attributable labour costs (employee benefits) that relate to the time spent by employees involved in the acquisition, construction, development and commissioning of the infrastructure and system have been capitalised. The relevant proportion of internal costs relating to staff have also been included within the cost of the asset.

Capitalisation of Interface Development

Costs relating to interface acquisition, development and commissioning required for the specified operational running of the system have been capitalised. Ongoing support and maintenance will be expensed as appropriate via the relevant income and expenditure accounts.

Capitalisation of Cloud Hosting, Compute & Storage Costs

Cloud Hosting, Compute & Storage costs that were identified as part of the PIN pricing response have been assumed to be all revenue costs based on the assumption that NHS Wales will not be able to manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, and individual application capabilities. NHS Wales would not have decision-making rights about which hardware (or infrastructure) the Supplier / 3rd party cloud provider will use to run RIS on. When accounting for Cloud Hosting, Compute & Storage the distinction between whether NHS Wales has "control" over an asset is what will allow for its capitalisation under specific Accounting Rules. Unless the Supplier / 3rd Party Cloud Provider specifically contracts to allow NHS Wales to retain control over underlying

assets these costs cannot be capitalised under IAS's. If, however, assets hosted by the Supplier and / or Cloud provider are reserved exclusively for use by the Trust then it's possible to demonstrate that the Trust has sufficient control over the underlying assets and some of the costs may be capitalised.

Implementation costs

Implementation costs, such as initial delivery and handling costs, and installation costs which under FRS 15 are considered "directly attributable" to the development of the asset, are capitalised.

4.5 Capital Charges

Depreciation

Depreciation estimates are based on a straight-line basis over 5 years in line with the planned contract term and commence from 2026/27 once all Health Boards are deployed and associated assets capitalised. Accelerated depreciation is assumed in 2031/32 to reflect asset write down at the point that all contract deployment periods come to an end.

4.6 Value Added Tax

VAT

Initial advice will be sought from one of the NHS Wales VAT advisors as to the possible VAT accounting treatment for the RIS procurement in order to ascertain the likely VAT treatment of the contract. Initial review of VAT guidance would suggest:

In relation to Software as a Service (SaaS) and Cloud Services, the current HMRC view is based on the question - is the solution as a whole something that can be demonstrated to be 'to the specification of' NHS Wales? If NHS Wales can demonstrate that the answer to this question is yes, as appears to be the case for other PACS Solutions across the UK, the costs should be VAT recoverable.

It is assumed that all capital costs (excluding capitalised staff) are not deemed VAT recoverable whilst ongoing service provision, support and maintenance will be recoverable as per COS Heading 14 - Computer services supplied to the specification of the recipient.

4.7 Baseline Costs

FBC Costs

Baseline costs are estimated based on the Financial Commercial paper from February 21 which identified revenue costs for PACS and WRIS of £m. These have been uplifted to 2023/24 prices using the HM Treasury GDP Deflator. Baseline costs have also been adjusted from the February 21 paper to reflect a realignment of the organisational boundaries between Swansea Bay and Cwm Taf and recognising the support for Powys provided by neighbouring health boards within the current PACS contracts. As a result, the baseline costs more accurately reflect the future configuration of RISP deployment orders.

Table 17: Baseline Costs

	PACS £'000	WRIS £'000	Total £'000
Aneurin Bevan UHB			
Betsi Cadwaladr UHB			
Cardiff and Vale UHB			
Cwm Taf Morgannwg UHB			
DHCW			
Hywel Dda UHB			
National Imaging Academy Wales			
Powys Teaching HB			
Public Health Wales			
Swansea Bay UHB			
Velindre University NHS Trust			
Total Baseline Costs			

It is anticipated that these costs will continue until each Health Board's stable operation date for the new system plus one month of dual running costs. The table below shows the stable operation date for each of the Health Boards and the number of months that the current PACS/WRIS costs are incurred during the three-year implementation period.

Table 18: Stable Operation Date

	Stable Operation Date	Number of months of current PACS/WRIS costs incurred during implementation period		
		2023/24	2024/25	2025/26
Aneurin Bevan UHB	Jan-25	12	10	0
Betsi Cadwaladr UHB	Oct-24	12	7	0
Cardiff and Vale UHB	Jul-25	12	12	4
Cwm Taf Morgannwg UHB	Mar-25	12	12	0
DHCW	N/A	12	12	4
Hywel Dda UHB	Feb-25	12	11	0
National Imaging Academy Wales	Jul-25	12	12	4
Powys Teaching HB	Jun-25	12	12	3
Public Health Wales	May-25	12	12	2
Swansea Bay UHB	Jun-25	12	12	3
Velindre University NHS Trust	Apr-25	12	12	1

As a result, the following total costs are included in the 10-year appraisal period for the existing PACS/RIS system.

Table 19: Existing PACS/RIS costs (2023/24 – 2025/26)

	Capital £'000	Revenue £'000	Total £'000
Aneurin Bevan UHB	-		
Betsi Cadwaladr UHB	-		
Cardiff and Vale UHB	-		
Cwm Taf Morgannwg UHB	-		
DHCW	-		
Hywel Dda UHB	-		
National Imaging Academy Wales	-		
Powys Teaching HB	-		
Public Health Wales	-		
Swansea Bay UHB	-		
Velindre University NHS Trust	-		
Total Legacy Costs	-		

Changes since OBC

These final costs have been compared to the estimated values which were included in the OBC.

Table 20: Legacy Solution Costs Compared to OBC

	Initial Charges including VAT £'000	Service Charges £'000	Total £'000
FBC Legacy Costs	-		
OBC Legacy Costs	-		
Movement since OBC	-		

Legacy costs in the FBC are £m lower since OBC, which is largely driven by the number of years considered in the appraisal period.

4.7 Preferred Bidder Solution Costs

FBC Costs

Solution costs are based on tendered costs submitted by the Preferred Bidder. The Preferred Bidder has allocated these costs as follows:

- **Initial Charges:** Includes initial investment in hardware and software, professional services for testing, training, PM, data migration and implementation during the implementation period (2024/25 – 2025/26). Current assumption is that VAT is not recoverable on the initial charges although this is under investigation.

- **Service Charges:** Includes ongoing annual maintenance and support during the term of the contract.

Costs have been allocated to Health Boards based on the contract value apportionment and stable operation dates provided to the Preferred Bidder as part of the procurement process.

The resulting costs are outlined in the table below.

Table 21: Solution Costs

	Initial Charges £'000	Service Charges £'000	Total £'000
Aneurin Bevan UHB			
Betsi Cadwaladr UHB			
Cardiff and Vale UHB			
Cwm Taf Morgannwg UHB			
DHCW			
Hywel Dda UHB			
National Imaging Academy Wales			
Powys Teaching HB			
Public Health Wales			
Swansea Bay UHB			
Velindre University NHS Trust			
Total Solution Costs excluding VAT			
VAT			
Total Solution Costs including VAT			

Changes since OBC

These final costs have been compared to the estimated values which were included in the OBC.

Table 22: Solution Costs Compared to OBC

	Initial Charges including VAT £'000	Service Charges £'000	Total £'000
FBC Solution Costs			
OBC Solution Costs			
Movement since OBC			

This demonstrates an increase in solution costs of £m since OBC, which is largely driven by slightly higher service charges than anticipated.

For the purposes of the 10-year appraisal period, it is assumed that the average annual service charge costs will continue at the same level following the contract end date at each Health Board.

4.8 Programme Resource Plan

FBC Costs

The Resource Plan for delivery of the Programme has been updated as part of the FBC based on

- The resource plan required to deliver RISP including the key functions and requirements as outlined in the table below.

- Pay costs based on 2023/24 Agenda for Change pay scales including on costs plus 2.5% annual inflation.

Table 23: Resourcing Requirements

Function	Requirements
Programme Management Office	- Programme Director - Programme and Project Management - Project Support - Commercial Manager - Radiology SME - Business Change Manager - Clinical Leads
Technical Support	- Application architecture - Infrastructure and networking architecture - Integration and reference application teams - Applications development - RADIS teams (Team leads, developers, analysts, testers) - Service management - Data standards - Information governance and patient safety
Local Deployment Teams	- Project managers - IT support - PACS/RIS support

Costs have been allocated to Health Boards based on the contract value apportionment used by the Preferred Bidder within the solution costs.

The resulting costs for the programme resource plan are presented in the table below.

Table 24: Programme Resource Costs

	Capital £'000	Revenue WG Funded £'000	Revenue HB Funded £'000	Total £'000
Aneurin Bevan UHB	315	165	308	788
Betsi Cadwaladr UHB	286	84	347	717

	Capital £'000	Revenue WG Funded £'000	Revenue HB Funded £'000	Total £'000
Cardiff and Vale UHB	515	381	394	1,290
Cwm Taf Morgannwg UHB	286	169	262	717
DHCW	0	0	0	0
Hywel Dda UHB	286	105	325	717
National Imaging Academy Wales	172	258	0	430
Powys Teaching HB	114	172	0	287
Public Health Wales	372	415	145	932
Swansea Bay UHB	429	268	378	1,075
Velindre University NHS Trust	86	58	71	215
Total Programme Resource Costs	**2,861**	**2,075**	**2,232**	**7,168**

Changes since OBC

These final costs have been compared to the estimated values which were included in the OBC.

Table 25: Programme Resource Costs vs OBC

	Capital £'000	Revenue WG Funded £'000	Revenue HB Funded £'000	Total £'000
FBC Programme Resource Costs	2,861	2,075	2,232	7,168
OBC Programme Resource Costs	1,154	1,222	2,122	4,498
Movement since OBC	1,707	853	110	2,670

Following a full review of the programme resource requirements an additional £2.7m.

4.9 Local Infrastructure Costs

FBC Costs

Infrastructure costs have updated as part of the FBC based on estimated capital and revenue costs for PSBA networks, network switches, firewalls.

Costs have been allocated to Health Boards based on actual requirements.

The resulting costs for the infrastructure are presented in the table below.

Table 26: Infrastructure Costs

	Capital £'000	Revenue £'000	Total £'000
Aneurin Bevan UHB	717	1,080	1,797
Betsi Cadwaladr UHB	784	2,668	3,452
Cardiff and Vale UHB	1,059	2,572	3,630
Cwm Taf Morgannwg UHB	818	825	1,642
DHCW	-	-	-
Hywel Dda UHB	374	348	722
National Imaging Academy Wales	-	-	-
Powys Teaching HB	214	272	486
Public Health Wales	571	-	571
Swansea Bay UHB	92	99	191
Velindre University NHS Trust	413	184	597
Total Infrastructure Costs	5,042	8,047	13,088
Irrecoverable VAT	1,008		1,008
Total Infrastructure Costs including VAT	6,050	8,047	14,097

Changes since OBC

These final costs have been compared to the estimated values which were included in the OBC.

Table 27: Infrastructure Costs vs OBC

	Capital £'000	Revenue £'000	Total £'000
FBC Infrastructure Costs	6,050	8,047	14,097
OBC Infrastructure Costs	2,423	-	2,423
Movement since OBC	3,627	8,047	11,674

Following a full review of the local infrastructure requirements an additional £3.6m of capital investment requirements have been identified, including VAT.

This will incur £0.9m of annual revenue consequences. Although these were not identified separately in the OBC, they have been offset by reduced legacy costs compared to the OBC.

4.10 Ongoing Support for Integration Costs

FBC Costs

DHCW has estimated that an additional £150k p.a. of costs will be incurred for the ongoing support for integration.

Costs have been allocated to Health Boards in line with the solution contract value allocation.

The resulting costs for the ongoing support for integration are presented in the table below.

Table 28: Ongoing Support for Integration Costs

	Capital £'000	Revenue £'000	Total £'000
Aneurin Bevan UHB	-	116	116
Betsi Cadwaladr UHB	-	105	105
Cardiff and Vale UHB	-	189	189
Cwm Taf Morgannwg UHB	-	105	105
DHCW	-	0	0
Hywel Dda UHB	-	105	105
National Imaging Academy Wales	-	63	63
Powys Teaching HB	-	42	42
Public Health Wales	-	137	137
Swansea Bay UHB	-	158	158
Velindre University NHS Trust	-	32	32
Total Ongoing Support for Integration	-	1,050	1,050

Changes since OBC

These costs were not included at OBC-stage.

4.11 Impact on Financial Statements

Impact on Balance Sheet

The proposed accounting treatment for the preferred option is that £25.9m of assets will be capitalised and brought on balance sheet (including VAT where appropriate).

For this contract any assets owned by NHS Wales will be reflected on the balance sheet of those Authority Parties receiving the Service and / or where ownership and control of the asset resides. It is anticipated that as with other All Wales procurements the successful

supplier will require the total All Wales capital cost to be included in the deployment order for the first Authority Party in which the new System is to be implemented. This Authority Party has not been agreed at this stage, but the Total All Wales Asset Value for the new System will need to be recorded on the balance sheet of that party and then the respective share of the asset value transferred to the Balance Sheet of each Party once the new System has been implemented and is operation in each organisation.

4.12 Impact on Income & Expenditure

As outlined at OBC, there are minimal recurring revenue implications overall since the current PACS/WRIS costs of £m p.a. will cover both the ongoing solution service charges of £m and the infrastructure revenue costs of £m p.a. resulting in a net overall saving to NHS Wales from 2026/27 onwards of £m p.a.

However, there are non-recurring revenue impacts during the implementation period including:

- Programme resource costs of £4.3m during 2023/24 – 2025/26 which it is anticipated will be funded as follows:

  - £2.2m from Health Boards allocated based on the 2022/23 contribution of £744k continuing for the next 3 years.

  - The remaining £2.1m is requested from Welsh Government.

- £2.1m cost pressure during 2024/25 and 2025/26 due to double running of the existing systems and the revenue consequences of implementing the local infrastructure. It should be noted that this may be reduced depending on phasing of infrastructure costs.

The impact to Health Boards, based on the allocation of costs outlined in the previous sections, is outlined in the table below.

4.13 Overall affordability and funding

As outlined in section 1.2, based on the tendered costs from the Preferred Bidder and updated programme costs, delivery of the preferred option requires the following funding:

- £25.9m capital investment requested from Welsh Government, a £5.3m increase on the funding committed at OBC.

- £2.1m non-recurring revenue requested from Welsh Government, which is a £0.9m increase on the £1.2m committed at OBC.

- £2.2m Health Board contribution during 2023/24 to 2025/26. Given that Health Boards have already contributed £0.7m during 2022/23, this represents a £0.9m increase on the £2.1m identified at OBC.

As outlined at OBC, there are minimal revenue implications for Health Boards since the current PACS/WRIS costs of £m p.a. will cover the ongoing solution service charges of £m, the infrastructure revenue costs of £m p.a. and the ongoing support for integration of £m p.a.

There will however be a cost pressure during 2024/25 and 2025/26 of £2.1m due to double running of the existing systems and implementing the local infrastructure. It should be noted that this may be reduced depending on phasing of infrastructure costs.

5. The Management Case

5.1 Introduction

This section of the Full Business Case sets out the approach that will be taken to support the successful delivery of the Programme, in accordance with best practice. The programme structure has been designed to ensure compliance with the guidance set out in the Treasury Green Book and Welsh Government Five Case Model. It is assumed there will be flexibility to support any new developments and discoveries as they emerge.

A Strategic Outline Case (SOC) was not required for RISP, as it is driven by the need to re-procure a new radiology system. This Full Business Case (FBC) further evolves the approach to managing and delivering this programme, as originally set out in the Outline Business Case (OBC).

5.2 Programme Governance

Following a review period by the steering group overseeing the NHS Executive, it was agreed that the RISP programme would not transfer into the NHS executive but d into Digital Health and Care Wales, on 1st January 2023. The programme is managed in accordance with Managing Successful Programmes (MSP) and PRINCE2 standards, which are tailored to suit the needs of the service.

Diagram 2 below outlines the Programme Board reports to DHCW Executive Board. The Programme also reports to the National Imaging Strategy Programme Board on progress as part of its responsibility to deliver the Informatics element of the Imaging Statement of Intent and, as it is clinically led, to meet the requirements to provide a comprehensive clinical imaging service for patients and healthcare service in Wales.
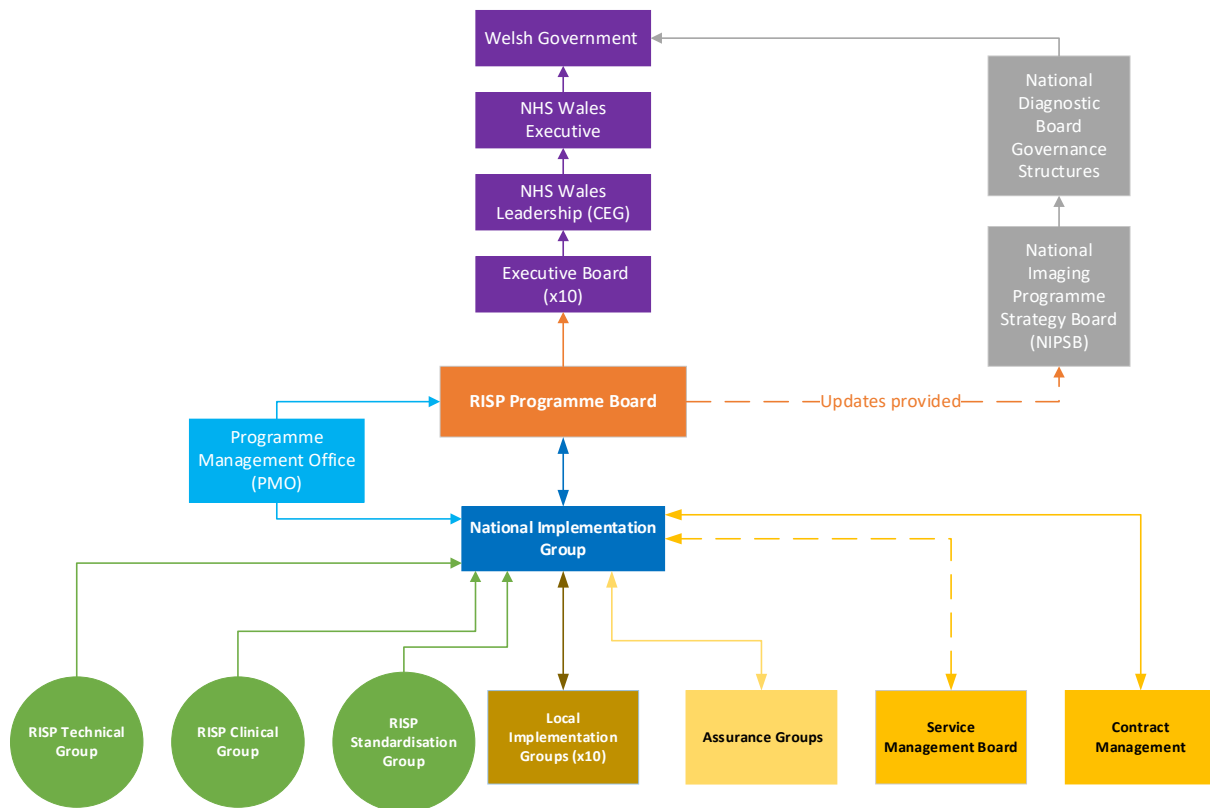
Diagram 5 – Programme Structure

A RISP Programme Board is well established with a remit to provide oversight and direction and to review and assure the Programme's progress. Membership comprises senior representatives from each health board and trust, nominated by CEOs with key stakeholder groups also represented. The RISP Senior Responsible Owner (SRO) is Matt John (Head of Digital SBUHB), who chairs the RISP Programme Board, oversees all projects within the Programme, and will provide strategic direction and leadership to the Programme.

A list of the Board members can be found in Programme Board Terms of Reference Appendix M1.

RISP Programme Management Structure

A RISP Programme Management Office (PMO) team is responsible for managing and driving the delivery of the Programme. The Programme team is led by the National Programme Lead, Gareth Cooke and overseen by a Programme Director, Alison Maguire. The role of the PMO is to plan, coordinate and manage the Programme on a day-to-day basis and adds value

through its staff's knowledge, experience and skills. The PMO sets and maintains standards for project management throughout the Programme to ensure best practice.

Following a review of the PMO resources as initially outlined in the OBC, it is proposed that an additional Principal Project Manager is appointed to support the complex work of implementation and the number of support workers is reduced from 3 to 2 as more efficient use of time and resources is adopted. From 2023/24, the Programme Management Office (PMO) will comprise of:2 Principal Project Managers, focussing on programme implementation; supported by

- Two Project Managers focussing on Commercial, Business Change and implementation projects

- Two Support Workers that support programme governance and assurance

- 1 Subject Matter Expert who works with the Radiology Departments on business change projects, as well as participates in the procurement, development, testing, training, and deployment of the new solution

- 0.5 FTE Commercial Manager who will manage the contract and support implementation following on from the procurement exercise

- 1 Business Change Manager who will be responsible for supporting the change process and developing training to support the implementation
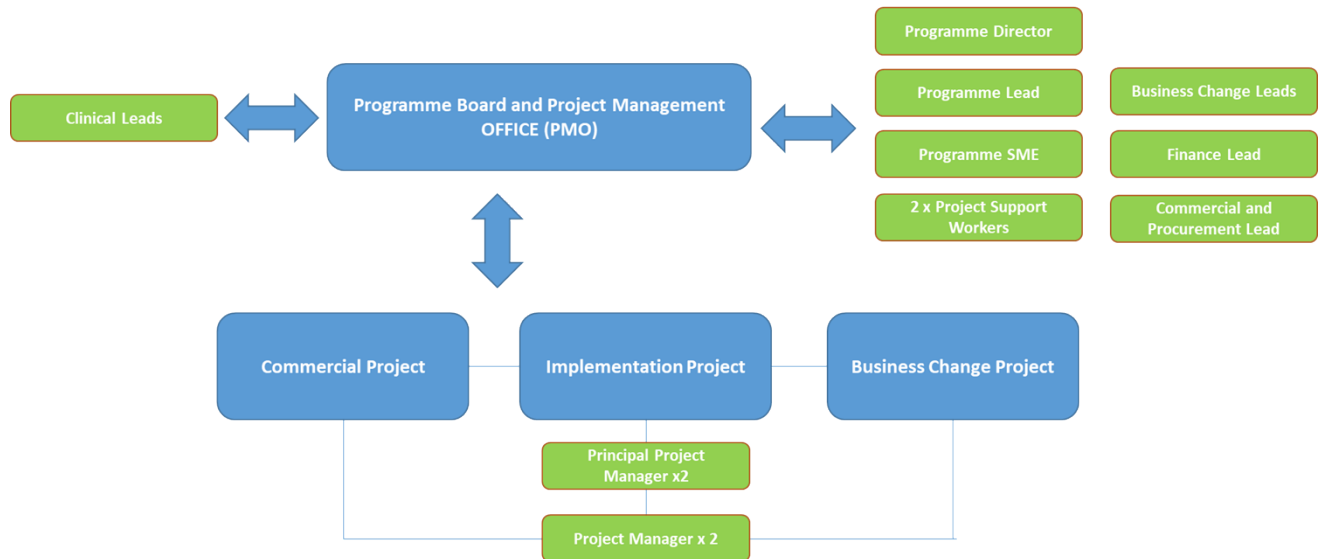
RISP Programme Management Structure 2023

Diagram 6 – Programme Management Structure

Radiology Clinical Leads

Three (3) Consultant Radiologists are appointed to work with the Programme on a sessional basis. These include:

Dr Sian Phillips (Consultant Radiologist CTMUHB, Chair of Medical Imaging Scientific Committee (MISC)) supported by Dr Balan Palaniappan (CTMUHB) and Dr Tishi Ninan (SBUHB). The clinical team will engage the clinical partners within Radiology and the wider NHS clinical service in defining the requirements, designing the standard solution, and supporting the deployment of the developed solution. Their continued support of the Programme will facilitate transitioning from legacy systems to the preferred bidder. They will support HBs in developing and optimising the new system service and business change/ modernisation.

Technical Advisors

The RISP Programme has a small team of experts from across Public Health Wales, National Imaging Academy Wales, and NHS Wales Shared Services Partnership (NWSSP), that support the procurement and implementation of the Programme.

FBC V3 - 25 April 2023   Commercial-in-Confidence

- Archus Ltd has supported the development of the financial and economic cases.

Implementation

As the procurement process has progressed, it has become clear that further and more detailed consideration was needed to be given to programme implementation, hence why a separate project has been set up dedicated to implementation.

In order to successfully transition from the current systems to the new systems, it has been identified that a number of technical posts are required:

- Application Architects – Implement systems integration across applications /interoperability

- Infrastructure – to support design and implementation of DHCW infrastructure configurations required to deliver the solution (e.g., connectivity between NHS Wales networks and Contractor hosting locations, configuring of security systems such as firewalls, and national NHS-side monitoring systems). Also to provide NHS-side infrastructure-specific subject matter expertise and leadership to support implementation of the RISP solution, both within the national programme and to local implementation projects

- Software engineers – supporting Integration Services (Development, testing and deployment of messaging software and flows. Ongoing maintenance and updates). Integration Services (assisting with Testing of new flows and the comparison with existing functionality. Deployment of flows to environments, Service Management, connection and validation testing process for go live. Live support and reporting.)

- RADIS transition

    o Pre population of PACS/ RIS:

    - Analysis of requirements for data extraction and new feed

    - Document deliverables for data extraction and feed

    - Data extract build, test and execution

    - New feed build, test, implementation and support

    o   Data migration for cutover

       -    Analysis of requirements for data migration

       -    Document deliverables for data migration

       -    Data migration build, test, execution

    o   National Radiology Data

       -    Analysis of requirements

       -    Document deliverables

       -    Build, test and implement the solution

- Testing – although some testing will be undertaken at a health board level, at a national level, User Acceptance Testing will need to be conducted before implementation

Service Management

Current PACS and WRIS Service Management Boards (SMB) will continue until all of the HB's have implemented the preferred system. A New Service Management Board superseding PACS & WRIS SMB will be set up upon initial implementations as seen in diagrams 8 and 9 below:

1st Health Board Implemented
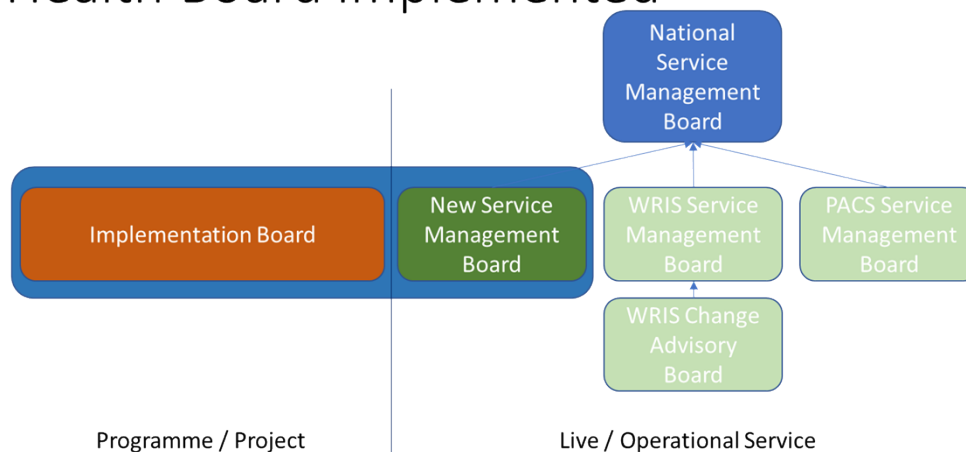
Diagram 7 -Transition SMB

Once all health boards are live, the new structure will be as follows:

All Health Boards Live
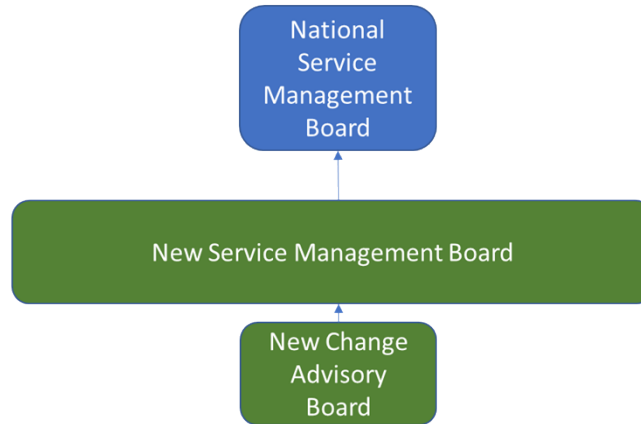
Diagram 8 – New SMB when all Organisations are live

Concerning Change Requests, CCNs with only a local impact are to be formally logged to the Supplier & copied to the central change log. CCNs with wider reaching impact will be taken to SMB for approval before being submitted officially to the Supplier and copied to the central change log. The Supplier will determine the local/national impact of each CCN.

Local Implementation

Underpinning the National SMB will be local implementation groups set up in each health board, 12 months before implementation.

These local groups will be supported by the Programmes PMO, but will also receive dedicated funding through the Programme for new or existing posts:

- 1 x FTE dedicated band 7 project manager for 12 months

- 1 x FTE IT support (band 6) for 3-6 months

- 1 x FTE PACS/RIS support (band 7) for 3-6 months

Individual health boards will be responsible for recruiting and employing/back filling these roles.

Under the current PACS agreement with Fuji, there are some computerised and digital Radiology hardware components that are not within the scope of the RISP Programme. This equipment will be replaced under a separate Programme of work.

5.3 Projects and Workstreams

In the OBC, the Programme identified several key projects as set out below:

- **Commercial:** to develop and deliver the commercial case, manage the pre-procurement documentation and the procurement of the new service and the Contractor.

- **Technical and Functional**: to define and deliver the output-based specification for the design and delivery of a seamless end-to-end solution from electronic requesting to results acknowledgement; develop the new solution at a national level, migrate the data and develop the local ICT model required to be in place to deploy the new solution.

- **Clinical**: to engage the Radiology and wider NHS service in defining the requirements, take forward standardisation to eliminate all unwarranted variation in service, design the standard solution, and deploy the developed solution.

- **Information and Business Intelligence**: to deliver the Business Intelligence (BI) requirements for the new Radiology Informatics System and to baseline the status of business processes within Radiology to include receipt of the radiology request, vetting, appointments (scheduling), reception and room procedures, reports and validation, MDT and peer review.

- **Business Change:** to define and realise the benefits of the new Radiology Informatics System, whilst also determining a set of harmonised codes, interface specifications, working practices and performance indicators to deliver the outcome of seamless care across organisational boundaries and support development of new and innovative service models built on a sound basis of service related metrics.

Underpinning all these workstreams is the Programme Governance workstream ensuring the RISP Programme is professionally managed and assured.

Now that the procurement process has been completed, a proposed new project structure has been developed, with a particular focus on implementation:
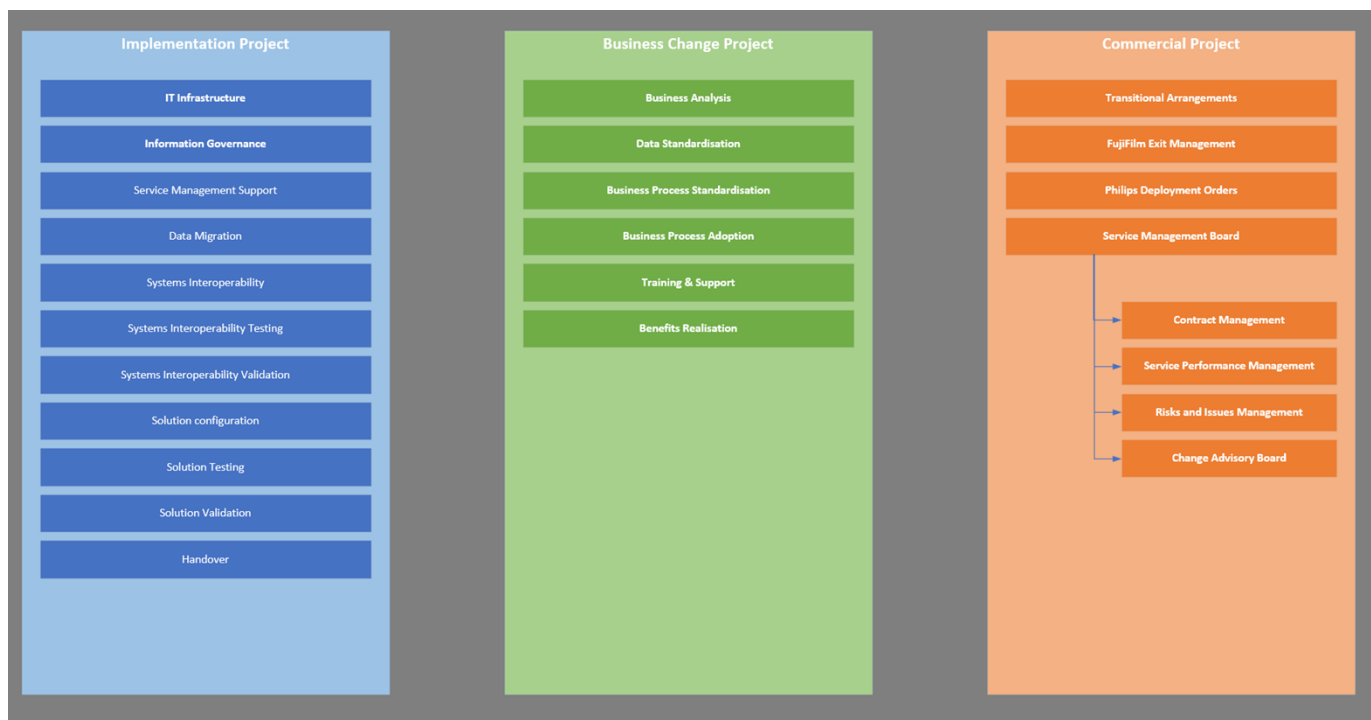

Diagram 9 – Proposed RSIP Project Structure

Implementation Project

This takes the technical aspect of the Programme's implementation and will ensure a smooth transition from existing to new systems and suppliers. This complex project involves several systems that need to be integrated.

Implementation timescales are challenging, and once the contract is awarded, it can be revisited with the successful Supplier.

Sitting underneath the National Service Management Board

Business Change

Building on the existing business change project, this project will measure and report on programme benefits and ensure standardisation for PACS and RIS systems across Wales. This will involve interoperability, adopting core datasets, developing shared working practices,

vetting and reporting, e-requesting, results viewing, and enterprise viewing. The Programme will not mandate that health boards adopt universal standards but instead recommends that these are adopted to maximise the full benefits of the Programme. This project will also support health boards regarding change management processes and work closely with the implementation project to ensure business processes are standardised.

Commercial Project

This new project will focus on contract management, supplier relationship and service management. This project will work closely with the Service Management Board (SMB – Diagrams 3&4) to oversee any contract changes.

The Programme Board will approve which projects are needed, and the Programme Management team will ensure the appropriate project governance and management arrangements are in place following established best practice.

The Programme Lead and Programme Director will be responsible for appointing the Project Managers, with the approval of the Board. They will support the Project Managers in establishing their project teams. The Programme Board will ensure there is appropriate representation from RISP specialist teams across all the projects, depending on the requirements of each project. The RISP resources and project structures will be regularly reviewed throughout the Programme.

5.4 Technical and Assurance

Medical Devices

Some parts of the RISP solution e.g. the PACS software and diagnostic workstation displays, fall under the remit of the Medical Devices Regulations 2002 (SI 2002 618, as amended. The Contractor is required to comply with relevant Medical Devices Regulations for any such devices. Before contract award the Contractor is specifically required to provide evidence demonstrating that software components are UKCA or CE marked, provide evidence of conformity against ISO 14971:2019 (Medical Device Risk Management) and ISO 13485:2016 (Medical Devices – Quality Management Systems); and to ensure appropriate management

of clinical safety issues through provision of post marketing surveillance, field safety notices and documented clinical safety management processes**.**

The Programme will work with the Wales Informatics Assurance Group and other national and Health Board teams to ensure compliance with requirements in all areas relating to equality, safety, technical architecture, infrastructure, service management, systems integrations, information governance, information standards, cyber security standards and Welsh language.

Systems and Integration

Diagram 11 below shows how the RISP solution interfaces with the various technical systems to support the clinical workflow.

Clinical Review

- Patient reviewed by clinician
- Clinician reviews result history in WCP (WCP "pulls" test and results from WRRS)
- Clinician makes new radiology request (e-request launched from WCP, and pulls reference data from RIS then posts new request to WRRS)

Exam Attendance

- WRRS posts request into RIS- if patient demographics don't match a known RIS patient then RIS can "query" EMPI for demographics or post new patient identifier to EMPI
- When patient attends for exam- RIS posts study details to modality and to PACS
- When exam complete, modality sends images to PACS and PACS forwards them to PDMS.
- PDMS may post "summary data" back to RIS

Radiology Reporting

- Images reviewed in PACS
- PACS launches nuance VR
- PACS viewer may launch WCP to view external data- e.g. pathology results

- Radiology report created in PACS and posted to RIS

- RIS posts result to WRRS

Result Review

1. WRRS updates "My results" list in WCP

2. Clinician review result- WCP pulls data from WRRS

3. Clinician may review images by launching PACS viewer from within WCP

4. Clinician acknowledges radiology report in WCP

5. WCP acknowledgment posted back to RIS

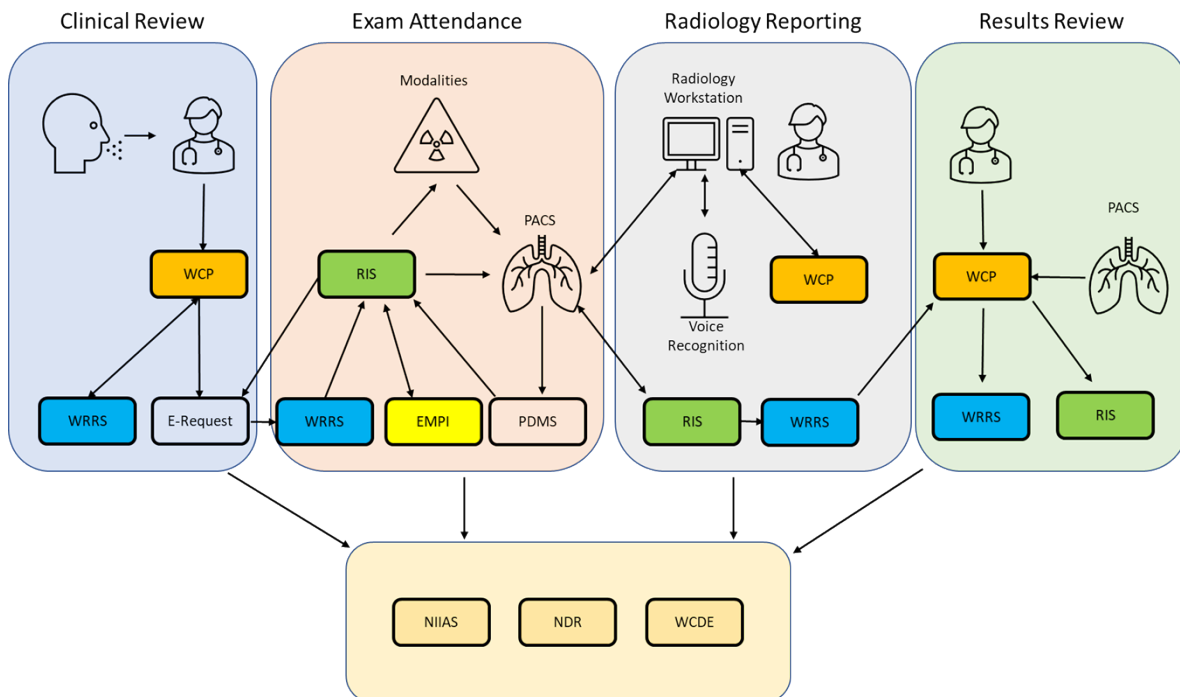The complexity and integration of the various systems is detailed in Diagrams 11 and 12.

Diagram 10 – RISP solution Interfaces

Diagram 12 below shows a further detailed systems map of the RISP Programme. Some details may be subject to change following technical discussions with the supplier
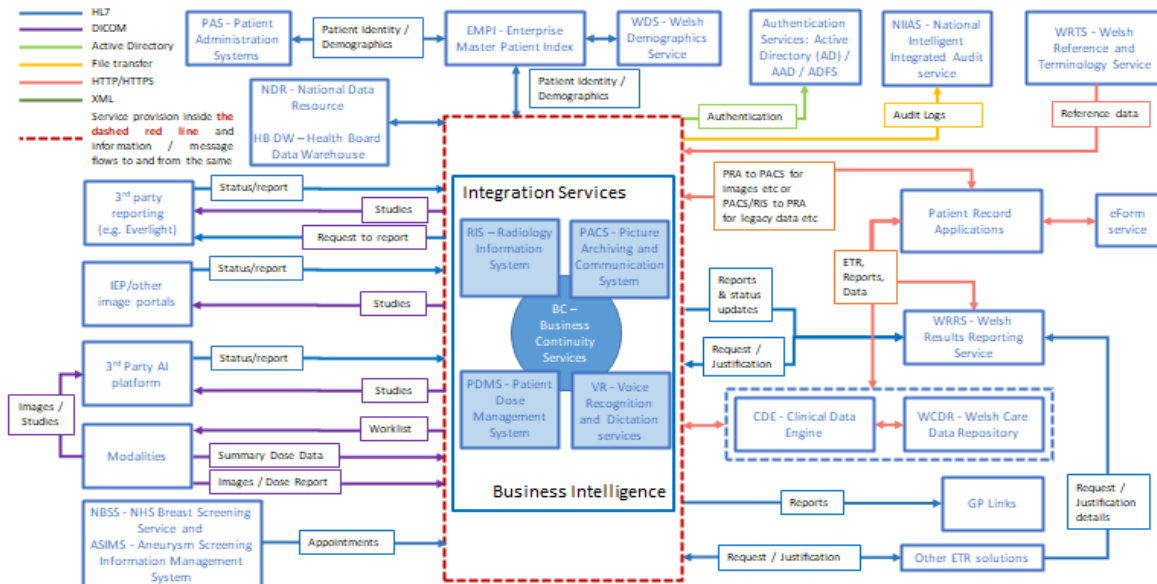

Diagram 11 – RISP Integrations

5.5 Benefits Realisation

A vital responsibility of the Programme Management Office and Programme Board has been establishing a Benefits Management Strategy and framework for monitoring and managing the benefits the Programme will enable. This includes a benefits register and profiles identifying how each benefit will be assessed and who will be responsible for delivering each benefit.

A Benefits Project is established and will run throughout the life of the Programme. As part of the FBC, benefits have been identified, measures set, and a plan agreed to collect baseline data and agree targets and monitoring methods. The Benefits Register and Strategy are attached at Appendix M3 and Appendix M2.

5.6 Outline Arrangements for Risk Management

The strategy, framework, and plan for dealing with the management of risk are as follows:

- Risks can be raised by anyone on the programme and added to the risk register through the PMO.

- The risk register has been designed in accordance with good practice guidelines within PRINCE2 and DHCW standards.

- The risks are reviewed at least once a month by the PMO and Programme Board members at the Working Group and Programme Board.

- The Programme Lead will escalate any risks that the PMO cannot manage and require urgent action to the Programme Director. If needed, they will escalate to the SRO and jointly decide on the appropriate action.

- In liaison with the SRO, the Programme Director will escalate any risks that cannot be dealt with at the level of the Programme Board to DHCW Executive Board for corporate decision.

- The Programme RAID log, containing the Risk Register is attached at Appendix M4.

The high-level Programme risks are identified below:

Table 29:Programme high-level risks

High level risk	Mitigation
If funding is not identifed to upgrade the current firewall and PSBA infrastructure within each health board to the minimum contractor requirements, Then health boards may be unable to implement the new system, Resulting in delays to programme benefits and wider implementation	Some health boards have already begun to upgrade their infrastructure. Reconsider minimum requirements from Philips vs future proofing i.e. 1GB PSBA instead of 10GB.
If an extension to the termination assistance clause is not signed by the existing supplier, Then there will be even less time for implementation, Resulting in increased pressure on all health boards to implement within shorter timescales	Engage with Fuji in order to negotiate termination assistance clause.
If there are any delays in the sign off procedures within health boards, Then the contract start date will be delayed, Resulting in a delay in implementing the new contract	Ensure HB's are aware of timescales through national implementation meetings. Support HB's to set up local implementation meetings.
If there is no contingency plan to replace the existing Computerised/Digital Radiology equipment that belongs to the existing supplier the when new contract begins, Then some health boards may be without CR/DR equipment, Resulting in them not being able to undertake imaging, and potentially putting patients at risk (noting this has a greater impact on rural areas)	Continue to work with the National Imaging Board and HB's in order to develop replacement equipment and/or reconfiguration of service delivery models
If both LINC and RISP implementation timescales continue as planned, Then there may not be sufficient technical and project resources available to support both programmes, Resulting in delayed implementation	Continue to work closely with the LINC programme to ensure sufficient time in between implementation dates for each health board
If the Philips solution does not maintain the patient identity across multiple instances, Then patients may be incorrectly identified, Resulting in compliance failure, patient safety issues and the solution not going live	Proceed with FBC development and approval processes whilst clarification is sought from Philips.

Contingency Plans

If this programme fails, the current commercial arrangements will no longer be able to be relied upon, as the termination assistance period will have been exhausted. The programme

will seek urgent legal advice to ensure service continuity is provided within the legal framework and the appropriate replacement contracts are put in place.

The risk is the current provider will no longer wish to support NHS Wales without significant investment, as some elements of the service may no longer be in production and/or supported.

5.7 Outline Arrangements for Post Project Evaluation

Post Implementation Review (PIR)

Initial lessons learned and evaluation reviews will be conducted for each health board implementation. These reviews ascertain whether the anticipated benefits have been delivered and are scheduled between March and September 2025.

Project Evaluation Reviews (PERs)

PERs appraise how well the project was managed and delivered compared with expectations and are timed to take place between March and September 2025.

Gateway Review Arrangements

Gateway reviews are planned for the end of each tranche of the Programme, which began with the Gateway 2 review in June 2021 to ensure the delivery strategy and Gateway 3 in February 2023.

Contingency Plans

If this Programme fails, the ongoing commercial arrangements will no longer be able to be relied upon, as the termination assistance period will have been exhausted. The Programme will seek urgent legal advice to ensure service continuity is provided within the legal framework and the appropriate replacement contracts are implemented.

The risk is that the current provider will no longer wish to support NHS Wales without significant investment, as some service elements may no longer be in production and supported.

Appendix

Appendix S1: Business Strategies & Reports

S2.1 A Healthier Wales- our plan for health and social care:

PDF

S2.1
a-healthier-wales-acti

S2.2 Imaging statement of intent:

PDF

S2.2
imaging-statement-of

S2.3 Wales Audit Office Report: Radiology Services in Wales (2018):

PDF

S2.3 Auditor General
for Wales Report - Ra

S2.4 Digital Architecture Review (2019):

PDF

S2.4 Digital
Architecture Review R

S2.5 Academy of Medical Colleges: Alerts and notification of imaging reports Recommendations (2022):

PDF

4.
Alerts_notification_i

S2.6 Safer Practice Notice- NPSA 16:

PDF

npsa-16.pdf

Appendix E1: Economic Model (Redacted)

Appendix F1: Financial Model (Redacted)

Appendix M1: Programme Board Terms of Reference (Back)

RISP Programme
Board ToRs Tranche 2

Appendix M2: Benefits Management Strategy (Back)

M3 RISP Benefits
Management Strategy

Appendix M3: Benefits Register (Back)

Appendix M3-
Benefits Register.xls

Appendix M4: RAID (Risks, Actions, Issues and Decisions) (Back)

Appendix M4- RAID
log.xlsx

Appendix C1: Draft Implementation Plan (Back)

This implementation plan is provided for indicative purposes only, the plan will be refined and further developed for approval following award to the successful Contractor.

National Implementation
Betsi Cadwaladr University Health Board
Aneurin Bevan University Health Board
National Imaging Academy Wales (NIAW)
Hywel Dda University Health Board
Cwm Taf Morgannwg University Health Board
Velindre University NHS Trust
Public Health Wales
Swansea Bay University Health Board
Cardiff and Vale University Health Board
Powys Teaching Health Board 1st Deploy
Powys Teaching Health Board 2nd Deploy
Powys Teaching Health Board 3rd Deploy
Powys Teaching Health Board 4th Deploy
month count

Configuration and Integration
Local Implementation
"Go Live"
"Stable Operations"
Extension Option
Last month of "Old" PACS Termination Assistance

NB Organisation names added only to gain visibilty of current contract end dates. The Implementation order may change
NB Powys implementation reflects their dependancy on the supporting 4 x HB's BCUHB, ABUHB, HDUHB and SBUHB

Appendix C2: Procurement Route Evaluation (Back)

The Public Contracts Regulations 2015:

https://www.legislation.gov.uk/uksi/2015/102/contents/made

https://www.legislation.gov.uk/uksi/2015/102/regulation/29/made

https://www.legislation.gov.uk/uksi/2015/102/regulation/30/made

Radiology Informatics System Procurement (RISP) Programme

Programme Board

Terms of Reference

Tranche 2

Contents

1. Document Control

1.1 Document Information:

Document Name:	RISP Programme Board Terms of Reference
Version:	1.3
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Document Authoriser:	Lynne Burrows
Document Owner/Author:	Emily Jarmann
Contributor(s):	RISP PMO

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Amended by	Version	Status	Date	Purpose of Change
Emily Jarmann	0.1	Draft	02/02/2022	Terms of Reference updated for Tranche 2
Emily Jarmann	0.2	Draft	17/02/2022	Information Workstream Removed
Emily Jarmann	1.0	Final	01/03/2022	Approved by Programme Board
Emily Jarmann	1.1	Final	05/05/2022	Finance representative added
Emily Jarmann	1.2	Final	17/05/2022	NWSSP representative added
Emily Jarmann	1.3	Final	02/08/2022	Technical representative added
Cory McCarthy	1.4	Final	02/12/2022	Technical representative added

1.3 Reviewers (Draft) / Circulation List (Final):

Name	Title	Organisation

RISP Programme Board ToR
Author: RISP PMO
Date: 02/08/2022

Version: 1.3
Status: Final
Page: 3

RISP Working Group	Working Group Members	NHSWHC
RISP Programme Board	Board Members	NHSWHC
NHSWHC CEG	Board Members	NHSWHC

1.4 References

Document	Version

1.5 Document Location

System	Location
RISP	S:\NHS Wales Health Collaborative\RISP Programme\4. Meetings\1. Programme Board Meetings\2. ToRs\2. Tranche 2

1.6 Authorisation

Authoriser's Name:	Lynne Burrows
Title:	Senior Programme Manager
Organisation:	NHSWHC
Signature:	X _____

2. Purpose

The purpose of this document is to set out the Terms of Reference for the Radiology Informatics System Procurement (RISP) Programme Board in the context of the RISP Programme aims, objectives and scope, in accordance with the Managing Successful Programmes (MSP).

3. Programme Background

On 5th March 2018, the Cabinet Secretary launched the Imaging Statement of Intent (ISoI), the purpose of which was to address the current challenges in diagnostic and therapeutic imaging in NHS Wales. The ISoI identified Informatics & Information as a priority area, with effective and high-quality informatics systems and information being critical to the delivery of a world-leading, sustainable, effective, and efficient imaging service.

Authority was provided by the Collaborative Executive Group for the NHS Wales Health Collaborative to establish the RISP Programme:

- To manage the All-Wales Picture Archive System (PACS) contract, supplied by Fujifilm, which is due to end.
- To support the delivery of the ISoI.

In December 2021, the Programme Outline Business Case was approved, and the Programme was given authority to proceed to the next stage; procurement.

4. Programme Governance

The RISP Programme is governed in accordance with the standards set out in Managing Successful Programmes (MSP), PRINCE2 project management and the requirements of NHS Wales Health Collaborative, Public Health Wales as hosting organisation, and Welsh Government, including gateway reviews, resource management and benefits realisation.

The RISP Programme sits within the portfolio of the NHS Wales Health Collaborative and is accountable to the NHS Wales Collaborative Executive Group (CEG). The RISP Programme Board also provides progress reports to the National Imaging Programme Strategy Board (NIPSB). The Programme Board reports directly to Chief Executives. The programme governance structure is set out in Figure 1.
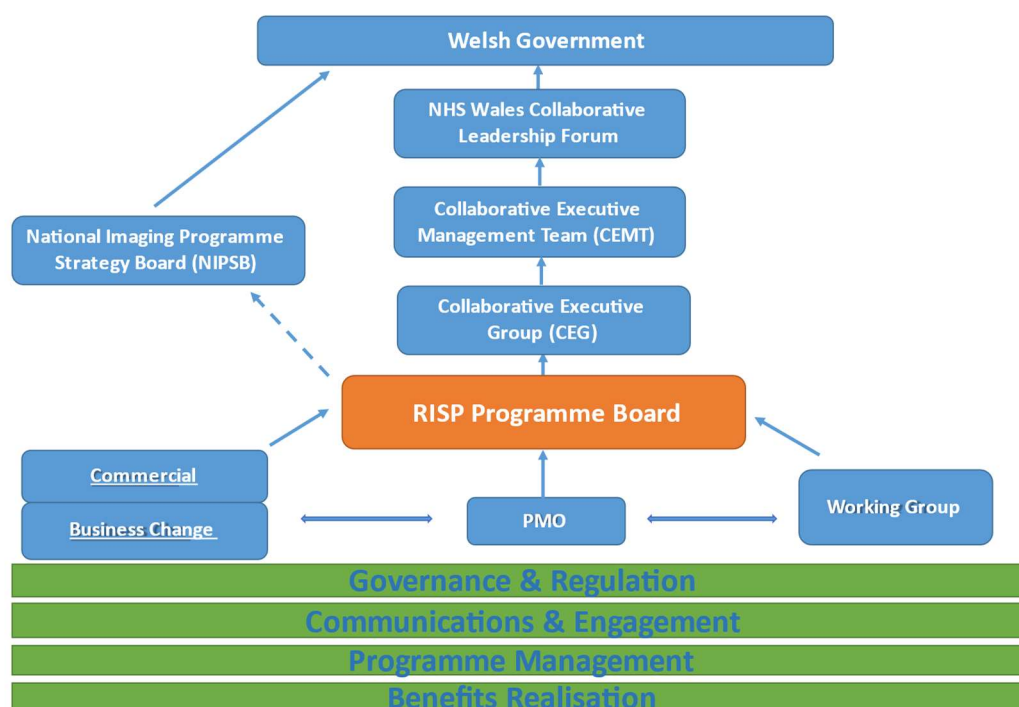
Figure 1: *RISP Programme Governance Structure*

5. Projects Dossier

Tranche 2 of the RISP Programme comprises two workstreams as set out below. Additional workstreams and projects may be added as the Programme progresses into Tranches 3 and 4.

The RISP workstreams for Tranche 2 are:

- Commercial Workstream comprising:
    - o Procurement Project
- Business Change Workstream comprising:
    - o Standardisation project
    - o Benefits project

Additional projects may be established as the programme develops.

6. Programme Board Scope

The scope of the Programme Board includes Tranche 2 of the RISP Programme and its projects/deliverables.

7. Role of the Programme Board

The Senior Responsible Owner (SRO) is accountable for the successful delivery of the RISP Programme. The prime purpose of the RISP Programme Board is to provide resource and specific commitments to support the SRO in driving the programme forward and delivering the outcomes and benefits. This includes reviewing and approving Programme documentation and providing assurance to Chief Executives of robust delivery. Programme Board members take the lead in ensuring a whole systems approach and ensuring appropriate coordination across the projects and activities that comprise the programme.

8. Programme Board Accountability

The RISP Programme is part of the programme portfolio of the NHS Wales Health Collaborative. The RISP Programme Board is accountable to the NHS Wales Collaborative Executive Group (CEG) who review progress, assure the programme, and approve key recommendations once agreed by the Programme Board. The CEG also resolve strategic risks and issues escalated by the Programme Board.

Corporate accountability is provided through the Chief Executive Group (CEG) and the NHS Wales Collaborative Leadership Forum to the NHS Wales Chief Executive and Welsh Government.

There is also a robust relationship with the relevant professional bodies including MISC, WSAC and Royal College of Radiologists.

Each RISP project will be assessed as to whether it requires a separate Project Board or can report directly to the RISP Programme Board. Project Boards/Groups will be run in accordance with PRINCE2 and the business owner for each project will be the Senior Programme Manager. Risks and issues that cannot be managed within the Projects will be escalated to the Programme Board.

9. Programme Board Responsibilities

The responsibilities of the Programme Board comprise:

- Providing strategic direction to the Programme and resolving strategic and directional issues between projects to ensure the progress of the Programme.

- Defining the acceptable risk profile and risk thresholds for the Programme and its constituent projects.

- Ensuring the Programme delivers within its agreed parameters including costs, organisational impact, adoption of the new radiology system and benefits realisation.

- Ensuring that, where appropriate, projects within the Programme adhere to the NHS Wales Governance Framework (Welsh Informatics Assurance Board, Patient Safety, Information Governance and Information Standards).

- Ensuring the integrity of benefit profiles and realisation plan and ensuring there is no double counting of benefits.

- Reviewing post-project evaluations to determine whether proposed benefits are realised.

- Providing assurance for operational stability and effectiveness through the Programme delivery cycle.

10. Responsibility of the Programme Board Members

Each Programme Board member will provide and commit to the SRO for some or all of the following as appropriate for the area they represent:

- Understanding and managing the impact of change.

- Benefits estimation and achievement.

- Owning the resolution of risks and issues the Programme faces.

- Resolving dependencies with other pieces of work, whether Programmes, projects, change or business operations.

- Representing local strategy as expressed in, for example, IMTPS and operational blueprints.

- Supporting the application of and compliance with relevant standards.

- Making resource available for planning and delivery purposes.

11. Membership

The RISP SRO will Chair the Programme Board, and will nominate a Deputy Chair. The membership of the Board is set out below and detailed in Appendix 1.

Each representative of the Board is nominated by their organisation or professional body and has decision-making authority for that organisation or body in relation to the RISP Programme.

Additional permanent members and/or co-opted members will be invited to join the Board for specific periods to provide additional expertise based on specific streams of work on an as needs basis.

12. Meeting Protocol

12.1 Frequency of Meetings

Due to the Programme timescale, the Programme Board will meet monthly throughout the financial year. Due to the coronavirus pandemic, meetings will predominantly be held virtually using Microsoft Teams. Where possible in adherence to Welsh Government guidance, meetings may be arranged at the National Imaging Academy Wales, as a central location. The Programme Board meetings are to be recorded for minuting purposes. Once the minutes are finalised, the recording will be deleted from file.

12.2 Agenda Items

The Chair will agree the final agenda for each meeting of the Programme Board. All members may ask for an item or paper to be included on the agenda, with a call for papers for distribution two weeks prior to the meeting.

12.3 Circulation of Papers

To improve transparency and communication agendas, supporting papers and minutes of the previous meeting, will be circulated to members of the Programme Board at least five days before each meeting.

12.4 Quorum

The quorum for meetings of the Programme Board shall be reached when half of the members are present and either the SRO, Vice-Chair or Programme Lead are also present.

Where a meeting is identified as inquorate, the meeting may either be adjourned until a time the Chair determines, or the Programme Board must subsequently ratify any matter for decision, considered at the inquorate meeting, either by email or at the next meeting before those decisions can be actioned.

12.5 Deputies

Whilst members must make every effort to attend, deputies will be allowed. Deputies will be assumed to have the full delegated authority of the member they represent.

12.6 Withdrawal of Individuals in Attendance

At the discretion of the Chair, any or all individuals in attendance at a meeting of the RISP Programme Board (i.e. non-members), may be asked to withdraw from parts of the meeting, in order to facilitate full and frank discussion.

12.7 Conduct of Urgent Business

Where there is, a need to conduct urgent business between meetings, the Chair will arrange for seek the member's views via email, with the outcome reported at the next meeting.

12.8 Conflicts of Interest

Members of the RISP Programme Board are required to complete a Declaration of Interest (DoI) form on joining the Board. DoI will be a standing item on the agenda so members can declare to the Chair any real, perceived or potential conflict of interest they may have with any item on the agenda.

If the Chair deems a member to have a conflict of interest in a matter before the meeting, the member may be excused from the discussions and deliberations on that matter or may be asked to leave the meeting when members considers that matter.

12.9 Support

The RISP Programme Board will be supported administratively by a Senior Project Support Officer from the RISP Programme, and they will be responsible for:

- Setting the schedule of meetings.
- Sending invitations to attend meetings on behalf of the Chair.
- Preparing and circulating agendas, papers and minutes.
- Maintaining and following up on a list of agreed actions.
- Facilitating the conduct of urgent business by email.

13. Terms of Reference Review

The RISP Programme Board Terms of Reference will be reviewed annually.

14. Appendix 1: Proposed Programme Board Membership

Name	Position	Board Role
Lynne Burrows	Senior Programme Manager	Programme Lead, NHSWHC
Matt John	Director of Digital	Senior Responsible Officer
Judith Bates	Programme Director	Programme Lead, NHSWHC
Dr Balan Palaniappan	RISP Clinical Lead	RISP Clinical Lead
Dr Tishi Ninan	RISP Clinical Lead	RISP Clinical Lead

Name	Position	Board Role
Dr Sian Phillips	RISP Clinical Lead/Head of School HEIW	RISP Clinical Lead/ Chair of MISC
Dr. Ishan Gunatunga	Clinical Director	ABUHB HB Representative
Arvind Kumar	Radiology Manager	ABUHB HB Representative
Dr. Kakali Mitra	Clinical Director	BCUHB HB Representative
Craig Garner	Head of Systems and Performance	BCUHB HB Representative
Dr. Craig Parry	Consultant Radiologist	C&VUHB HB Representative
Alicia Christopher	Radiology Manager	C&VUHB HB Representative
Dr Sally Bolt	Clinical Director	CTMUHB HB Representative
Dr. Liaquat Khan	Clinical Director	HDUHB HB Representative
Gail Roberts-Davies	Radiology Manager	HDUHB HB Representative
Dr. Philip Wardle	Director NIAW	NIAW Representative
Dr Rhidian Hurle	Medical Director	DHCW Representative / CCIO for Wales
Michelle Sell	Chief Operating Officer	DHCW Representative
Dr. Sharon Hillier	Director Screening Services	PHW Trust Representative
Dean Phillips	Head of Screening Programme	PHW Trust Representative
Michelle Kirkham	Radiology Lead	Powys HB Representative
Dr Toby Wells	Clinical Director	SBUHB HB Representative, Chair RCR Welsh Standing Committee
Alexandra Simmonds	Radiology Services Manager	SBUHB Representative
Dr. Nick Morley	Consultant Radiologist	Velindre Trust Representative
Michael Booth	Radiology Manager	Velindre Trust Representative
Karen Evans	Director of Resources	Deputy Director of Finance Representative
Karen Hatch	Assistant Director of Therapies and Health Sciences	Directors of Therapies and Health Sciences Representative
Victoria Wallace	Deputy Director of Strategy and Partnerships	Directors Of Planning Representative
Donald Kennedy	Lead Infrastructure Design Architect	Technical Representative
John Collins	RISP Subject Matter Expert (SME)	RISP SME
Steve Buckle	Chair of WRIS SMB	WRIS SMB Representative
Helen Hughes	Chair of All Wales Imaging Quality Forum	All Wales Imaging Quality Forum Representative/Professional Service Manager Radiography
Dean McCarthy	Chair of PACS SMB	PACS SMB Representative
Lynn Bateman	Clinical Scientist – Radiation Physics	Radiation Protection Group Specialist Standing Advisory Group (RPSSAG) &

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Name	Position	Board Role
		WSAC & MPCE Representative
Alastair Roeves	National Clinical Lead for Primary Care and Community Care for Wales	Primary Care Representative
Leon Hitchings	All Wales Infrastructure Review Programme (AWIP) Lead	AWIP Representative
Matthew Ager	Welsh Government Lead	Welsh Government Representative
Amanda Evans	National Imaging Portfolio Programme Lead	NHSWHC Representative for Imaging Programmes
Andrew Ward	Senior Programme Manager Specialist Diagnostic and Therapies Equipment	NHS Wales Shared Services Partnership representative
Amanda Carter	Senior Product Specialist (Hospital), DHCW - Software Development	Technical Representative

Radiology Informatics System Procurement (RISP) Programme

Benefits Management Strategy

Contents

1. Document Control

1.1.   Document Information:

Document Name:	Benefits Management Strategy
Version:	1.2
Date Issued:	30/09/2021
Status:	Final
Document Authoriser:	Judith Bates
Document Owner/Author:	Lynne Burrows
Contributor(s):	Emily Jarmann, Scarlett Clarke, Anouska Huggins

1.2.   Document History:

Amended by	Version	Status	Date	Purpose of Change
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Scarlett Clarke	0.2	Draft	01/03/2021	Revisions
Emily Jarmann	0.3	Draft	03/03/2021	Addition of background section
Emily Jarmann	0.4	Draft	16/03/2021	Addition of details following Archus workshop
Lynne Burrows	0.5	Draft	22/06/2021	Amends following comments
Emily Jarmann	0.6	Draft	25/06/2021	Amends following circulation to Working Group
Emily Jarmann	1.0	Final	01/07/2021	Finalised following approval of Programme Board
Emily Jarmann	1.1	Final	22/09/2021	Tranche diagram updated

| Emily Jarmann | 1.2 | Final | 30/09/2021 | Tranche diagram updated |

1.3.　　Reviewers (Draft) / Circulation List (Final):

Name	Title	Organisation
Project Team	-	RISP Programme
Working Group	-	RISP Programme
Programme Board	-	RISP Programme

1.4.　　References

Document	Version

1.5.　　Document Location

System	Location
Shared Drive	RISP Programme/Benefits

1.6.　　Authorisation

Authoriser's Name:	Judith Bates
Title:	Programme Director
Organisation:	NHSWHC
Signature:	X _____

2. Introduction

The Radiology Informatics System Procurement (RISP) Programme was established in 2019 to support the delivery of the Imaging Statement of Intent the recommendations from the Welsh Audit Office Radiology Services Report and manage the all Wales Picture Archive System (PACS) contract which was coming to an end.

The vision for RISP is to deliver "a seamless end-to-end electronic radiology solution from receipt of request to publishing of the result and receipt of acknowledgement"

3. Purpose

A Benefits Management Framework is a structured way of ensuring the right projects get the right level of investment resources. It also helps the organisation focus on achieving its strategic objectives and getting best values from its investment. This document sets out the approach and overarching framework that the RISP Programme will use to ensure successful benefit management.

4. Approach

The approach being adopted is based on the Public Sector Programme Management approach with the 'Managing Successful Programmes' (MSP®) and APMG's 'Managing Benefits' publications as the main source of guidance on the benefit realisation management process.

5. Benefit Realisation Management

Benefit Realisation Management is a core element of programme/ change management. It provides a systematic approach to identifying, defining, tracking, realising, optimising, reviewing and communicating benefits during and beyond a programme lifecycle.

The reasons for having processes in place to manage and realise benefits include:
- Ensuring benefits are identified and clearly defined
- Ensuring benefits are aligned to the programme vision, objectives and to the strategic direction of the organisation.
- Ensuring service areas take ownership of the benefits and are committed to their realisation.

- Ensuring that the project and programme outputs do support the benefits and business changes that will be needed
- Ensuring benefits are tracked and recorded and that achievements are properly recognised; and
- Ensuring key benefit measures are mainstreamed into the performance framework.

6. Benefits Identified

Work has been undertaken to identify key benefits of investing in the RISP Programme these include:

- Increased patient safety due to having a more complete radiological history provides greater information at the point of need, improving diagnosis and quality of care.
- Reduce the risk of clinicians referring for examinations already requested or performed which could cause an inappropriate radiation dose.
- Produce a more effective and efficient MDT meeting by having all the information in the right place at the right time in one system.
- Reduce the Training Requirements for all RISP users as they alternate between sites and Trusts within NHS Wales.
- Reduce time wasted with multiple logins as users will also only require a single log on.
- Enable the ability to review radiology workflows and processes across NHS Wales to improve efficiency and productivity.
- Enable easier cross site reporting which may be required to facilitate service transformation and support the work of the Imaging Essential Services Group.
- Standard reporting templates enables improved data quality and analytics to improve service planning and configuration to assist with reducing the pressures of the radiology workforce.
- Single solution for storage and distribution of all imaging outside radiology e.g. pathology, cardiology etc. to be available in time.

These benefits will be mapped to the strategic objectives identified within the Outline Business Case, which is currently being developed. Work is continuing identifying benefits and benefit profiles will be developed as the OBC is finalised and the programme progresses.

A detailed breakdown of the Programme benefits is available in the benefits register which will show benefit types and how each will be measured.

7. Roles & Responsibilities

This section of the document defines the roles and responsibilities required to deliver this strategy which will be developed and managed by the RISP Programme Management Office with the support of a benefits group.

A plan is in place to allocate named individuals to the roles outlined in the table below as the programme develops and by Full Business Case.

Table 1 Roles and Responsibilities

Role	Responsibility
Benefit Lead	Advise on the approach, develop guidelines for the health boards and trusts and produce the benefits section for the Business Case
Project Leads / Health Board representatives	Develop the benefits register, define how benefits will be measured
Business Analyst	Baseline and measure benefits across Wales

The Benefits Management Strategy will be ratified by the Senior Responsible Owner and the RISP Programme Board. Many of the anticipated benefits will not start to materialise until after the project has been delivered therefore it is essential that the ownership of the realisation plan is maintained beyond project delivery through to complete realisation. The process should also include a post-implementation review, allowing time for analysis and a proper evaluation against the original business case.

8. Timescales

The programme's benefits management strategy spans the entirety of the programme as shown in the timeline below.

Benefits measurement will continue to take place beyond the closure of the programme's deployment stage, as benefits realisation will take place following the system being operational.

A post implementation review will be undertaken by the programme after an agreed period with the support of the health board and is to be continued in line with the Benefits Realisation Plan.

Tranche 1	Tranche 2	Tranche 3	Tranche 4	Tranche 5
Pre-Procurement	Procurement	Configuration and Integration	Deployment	Ongoing Contract Management
Jun 2019 – Dec 2021	Jan 2022 – Apr 2023	May 2023 – Apr 2024	May 2024 – Jun 2025	Jul 2025 Onwards
• Programme definition • Outline business case • Procurement documentation	• Procurement • Full business case	• Config and testing • Systems integration • Data migration	• Implementation • Handover	• Business as usual

Figure 1 RISP Tranche Structure

9. Processes

This section of the document describes the processes in place to ensure that benefits are not double-counted and that cumulative benefits are achieved.

Fig 1: The sequence of steps to be followed in benefits planning
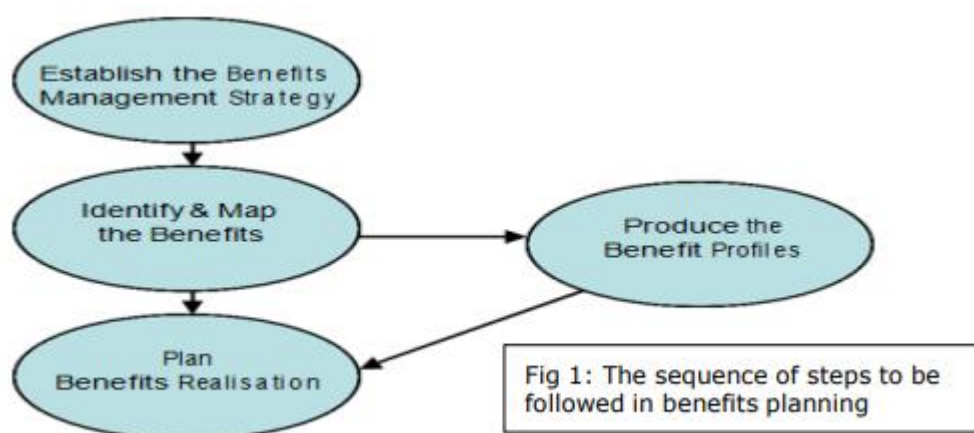
9.1. Identifying and Mapping the Benefits

The RISP Programme will establish and maintain a Benefits Map that captures and illustrates the relationships between the outputs that the projects are producing; the business changes that are needed to take on the new capability; the outcome(s) that are expected from the successful conduct of those business changes; the benefits (intermediate and end benefits) that are anticipated to be realised because of those outcomes; and the strategic objective(s) that will be achieved as a result.

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Status: Final

Fig 2: Benefit Map

9.2.   Planning the Benefits

Sound and realistic planning of benefits will be essential to determining the eventual success of the RISP implementation. Benefits' planning is an ongoing and iterative activity, especially if the Programme may later consider or implement change(s) that are likely to impact on its vision, business case, blueprint, and/or the strategic programme plan

9.3.   Setting Benefits Priorities

Prioritising the delivery of benefits ensures that RISP derives the right benefits sooner rather than later, but also that it derives value faster by having its most important needs, if they can be delivered, being met earlier. Setting benefit priorities is a part of benefit planning (and replanning) and is required to be done each time the programme considers a change in its plans, reviews progress, or responds to an issue impacting on benefits. As part of the information gathering exercise to support the development of the OBC, work was done to capture current ways of working within radiology in the Health Boards and the benefits/ impact of implementing RISP. The Programme will produce a benefit / stakeholder matrix to show the impact on the stakeholders which will be reviewed on a regular basis by the Benefits Group or when there is a move to change the scope of what the programme is delivering.

9.4.   Benefit Profiles

Benefit Profiles will be developed to enable everyone concerned with the programme to be clear about what the benefit is; where it will occur; who is involved and what must done to achieve it and finally, how we know that we have achieved it. The Benefit Profiles, once approved, help define why the programme was established and constantly guides not only the things that the programme needs to deliver, but also the changes that the service

need to make on a day-to-day basis to enable the new capabilities (i.e. this is undertaken by Benefit Leads appointed from within the service).

The Programme will maintain and apply change control to all Benefit Profiles once they have been approved by the Board. Once approved, these should only change with the approval of the Board and reviewed against the Business Case.

9.5.   Benefits Realisation Plan

The Programme will manage, track, and control the realisation of benefits through the RISP Benefits Realisation Plan. The Benefits Realisation Plan is to be maintained by the Programme Management Office, in detail by a designated Benefits Lead working in conjunction with the benefits group.

At a minimum, the plan will contain and provide information on:

- A schedule that details when each benefit or groups of benefits (including any dis-benefits) will be realised
- Milestones for undertaking Benefits Review(s), to determine progress and inform questions about the likelihood of ongoing success in the future
- Dates when specific outcomes (i.e. business transition(s)) that will bring about benefits, are planned to be achieved
- Any dependencies
- Details of the handover and embedding activities necessary to realise any benefits after the programme has closed.

The key objectives of benefit realisation are to understand how the new system has made a difference to the Radiology service, to patients and patient care both in terms of outcomes and experience of services.

10. Benefit Categories

This section describes some of the benefit categories that have been adopted by the programme and include

1. Cash Releasing Benefits

Cash releasing efficiencies are realised when the same service or function is delivered at a tangible reduced cost and give rise to immediate bankable returns and/ or

Cash can be saved via reduced costs (e.g. procurement), capital receipts (e.g. disposal of property) or cost avoidance (e.g. rates, maintenance for disposed asset).

2. Non-Cash Releasing Benefits

Time releasing efficiencies can be expressed in monetary terms but do not release financial resources; instead they allow better delivery of services for the same cost.

3. Quantitative Benefits

These are benefits which can be quantified but cannot be evidenced in financial terms

4. Qualitative Benefits

Benefits which cannot be evidenced by quantitative techniques, but can be evidenced qualitatively

Disbenefits

Disbenefits are the outcomes from change which are perceived by one or more stakeholders as negative, e.g. loss of status, a loss of power or influence, a loss of jobs, a reduction in asset holdings (e.g. buildings). The same change can be seen by different stakeholders as both a benefit (net cost reduction through fewer buildings) and a disbenefit (increased travelling time/cost for staff). It is important to provide a description to articulate the perceived disbenefit to a stakeholder or group. These disbenefits can be classified, managed and measured in the same way as benefits. The description is very important and should specify why, for example a loss of status is seen as a disbenefit to a stakeholder.

Disbenefits can be confused with risks, but whereas risks may be avoided, disbenefits will be created by the programme and the task is to manage their impact. It is important to understand which stakeholders may lose out so that this can be managed. Overlooking their disbenefits may cause some stakeholders to disengage, to resist the required changes and even refusing to cooperate. If managed pro-actively some disbenefits can be turned into opportunities or even new benefits (for example, the resultant savings from asset disposal may be re-invested in upgrading remaining assets).

11. Measurement Methods

Measurement methods will vary depending on the individual benefits with individual measures captured on the Programme's benefits register. The measurement will include a baseline, where applicable, to understand status of current system performance.

Developing Benefit Baselines

An important part of this process is to establish a baseline that will be the starting point for realising the benefit. It seeks to establish the baseline situation immediately before implementation (the AS-IS) and how it will be changed after the benefit has been delivered (the TO-BE). An accurate baseline is essential for planning the enabling changes and business changes which will be required for successful delivery of the project/ programme outcomes and realisation of the benefits. In benefits management, baseline information is made available by the project team and this determines the requirements of the system and optimum supporting processes. It also determines the business changes required to support benefit realisation and ensures successful project/ programme outcomes.

Developing the baseline involves:

- Measuring the baseline
- Valuing the benefits
- Recording the baseline

12. Review Process

The PMO will be responsible for reviewing progress toward benefit realisation until the point of programme closure. This process involves regular, scheduled reviews at major milestones, or quarterly, whichever is the shorter duration. This will provide the opportunity for reshaping, prioritising and further benefit identification by the programme or project boards.

By integrating benefit tracking into the existing reporting and management processes, benefit owners have the basis for refining and optimising benefits. Review points will provide the occasion to identify any benefits which have not been achieved since the last review; verify that the benefits are still valid and if not gain approval to vary the benefit information; add in any new benefits that have been identified; and report to the RISP

Programme Board and relevant stakeholder groups on the status of benefit realisation.

During the life of the programme, benefits should be reviewed at the RISP Programme Board and individual Project Boards. Structures and mechanisms should be established, which will continue the process of tracking and reviewing achievements of benefits beyond programme closure.

RISP FBC Benefits Register

ID	Benefit	Benefit Type	Metric	Baseline Position	Target Improvement	Monetary Value £'000	Assumptions
More Streamlined Workflow							
801	Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outcomes)	Unmonetised	Average number of days from request to receipt of referral	Average of 4.6 days from request to receipt of referral	Reduce to within 1 day	Not monetisable	The introduction of RISP will improve the end-to-end process
803	Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outcomes)	Unmonetised	Average number of days from receipt of referral to report	Average of 4.6 days from receipt of referral to report	Reduce to within 1 day	Not monetisable	The introduction of RISP would improve the end-to-end process
815	Improved strategic planning / better demand management	Unmonetised	Not easily measurable	Qualitative	Qualitative	Not monetisable	Electronic vetting should streamline the workflow and automate rules but will still require some level of manual intervention to review and schedule. Multiple factors that may impact on this average time taken such as the number of occasions when appointments need to be vetted before being booked and the number of walk-in cases make it difficult to set an achievable target improvement that is directly impacted by the investment in RISP.
Increased Accuracy							
806	Reduced risk of missing urgent diagnosis	Unmonetised	Not easily measurable	Qualitative	Qualitative	Not monetisable	Information from claims managers was found not to be a suitable measure due to the variability.
813	Reduced risk of errors	Unmonetised	Number of obsoleted reports	Current average of 374 p.a. per HB	Reduce by 80%	Not monetisable	A major benefit of RISP will be that it will prevent errors in the digital dictation system reporting against an incorrect patient. However, this would not be eradicated completely as there may be other reasons for a report being obsoleted.
System Reliability							
808	Reduced lost time waiting for system to respond	Unmonetised	Not easily measurable	Qualitative	Qualitative	Not monetisable	Not easily measurable
Productivity							
802	Reduced manual intervention to manage referrals	Non-cash releasing	Number of hours spent on request handling p.a.	On average takes around 2 minutes per request, applying to around 1.9m requests p.a. which are currently managed manually	80% reduction in time spent manually transcribing requests	852	It is reasonable to expect RISP will result in a minimal amount of time spent manually transcribing requests into RIS since there will be very few paper requests received, although it should be recognised that the rest of the 'request handling' process, such as appointment scheduling, would only see marginal improvement.
804	Reduced manual intervention for reporting and acknowledgement	Non-cash releasing	Number of hours spent on process for the acknowledgement of urgent referrals p.a.	On average takes less than 30 seconds per report printed, applying to around 1.3m referrals p.a.	50% reduction in time spent processing acknowledgements	65	Currently increased time spent on the process for the acknowledgement of urgent referrals due to the need for printing. ABUHB already has an electronic process in place which has reduced the amount of manual printing requirements significantly. It is anticipated that 2/3 of referrals are printed (the remaining 1/3 being GP referrals which are typically not printed). There are other factors other than just RISP contributing to this improvement, therefore a target reduction of 50% was reasonable.
805	Reduced reporting costs	Non-cash releasing	Number of hours spent on reporting p.a.	Current average 23.61 minutes between subsequent reports, based on 0.3m reports p.a.	1% reduction in time spent	1,127	Exact level of improvement difficult to measure and would be relatively small. Therefore range of scenarios based on average time between subsequent reports and estimating the impact of between 1% to 5% improvement. Prudent estimate has been made at 1%.
Workforce							
821	Improved workforce experience	Unmonetised	Not easily measurable	Qualitative	Qualitative	Not monetisable	Multiple factors impacting staff satisfaction so not easily measurable
Cost Reduction Benefits							
811	Reduced reliance on paper-based systems leading to paper, printing and manual storage cost savings	Non-cash releasing	Expenditure on paper, printing and manual storage p.a.	£14k p.a. across NHS Wales	80% reduction	11	
Patient Safety							
809	Reduced risk of repeat examinations and inappropriate radiation dosage	Unmonetised	Number of significant accidental and unintended exposures as a result of repeat imaging in a 2-3 year period	Baseline not available	10% improvement	Not monetisable	10% improvement target to reflect direct impact on proportion of events (i.e. alert so not imaging people who have already had imaging)
823	Improved ability to accurately and frequently access radiation dosage to evidence statutory compliance	Non-cash releasing	Number of hours p.a. spent manual vs automated audits	Current average of 200 hours p.a. per HB	80% improvement	19	Based on BCU baseline of 2 weeks spent on audits p.a.
824	Increased compliance for recording dosage in PDMS vs manual entry	Unmonetised	Number of times dosage not recorded	Baseline not available	80% improvement	Not monetisable	Currently not recorded in 7% of cases. Will be mandated in functional requirements so would largely be eradicated but there may be some circumstances where booked a procedure with radiated dose but scan abandoned.
825	Increased accuracy of patient dose record	Unmonetised	Not easily measurable	Qualitative	Qualitative	Not monetisable	
826	Improved personalisation of dose assessments	Non-cash releasing	Number of hours p.a. spent dealing with patients flagged for skin injury review	Current average of 30 hours p.a. per HB	75% improvement	5	Average of 30 p.a. as reasonable baseline for number of patients flagged for skin injury review based on BCU and C&V actuals. It is estimated that currently 2 hours per patient are spent on this which it is estimated could be reduced to 0.5 hours per patient.
827	Reduced amount of unreliable/unusable data leading to increased sample size of dose audits / B18 - Reduced amount of unreliable/unusable data leading to increased sample size of dose audits	Unmonetised	Amount of data 'thrown out'	Baseline not available	Target to reduce to 5%	Not monetisable	Currently 19% of data 'thrown out'. Target improvement to reduce down to 5% (some manual input errors will remain)
817	Increased ability for optimisation between patients or devices	Unmonetised	Not easily measurable	Qualitative	Qualitative	Not monetisable	
Patient Outcomes							
810	Effective and efficient MDT meetings supporting cross Health Board boundary workings and streamlining patient care	Non-cash releasing	Number of hours spent managing images for MDTs p.a.	Currently takes 2 minutes per referral, applied to 0.2m referrals p.a.	Eradicate entirely	113	Baseline data include both PACS and IEP data. RISP will significantly reduce the time spent on this since images will be automatically visible to all sites across NHS Wales with no need for transfers. This will improve cross-site functionality and ensure images are easy to access for MDTs, reducing the risk that MDTs may be delayed as a result of images not being available. Indicative calculation for the scale of this benefit is to assume each transfer currently takes Radiology circa. 2 minutes (in addition to the time spent in clinics having to chase missing images) multiplied by the number of transfers within NHS Wales each year.
819	Earlier diagnosis and improved clinical decision-making leads to better patient outcomes	Unmonetised	Not easily measurable	Qualitative	Qualitative	Not monetisable	It has not been possible to identify the number of patients not discussed at MDTs as a result of not having images available (links to B10)
820	Improved patient experience	Unmonetised	Not easily measurable	Qualitative	Qualitative	Not monetisable	
822	Reduced inequalities	Unmonetised	Not easily measurable	Qualitative	Qualitative	Not monetisable	Combination of B01 and B03 but reported in relation to the benefit to the patient rather than NHS Wales. Availability of reports from all locations would reduce the burden across health boards due to reporting on backlogs from elsewhere in Wales. This would reduce the variance.
Environmental							
828	Greener energy and greater efficiency as a result of cloud-based system	Unmonetised	Not easily measurable	Qualitative	Qualitative	Not monetisable	Not easily measurable
831	Reduced reliance on paper based systems leading to paper savings	Unmonetised	Not easily measurable	Qualitative	Qualitative	Not monetisable	In line with B11
						2,191	

Health Board values

ID	ABUHB Baseline	ABUHB Target Saving	ABUHB Monetary Value	BCUHB Baseline	BCUHB Target Saving	BCUHB Monetary Value	CAVUHB Baseline	CAVUHB Target Saving	CAVUHB Monetary Value	CTMUHB Baseline	CTMUHB Target Saving	CTMUHB Monetary Value	HDUHB Baseline	HDUHB Target Saving	HDUHB Monetary Value	PTHB Baseline	PTHB Target Saving	PTHB Monetary Value	SBUHB Baseline	SBUHB Target Saving	SBUHB Monetary Value	PHW Baseline	PHW Target Saving	PHW Monetary Value	VNHST Baseline	VNHST Target Saving	VNHST Monetary Value
801	10.96	Reduce to < 1 day	N/A	4.19	Reduce to < 1 day	N/A	Unknown	Reduce to < 1 day	N/A	3.10	Reduce to < 1 day	N/A	1.48	Reduce to < 1 day	N/A	Unknown	Reduce to < 1 day	N/A	5.88	Reduce to < 1 day	N/A	N/A	Reduce to < 1 day	N/A	1.72	Reduce to < 1 day	N/A
803	14.92	Reduce to < 1 day	N/A	4.32	Reduce to < 1 day	N/A	Unknown	Reduce to < 1 day	N/A	8.00	Reduce to < 1 day	N/A	12.00	Reduce to < 1 day	N/A	Unknown	Reduce to < 1 day	N/A	5.30	Reduce to < 1 day	N/A	N/A	Reduce to < 1 day	N/A	14.50	Reduce to < 1 day	N/A
813	218.67	Reduce by 80%	N/A	654.67	Reduce by 80%	N/A	Unknown	Reduce by 80%	N/A	132.00	Reduce by 80%	N/A	Unknown	Reduce by 80%	N/A	N/A	Reduce by 80%	N/A	492.00	Reduce by 80%	N/A		Reduce by 80%	N/A	Unknown	Reduce by 80%	N/A
802	7,020	5,616	94,615	26,364	21,091	355,333	14,040	11,232	189,230	Does not apply as use e-requesting	Does not apply as use e-requesting	Does not apply as use e-requesting	8,454	6,763	113,965	969	775	13,060	5,928	4,742	79,897	Does not apply as does not use RISP solution	Does not apply as does not use RISP solution	Does not apply as does not use RISP solution	418	334	5,632
804	Does not apply as currently processed electronically	Does not apply as currently processed electronically	N/A	3,640	1,820	30,662	624	312	5,256	1,880	940	15,837	1,210	605	10,195	173	87	1,461	117	59	986	Does not apply as does not use RISP solution	Does not apply as does not use RISP solution	Does not apply as does not use RISP solution	75	37	630
805	435,584	4,356	73,385	1,282,727	12,827	216,107	1,172,225	11,722	197,490	892,184	8,922	150,310	1,481,640	14,816	249,618	Does not apply - no CTs	Does not apply - no CTs	Does not apply - no CTs	1,268,640	12,686	213,733	Does not apply as does not use RISP solution	Does not apply as does not use RISP solution	Does not apply as does not use RISP solution	153,680	1,537	25,893
811	£800	Reduce by 80%	640	3,561	Reduce by 80%	2,849	1,775	Reduce by 80%	1,420	2,262	Reduce by 80%	1,810	2,609	Reduce by 80%	2,087	N/A	N/A	N/A	1,792	Reduce by 80%	1,434	N/A	N/A	N/A	1,400	Reduce by 80%	1,120
809		10% improvement			10% improvement			10% improvement			10% improvement			10% improvement			10% improvement			10% improvement			10% improvement			10% improvement	
823	200	160	2,696	200	160	2,696	200	160	2,696	200	160	2,696	N/A	N/A	N/A				200	160	2,696	N/A	N/A	N/A	200	160	2,696
824		80% improvement			80% improvement			80% improvement			80% improvement			80% improvement			80% improvement			80% improvement			80% improvement			80% improvement	
826	60	45	758	60	45	758	60	45	758	60	45	758	60	45	758	N/A	N/A	N/A	60	45	758	N/A	N/A	N/A	60	45	758
827		Target to reduce to 5%			Target to reduce to 5%			Target to reduce to 5%			Target to reduce to 5%			Target to reduce to 5%			Target to reduce to 5%			Target to reduce to 5%			Target to reduce to 5%			Target to reduce to 5%	
810	530	Eradicate completely	8,936	1,702	Eradicate completely	28,677	515	Eradicate completely	8,673	593	Eradicate completely	9,994	780	Eradicate completely	13,141	N/A	N/A	N/A	1,387	Eradicate completely	23,362	N/A	N/A	N/A	1,180	Eradicate completely	19,887
Total			£181,030			£637,081			£405,523			£181,405			£392,441			£14,521			£322,866						£56,615

B01 - Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outco

	ABUHB	BCUHB	CAVUHB
	Provided by HB	Provided by HB	Not provided
Current average number of days from request to receipt of referral	11.0	4.2	Unknown

CTMUHB	HDUHB	PTHB	SBUHB	PHW	VNHST	Total
Provided by HB	Provided by HB	Not provided	Provided by HB	Does not apply as does not use RISP solution	Provided by HB	
3.1	1.5	Unknown	5.9	N/A	1.7	4.6 Average

B02 - Reduced manual intervention to manage referrals

		ABUHB	BCUHB	CAVUHB
		Provided by HB	Provided by HB	Provided by HB
Number of requests		420,877	459,224	400,402
Time spent handling requests				
Number of hours per week		135	507	270
Average number of minutes per request	1.99	1.00	3.44	2.10
Current number of hours p.a.		**7,020**	**26,364**	**14,040**
Target improvement	**80%**	80%	80%	80%
Number of hours saved p.a.		**5,616**	**21,091**	**11,232**
Average cost per hour (Based on B4)	£16.85	£16.85	£16.85	£16.85
Value of time saved p.a.		**94,615**	**355,333**	**189,230**

CTMUHB	HDUHB	PTHB	SBUHB	PHW	VNHST	Total
Does not apply as use e-requesting	Estimate based on average of others in proportion to number of requests	Estimate based on average of others in proportion to number of requests	Provided by HB	Does not apply as does not use RISP solution	Estimate based on average of others in proportion to number of requests	
-	255,115	29,241	329,451	-	12,610	1,906,920
		-	114			
			1.08			
	8,454	969	5,928		418	63,193
80%	80%	80%	80%	80%	80%	
-	6,763	775	4,742	-	334	50,554
£16.85	£16.85	£16.85	£16.85	£16.85	£16.85	
-	113,945	13,060	79,897	-	5,632	851,713

B03 - Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outcor

	ABUHB	BCUHB	CAVUHB
	Provided by HB	Provided by HB	Provided by HB
Current average number of days from receipt of referral to report availability	14.9	4.3	5.3

CTMUHB	HDUHB	PTHB	SBUHB	PHW	VNHST	Total
Provided by HB	Provided by HB	Not provided	Provided by HB	Does not apply as does not use RISP solution	Provided by HB	
8.0	12.0	Unknown	5.3	N/A	14.5	9.8
						Average

B04 - Reduced manual intervention for reporting and acknowledgement

			ABUHB	BCUHB	CAVUHB
			Does not apply as currently processed electronically	Provided by HB	Provided by HB
Number of reports printed				344,418	320,322
Time spent on manual intervention for reporting					
Number of hours per week				70	12
Average number of minutes per report	**0.36**			0.63	0.12
Current number of hours p.a.				**3,640**	**624**
Target improvement	**50%**	50%	50%	50%	50%
Number of hours saved p.a.			-	**1,820**	**312**
Average cost per hour (Based on B4)	**£16.85**	£16.85	£16.85	£16.85	£16.85
Value of time saved p.a.			-	**30,662**	**5,256**

	CTMUHB	HDUHB	PTHB	SBUHB	PHW	VNHST	Total
	Estimate based on average of others in proportion to number of printed reports	Estimate based on average of others in proportion to number of printed reports	Estimate based on average of others in proportion to number of printed reports	Provided by HB	Does not apply as does not use RISP solution	Estimate based on average of others in proportion to number of requests	
	317,043	204,092	29,241	74,048	-	12,610	1,301,774
				2			
				0.09			
	1,880	1,210	173	117		75	7,720
	50%	50%	50%	50%	50%	50%	
	940	605	87	59	-	37	3,860
	£16.85	£16.85	£16.85	£16.85	£16.85	£16.85	
	15,837	10,195	1,461	986	-	630	65,027

B05 - Reduced reporting costs

		ABUHB	BCUHB	CAVUHB
		Provided by HB	Provided by HB	Estimate based on average of others in proportion to number of CT report
Number of CT reports		52,480	59,634	49,646
Average reporting time				
Average number of hours per report	23.61	8	22	
Current number of hours p.a.		435,584	1,282,727	1,172,225
Target improvement	1%	1%	1%	1%
Number of hours saved p.a.		4,356	12,827	11,722
Average cost per hour (Based on B4)	£16.85	£16.85	£16.85	£16.85
Value of time saved p.a.		73,385	216,107	197,490

CTMUHB	HDUHB	PTHB	SBUHB	PHW	VNHST	Total
Provided by HB	Provided by HB	Does not apply - no CTs	Provided by HB	Does not apply as does not use RISP solution	Estimate based on average of others in proportion to number of requests	
54,039	44,427	-	39,645	-	5,123	304,994
17	33		32		30	
892,184	1,481,640		1,268,640		153,690	6,686,690
1%	1%	1%	1%	1%	1%	
8,922	14,816	-	12,686	-	1,537	66,867
£16.85	£16.85	£16.85	£16.85	£16.85	£16.85	
150,310	249,618	-	213,733	-	25,893	1,126,536

B10 - Effective and efficient MDT meetings supporting cross Health Board boundary workings and st

		ABUHB	BCUHB
		Provided by HB	Provided by HB
Number of referrals			
Number of referrals to tertiary care per week	551.18	306	982
Current number of referrals p.a.		15,912	51,064
Target improvement (minutes saved)	2	2	2
Number of hours saved p.a.		530	1,702
Average cost per hour (Based on B4)	£16.85	£16.85	£16.85
Value of time saved p.a.		8,936	28,677

CAVUHB	CTMUHB	HDUHB	PTHB	SBUHB	PHW	VNHST
Provided by HB	Provided by HB	Provided by HB	Does not apply	Provided by HB	Does not apply	Provided by HB
297	342	450		800		681
15,444	17,797	23,400	-	41,600	-	35,412
2	2	2	2	2	2	2
515	593	780	-	1,387	-	1,180
£16.85	£16.85	£16.85	£16.85	£16.85	£16.85	£16.85
8,673	9,994	13,141	-	23,362	-	19,887

Total

200,629

6,688

112,669

B11 - Reduced reliance on paper based system

		ABUHB	BCUHB	CAVUHB
		Provided by HB	Provided by HB	Estimate based on average of others
Average expenditure				
Average expenditure per quarter	443.74	200	890	-
Current expenditure p.a.		**800**	**3,561**	**1,775**
Target improvement	**80%**	80%	80%	80%
Value expenditure saved p.a.		**640**	**2,849**	**1,420**

CTMUHB	HDUHB	PTHB	SBUHB	PHW	VNHST	Total
Provided by HB	Provided by HB	Does not apply	Provided by HB	Does not apply	Provided by HB	
566	652		448		350	
2,262	2,609		1,792		1,400	14,200
80%	80%	80%	80%	80%	80%	
1,810	2,087	-	1,434	-	1,120	11,360

B13 - Reduced risk of errors

	ABUHB	BCUHB	CAVUHB
	Provided by HB	Provided by HB	Not provided
Number of obsoleted reports (Jan-Sep)	164.0	491.0	Unknown
Number of obsoleted reports p.a.	218.7	654.7	Unknown

CTMUHB	HDUHB	PTHB	SBUHB	PHW	VNHST	Total
Provided by HB	Not provided	Does not apply	Provided by HB	Does not apply	Not provided	
99.0	Unknown	N/A	369.0	N/A	Unknown	280.8
						Average
132.0	Unknown	N/A	492.0	N/A	Unknown	374.3

B23 - Improved ability to accurately and frequently access radiation dosage to evidence statutory cc

		ABUHB	BCUHB
		Estimate based on BCU actuals	Estimate based on BCU actuals
Current time spent on audits		**200**	**200**
Target improvement	**80%**	80%	80%
Number of hours saved p.a.		**160**	**160**
Average cost per hour (Based on B4)	**£16.85**	£16.85	£16.85
Value of time saved p.a.		**2,696**	**2,696**

ompliance

CAVUHB	CTMUHB	HDUHB	PTHB	SBUHB	PHW	VNHST
Estimate based on BCU actuals	Estimate based on BCU actuals	Estimate based on BCU actuals	Does not apply	Estimate based on BCU actuals	Estimate based on BCU actuals	Estimate based on BCU actuals
200	200	200		200		200
80%	80%	80%	80%	80%	80%	80%
160	160	160	-	160	-	160
£16.85	£16.85	£16.85	£16.85	£16.85	£16.85	£16.85
2,696	2,696	2,696	-	2,696	-	2,696

Total
1,400
1,120
18,869

B26 - Improved personalisation of dose assessments

		ABUHB	BCUHB
		Estimate based on BCU actuals	Estimate based on BCU actuals
Current number of patients p.a.		30	30
Current time number of hours per patient		2	2
Current time spent p.a.		**60**	**60**
Target improvement	**75%**	75%	75%
Number of hours saved p.a.		**45**	**45**
Average cost per hour (Based on B4)	**£16.85**	£16.85	£16.85
Value of time saved p.a.		**758**	**758**

CAVUHB	CTMUHB	HDUHB	PTHB	SBUHB	PHW	VNHST
Estimate based on BCU actuals	Estimate based on BCU actuals	Estimate based on BCU actuals	Does not apply	Estimate based on BCU actuals	Estimate based on BCU actuals	Estimate based on BCU actuals
30	30	30		30		30
2	2	2		2		2
60	**60**	**60**		**60**		**60**
75%	75%	75%	75%	75%	75%	75%
45	**45**	**45**	-	**45**	-	**45**
£16.85	£16.85	£16.85	£16.85	£16.85	£16.85	£16.85
758	**758**	**758**	-	**758**	-	**758**

Total

210
14
420

315

5,307

ID	Benefit
B01	Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outcomes)
B02	Reduced manual intervention to manage referrals
B03	Reduced time to imaging referral contributing to earlier diagnosis (and ultimately patient outcomes)
B04	Reduced manual intervention for reporting and acknowledgement
B05	Reduced reporting costs
B06	Reduced risk of missing urgent diagnosis
B07	Reduced manual intervention to review lists
B08	Reduced lost time waiting for system to respond
B09	Reduced risk of repeat examinations and inappropriate radiation dosage
B10	Effective and efficient MDT meetings supporting cross Health Board boundary workings and streamlining patient care
B11	Reduced reliance on paper based systems leading to paper, printing and manual storage cost savings

B12	Reduced reliance on paper based systems leading to reduced manual intervention
B13	Reduced risk of errors
B14	Streamlined and reduced training requirements
B15	Improved strategic planning / better demand management
B16	Improved accuracy of referral codes
B17	Increased ability for optimisation between patients or devices
B18	Reduced amount of unreliable/unusable data leading to increased sample size of dose audits
B19	Earlier diagnosis and improved clinical decision making leads to better patient outcomes
B20	Improved patient experience
B21	Improved workforce experience
B22	Reduced inequalities
B23	Improved ability to accurately and frequently access radiation dosage to evidence statutory compliance
B24	Increased compliance for recording dosage in PDMS vs manual entry
B25	Increased accuracy of patient dose record
B26	Improved personalisation of dose assessments

B26	Improved personalisation of dose assessments
B27	Reduced amount of unreliable/unusable data leading to increased sample size of dose audits
B28	Greener energy as a result of cloud-based system
B29	Greater energy efficiency as a result of cloud-based system
B30	Reduced number of devices
B31	Reduced reliance on paper based systems leading to paper savings

Measuring Tool	Timelines for baseline
Average time from request to receipt of referral (days) (requested data from 2019 and 2022 - if one week only, 1st week April)	April - June 2022
B02a = Enter a sample of 20 radiology requests for plain film or US exams from GP/OP referral sources in RadIS B02b = Create appointments for 10 consecutive referrals in RadIS e.g. plain film or US.	Aug-22
Average time from referral to report availability	Jun - Aug 2022
Workforce time spent on process - acknowledgement of urgent referrals	Aug-22
Average reporting time between subsequent reports (end of one report to end of next report - minutes)	April - June 2022
Number of urgent diagnosis missed RadIs and WCP data	April - June 2022
Workforce time spent on process	Aug-22
Number of incidents reported to Fuji	Jun - Jul 22
Number of significant accidental and unintended exposures as a result of repeat imaging in a 2-3 year period	Being undertaken by PDMS sub-group
Number of referrals into tertiary care across organisational boundaries (per week) (requested data from 2019 and 2022 - if one week only, 1st week April)	April - June 2022
Paper and printing costs (costs per quarter - most recent quarter Jan - Mar 22 - current data is from 2021)	April - June 2022

Workforce time spent on process	Aug-22
Number of incidents? Number of obsoleted reports?	Oct-22
Workforce time spent on training	Aug-22
Measurement 1) time from 'put on hold' to 'appointment made' in RadIs Measurement 2) Time spent on vetting	Jun-22
%change accuracy (correct codes used)	Jun-22
Current variation vs future variation e.g. dose, protocol (hope to see a % decrease)	Oct-22
Amount of data 'thrown out'	Being undertaken by PDMS sub-group
Proposed measurement: Number of patients not discussed at MDT as a result of radiology information (images) not being available'	Jun-22
Patient surveys and/or better compliance to national guidelines on referral to treatment timelines	Oct-22
Staff surveys	Oct-22
Turn around time B01 + B03	Jun-22
Time saved manual vs automated audits	Being undertaken by PDMS sub-group
Number of times dosage not recorded	Being undertaken by PDMS sub-group
Number of patients flagged for skin injury review	Being undertaken by PDMS sub-group
Number of manual personal dose assessments completed	Being undertaken by PDMS sub-group

Number of manual personal dose assessments completed	Being undertaken by PDMS sub-group
Amount of data 'thrown out'	Being undertaken by PDMS sub-group
Reduction in energy usage x CO2 emissions x Value per tonne of CO2	To be calculated after dialogue
Reduction in energy usage x CO2 emissions x Value per tonne of CO2	To be calculated after dialogue
Energy consumption or embedded carbon?	To be calculated after dialogue
Number of trees saved (10,000 pages = one tree)	Jun-22

Baseline Position ABUHB	Baseline Position BCUHB	Baseline Position CAVUHB	Baseline Position CTMUHB
10.96	4.19		3.1
2020, More up to date data rec'd	1-7 April 22	Data rec'd with WB for analysis	Mar 22, paper
20 mins per bactch/135 hours per week	69 minutes per batch/507 hours per week	42 minutes per batch/270 hours per week	
10 mins per bacth/112 hours per week	107 minutes per batch/493 hours per week	53 minutes per batch/203 hours per week	
14.9225	4.32	5.3	8
CT Heads 1st week April (A&E, In, Out + GP)	4-10 April, CT heads	4-10 April, CT heads	4-10 April, CT heads
n/a completed electronically	64 minutes per batch/70 hours per week	12 mins per batch/12 hours per week	
8.3	21.51		16.51
CT Heads inpatient, Nov 22	1-7 April 22, avg across radiologists	Data rec'd with WB for analysis	CT heads, March 22
		Data sent	
5	20	3.5	1.7
42,230 exams	43,204 exams	88,573 exams (approx 44,000/month)	20,000 exams per month
Sev 1 + 2 Incident per month (Apr 22)	Sev 1 + 2 Incidents per month (Apr - Jun 22)	Sev 1 + 2Incidents per month (mar - Apr 22)	Sev 1 + 2 Incidents per month (Dec 21 - Feb 22)
	92 per year average		
306	982	297	342.25
Jan - May 22 - Image Exchange portal. DICOM data shared	1st week April 22 - Image Exchange Portal. Includes England. PACS transfers negligible.	IEP	March 22 - 711 IEP, 898 PACS
£200	£890.20		£565.55
		Pending	Jan - Mar 2022

164 Jan - Sep '22	491 Jan - Sep '22		99 Jan - Sep '22
1.8 54 seconds per report 1st - 14th June 22, Outpatients only, electronic vetting		6 Data provided in meeting	
126 incorrect codes Oct 21 - Mar 22	Data not collected	Julie investigating	Data not collected
	19%		
25.8825	8.51		11.1
B01 + B03	B01 + B03		B01 + B03
	2 weeks per year		
	7%		8.10%
			Jan - Oct 222
	4 patients since Oct 2020		
	30		

	2015 - 2022		
	19%		
1	4.5		1.6
20,366 sheets	90,652 sheets		57,592 sheets

Baseline Position HDUHB	Baseline Position PTHB	Baseline Position SBUHB	Baseline Position PHW
1.48	n/a	5.88	n/a
Mar-Apr 22		Jun-21	
	n/a	21.5 minutes per batch/113.6 hours per week 22.5 minutes per batch/60 hours per week	n/a
12	n/a	5.3	n/a
4-10 April, CT heads		4-10 April, CT heads	
	n/a	9.5 mins per batch/2.25 hours per week	n/a
33.35	n/a	32	n/a
1st week April, CT heads*		CT heads, March 22	
Data sent		Data sent	
			n/a
6	n/a	6	3
29,320 exams		29,733 exams	
Sev 1 + 2 Incidents per month (May 22)		Sev 1 +2 Incidents per month (Apr 22)	Sev 1 + 2 Incidents per month (Jan 22)
450	n/a	800	n/a
?		PACS - PACS. IEP = about 50, June 21	
£652.33	n/a	£448.11	n/a
Jan - Mar 2022		up to £896.22 for double sheet	

			n/a
	n/a	369 Data provided in meeting - avg 41 per month	n/a
80 Hours per year			n/a
	n/a	3.4 10 seconds per report CT Heads held to appt made Apr 21 - Apr 22	n/a
Data not collected		19	Data not collected
		GP referals only Oct 21 - Mar 22	
13.48	n/a	11.18	n/a
B01 + B03		B01 + B03	

1.3		2.3	n/a
66,428 sheets		45,632 sheets	

Baseline Position VNHST	Baseline Position (National average)	Comments
1.72 2019, 2021, 2022	4.555	Proposed baseline agreed by Benefits Group on 15.06.22
	256.4	
	218.5	
14.5 MRI heads Mar - April	9.191785714	Proposed baseline agreed by Benefits Group on 10.08.22
	28.08333333	
30 1st week April, CT heads*? Confirm which scan	25.005	reporting times for CT scans, average time in minutes from end of one report to end of next report (minutes) Proposed baseline agreed by Benefits Group on 15.06.22
		Data does not match up with WCP - may need to revert to plan A and include as Qualitative only
4 3685 exams Sev 1 + 2 Incidents per month (Mar - May 22)	6.15	Fuji call logs would be best for this. Agreement to record Sev 1 and 2 only at meeting on 10.08.22
46 per year on average	69	
681 Jan - Mar 2022, PACS - PACS. IEP Nov 22	551.1785714	
£350.00 Dec 21, Jan - Mar 22	£518	£3,106.19 Total cost/ quarter in Wales.

		benefit to be removed and re-mapped as a contributor
	280.75	Have contacted central Datix team for '•Datix entries of incidents arising as a result of data quality issues' Jan - Sep
	80	Agreed to remove at workshop 17/11
data not recorded	3.733333333	Days
	72.5	benefit to be removed and re-mapped as a contributor
		benefit to be included as an opportunity for future optimisation
		Agreement at workshop - unable to measure
		to be included as qualitative only
		to be included as qualitative only, with the future approach being descriped in the FBC
16.22 B01 + B03	17.3725	
	8%	
41 on average per year		
156	93	

2019 - 2022		
1.8	2.083333333	Trees saved per quarter - based on an assumption of printing one report per sheet, and cost of 0.00982 per sheet
35,641 sheets		

Scchedule 2.1 Activity Data

Organisation	CT	MR	US	MG	Plain Film	Fluoro / Intervention
Aneurin Bevan UHB	52,480	26,454	80,096	5,515	238,524	11,426
Betsi Cadwaladr UHB	59,634	22,074	111,897	7,809	247,034	6,284
Cardiff & Vale UHB	49,646	22,106	89,697	4,566	216,365	9,370
Cwm Taf Morgannwg UHB	54,039	24,112	84,446	5,512	208,655	7,826
Hywel Dda UHB	44,427	15,219	58,572	4,905	125,109	4,635
NIAW	NA- activity is recorded in CTM RIS					
Powys THB	0	0	7,844	0	21,397	0
Public Health Wales NHS Trust	0	0	31,000	132,000	0	0
Velindre University NHS Trust	5,123	2,254	1,076	0	2,365	29
Swansea Bay UHB	39,645	18,936	65,293	6,362	179,765	8,227
Total	**304,994**	**131,155**	**529,921**	**166,669**	**1,239,214**	**47,797**
Typical Uncompressed Study Size (MB)	**824**	**341**	**24**	**7040**	**48**	**191**
Scaling Factors	**B02-Requests on Hold**	**B02-Requests Appointed**	**Reports Printed**			
Aneurin Bevan UHB	420,877	116,807	0			
Betsi Cadwaladr UHB	459,224	143,692	344,418			
Cardiff & Vale UHB	400,402	119,855	320,322			
Cwm Taf Morgannwg UHB	NA	119,293	317,043			
Hywel Dda UHB	255,115	84,935	204,092			
NIAW	NA	NA	NA			
Powys THB	29241	6667	29,241			
Public Health Wales NHS Trust	NA	NA	NA			
Velindre University NHS Trust	12,610	5,392	12,610			
Swansea Bay UHB	329,451	91,417	74,048			

NM	PT	Dexa	Total
3,240	0	3,142	**420,877**
3,708	784	0	**459,224**
5,708	2,944	0	**400,402**
1,778	270	0	**386,638**
1,699	0	549	**255,115**
			0
0	0	0	**29,241**
0	0	0	**163,000**
1,763	0	0	**12,610**
4,461	1,191	5,571	**329,451**
22,357	**5,189**	**9,262**	**2,456,558**
92	**907**	**3**	

| B02 | Reduced manual intervention to manage referrals |
| | Workforce time spent on process - hours spent on manual intervention |

	Baseline Position ABUHB	Baseline Position BCUHB
B02a = Enter a sample of 20 radiology requests for plain film or US exams from GP/OP referral sources in RadIS	21,043 batches per annum = 405 batches per week. 20 mins per batch = 135 hours per week managing referrals	22,961 batches per annum = 442 batches per week. 69 mins per batch = 507 hours per week
B02b = Create appointments for 10 consecutive referrals in RadIS e.g. plain film or US.	11,681 batches per annum = 225 batches per week. 30 mins per batch = 112 hours per week	14,369 batches per annum = 276 batches per week. 107 minutes per batch = 493 hours per week

Baseline Position CAVUHB	Baseline Position CTMUHB	Baseline Position HDUHB	Baseline Position PTHB	Baseline Position SBUHB
20,020 batches per annum = 385 batches per week. 42 mins per batch = 270 hours per week				16,472 batches per annum = 317 batches per week. 21.5 minutes per batch = 113.6 hours per week
11,986 batches per annum = 230 batches per week. 53 minutes per batch = 203 hours per week				9,142 batches per annum = 176 batches per week. 22.5 minutes per batch = 66 hours per week

**Baseline Position
VNHST**

	2023/24	2024/25	2025/26
CL	148,916	152,639	156,455
8d	136,844	140,265	143,771
8c	96,593	99,007	101,482
8b	81,578	83,617	85,707
8a	68,274	69,981	71,730
8a	68,274	69,981	71,730
7	59,590	61,080	62,607
6	50,735	52,003	53,303
5	41,168	42,197	43,252
4	32,853	33,674	34,516

Ref	ON DATIX	Date Raised	Category	Project	Workstream	Description of Risk	Inherent Risk: Impact Score (1-5)	Inherent Risk: Likelihood Score (1-5)	Inherent Risk Score	Current (Residual) Risk: Impact Score (1-5)	Current (Residual) Risk: Likelihood Score (1-5)	Current (Residual) Risk Score	Current (Residual) Risk Rating	Target Risk: Impact Score (1-5)	Target Risk: Likelihood Score (1-5)	Target Risk Score	Change since last review	Change Trend	Risk Status	Owner	Management & Mitigation	Response Considered	Proximity	Progress Updates	Closed/ Transferred Date	Closure/ Transfer Identify
RISP-R35		18/03/2021	Business Objectives/Projects	Implementation	Programme	If both LINC and RISP implementation timescales continue as planned, Then there may not be sufficient technical and project resources available to support both programmes, Resulting in delayed implementation	4	4	16	3	2	6	Yellow	2	2	4	↔	No Change	Open	Gareth Cooke	Treat - Contingent	Programme to liaise with LINC around their implementation plan to possibly stagger deployment dates to ensure we are not implementing at the same time. HBs/Trusts also need to be involved in planning discussions.	2024	13/12/22 Risk shared with owner 12/10/22 Risk owner re-assigned to Gareth Cooke 14/09/22 Risk owner contacted for an update 10/08/22 Risk owner noted no changes to risk currently 18/07/22 Risk reviewed at monthly meeting; overlap expected with LINC in May May 2024. Risk remains low. 11/05/22 Risk owner contacted for an update 13/04/22 Risk reviewed at monthly meeting. LINC deployment timelines currently scheduled April 2023 - Dec 2024. RISP deployment is expected to begin May 2024. No		
RISP-R94		25/10/2022	Business Objectives/Projects	Programme	Programme	If there are any delays in the sign off procedures within health boards, Then the contract start date will be delayed, Resulting in a delay in implementing the new contract and potential reputational impact	5	4	20	3	4	12	Amber	4	1	4	↓	No Change	Open	Gareth Cooke	Treat - Contingent	Timelines will be monitored closely. The RISP programme will explore the possibility of splitting the roll-out of PACS and RIS and a contingency plan with FUJI will be discussed. Work with DHCW and Chief Executives of health boards to establish a solution. DHCW may be able to hold an extraordinary Board meeting in April to approve the contract signing Agreed to move sign off procedures	Jan-23	14/12/22 With mitigations in place for R60, impact of delay is reduced. 13/12/22 Risk reviewed at Board meeting 30th Nov, no changes to rating. 21/11/22 Risk discussed at monthly meeting, mitigation updated. 25/10/22 Risk raised following various conversations		
RISP-R95	YES	20/01/2023	Business Objectives/Projects	Programme	Programme	If the Philips solution does not maintain the patient identity across multiple instances, Then patients may be incorrectly identified, Resulting in compliance failure, patient safety issues and the solution not going live	3	5	15	3	5	15	Red	4	1	4	↔		Open	Gareth Cooke	Treat - Containment	we may be able to proceed with FBC development and approval processes whilst the clarification is sought and we have some contingency in place with the existing contract extensions so any delay may not be material.	2023/2024	January 2022 - Risk identified as part of the procurement process 27/2/23 - Meeting with Philips to discuss		
RISP-R96	YES	06/02/2023	Service Continuity	Programme	Programme	If there is no contingency plan to replace the existing Computerised/Digital Radiology equipment that belongs to Fuji the when Philips contract begins, Then some health boards may be without CR/DR equipment, Resulting in some health boards not being able to undertake imaging, and potentially putting patients at risk (noting this has a greater impact on rural areas)	4	4	16	4	4	16	Red	4	1	4	↑		Open	Gareth Cooke	Treat - Containment	Meeting held with Amanda Evans on 3/2/23 to discuss. Agreed that this sits with the Imaging Programme (from Nov 2022), who are currently updating a list of equipment and HB's that this affects. A business case will need to be written if funding is to be sought to purchase this equipment	Nov-24			
RISP-R24		27/02/2020	Business Objectives/Projects	Programme	Programme	If the solution is not suitable for primary care due to lack of engagement with the clinicians and statutory negotiating bodies (e.g. GPC Wales), then there will be poor/lack of integration with primary care clinical systems, resulting in Primary Care clinicians making up 50% of all requests into secondary care.	3	2	6	2	2	4	Yellow	1	1	1	↔	No Change	Open	John Collins	Treat - Contingent	Regular communication with primary care required. Primary care representative invited to Programme Board and included in enterprise user group. Representatives included on ETR project.	2025	14/12/22 Risk noted no changes at present 09/11/22 Risk owner noted no changes at present 12/10/22 The ETR programme is looking to establish pilot sites in CTM and Hywel Dda for GPs to commence electronic requesting. No change to rating. 14/09/22 Risk owner contacted for an update 10/08/22 Risk owner confirmed no changes at present. 18/07/22 Risk discussed at monthly meeting. Risk remains low. 21/04/22 Likelihood lowered to '2' on the basis that the requirements include launching, return results to and receive notifications from the GP system		
RISP-R68		19/10/2021	Business Objectives/Projects	Standardisation	Business Change	If Clinical Leads and Clinical Directors are not included in the standardisation membership, then the lack of clinical standardisation might result in a higher clinical risk.	3	2	6	3	2	6	Yellow	3	2	6	↔	No Change	Open	Oscar Merry Lewis	Treat - Contingent	Clinical Leads and Clinical Directors included in Standardisation Group membership.	2024	18/10/22 No change - too early. This risk is theoretical at this stage. 14/09/22 Risk shared with Standardisation PM 10/08/22 New PM for Standardisation in post 23rd Aug 13/07/22 A new PM for Standardisation has been appointed; start date not yet agreed. 07/06/22 Recent recruitment process to replace SC was unsuccessful; risk shared with LB and JC for review in interim while a replacement is sought. 11/05/22 SC no longer in post, risk to be reviewed once a replacement is in post 15/03/22 Risk reviewed by owner, no changes noted. 16/03/22 Standardisation Group scheduled for 16th March		
RISP-R75		12/11/2021	Business Objectives/Projects	Implementation	Programme	If some health boards choose to adopt ETR via RISP and others choose to use ETR via a third party (such as WCP), then some of the RISP benefits may not be achieved, resulting in standardisation risk across health boards.	3	2	6	3	2	6	Yellow	2	1	2	↔	No Change	Open	Emily Jarmann	Treat - Contingent	Work closely with the ETR Project to ensure it is fit for purpose and timelines are aligned. Engage with the health boards to ensure full take-up of ETR	2023	13/12/22 Risk reviewed by owner; shared with Programme Lead and SME. A gap analysis to be undertaken between RISP procurement requirement and DHCW ETR. 09/11/22 Risk owner noted; no changes since last review 12/10/22 Risk reviewed by owner; advice sought from Programme Director, no changes to the current position. 14/09/22 Risk reviewed by owner; seeking advice from programme lead regarding any changes. 10/08/22 Risk reviewed by owner; no changes since last update. 18/07/22 Risk reviewed at monthly meeting; ETR still an option within the		
RISP-R76		16/12/2021	Finance	Programme	Programme	If the funding for the Programme is for Year 3 (23/24), then there may be insufficiency in funding, as the Welsh Government has currently approved capital funding for years 1 (21/22) and 2 (22/23) only, resulting in the risk of the incompletion of the Programme.	3	2	6	3	2	6	Yellow	3	1	3	↔	No Change	Open	Gareth Cooke	Treat - Contingent	Funding requirements to be monitored as the programme progresses. Welsh Government funding monitored via DPIF reports.	Apr-23	12/10/22 Risk owner re-assigned to Gareth Cooke 14/09/22 Risk owner noted no changes ro risk rating currently; proximity updated to April 2023 10/08/22 Risk owner contacted for an update 18/07/22 Risk discussed at monthly meeting, risk remains low. 11/05/22 Risk owner contacted for an update 13/04/22 Risk reviewed at monthly meeting. Budget will be monitored by Karen Evans (NHSWHC). No changes to rating at present. 16/03/22 Risk reviewed at monthly meeting, mitigation updated.		
RISP-R79		10/02/2022	Business Objectives/Projects	Benefits	Business Change	If the health boards and trusts do not agree to support the benefits realisation plan, then it will be difficult to work with them during the development of plan stage, resulting in the risk to ensure Health Board and Trust buy-in.	3	2	6	3	3	9	Amber	2	2	4	↔	No Change	Open	Emily Jarmann	Treat - Contingent	Work with health boards and trusts during development of plan to ensure buy-in	2022-2025	16/12/22 Risk reviewed by owner; engagement with health boards has been positive, no changes to rating. 09/11/22 Risk reviewed by owner; no changes since last review 12/10/22 Risk reviewed by owner; no change since last review 14/09/22 Risk reviewed by owner; no change since last review 10/08/22 Risk reviewed by owner; some health boards less engaged than others making the baselining of benefits more difficult. This could impact the Full Business Case and benefits realisation in time; likelihood increased. 13/07/22 Risk reviewed by owner; majority of health boards still engaged with process. No changes at present		
RISP-R86		05/05/2022	Service Continuity	Implementation	Commercial	If the current global supply chain delays advance, then it might impact the availability of essential equipment (e.g., workstations & monitors), resulting in the inability to support the new solution implementation and deployment delays.	2	2	4	2	2	4	Yellow	3	1	3	↔	No Change	Open	Dean McCarthy	Treat - Contingent	Implementation timelines to be agreed in principal shortly after contract award and kept under review	2024	09/11/22 Risk owner confirmed no changes at present 17/10/22 Risk owner noted supply chain was beginning to show a slowdown on the buying side but it was not yet clear how this would impact things commercially. No changes to rating. 14/09/22 Risk owner noted no changes to the risk rating currently; internal discussions ongoing 05/05/22 Risk raised by RISP SME		
RISP-R92		12/10/2022	Business Objectives/Projects	Implementation	Commercial	If a decision is made to migrate all data, then there might be data quality issues or time constraints, which means that data migration may not be completed, resulting in the risk that the data migration may run beyond the end of the current Fuji contract.	3	2	6	3	1	3	Green	3	1	3	↓	No Change	Open	John Collins	Treat - Contingent	Contingency Plan in development for current Fuji contract end dates. Considerations within Schedule 2.1 to mitigate. Milestones included in the implementation plan for data migration.	Apr-23	14/12/22 Risk reviewed at monthly meeting, likelihood reduced 09/11/22 Risk owner noted no changes at present 12/10/22 Risk raised following the closure of R42 as it has been agreed to take an approach of full data take-on.		
RISP-R16	YES	27/02/2020	Business Objectives/Projects	Procurement	Commercial	If funding is not identified to upgrade the current firewall and PSBA infrastructure within each health board to the minimum Philips requirements, Then health boards may be unable to implement the new system, Resulting in delays to programme benefits and wider implementation	3	3	9	4	4	16	Red	2	2	4	↔	No Change	Open	Dean McCarthy	Treat - Contingent	Significant investment is required in network infrastructure by WG and within the Health Boards to ensure successful delivery of the benefits of RISP. Work closely with WG, HB IT leads and IMB.	Feb-23	14/12/22 Donald Kennedy taking forward via IMB. 13/12/22 Risk reviewed at Board meeing 30th Nov, no changes to rating, mitigation updated to remove reference to AWIP. 21/11/22 Risk reviewed at monthly meeting, Programme Team to meet with Donald. 09/11/22 Risk owner confirmed no changes at present 12/10/22 Risk reviewed at Board meeting on 5th Oct. Donald had asked IMB members to provide feedback on various matters relating to the Programme but had little response and recommended Matt John correspond with the IMB Chair, Chris Ball.		
RISP-R19		27/02/2020	Business Objectives/Projects	Procurement	Commercial	If DHCW cannot deliver WCP ETR functionality or be able to meet the new system's requirements and timescales, then this may lead to the optimum solution not being able to be implemented, which could result in the full benefits of ETR/a fully integrated system not being realised.	3	4	12	3	3	9	Amber	2	2	4	↔	No Change	Open	Victoria O'Higgins/Joao Martins	Treat - Contingent	The programme is working on the premise that the national ETR solution will be delivered by DHCW via WCP with the programme team feeding radiology requirements to the developers through the ETR Project Board. There will be an option to procure a commercial product if the DHCW solution is unable to meet the requirements.	Feb-23	13/12/22 Risk owner to cover maternity leave will be in post in January - added as a co-owner 09/11/22 Risk owner has met with Sally Pritchard and Stephen Winder to discuss ETR. ETR needs to be live before the RISP system is implemented. Integration support and resource will be needed. Discussions ongoing. No change to rating however may need to increase to 12 at next review. 12/10/22 Risk owner confirmed a meeting was scheduled with Sally Pritchard to discuss this 23/09/22 Risk owner confirmed no changes at present		
RISP-R25		27/02/2020	Service Continuity	Procurement	Commercial	If the chosen supplier cannot guarantee the required level of uptime, then the safe running of the clinical systems may not be ensured, resulting in system outages and impacts on clinical care, patient safety/outcomes during deployment across NHS Wales.	3	3	9	3	1	3	Green	1	1	1	↓	Decreasing	Open	John Collins	Tolerate	The requirements for high uptime guarantees and appropriate business continuity and disaster recovery solutions are reflected in the functional and technical requirements. The suppliers are offering resilient dual datacentre solutions and local business continuity systems that mitigate against significant system downtime	2023	14/02/22 Risk lowered as requirements have been agreed through dialogue 09/11/22 Risk owner noted no changes at present 12/10/22 the Programme Board has asked IMB members (Action: RISPPB-77) to feedback comments / concerns about the RISP infrastructure requirements so that these can be incorporated into the FBC 14/09/22 Risk owner contacted for an update 10/08/22 Risk owner amended to John Collins. 13/07/22 Risk owner contacted for an update 07/06/22 Risk owner contacted for an update		

Risk Ref	Esc	Date Raised	Category	Sub-Category	Type	Area	Risk Description	L	I	Score	L	I	Score	RAG	L	I	Score	Trend	Trend Text	Status	Owner	Response	Mitigation	Target	Updates
RISP-R37	YES	30/03/2021	Business Objectives/Projects	Programme	Programme	Programme	If there are not sufficient resources available to support the implementation of the programme within individual health boards (noting Covid 19 recovery and winter pressures), then the supplier may not be able to implement the Philips solution, resulting in delays to the programme	3	3	9	4	4	16	Red	2	1	2	↔	No Change	Open	Gareth Cooke	Treat - Contingent	Early communication of requirements and sharing of documents, and collaboration with the service.	2022 - 2025	14/12/22 Implementation workshop being held Jan 23 to identify resources required for implementation 13/12/22 Risk reviewed at Board meeting 30th Nov, no changes to rating. 21/11/22 Risk reviewed at monthly meeting, programme resources are being reviewed with a view to reducing this risk 12/10/22 Risk reviewed at Board meeting on 5th Oct. This remained a risk due to continuing pressure on the service. There was no issue currently and the service remained supportive of RISP. Sian Phillips added hospital admissions around COVID had escalated significantly over the last two weeks, so this risk may increase. Judith
RISP-R60	YES	01/09/2021	Service Continuity	Programme	Programme	Programme	If Fuji do not sign an extension to the termination assistance clause, Then there will be even less time for implementation, Resulting in increased pressure on all partners to implement within shorter timescales	4	3	12	4	3	12	Amber	3	2	6	↓	Decreasing	Open	Gareth Cooke	Treat - Contingent	Timelines will be monitored closely. The RISP programme will explore the possibility of splitting the roll-out of PACS and RIS and a contingency plan with FUJI will be discussed. Termination assistance clause being saught (see updates)	2024	14/12/22 An extension of the provision of Termination Assistance Services ("TAS") for the Deployment Order is required to support Data Migration and transfer to a new solution. Each Authority Party shall have the ability to extend the current Termination Assistance Service ("TAS") for a period of at least three (3) months, with the option for a further three (3) periods of three (3) months of Termination Assistance Services. For the avoidance of doubt, the Change Control Notice ("CCN") has a total effect of extending the Termination assistance period by up to twelve (12) months in total. Rating reduced to Amber. 13/12/22 Risk reviewed at Board meeting 30th Nov, rating has been reduced but is still red.
RISP-R63		19/10/2021	Business Objectives/Projects	Standardisation	Business Change	Business Change	If there is a lack of appetite to support standardisation, then it will be difficult to implement a once-for-Wales system, resulting in too much local variation, which could increase the complexity of the system and impact effectiveness, efficiency and interoperability.	3	3	9	3	2	6	Yellow	3	2	6	↔	No Change	Open	Oscar Merry Lewis	Treat - Contingent	Ensure Standardisation Group membership covers all HBs/Trusts with a variety of skillsets. Work closely with NHS Delivery Unit and NIPSB on pieces of standardisation work.	2022/23	18/10/22 Reduced if anything, perception of standardisation has changed. ACTION: Review attendance at the Standardisation Group to ensure that the correct representation from each HB. Also review TOR. 14/09/22 Risk shared with Standardisation PM 10/08/22 New PM for Standardisaion in post 23rd Aug 13/07/22 A new PM for Standardisation has been appointed; start date not yet agreed. 07/06/22 Recent recruitment process to replace SC was unsuccessful; risk shared with LB and JC for review in interim while a replacement is sought.
RISP-R64		19/10/2021	Business Objectives/Projects	Standardisation	Business Change	Business Change	If there is a lack of standardisation, then local variation of the new system is likely to be higher, resulting in the benefits of the new system being limited.	3	3	9	3	3	9	Amber	3	2	6	↑	Increasing	Open	Oscar Merry Lewis	Treat - Contingent	Work with the Standardisation Group to consider an appropriate response to this risk.	2024	19/10/22 SC no longer in post, risk to be reviewed once a replacement is in post ... allows for greater localisation. Unclear what needs to be standardised until the supplier tells us. 14/09/22 Risk shared with Standardisation PM 10/08/22 New PM for Standardisaion in post 23rd Aug 13/07/22 A new PM for Standardisation has been appointed; start date not yet agreed. 07/06/22 Recent recruitment process to replace SC was unsuccessful; risk shared with LB and JC for review in interim while a replacement is sought. 11/05/22 SC no longer in post, risk to be reviewed once a replacement is in post
RISP-R65		19/10/2021	Business Objectives/Projects	Standardisation	Business Change	Business Change	If there is a lack of capacity and/or competing demands which affect the Radiology Service's ability to engage with the project, then desired levels of standardisation might not be achievable, which would result in the benefits of the new system being limited.	3	1	3	3	3	9	Amber	3	2	6	↔	No Change	Open	Oscar Merry Lewis	Treat - Contingent	Work with HBs individually via requirements workshops to maximise attendance.	2022/23	18/10/22 No change - might end up being changed depending on the proposed work packages resulting from the Workshops. 14/09/22 Risk shared with Standardisation PM 10/08/22 New PM for Standardisaion in post 23rd Aug 13/07/22 A new PM for Standardisation has been appointed; start date not yet agreed. 07/06/22 Recent recruitment process to replace SC was unsuccessful; risk shared with LB and JC for review in interim while a replacement is sought. 11/05/22 SC no longer in post, risk to be reviewed once a replacement is in post 14/04/22 Requirements workshops to be arranged individually with HBs to maximise
RISP-R67		19/10/2021	Business Objectives/Projects	Standardisation	Business Change	Business Change	If standardisation limits local flexibility and innovation, then local clinical efficiency may be limited, which could result in weaker patient outcomes.	3	3	9	3	2	6	Yellow	3	2	6	↔	No Change	Open	Oscar Merry Lewis	Treat - Contingent	Clinical Leads and Clinical Directors included in Standardisation Group membership.	2024	18/10/22 No change - review of attendance within the groups to be conducted, may increase/decrease depending on outcome. 14/09/22 Risk shared with Standardisation PM 10/08/22 New PM for Standardisaion in post 23rd Aug 13/07/22 A new PM for Standardisation has been appointed; start date not yet agreed. 11/05/22 SC no longer in post, risk to be reviewed once a replacement is in post 14/04/22 Risk rating lowered as the project will only focus on areas where standardisation is beneficial to the service and will avoid needless standardisation (as
RISP-R69		19/10/2021	Business Objectives/Projects	Standardisation	Business Change	Business Change	If work is undertaken on standardising the new system before the supplier is chosen, then this may eventually be wasted effort, which results in lower programme efficiency.	3	3	9	3	2	6	Yellow	3	2	6	↔	No Change	Open	Oscar Merry Lewis	Treat - Contingent	Project split into phases with Phase 1 focusing on areas that would not require supplier involvement.	2023	18/10/22 No change - project split into phases to reduce likelihood of wasted effort. Some standardisation is required because of deployment of the ETR solution. 14/09/22 Risk shared with Standardisation PM 10/08/22 New PM for Standardisaion in post 23rd Aug 13/07/22 A new PM for Standardisation has been appointed; start date not yet agreed. 07/06/22 Recent recruitment process to replace SC was unsuccessful; risk shared with LB and JC for review in interim while a replacement is sought. 11/05/22 SC no longer in post, risk to be reviewed once a replacement is in post
RISP-R70		19/10/2021	Business Objectives/Projects	Standardisation	Business Change	Business Change	If there is a lack of capacity to standardise the usage of procedure codes across all healthboards, then this may result in unwanted variation, resulting in lower interoperability.	3	4	12	3	2	6	Yellow	3	2	6	↔	No Change	Open	Oscar Merry Lewis	Treat - Contingent	WRTS team representative on Standardisation Group to work on the adoption and management of National Reference Data Sets.	2022/23	18/04/22 No change to risk as the project has been split into two phases, with standardise the usage of codes across healthboards. 14/09/22 Risk shared with Standardisation PM 10/08/22 New PM for Standardisaion in post 23rd Aug 13/07/22 A new PM for Standardisation has been appointed; start date not yet agreed. 07/06/22 Recent recruitment process to replace SC was unsuccessful; risk shared with LB and JC for review in interim while a replacement is sought. 11/05/22 SC no longer in post, risk to be reviewed once a replacement is in post
RISP-R72		09/11/2021	Business Objectives/Projects	Standardisation	Business Change	Business Change	If there is scope creep within the standardisation project, then additional resource may be required to carry out the work, resulting in higher programme cost/time being necessary.	3	3	9	3	2	6	Yellow	3	2	6	↔	No Change	Open	Oscar Merry Lewis	Treat - Contingent	Scope and scope inclusions included in the project initiation document.	2022	18/10/22 No change at this stage - discussion surrounding the impact of legacy equipment management has been added to the workshops, which wasn't previously explicitly identified as within the scope of the project. 14/09/22 Risk shared with Standardisation PM 10/08/22 New PM for Standardisaion in post 23rd Aug 13/07/22 A new PM for Standardisation has been appointed; start date not yet agreed. 07/06/22 Recent recruitment process to replace SC was unsuccessful; risk shared with LB and JC for review in interim while a replacement is sought.
RISP-R82		10/02/2022	Business Objectives/Projects	Benefits	Business Change	Business Change	If the measurements for financial and economic benefits are not clearly defined, then these benefits may not be measured effectively, which could result in the benefits of the programme not being fully measurable/realised.	3	3	9	3	3	9	Amber	3	1	3	↔	No Change	Open	Emily Jarmann	Treat - Contingent	Work with Benefits Group to measure financial and economic benefits	Feb-23	13/12/22 Risk reviewed by owner; group has agreed there are a number of benefits that cannot be measured, but the measurable benefits will hopefully be sufficient for the FBC 09/11/22 Risk reviewed by owner; there are a number of Benefits that cannot be measured and these will be reviewed at a workshop on 17th November. No changes at present. 12/10/22 Risk reviewed by owner, Programme Director advised no concerns were raised at OBC stage, however issues with data gathering remain; no changes to risk 14/09/22 Risk reviewed by owner, LB contacted regarding queries from Welsh Government. Presently updated in line with FBC plan.
RISP-R83		10/02/2022	Business Objectives/Projects	Benefits	Business Change	Business Change	There is a risk that benefits may not be realised by health boards or trusts post implementation	3	3	9	3	3	9	Amber	3	1	3	↔	No Change	Open	Emily Jarmann	Treat - Contingent	Establish a benefits realisation plan and owners within health boards	2025	09/11/22 Risk reviewed by owner; no changes since last review 12/10/22 Risk reviewed by owner; no changes 14/09/22 Risk reviewed by owner; no changes 10/08/22 Risk reviewed by owner; no changes currently 13/07/22 Risk reviewed by owner; no changes at present 07/06/22 Risk shared with Benefits Group ahead of next meeting 11/05/22 Risk reviewed by owner; no changes at present 13/04/22 Risk shared with Benefits Group; feedback requested. 03/03/22 Risk reviewed by owner - will be raised for discussion at next Benefits Group
RISP-R84		12/04/2022	Business Objectives/Projects	Benefits	Business Change	Business Change	If benefits baselines are not established within the timeframe, then there may be difficulties seeking FBC approval, which could result in the programme being stalled/timeframe slippage.	3	3	9	3	4	12	Amber	3	1	3	↔	No Change	Open	Emily Jarmann	Treat - Contingent	Work with Benefits Group to measure baselines for FBC	Nov-22	13/12/22 Risk reviewed by owner, there are still a few gaps in data collection so risk remains the same. 21/11/22 Risk reviewed at monthly meeting, reduced to Amber following productive Workshop 09/11/22 Risk reviewed by owner; all Benefits identified at OBC stage have been discussed by stakeholders, and a number cannot be measured. Being reviewed at a workshop on 17th Nov. 12/10/22 Risk raised at Board meeting on 5th Oct. Judith Bates suggested seeking advice from Anouska Huggins. The risk level would be re-evaluated at the next Board once further benefits meetings had been held with health boards to determine whether the Programme could further assist with data gathering. 21/09/22 Risk raised to red following discussion with PMO
RISP-R87		23/05/2022	Staffing	Validation & Testing	Commercial	Commercial	If sufficient testing resource cannot be provided by DHCW, then some elements of the necessary testing may not be carried out, which could result in an un-tested system being implemented, and patient outcomes being impacted.	3	3	9	4	3	12	Amber	3	1	3	↔	No Change	Open	Victoria O'Higgins/Joao Martins	Treat - Contingent	Escalated to Director responsible for testing resource. To be reviewed in August 23.	Apr-23	13/12/22 Risk owner to cover maternity leave will be in post in January - added as a co-owner 21/11/22 Risk reviewed at monthly meeting, impact increased 09/11/22 Risk owner has discussed resourcing with Meirion however recruitment has been challenging. May need to consider a work package with a third party company. 12/10/22 Risk owner confirmed no changes for now; DHCW was now planning for next year. This resource needed to be included in the full business case. 23/09/22 Risk owner confirmed no changes at present and will likely remain open until FBC is finalised. 14/09/22 Risk owner contacted for an update 10/08/22 Risk owner contacted for an update 13/07/22 The procurement board has decided that during the dialogue R1 there will be no testing representative, and this will be revisited at a later stage to decide whether someone is required at subsequent rounds.

| RISP-R93 | | 25/10/2022 | Business Objectives/Projects | Programme | Programme | If the programme faces disruption during the TUPE transfer to DHCW, **then** the programme may be stalled, which could **result in** programme slippage. | 3 | 4 | 12 | 4 | 2 | 8 | Amber | 4 | 1 | 4 | ↓ | Decreasing | **Open** | Gareth Cooke | Treat - Contingent | Work with DHCW to ensure a smooth transition | Jan-23 | **13/12/22** Risk shared with owner
21/11/22 Risk discussed at monthly meeting, Programme has been working closely with DHCW and an interim Director has been appointed. Risk reduced to Amber.
25/10/22 Risk raised following launch of consultation process | | |

A Healthier Wales:
our Plan for Health and Social Care

Llywodraeth Cymru
Welsh Government

Contents

Foreword

With cross-party support, the Welsh Government recently commissioned a Parliamentary Review of the Long Term Future of Health and Social Care. An international panel of experts, chaired by Dr Ruth Hussey, called for a "revolution from within", to drive the changes we need to see in our health and social care system, so that it is able to meet the needs of current and future generations in Wales. This plan is a response to the Parliamentary Review report.

When it was established 70 years ago, inspired by Aneurin Bevan and the model of the Tredegar Medical Aid Society, the NHS was visionary, bold, and radical. It transformed health services for millions of people. It brought certainty and security, especially for the people who needed those services most. It made sure that services reached the same national standards for everyone, everywhere, according to need not the ability to pay.

But we no longer live in the world which the NHS was originally designed for. People live longer, medicine can do much more, technology is transforming the way we live, lifestyles and expectations have changed. Treating people in hospitals when they are ill is only a small part of modern health and social care.

Our ambition now is to bring health and social care services together, so that they are designed and delivered around the needs and preferences of individuals, with a much greater emphasis on keeping people healthy and well. We want a seamless whole system approach to health and social care. Services from different providers should be seamlessly co-ordinated, and we should go beyond services to make a difference to the social and economic factors which influence health, wellbeing and life chances.

This is not a challenge which the Welsh Government, NHS Wales, or local government can meet on their own. We will need broader and deeper partnerships, new skills and ways of working and we will need people to take more responsibility for their own health and wellbeing. We may also need to change how we pay for health and social care services. None of these changes will come quickly or easily. We will need a strong sense of shared values and partnership, over many years.

We acknowledge the level of challenge to meet the aspirations of this plan, but we believe this can be met if we can rediscover the confidence and bold ambition that made Wales the birthplace of the greatest National Health Service in the world.

Vaughan Gething
Cabinet Secretary for Health
and Social Services

Huw Irranca-Davies
Minister for Children, Older People
and Social Care

Introduction

The Parliamentary Review described the increasing demands and new challenges that face the NHS and social care – an ageing population, lifestyle changes, public expectations and new and emerging medical technologies. The Review made a strong case that a service based mainly on a medical model of health, and a separate system of social care, is not fit for the future. The need for change is with us now, not just at some distant date. Our focus has to be on transformation, innovation and delivery knowing we have foundations to build on in our current system. Without response and change we will fall short of meeting the needs of the Welsh population.

Wales has made distinctive choices. We have adopted a planned approach, establishing integrated Local Health Boards and statutory Regional Partnership Boards. This has allowed social models of community based-care which cut across traditional organisation and service boundaries. New legislative powers have led to the *Well-being of Future Generations (Wales) Act*, the *Social Services and Well-being (Wales) Act*, the *Regulation and Inspection of Social Care (Wales) Act*, and to innovative actions on smoking in public places and organ donation. The Welsh Government has set out in *Prosperity for All*, the national strategy for the 5-years of this National Assembly term, its commitment to "health in all policies", to make a difference to wider social and economic influences such as housing, parenting, education and employability.

What we need now is to speed up change, not to go in a different direction. Using the idea of the Quadruple Aim, supported by practical Design Principles, we will be able to focus at every level on achieving our future vision. Through local innovation which feeds through to new models of seamless health and social care, we will scale up new ideas and better ways of working to regional and then to national level. A national Transformation Programme will bring pace and purpose to how we support change across our whole system.

We will embed change, so that it is better able to meet future challenges and opportunities, and to be sustainable for future generations. Most importantly this will invest in the people who deliver health and care services, and in making Wales a great place to work. It will develop a continuous engagement with them and with the wider public, so that we can tackle the difficult choices which lie ahead together, as partners. Stronger national leadership and direction will support these changes, enabling us to grasp the full potential of our integrated system and our planning approach, but our real test will be in the delivery of services and improved outcomes across Wales.

Andrew Goodall
Director General for Health and Social Services,
Chief Executive of the NHS Wales

Executive summary

This plan sets out a long term future vision of a 'whole system approach to health and social care', which is focussed on health and wellbeing, and on preventing illness.

We will build on the philosophy of Prudent Healthcare, and on the close and effective relationships we have in Wales, to make an impact on health and wellbeing throughout life. We will have a greater emphasis on preventing illness, on supporting people to manage their own health and wellbeing, and on enabling people to live independently for as long as they can, supported by new technologies and by integrated health and social care services which are delivered closer to home.

To achieve this future vision, we will develop 'new models of seamless local health and social care', which will scale from local to national level. These models will build on a foundation of local innovation including through Clusters of primary and community care providers. Regional Partnership Boards, which bring together local authorities, health boards and Third Sector providers, will occupy a strong oversight and coordinating role. Regional partnership working will be at the heart of how we will develop high value models of integrated health and social care, which will be promoted for wider adoption across Wales.

A national Transformation Programme will ensure that change happens quickly, and with purpose, across Wales. The Transformation Programme will be responsible for delivering the commitments in this plan, focussed on demonstrating an early impact over three years, to build the momentum needed to shift the whole system towards achieving our long term vision. It will provide targeted funding and resources to accelerate progress, including through a dedicated £100m Transformation Fund.

We will strengthen national leadership and direction, linked to a regional focus for integrated local health and social care delivery. A new national executive function will speed up decision making and make the system more responsive to national priorities. This will include a shared planning approach at national, regional and local levels, supported by levers for change and quality statements.

We will ensure that the whole system is 'fit for the future', so that it is able to respond more quickly to future challenges and opportunities. We will increase our investment in digital technologies as a key enabler of change. We will continue to support and invest in the development of the health, social care and third sector workforce, including unpaid carers and volunteers. We will continue to pursue quality and value through co-ordinating our research, innovation and improvement activity.

All of this work, and our future system, will be underpinned by a strong shared philosophy and continuous engagement. We set out common values for the whole system, and we will use ten Design Principles to translate our Prudent Healthcare philosophy and the central idea of the Quadruple Aim into practical tools which will help to align all of our transformation activity at every level. Continuous engagement and an ongoing conversation with the Welsh population will ensure everyone has a voice in our whole system approach and how it develops.

Our vision for the future

The Parliamentary Review Panel made the case for a strong future vision of health and social care in Wales as a key part of transforming to an integrated whole system approach. Our vision is based on prudent healthcare as a guiding philosophy, on the Parliamentary Review's work, and on our engagement across health and social care with leaders, staff and the public.

"Our vision is that everyone in Wales should have longer healthier and happier lives, able to remain active and independent, in their own homes, for as long as possible.

There will be a whole system approach to health and social care, in which services are only one element of supporting people to have better health and wellbeing throughout their whole lives. It will be a 'wellness' system, which aims to support and anticipate health needs, to prevent illness, and to reduce the impact of poor health.

This whole system approach will be equitable. Services and support will deliver the same high quality of care, and achieve more equal health outcomes, for everyone in Wales. It will

improve the physical and mental well-being of all, throughout their lives, from birth to a dignified end.

When people need support, care or treatment, they will be able to access a range of services which are made seamless, and delivered as close to home as possible. Services will be designed around the individual and around groups of people, based on their unique needs and what matters to them, as well as quality and safety outcomes.

People will only go to a general hospital when that is essential. Hospital services will be designed to reduce the time spent in hospital, and to speed up recovery. The shift in resources to the community will mean that when hospital-based care is needed, it can be accessed more quickly.

Because of its emphasis on driving change and improvement, its emphasis on wellbeing, prevention and early intervention, and on using technology to support high quality services, this whole system approach will be more effective, efficient and equitable, so that it is sustainable for future generations in Wales."

Values

It is important that we set ambitions for progress and improvement whilst responding to the challenges placed on the current system. We will drive transformation through values which focus on the

Welsh population, and on the best possible delivery of public services, helping us to make better choices about how and where and when to provide support and services. The core values that underpin the NHS in Wales are:

NHS Wales core values

Putting quality and safety above all else – providing high value evidence based care for our patients at all times.

Integrating improvement into everyday working and eliminating harm, variation and waste.

Focusing on prevention, health improvement and inequality as key to sustainable development, wellness and wellbeing for future generations of the people of Wales.

Working in true partnerships with partners and organisations and with our staff.

Investing in our staff through training and development, enabling them to influence decisions and providing them with the tools, systems and environment to work safely and effectively.

These values provide a good foundation for the distinctive character and culture we want to see across the whole of our future health and social care system. But moving from the way services are organised today to a whole system approach will need additional commitment and ambition across all providers, including the third sector and business partners. We want to engage everyone in developing the values and common priorities we will need to achieve our future vision:

Proposed whole system values

Co-ordinating health and social care services seamlessly, wrapped around the needs and preferences of the individual, so that it makes no difference who is providing individual services.

Measuring the health and wellbeing outcomes which matter to people, and using that information to support improvement and better collaborative decision making.

Proactively supporting people throughout the whole of their lives, and through the whole of Wales, making an extra effort to reach those most in need to help reduce the health and wellbeing inequalities that exist.

Driving transformative change through strong leadership and clear decision making, adopting good practice and new models nationally, more open and confident engagement with external partners.

Promoting the distinctive values and culture of the Welsh whole system approach with pride, making the case for how different choices are delivering more equitable outcomes and making Wales a better place in which to live and work.

These shared values will ensure that we will all be proud of the health and care system we have in Wales. Proud of what it achieves, and proud of how it continues to deliver against Aneurin Bevan's founding principles. We will all have a shared ownership of our health and care system, and we will be able to contribute to how it develops, so that as individuals and communities we can all help make it stronger for future generations.

Delivering our Vision

In this section we describe what we expect some elements of this future vision and whole system approach to look like. But this is not a rigidly fixed plan for everything – there are too many different services, delivered across a wide range of settings, and they will evolve in ways we can not predict exactly today, using new technologies like artificial intelligence or genetic diagnostics. What people need and expect from health and social care will also change over the next decade.

A range of services and support will be available, from promoting nationally-based population health programmes through to personal wellbeing support. We will ensure that services appropriate to individual needs are provided at the primary and community care level. Local health facilities and services will focus on prevention and early intervention, and on seamless care and support for people when they need it. Access to hospital, and most significantly at the specialist hospital level, will be provided when this exceeds the level of local support available and this will represent a shift over time in the system's reliance on traditional hospital services.

Equally our whole system approach will involve a change in the traditional relationship between 'patients' or 'service users' and 'providers'. We will see a shift to conversations that start by asking 'what matters to you?' and lead into a discussion about how people can themselves contribute to better health, reflecting our philosophy of Prudent Healthcare.

Hospital based care and treatment

Local health and social care services

Home based care and self management

Health, wellbeing and prevention

2028

2018

Hospital based care and treatment

Local health and social care services

Home based care and self management

Health, wellbeing and prevention
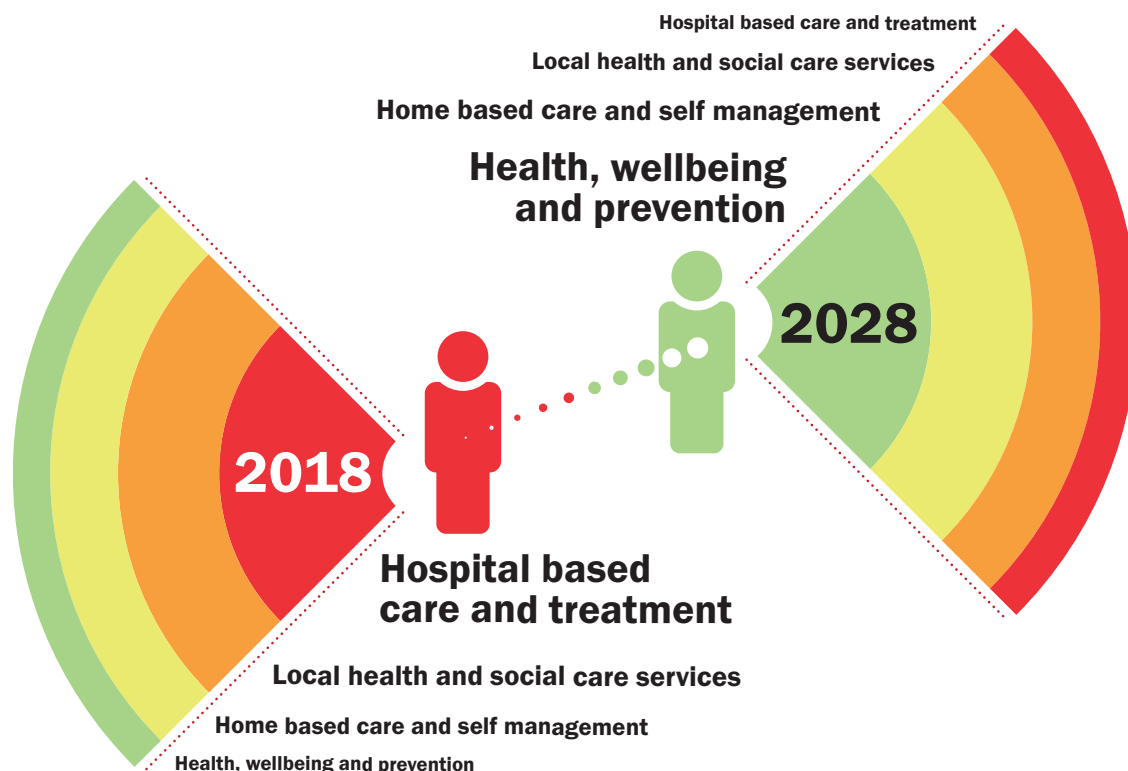
Longer, Healthier and Happier Lives

As part of working together to achieve our future vision, we need people to take more responsibility, not only for their own health and wellbeing, but also for their family and for people they care for, perhaps even for their friends and neighbours.

The choices that individuals make have a significant influence on health outcomes, as does their feeling of control over those choices. The renowned Caerphilly Cohort study demonstrates the impact of 'lifestyle factors' such as not smoking, avoiding excessive drinking, maintaining a healthy weight, good diet and exercise. As part of working together to achieve our future vision, we need people to take more responsibility, not only for their own health and wellbeing, but also for their family and

for people they care for, perhaps even for their friends and neighbours. We will enable this through different forms of engagement, for example using social media and digital platforms, linked to a better understanding of what influences behaviour and the choices we make.

A strong public health approach is key to a healthy society, even as new technologies allow more personalised health services. Through our recently revised 'burden of disease in Wales' work, we know more now about which public health approaches are most effective. Using this evidence and by learning from improvements across Wales, we will drive good practice across different settings, to reduce health inequalities and improve population health outcomes. Our future system will also continue to deliver strong immunisation and public health programmes driven by a consistent national framework, including promoting a better understanding of health, infection, and environmental hazards.

Improving the health and wellbeing of everyone in Wales is something which we can all contribute to, through a new kind of public partnership approach. This work should start early – from pre-birth and the first 1000 days, through to the influence of a new school curriculum where we will expand on the existing Healthy Schools Programme to build insights about healthy and active life choices, mental resilience and other life management skills into young people's education. It needs to continue through adult life, including through initiatives such as Healthy Working Wales which supports employers across Wales to improve health and well-being at work, and through helping people to plan effectively for their own long term housing and care needs.

A whole system approach to health and social care

There will be a whole system approach to health and social care, in which services are only one element of supporting people to have better health and wellbeing throughout their whole lives. It will be a 'wellness' system, which aims to support and anticipate health needs, to prevent illness, and to reduce the impact of poor health.

Over the next decade, we will see a shift of services from hospitals to communities, and from communities to homes. People will be supported to remain active and independent, in their own homes, for as long as possible. A lot of this change will be as a result of maintaining good health, through more emphasis being placed on prevention.

New community-based models of health and social care will combine seamlessly with assistive technologies and remote monitoring, so that people can have the same high quality of support in their own home as they would in a residential care setting, or in a hospital.

Residential care will flex over time, enabling and encouraging people to recover their independence wherever possible. When someone's needs or circumstances mean that they can no longer live in their own home, or if their wellbeing is best protected by being looked after in another setting, they can expect to have high quality care provided – across the whole system, there will be a range of support in different settings, which will be personalised to meet people's needs and preferences. This support will enable and encourage people towards more independence and self-management, but always at a pace and to a degree appropriate to the individual. Where possible, people will be supported to return to living independently in their own homes.

A holistic approach to supporting health and wellbeing will go beyond providing support services in the home or in residential care. For example, community activities and regular contact with friends and neighbours will help people to stay active, and reduce loneliness and isolation, supporting mental and physical health. For many people the support they need will be delivered by different people working closely together – professional and unpaid carers, family and friends, community volunteers, housing organisations and neighbours, as well as themselves. A whole system approach will enable all of these people and teams to work together, harnessing the full range of community assets, and based on a solid foundation of common values, shared information and mutual respect.

An equitable system which achieves equal health outcomes for all

The holistic approach we need is also one that provides an equitable level of treatment, care or support to people throughout their lives and irrespective of whether it is a matter of physical or mental health.

Almost everything has an influence on our health and wellbeing – for example, our family, our friends and communities, the quality and security of our housing, securing rights and entitlements, our level of education and skills, availability of good work, money and resources and also our surroundings. We know that factors in our childhood, particularly 'adverse childhood experiences,' have a significant impact on us as we grow up. Mental and physical wellbeing throughout life helps individuals to realise their full potential – coping with the challenges that life throws at them, working productively, and contributing to their family life and communities.

These influences can combine to have a big impact. In Wales there are large differences in healthy life expectancy, even for people who live in communities within a few miles of each other. Our whole system approach will include tackling these wider influences and the 'social gradient' so that people have better and more equal life chances and health outcomes regardless of where they live. Many of those who could benefit most from this support are not in frequent contact with health and care services, which is why we must go beyond what we do now, using new models which work through partners and communities, to address social causes of poor health and wellbeing. This includes, for example, loneliness and isolation, which have been shown to have a marked impact on mental and physical health. The holistic approach we need is also

one that provides an equitable level of treatment, care or support to people throughout their lives and irrespective of whether it is a matter of physical or mental health. Services must help people to have the best start in life and to live well. They must protect people from abuse, neglect or harm, provide treatment and care when it is needed, and support people to age well, in their own home or as close to home as possible.

This means ensuring good health and healthy behaviours are supported in the first few years of life, with pre-birth and the first 1000 days as the most critical time to influence healthy outcomes. It means that young people who are looked after or on the edge of care will be helped and supported to enjoy the same life chances as other children. It means those services which people rely on at major points in their life can expect the same high quality services wherever they are. It means older people will be valued, supported to live independently and treated with dignity and respect with Welsh Government, statutory partners and the third sector all playing their role to make rights real.

Services which are seamless, delivered as close to home as possible

Everything should be presented as a single package of support, care or treatment, tailored to the needs and preferences of that person, even if it is made up of services delivered by several different providers.

New models of seamless health and social care will integrate services at the local and regional level. Our future vision is of a single whole system approach in which services delivered by different providers are co-ordinated seamlessly for and around the individual. Everything should be

presented as a single package of support, care or treatment, tailored to the needs and preferences of that person, even if it is made up of services delivered by several different providers.

The NHS and local authorities will play a leading role, but they will not be the only providers. For example, we will need a sustainable social care sector, which provides important employment and career opportunities as part of the 'foundational economy' in many communities. Services will be more resilient if we support new and existing providers, encourage innovation, and enable diversification. This will strengthen the prosperity of local economies, which will have a longer term positive impact on health and wellbeing.

Over the next decade we will see a shift of services from large general hospitals to regional and local centres. Routine diagnostics, outpatient services, day-case treatments, minor surgery and injury services can all be delivered safely and to high quality in smaller centres. Clinical expertise and specialisation can be shared through hub and spoke models. These changes will help to modernise services, allowing them to use new technologies and to share good practice nationally, so that services are of equally high quality across the whole of Wales.

Primary and community care will offer a wider range of professionally-led services and support. Within a local area, clusters of GPs, nurses and other professionals in the community, such as dentists, community pharmacists and optometrists, will work closely with an expanded range of professionals, including physiotherapists, occupational therapists, paramedics, audiologists and social workers as a seamless health and well-being service focussed on prevention and early intervention. These services will support people in making decisions about looking after themselves and staying independent, so that they have access to the best professional or service to meet their particular need – including by using rapidly evolving in-home web based support, as well

as in person. There will be better ways to access other sources of non-medical care and support, such as how to manage debt, housing problems or local community services and activities.

Seamless services will support people before and after their time in hospital. Community based services will help people to prepare for treatment and to recover quickly. New partnerships between health and housing will develop joint solutions and enable improvements in step-up and step-down support for people in the community. Hospitals will develop new tools to forecast flows in and out of hospitals, so that they can match resources to need, throughout the week and throughout the year. Hospital-based services are resource intensive, and most people would prefer to be closer to home, which will allow new models of partnership between different providers, and individuals, enabling people to minimise their hospital stay. Hospitals will also be oriented to ensuring that people who are frail or are at the end of their lives are placed in the most appropriate setting, and treated with dignity.

The aim of holistic care that incorporates physical, mental and emotional wellbeing, linked to healthy life style choices, also requires a transformation in how care givers interact with the public. Every contact is an opportunity to support someone to better maintain or improve their own health and wellbeing, which will often mean looking beyond their immediate symptoms or needs. Our philosophy of Prudent Healthcare already commits to ensuring that decisions and choices are taken forward hand in hand with those receiving our services and this extends to how our system supports lifestyle and wellbeing choices. As new tools improve diagnosis and treatment, and allow people to manage more of their own care and treatment, professionals will have more scope to lead conversations with people about 'what matters' to them, and what they could do themselves to improve their health and wellbeing, or to avoid illness. This will be an increasingly important part of putting the citizen at the heart of a whole system approach.

New technologies and digital approaches will be an important part of our future whole system approach to health and social care, but they will only be a part. Some people will be unable to access digital services, others will choose not to. Face-to-face and hands-on human contact is an extremely valuable and absolutely essential part of care and treatment. There are many things which can not be delivered digitally or through technology. People will always be the foundation of high quality health and social care services.

People will only go to a general hospital when it is essential

The types of services which are delivered in our major hospitals will continue to change. People will spend less time in hospital, and will have more support to recover quickly.

Hospital based services will remain an essential and visible part of our future health and care system. People will be broadly supported by a range of community-based services and activities, building on local community hubs and on GP and primary care support. Larger general hospitals will provide a full 24/7 accident and emergency service and range of supporting specialties and facilities. They will support more specialist centres through an increasing focus on networks across hospitals and organisations.

The types of services which are delivered in our major hospitals will continue to change, as some services are moved out into community centres, and others become more specialised. We will need to lead and support changes that deliver safer services and promote better outcomes for those receiving care, in planned and emergency settings, including where necessary centralising specific services based

on clinical evidence and advice. Other hospitals will develop a clear function and range of services that support communities, delivering settings for outpatient, diagnostics and ambulatory care, including the potential for centres of excellence. Community hospitals and out-of-hours services will continue to play an important access and support role in local settings across the patient pathway.

People will spend less time in hospital, and will have more support to recover quickly. Hospital based services will be developed based on the outcomes they achieve for patients, on our national approach to improving quality and safety in line with ensuring that the appropriate skilled workforce is in place. There will be a strong emphasis on speeding up diagnosis, on reducing the time people need to spend in hospital for treatment, on helping people to recover their independence after treatment, and on ensuring that they do not need to be re-admitted to hospital. Where specialist services need to be accessed, the system will ensure that patients return to the most appropriate local setting for their ongoing care, whether in a local health setting, in a step-down facility in the community or in their home.

New specialised treatments will be made possible, through developments in science and medicine. This evolution of practice will change the areas in which doctors and other staff are qualified to work, and what can be delivered safely in hospitals, or in community centres. Some of today's specialist treatments will in future become common practice, but many specialised services only treat and support small numbers of patients, meaning larger populations are required for a service to be clinically viable and for skills to be maintained for safe and effective care. Everyone in Wales will have access to these specialist services, wherever centres are based, but some very complex services may not be provided in Wales, for example if they only treat a small number of patients across the whole of the

UK. In other cases, there may be specialist centres based in Wales, which are viable only because they serve a wider UK or even international population.

Using technology to support high quality, sustainable services

As we look ahead 10 years, many of these technologies and practices are unknown fully and still emerging, so we need to provide a system that can respond with urgency and agility to these new opportunities.

New technologies will enable our future health and social care services to predict poor health, to detect early deterioration and illness sooner, to diagnose more precisely, and to make better choices about which treatment is right for the individual. New genetic diagnostics will help to detect cancer much earlier, probably from a simple blood test, and to identify specific types of cancer, which can be matched to the treatment which is most likely to cure. New assistive technologies in the home will enable people to remain independent for longer, supporting them physically, and keeping them safe through intelligent monitoring and alerting. New digital systems will improve our ability to spot gradual decline in mental and physical health, and to see very early signs of deterioration and illness through improved and better connected data and through new methods, including machine learning and artificial intelligence.

Ensuring that the relevant information is accurate, complete, up to date, and shared between everyone responsible for the individual's care and treatment will make services safer and more effective. This will help patients to access the services that match their needs. Digital technologies will support better clinical decisions, by filtering and interpreting information about the individual, and groups of similar individuals, and by predicting outcomes for different treatments. This will help to prioritise and speed up treatment, and it will help the individual to work more closely with professionals, so that their care is personalised to their own needs and preferences with more predicable outcomes.

These are important opportunities to shift the balance of our health and care system towards earlier detection and intervention, which is designed to prevent illness and to prolong independence. People will have a greater role and greater control in managing their own health and wellbeing, making decisions about treatment, and managing long term conditions. New digital services can be designed and delivered around individuals and groups, based on what they need, rather than where they live. Instead of waiting for something to 'go wrong', our system will use all the tools available to ensure that things 'stay right'.

In setting out this vision, we recognise the size of the task that confronts us. The Parliamentary Review Report set out the stark challenges that health and social care faces, as a result of demographic and other societal trends, set within the context of ongoing austerity across the UK. Wales is not alone in grappling with these challenges.

In this Plan we set out what we see as a long-term journey towards achieving our vision. Our commitments and actions focus on the short term, and on what we will do over the next three years. By implementing the Parliamentary Review's recommendations with confidence and at pace, we aim to kick start change within the system. Through our commitment to genuine continuous engagement, including in developing this Plan, we want to lead all of our partners and stakeholders towards achieving our vision for the next decade.

A "revolution from within" must be shaped by a strong central idea. We have shaped this plan around the Quadruple Aim, using it to steer the changes we want to see, and to ensure that we are making progress on all fronts towards achieving our future vision for a whole system approach to health and social care in Wales.

The Quadruple Aim

The idea of four interlocking aims – described together as the Quadruple Aim – is driving the development of many high performing international health and social care systems. As the Parliamentary Review recommended we will use the Quadruple Aim as a central idea to help develop a shared understanding of how we want our system to develop and how we will prioritise change.

Our philosophy of Prudent Healthcare will continue to be a distinctive feature of the Welsh system, enabling higher quality and value through reducing variation, waste and harm, and through less intensive clinical interventions. Our legislation also embeds a commitment to prevention and early intervention, and to co-production and shared voice and control, for example through the Social Services and Wellbeing (Wales) Act. Using the Quadruple Aim we will map how our health and social care system contributes to achieving the goals defined in the Well-being of Future Generations Act.

The international profile of the Quadruple Aim means using it in our system will help us learn and share with other health and social care systems, so that we can share experiences and speed up learning. Sustainable health and social care is a global challenge. We are determined to have an open engagement with other countries, and with other sectors. The four themes of the Quadruple Aim, interpreted for our context in Wales are:

- Improved population health and wellbeing;
- Better quality and more accessible health and social care services;
- Higher value health and social care; and
- A motivated and sustainable health and social care workforce.

We will also use the Quadruple Aim to report on our progress towards achieving the future vision.

Design Principles

Ideas need to be translated into reality, so we will use 'design principles' to help the public and staff to understand in practical terms how the Quadruple Aim and our wider philosophy of Prudent Healthcare can be applied to drive change. These design principles will help to align the many change projects and programmes we need to see, across our whole system, so that they can combine together to deliver a 'revolution from within' in health and social care.

The design principles will help people to check whether they are heading in the right direction, at the right pace. Individual projects may not meet all of the design principles. They may focus on one part

External Goals

Of direct relevance to population and individuals, supported by communications,
engagement and co-production, relatively stable long term objectives,

"Our vision for the future health and care system"

**Population
Health and Wellbeing**

Better prevention
and self-management

**Health and Social
Care Services**

Better quality and experience,
enabled by digital, supported
by engagement

**National
Transformation
Programme**

Apply design principles
Develop and scale new models
Accountability
and pace

**Health and Social
Care Workforce**

Improve wellbeing, capability,
engagement, leadership

**Higher Value
Health and Social Care**

Rapid imporovement and innovation,
enabled by data, focussed on outcomes

Internal Goals

Developing capability and capacity to change, rapid adoption of new tools
and understanding, relatively short term objectives,

"Making our health and care system fit for the future"

of the whole system, on one service, or on one new way of working. Trying to do everything at the same time, or requiring even the smallest projects to meet every national priority, will not allow the rapid cycle of developing, testing, refining and scaling up that we need.

As highlighted by the Review Panel, we must balance a nationally consistent framework and set of expectations with local delivery and opportunities to innovate. By finding ways of supporting change which allow people at every level to contribute to making services better, drawing on their collective experience and expert knowledge, we will promote national standards and meet local needs together.

A common approach across Wales will help to share learning – it does not make sense for every locality to design a model of care from scratch, if there is

already good practice recognised elsewhere in Wales, or internationally.

The design principles will help to guide the innovation and appetite for change which we already have across health and social care, so that it builds more quickly and with more purpose into new models of seamless local health and social care, which can be scaled regionally and nationally, in line with our future vision of a whole system approach. They are principles for everyone, not just for health and social care service providers. We want to work with the wider community assets in a locality to build resilience, for example support groups and voluntary schemes, and we want to work with external partners, including industry and commercial providers.

The ten national design principles to drive change and transformation – and examples of how they could be applied are:

Prevention and early intervention – acting to enable and encourage good health and wellbeing throughout life; anticipating and predicting poor health and wellbeing.

Safety – not only healthcare that does no harm, but enabling people to live safely within families and communities, safeguarding people from becoming at risk of abuse, neglect or other kinds of harm.

Independence – supporting people to manage their own health and wellbeing, be resilient and independent for longer, in their own homes and localities, including speeding up recovery after treatment and care, and supporting self-management of long term conditions.

Voice – empowering people with the information and support they need to understand and to manage their health and wellbeing, to make decisions about care and treatment based on 'what matters' to them, and to contribute to improving our whole system approach to health and care; simple clear timely communication and co-ordinated engagement appropriate to age and level of understanding.

Personalised – health and care services which are tailored to individual needs and preferences including in the language of their choice; precision medicine; involving people in decisions about their care and treatment; supporting people to manage their own care and outcomes.

Seamless – services and information which are less complex and better co-ordinated for the individual; close professional integration, joint working, and information sharing between services and providers to avoid transitions between services which create uncertainty for the individual.

Higher value – achieving better outcomes and a better experience for people at reduced cost; care and treatment which is designed to achieve 'what matters' and which is delivered by the right person at the right time; less variation and no harm.

Evidence driven – using research, knowledge and information to understand what works; learning from and working with others; using innovation and improvement to develop and evaluate better tools and ways of working.

Scalable – ensuring that good practice scales up from local to regional and national level, and out to other teams and organisations.

Transformative – ensuring that new ways of working are affordable and sustainable, that they change and replace existing approaches, rather than add an extra permanent service layer to what we do now.

We will engage with the health, social care and third sector workforce on the design principles, to make sure that they are widely understood and supported. As a learning system we will review them in three years and refine them as needed, based on what they have delivered, and on feedback from the people that have worked with them.

Action	Date
Promote understanding of our Prudent Healthcare philosophy, our Quadruple Aim approach, and the Design Principles through a public and workforce engagement programme.	**From 2018**
Evaluate the impact of the Design Principles and refine them if necessary.	**By 2021**
Publish a national overview of the overall performance of the health and care system against the Quadruple Aim and submit to the National Assembly for Wales.	**By 2021**

New Models of Seamless Local Health and Social Care

The Parliamentary Review recommended that the primary focus for change across the system should be new models of seamless local health and social care. Across Wales we have seen a number of new models and approaches emerging in recent years, supported for example by the Primary Care Fund and the Integrated Care Fund. It is encouraging that some of these models have originated in a very local context, including through primary care clusters, and that many have demonstrated effective joint working between health and social care providers. In some clusters there has been innovative collaboration with the Third Sector, as they have implemented health and social care delivery mechanisms with good outcomes and demonstrated value for money.

For example, innovative work by Clusters[1], through the national primary care pacesetter programme, has been the basis of much emerging good practice. These have been brought together as a national model for transforming access to, and the sustainability of, local health and care. The model, which is being used to improve locality, community and home based care, is a whole system approach with the citizen at the centre and is designed to support people's health and wellbeing in ways that emphasise prevention.

Through this plan we want to see more of these new models emerging, strongly aligned with the Quadruple Aim and the Design Principles, delivering improved outcomes which matter to people, able to scale quickly to regional and national level. We expect to see a range of new models, addressing the needs of different groups, and responding to local preferences and opportunities. The Parliamentary Review identified some priority areas – children and young people, rural areas, and people who depend on carers – and described how services to older people should be designed for the future including how they should be experienced by older people. The Review also described how primary care clusters, local citizens, and others should have an essential role in designing and developing new models of seamless health and social care.

We see a key role for Regional Partnership Boards (RPBs)[2] in driving the development at local level of models of health and social care, including primary and secondary care. Local cluster needs assessment and service plans should feed into regional assessments and Area Plans developed by RPBs. Early models of care may focus on the priority groups identified by the Review (i.e. the Welsh language, older people, children, people with mental ill health and people with disabilities), but we expect to see clusters and RPBs working together

[1] Clusters are sixty four groups of neighbouring GP practices and partner organisations across Wales which provide services for their local populations of between 30,000 and 50,000 people.
[2] Regional Partnership Boards are seven statutory partnerships between local government, the third sector and the NHS. Their purpose is to drive the strategic regional delivery of social services in close collaboration with health.

Abertawe Bro Morgannwg University LHB

1 Afan
2 BayHealth
3 Bridgend East Network
4 Bridgend North Network
5 Bridgend West Network
6 CityHealth
7 Cwmtawe
8 Llwchwr
9 Neath
10 Penderi
11 Upper Valleys

Aneurin Bevan LHB

12 Blaenau Gwent East
13 Blaenau Gwent West
14 Caerphilly East
15 Caerphilly North
16 Caerphilly South
17 Monmouthshire North
18 Monmouthshire South
19 Newport Central
20 Newport East
21 Newport West
22 Torfaen North
23 Torfaen South

Betsi Cadwaladr University LHB

24 Anglesey
25 Arfon
26 Central & South Denbighshire
27 Conwy East
28 Conwy West
29 Deeside, Hawarden & Saltney
30 Dwyfor
31 Holywell & Flint
32 Meirionnydd
33 Mold, Buckley & Caergwle
34 North Denbighshire
35 South Wrexham
36 West & North Wrexham
37 Wrexham Town

Cardiff and Vale University LHB

38 Cardiff East
39 Cardiff South East
40 City & Cardiff South
41 Cardiff North
42 Cardiff South West
43 Cardiff West
44 Central Vale
45 Eastern Vale
46 Western Vale

Cwm Taf LHB

47 North Cynon
48 North Merthyr Tydfil
49 North Rhondda
50 North Taf Ely
51 South Cynon
52 South Merthyr Tydfil
53 South Rhondda
54 South Taf Ely

Hywel Dda LHB

55 Amman Gwendraeth
56 Llanelli
57 North Ceredigion
58 North Pembrokeshire
59 South Ceredigion
60 South Pembrokeshire
61 Taf / Teifi / Tywi

Powys Teaching LHB

62 Mid Powys
63 North Powys
64 South Powys
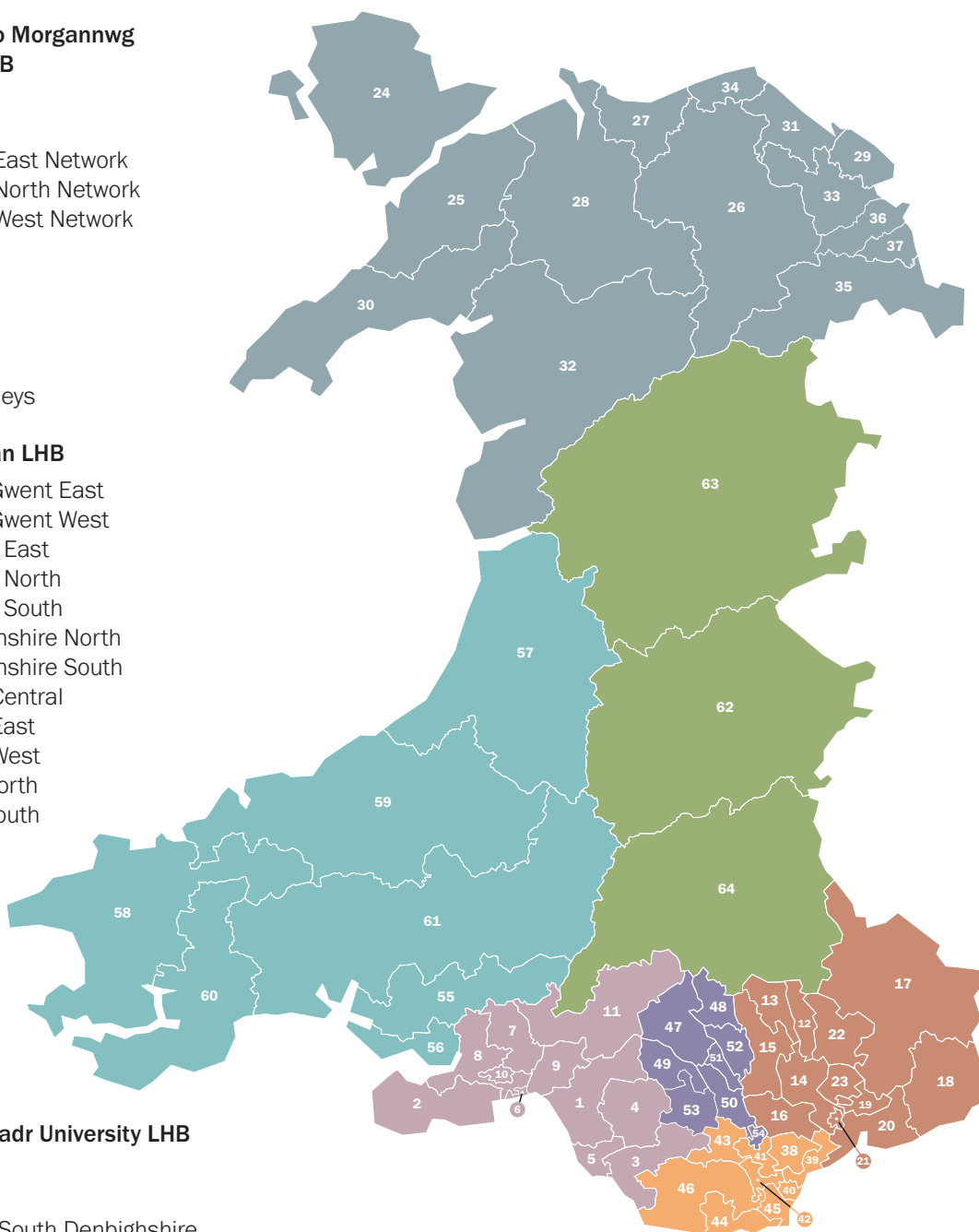
to interpret the national Design Principles for themselves and aligning them to their own priorities. We will need to see models coming through which have a particular focus on Welsh language provision, building on the standards of *Mwy na Geiriau* (*More than Just Words*) so that more people can communicate in their language of choice. Clusters and RPBs should foster closer collaborative working in order to enable this.

We want to encourage all localities to think carefully about their current arrangements, and to work together, across boundaries, to design and deliver better seamless care at the community level. These conversations must include those involved in delivering care in hospitals so that full patient pathways are considered from the outset, irrespective of the delivery setting. Regional Partnership Boards will have the opportunity to promote alternative delivery models and social value organisations, in keeping with the principle of the Social Services and Well-being (Wales) Act. This could allow a more diverse and democratic social care sector, including co-produced services.

It could also deliver long-term sustainability through preventative services that improve health and wellbeing outcomes, supporting statutory services.

We are clear that there is no locality in Wales where further progress cannot be made. In particular, this will mean partners challenging each other to ensure that changes in individual services or professions are introduced as part of a shared agenda designed to create the very best whole health, social care and wellbeing system.

By aligning with the Design Principles and adapting them for different population groups if necessary, new models promoted by Regional Partnership Boards should have the capacity to scale from local, to regional, and to national level. These new models are a key enabler of the transformative change which we need to see over the next decade, acting as a mechanism for developing ground-breaking new models of seamless health and social care. Through a national Transformation Programme, RPBs and new models will be supported through continuous learning, evaluation, and sharing of good practice.

Action	Date
Regional Partnership Boards will be the key driver of change in health and social care at regional level.	**From 2018**
Clusters will continue to develop models of seamless local partnership working, working closely with Regional Partnership Boards to promote transformational ways of working, so that they are adopted across Wales.	**From 2018**
Each Regional Partnership Board will identify and promote at least two models of seamless locality-based health and social care services, aligned to the Quadruple Aim and Design Principles.	**By end of 2018**
Commission the Healthcare Inspectorate Wales and the Care Inspectorate Wales to jointly examine the progress of new local models of health and social care, and the effectiveness of RPB joint working.	**By end of 2018**
The national primary care contracts will be reformed to enable the delivery of seamless local care and support.	**By 2020**

Transformation Programme

To deliver this plan, we will establish a Transformation Programme, led by the Director General, Health & Social Services, with local governance through the RPBs supported by a representative National Transformation Board of senior health and social care leaders and other key partners and stakeholders. The Transformation Programme will oversee and be accountable nationally for the commitments in this plan. It will advise on and commit targeted funding support to health and social care providers, particularly focussed on selected new models of seamless local health and social care which are identified as delivering significant enhanced value, and are strongly aligned to national priorities.

A national Transformation Programme and methodology was a prominent recommendation made in the Parliamentary Review, which also noted that there are numerous existing programme boards, networks, delivery mechanisms, funds and other initiatives which support strategic change.

As part of our drive towards a more coherent and co-ordinated approach to transformation, we will review all of these and consider opportunities to align and merge them into the Transformation Programme and our national approach to transformation. We will set expectations for local delivery through those organisations delivering health and social care locally, through governance models and NHS structures.

Our vision of a whole system approach to health and social care will require a whole system effort. The Transformation Programme is only one element of the far wider commitment and leadership which this plan requires, and the Transformation Fund is only one element of the Transformation Programme. The Fund is a significant investment, but it is currently small in the context of health and social care funding overall, so it must be targeted to priority projects and to new models of health and social care, with the aim of speeding up their development and demonstrating their value. The initial focus of the Transformation Fund will be on

Adopted as National Model

New Regional Model

Local Innovation and Coordination

Successful regional model will be transformed into national model to be applied across Wales

Promising innovation will be supported to develop into a new regional model
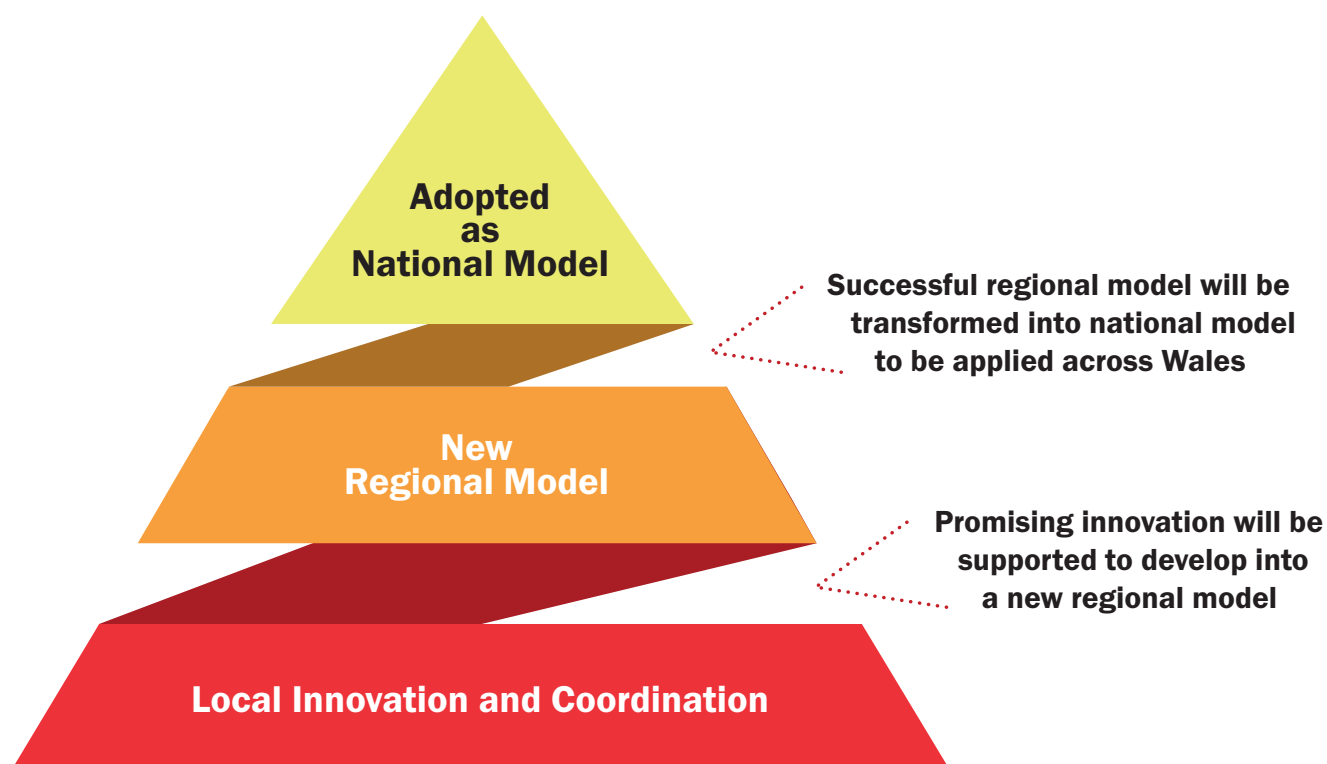
models which make early progress on: seamless alignment of health and social care services; local primary and community-based health and social care delivery; and new integrated prevention services

and activities. Over the long term, these and other new models must be taken up by health and social care providers, at local, regional and national level, funded from their own resources.

Action	Date
Establish a national Transformation Programme to drive implementation of this Plan, led by the Director General, Health & Social Services, supported by a representative cross-sector Transformation Board.	**June 2018**
Establish a targeted Transformation Fund to support the implementation of this Plan, particularly new models of seamless health and social care promoted by Regional Partnership Boards.	**June 2018**
Review existing programme boards, networks, delivery mechanisms, and initiatives supporting strategic change, to align and merge them into the Transformation Programme and Fund.	**By March 2019**

Making our health system fit for the future

Improving Quality and Value

"At its core is maximizing value for patients: that is, achieving the best outcomes at the lowest cost."

Michael Porter and Thomas Lee, Harvard Business Review, October 2013

Quality is about making health and social care safe, effective, patient-centred, timely, efficient and equitable. Wales has for many years promoted quality as its main principle and focus for improving health services. We have a well established and highly regarded quality management approach which can be viewed as a cycle comprising three core elements – quality planning, improvement and control.

The national 1000 Lives Improvement Programme has equipped thousands of people working in NHS Wales with the skills they need to drive improvement, as individuals and in front-line teams. Quality will be at the heart of our Transformation programme and new models of care. We should in future find ways the public can contribute directly to this cycle of improvement.

Value in health and social care is also a way of giving greater focus to the outcomes that matter to individuals, and considering their relation to the costs of achieving those outcomes. This approach therefore interprets efficiency and effectiveness by going beyond cost-savings, safety and clinical quality. In the way that it brings the individual to the fore, and considers the relative value of different care and treatment options,

it has a strong alignment with the philosophy of Prudent Healthcare.

We will continue to invest in our approach to improving quality, including through strengthening our talent and leadership, and planning on a national basis to ensure that good practice is widely shared. We will continue to develop our high quality clinical information, and develop measures using feedback from people patients and staff, so that we can embed value-based healthcare as the way we measure what matters most to people, ensuring that improvement activity is focussed on outcomes. Initially this work will focus on the quality cycle affecting whole system pathways across six different clinical areas: safer medicines management; surgery and surgical pathways; frail elderly care; managing acute illness; equitable health and social care services; and end of life care.

Like the Quadruple Aim, both quality and value are internationally recognised concepts, strongly supported by global learning communities, and by tried and tested tools and methods. Through our 1000 Lives Improvement Service, and other networked activities, we are already actively involved in a number of international networks and this will enable us to draw on case studies of good practice from other countries, considered and presented using familiar language and terminology, and use international comparison and benchmarking to evaluate our achievements and progress, for example using the "standard sets" developed by the International Consortium for Health Outcomes Measurement. Through the many networks and events focused on quality and value we will share our own learning, to promote the profile and reputation of Wales and its health and care system.

Alongside quality and value-based improvement, change is also driven by research and innovation activity across our health and social care system, and by engagement with external partners and suppliers. All Health Boards in Wales have

partnership arrangements with Universities, as University Health Boards or as a Teaching Health Board. In recent years, the NHS in Wales has worked more confidently with industry, supported by Welsh Government policy and initiatives like the Life Sciences Hub. In social care, local authorities are experienced in working with commercial providers and suppliers, and with social enterprises and the Third sector.

Our aim now is to bring all of these different change drivers together, and to broaden our approach beyond the NHS, so that our entire health and social care system and workforce is directly engaged. Everyone working in our health and social care services should have the opportunity to apply their knowledge and experience to better ways of working, including through opportunities for staff to combine research with clinical roles. We need innovation from all sources to deliver on our vision of a whole system approach, focussed on what matters most to the individual and which delivers greater value.

Local innovation is essential, but it is not enough on its own. Good practice must scale up to regional and to national levels, in a systematic way, and at pace. We must challenge and support each other, as a learning community, to drive better quality and value as rapidly and effectively as possible. Better co-ordination of research, innovation and improvement, in pursuit of higher quality and value, will provide a pipeline of local opportunities which can be further developed into new models of seamless care, through Regional Partnership Boards. Relationships with important partners, including for example universities and industry, need to be developed and managed transparently, with confidence and assurance. Combining local and regional approaches with national leadership and priorities is also important – some opportunities require a national scale. Our engagement with international

networks will in most cases be done best at an all-Wales level.

We will bring together all research, innovation and improvement activity within each regional partnership board footprint, focussed on supporting local innovation and partnerships which drive towards new models of care. In doing this, we will not lose the strength of established Research Offices, Quality Improvement Hubs, and partnerships with Universities, or engagement with industry and other external partners. The NHS and social care

is an essential part of our cross-cutting approach to supporting science, research and innovation, set out in the Economic Action Plan and other national strategy documents, including the recent recommendations of the Reid Review of government funded research and innovation. These changes are about better alignment and co-ordination of what happens within the health and social care system with the wider economy and communities, so that it contributes more clearly and directly to achieving all of our national priorities.

Action	Date
Establish a nationally co-ordinated network of hubs which bring together research, innovation and improvement activity within each RPB footprint.	**By March 2019**
Adopt national standards for rapid evaluation of all innovation and improvement activity, using a value-based approach to measuring quality and outcomes.	**From 2019**
Invest in a small number of priority areas which offer opportunities to drive higher value health and social care, through new approaches, emerging technologies, and strategic partnership opportunities.	**From 2019**

Digital and Data

Digital is a key enabler of transformational change, which the Parliamentary Review recognised as an important priority. It provides a shared platform for safe and effective joint working between different organisations, and with citizens directly. Making better use of digital, data, and communication technologies will help us to raise the quality and value of health and social care services, so that they are cost-effective and sustainable and also bring our offer in line with increasing expectations of technology in people's day-to-day lives.

Digital technologies will bring information from different providers together, so that they can model and predict the demand for health and social care services, and improve understanding and management of how services work together. An integrated platform will also capture much more information about the health and wellbeing outcomes which actually matter to people, so that this information can be used to prioritise services, based on a full picture of their quality and value, not just cost and volume. This is essential in ensuring that clinical care is provided prudently with a focus on what works and the avoidance of which

does not, based on up to date and robust outcomes information which can be shared across the system.

We already have excellent examples of digital systems sharing information across and between primary care, secondary care and social care. The Welsh Community Care Information System is a national programme enabling the safe sharing of information between health and social care. Providing a single electronic patient record will enable health and social care to undertake joint decision making and provide joined-up care, benefiting everyone who receives health services, care and support. At the same time we will also ensure delivery at pace locally, across organisations and nationally.

This ability to share information is essential for realising the multidisciplinary workforce we need to see under new models of care and without it the pace of change will be slowed. Informatics and digital technologies are a foundation for safe high quality care. Having all the information needed about the individual, or about groups of similar people,

will deliver better outcomes by helping clinicians at every level to make better decisions. Digital systems can monitor issues that could cause harm and alert staff so that they are able to take early preventative action. New technologies, devices and digital approaches can also act as agents of transformative change, helping people to shift more quickly to new ways of working, and to do so in ways that ensure we meet the same standards of clinical quality and safety across Wales.

Our ambition is also to provide an online digital platform for citizens, to give people greater control and enable them to become more active participants in their own health and well-being. This will help people to make informed choices about their own treatment, care and support: finding the most appropriate service for their needs, contributing to and sharing information about their health and care, managing appointments and communications with professionals, and working with others to co-ordinate the care and treatment they need, so that it is delivered seamlessly.

Digital technology develops at a very rapid pace, and we expect to see new opportunities and challenges throughout the life of this plan. We cannot predict fully what those will be, but we will be more agile in how we respond to emerging technologies such as artificial intelligence, machine learning, precision medicine and genomics. We will invest to develop the skills we need within our own workforce, for example to make better use of clinical informatics, and to drive digital transformation projects. We will also ensure that our digital architecture, and the way we work digitally, is more open to the outside world, in ways that support economic development in Wales, and which offer exciting career opportunities, as well as improving health and social care services. To do this we must focus our efforts through a revitalised 'Once for Wales' approach which sets standards and expectations and where common platforms are mandated where there are clear benefits of doing so.

Action	Date
Accelerate progress towards a fully integrated national digital architecture, the roll out of the Wales Community Care Information System, and creating an online digital platform for citizens, alongside other nationally mandated services.	**From 2018**
Invest in the future skills we need within the health and social care workforce, and in the wider economy, to accelerate digital change and maximise wider benefits for society and the Welsh economy.	**From 2018**
Develop an 'open platform' approach to digital innovation, through publishing national standards for how software and technologies work together, and how external partners can work with the national digital platform and national data resource.	**From 2018**
Significantly increase investment in digital infrastructure, technologies and workforce capacity, supported by stronger national digital leadership and delivery arrangements.	**From 2019**
Establish a national data resource which allows large scale information to be shared securely and appropriately.	**By 2020**

Sustainable health and social care funding

The value we place on our health and social care services is reflected in our future spending decisions. We spend over £9 billion annually on health and social services in Wales, 8% more per head of population than is spent in England, and over the next two years we will invest a further £450 million in the NHS and over £100 million in social care.

The Parliamentary Review's terms of reference did not include future funding of health and social care services, but reports by the Nuffield Trust and the Health Foundation have previously assessed the long term funding challenge for health, setting out a framework of expectations for efficiency and sustainability. Such independent analysis brings a transparent and well-informed challenge to funding decisions and they will continue to have a central role in informing the annual budget setting process for Welsh Government.

Developing a long term sustainable funding framework for social care is a significantly more complex task. The Welsh Government has taken action to reduce the financial burden on individuals associated with current charging arrangements with the introduction in 2011 of a maximum charge for non-residential care and the commitment to increase the amount of capital individuals can retain without having to pay for their residential care.

To meet the vision of a whole system approach to health and social care, we will need to improve our understanding of how demographic change and other factors impact on future costs for social care, of the interaction between social care and health spending over the long term, and of how closer integration around the Quadruple Aim can help to balance spending across the health and social care interface. We also need to increase our understanding of the levels of resource we are currently investing in preventing ill-health and the progression of disease.

Achieving a sustainable funding model for health and social care that will stand the test of time will not be a quick task to complete, and discussions to find the right approach will potentially continue beyond the lifetime of this current Assembly. Through this plan we will make an urgent start on that work, by commissioning a new analysis of current spending in health and social care, and how adoption of new models of care can impact on the future costs. We will also start a national conversation to explore more radical options for funding social care in future, including how Wales' new tax-raising powers could be used to provide a renewed promise. This will take into account Professor Gerry Holtham's proposals for a social care levy, which are currently being explored by the Welsh Government.

In addition to our continued core investment in the NHS and social services, our Transformation Programme will be supported by a £100 million Transformation Fund. This is time-limited funding that

will be targeted towards the rapid development and implementation of new models of seamless health and social care, selected for their potential to scale up to a wider population base, and their alignment with national priorities. There will be a robust evaluation of this investment to understand what works and how it works, to inform further investment in transforming services and beyond its immediate priorities to establish the potential for enhancing and embedding such a fund as an enabler for change into the long-term.

Over the next year, we will align other existing funding streams, supporting service improvement, integration and transformation, around the Transformation Programme. This will include the Integrated Care Fund, Primary Care Fund, Delivery Plan funding, the Aids and Adaptations Fund and other relevant funding streams. The evidence we gain from our evaluation of the Transformation Fund will inform how we apply future core investment in health and social care. Channelling resources to support new models of care that are consistent with the national design principles will mean increased investment in prevention and early intervention. In order to determine whether the rate of change is sufficient, we will design a methodology to track this changing pattern over time and publish the results that it provides.

To ensure we drive the maximum medium-term benefit from this investment, we will ensure that planning and governance systems are aligned, as far as is possible, across health and social services to remove any barriers to delivery of these new models of care. We remain committed to implementing pooled funding arrangements between the NHS and social services around client groups, to emphasise a seamless health and social care system and to increase value by aligning these funding streams more closely around shared objectives.

Our transformation of locally-based care will be initially supported through our £68 million capital

investment in new health and care centres across Wales. We will build up the capital element of the Integrated Care Fund and use it to support housing options consistent with our vision of care closer to home and the opportunity for different service models. Our ambition is to deliver modern and fit for purpose facilities to support the new models of care, but we will always have to balance this against maintaining our existing infrastructure when prioritising the application of capital funding. This will inevitably mean continuing to invest in the hospital estate alongside improving primary, community and social care facilities. To do this we will undertake a review of investment in capital and estates programmes to determine a broader understanding of current investment and future need. This will consider how different capital funding options can be used as well as where public service assets which

would not normally be considered as health and social care can be part of a wider, community based approach to locating services. Our future approach to the health and social care estate will support Welsh Government's overarching commitment to decarbonise the public sector.

The actions above will inform the development of a longer-term and more sustainable approach to funding the seamless service we aspire to. The evidence gathered and improvements made will build an evidence base to inform how future resource allocation decisions can help a shift to population health, prevention, early intervention and integrated pathways of care, in a way which maintains quality and safety for people at whatever point in the system they receive services.

Action	Date
Commission analysis of future health and social care spending and the relationship between them, including new models of care and new funding arrangements.	**By end 2018**
Develop a method of tracking how resources are allocated across our whole system including through new seamless models, integrated pathways and pooled budgeting arrangements, highlighting the shift to prevention.	**By end 2019**
Undertake a review of capital and estates investment, to identify future need and the full range of assets that can be used to drive service change.	**By end 2019**

Continuous Engagement

Consistent with our commitment to the Wellbeing of Future Generations Act and its 'five ways of working' we are determined to listen to all voices, to build mutual understanding and trust not only with citizens, but also with those who work in our health and care services, to develop a shared sense of ownership and responsibility. To help achieve this we will adopt

an engagement approach which is continuous and integrated. This will be a change of approach in three ways.

Firstly we want to see different organisations engaging on a collaborative basis, rather than separately, whether with the public or with their workforce. Providers of health and social care services now have varying legal duties to consult and engage,

which means they must sometimes do so separately, and in different ways. We want to bring that together so that it is more efficient, effective and easier for people to contribute.

Secondly, we want to engage continuously, not just from time to time. Our future vision will need to change as new challenges and opportunities emerge, or as people's needs and expectations develop. Digital developments mean there are many more ways of reaching our population and our workforce, in real time, allowing a more dynamic interaction. This will be an important part of our approach to providing an open engagement, which allows people to contribute their knowledge and preferences throughout the life of this plan.

Thirdly, we want to engage on a more holistic basis, so that conversations about changes to services are more clearly linked to how they will be delivered and to how they will be funded and paid for. Initially,

we will engage on three different themes together to highlight the way they all depend on each other: our Future Vision of a whole system approach with a greater emphasis on wellbeing and preventing illness; the Quadruple Aim and Design Principles which are our central idea and priorities for how we will drive change; and Future Funding Models which explore how we will pay for health and social care services over the longer term, making them sustainable for future generations.

We will therefore develop a comprehensive engagement programme which is jointly delivered by all partners, uses digital platforms alongside regular events and communications and fully reflects the National Principles of Public Engagement. This will mean an ongoing conversation with citizens, communities and the Welsh population overall about the future of our whole system of health and social care.

Action	Date
Establish a new national 'offer of involvement' through which people can participate in the decisions that need to be taken about the future of health and social care services.	**By end 2018**
Underpin this with a joined-up and multi-year "Future Health and Social care" engagement programme, jointly delivered by all partners (Welsh Government, NHS, Local Authorities, the Third Sector, Regional Partnership Boards and others).	**By end 2019**

The Health and Social Care workforce

Our staff, their skills, experience and values, are fundamental to a successful NHS and social care system. Delivering a truly seamless system of health and care calls for a fundamental shift in our understanding of who constitutes the workforce and how we support the contribution that each individual makes. It means thinking about who is best placed to provide care and equipping individuals with the skills and expertise to deliver the new models Wales' needs, regardless of their professional affiliation, employer or location.

It also means a more equitable appreciation of the wide and varied roles people play in the joint aim of delivering high quality services, across a broad system which runs from primary and community provision through to hospital based care and specialised services. This requires not only greater parity of esteem between health and care professionals, but also recognising and supporting the vital role played by the informal workforce of unpaid carers and of volunteers, without whom there would be no overall system.

The best new models being developed in Wales share a common characteristic: a broad multidisciplinary team approach where well-trained people work effectively together and all the up-to-date and relevant information about the individual's circumstances and preferences is shared, in order to make the best possible use of everyone's skills and experience. To support these new models of care, we must strengthen the support, training, development and services available to the workforce with a focus on building skills across a whole career and supporting their health and wellbeing. This will enable them to continue to care, to maintain and improve their own physical and mental health, and to act as role models to encourage others to do the same.

As more new seamless models of health and care emerge with the encouragement and support of this plan, we will need a clear and coherent approach to developing and planning the whole workforce so that we are ready to develop and roll-out the best new ways of working across Wales. To do this, the Welsh Government will commission Health Education and Improvement Wales (HEIW) and Social Care Wales (SCW) to develop a long-term workforce strategy in partnership with NHS and Local Government, the voluntary and independent sectors as well as regulators, professional bodies, and education providers.

This new strategy will address the Parliamentary Review's call for joint regional workforce planning, with an emphasis on expanding generalist skills and enabling staff to work at the top of their skill set and across professional boundaries, in line with the philosophy of Prudent Healthcare. It will include action to secure better data and undertake improved modelling of future needs and it will move forward commitments to providing care though the medium of Welsh and other languages. For the workforce themselves, the strategy will mean they feel valued and supported at all stages of their career, supported by access to refocused education and training as well as ongoing development offers. It will open up opportunities to flexible career pathways and maximise opportunities for multi-professional learning. Through the strategy we must enable everybody to deliver individual care alongside excellent treatment based on clinical and well-being needs.

Recruitment and retention will also form a key theme. Whilst our health and social care services already attract some of the best talent in the world we do not take this for granted. Irrespective of our future intentions and record levels of workforce, we have evidence of fragility in specific services and areas that are affecting delivery now. The national Train, Work, Live campaign has started to make a difference to recruitment in the NHS but we need to do more if we

are to continue to attract and retain the best, and to provide an attractive environment and culture for new entrants to the workforce.

Wales is a country of diverse and inspiring communities. The NHS and local authorities are the two largest employers. To make the most of these benefits, health boards and local authorities will need to work together with local providers to establish joint campaigns, make best use of resources and recruit the best people. In doing so they will need to identify shared recruitment and staffing needs and develop attractive employment packages which can help entice individuals and families to train, work and live in Welsh communities.

A key feature of any positive employment offer is the opportunity to learn and to develop and here new, community based models of care provide a real opportunity to re-evaluate education and training and to develop more flexible career pathways. Specific education and training needs will differ for each staff group and profession. Our national approach will be guided by emerging models of health and social care which will require workforce skills focussed on prevention and wellbeing, underpinned by increasing generalist skills which can be a platform for people to adapt and diversify throughout their careers. To make this radical reworking possible all health and social care organisations will need to establish strategic partnerships with education providers across Wales – at every level from school to university, and in all sectors from which the workforce is drawn.

We will also kick start capacity building in core areas by establishing a small number of intensive learning academies focussed on the professional capability which we will need in the future. These will act as hubs for developing the skills and expertise needed, for sharing knowledge and good practice, for translating research into outcomes, and for working with external partners. Graduates of the academies can then take a leading role in supporting

redesign of the systems/policy in key areas and act as informed advocates of change.

The Parliamentary Review recognised that a key factor in delivering high quality health and social care is the wellbeing and engagement of staff, making one dimension of the quadruple aim: "to enrich the wellbeing, capability and engagement of the health and social care workforce". Our commitment is to make NHS Wales an exemplar employer in its support for wellbeing at work and a healthy workforce, building on work that is already underway in the NHS. We want to see the NHS leading change in this area across health and social care, and into other sectors, by sharing good practice, guidance, and online promotion and evaluation tools.

Dynamic leadership will be needed to instigate change, empower others and lead by example, as well as to create the conditions for continuous innovation and improvement to drive up the quality and value of services. Building on the evidence about effective programmes, we will develop a new leadership competency framework and development programmes. Generating a shared language and approach will enable leaders to pursue career pathways across organisations and sectors, supported by a comprehensive framework of leadership development programmes and targeted secondments.

Action	Date
Develop a new Workforce Strategy for Health and Social Care in Wales, which includes planning for new workforce models, strengthening prevention, well-being, generalist and Welsh language skills, developing strategic education and training partnerships, supporting career long development and diversification across the wider workforce.	**By end 2019**
Align recruitment across sectors and with partners to attract talented people to train work and live in Wales.	**From 2018**
Make NHS Wales an exemplar employer on wellbeing at work and a healthy workforce, with the intent to share this approach across the health and social care sector and the wider economy.	**From 2018**
Establish intensive learning academies focussed on the professional capability and system leadership which we will need in the future.	**By end 2019**

National Leadership and Direction

Every system is perfectly designed to get the results that it gets. A major purpose of this Plan therefore is to re-align policy levers so that they support and incentivise decision making that is consistent with our vision. Specifically, planning, performance and accountability arrangements will be reshaped to drive services towards the vision. Commensurate with this approach we will provide stronger direction to decision making at a national level.

National and regionally integrated planning

We will improve the system's capacity to plan effectively and efficiently. A key priority will be to work

with health and social care organisations and other partners to simplify and streamline the planning landscape.

A series of 'quality statements' which describe the outcomes and standards we would expect to see in high quality, patient focussed services will be developed for the NHS. These will set out ambitions to be delivered consistently across Wales. They will inform national oversight of delivery through the planning framework and the performance management system.

Through a national clinical plan, we will set out our strategic approach to delivering high quality health and social care services which meet the needs of people across Wales. This will include consideration of how specialist services and hospital-based services should be provided, and the skills and technologies needed to support them, as part of the broader health and social care offer.

The NHS and local government will work together through RPBs and build strong relationships with the wide range of organisations which contribute to achievement of our Vision. We also recognise that the wider determinants of health are in people's environments, including their early years, schooling, their communities and their work. Public Service Boards are therefore central to this broader agenda to develop effective working and longer-term thinking at a local level.

We look to the NHS and Social Care to play a full role in these partnerships. We will expect to see effective and streamlined working at local, regional and national levels.

We believe that integrated planning will deliver better value for citizens and that it has the capacity to drive change with more pace and strategic purpose. We will continue to strengthen our approach, building on the existing statutory framework, and extending our approach beyond health services:

- We will support strong integrated health and social care planning by RPBs. RPB Area Plans will provide a robust platform for new pooled budgeting and joint commissioning agreements. Area Plans and joint commissioning strategies will be central to the partnership agenda, within which the housing sector will have a more prominent role.

- The Integrated Medium Term Plan (IMTP) process will be strengthened. Set within the context of population focussed, longer-term clinical services strategies and jointly produced Area Plans, IMTPs will continue to form the bedrock of health planning. We will expect these plans to be developed in close liaison with key partners, and for plans to be complementary and aligned. Our aim will be that all local plans are developed and agreed in partnership.

- A national plan for the NHS will be developed, bringing together all NHS Health Board and Trust IMTPs to produce a national picture. This will set out the progress that the NHS will make across Wales as a whole in the coming years. The national dimension of the planning system will develop as we strengthen the foundations of local and regional planning.

We expect the Area Plan produced by each Regional Partnership Board and the Health Boards' Integrated Medium Term Plan to be inextricably linked and to be entirely consistent, including with Public Service Board planning. Each serves a distinct, but complementary, purpose. Over time, all three aspects of this planned approach – local health board/trust level health planning, regional health and social care planning, and national health planning – will converge to make whole system planning a reality. We will work with our delivery partners to ensure that local and regional needs and preferences are balanced appropriately with national direction and priorities.

Action	Date
Strengthen planning capacity and capability throughout the health and social care system, including in Regional Partnership Boards and Public Service Boards.	**From 2018**
Support Regional Partnership Boards to develop their Area Plans setting out new models of seamless care, pooled budgets and joint commissioning arrangements.	**From 2018**
Develop a range of 'quality statements' which set out the outcomes and standards we expect to see in high quality, patient focussed NHS services.	**By end 2019**
Simplify and streamline the existing NHS IMTP approach, and develop a National Integrated Medium Term Plan to strengthen strategic direction and prioritisation.	**By end 2019**
Develop a national clinical plan for specialist health services setting out our strategic approach to delivering safe and high quality health services which meet the needs of people across Wales.	**By end 2019**

Integrated performance management and accountability

The Parliamentary Review proposed changes to performance measures and management in order to steer the whole system towards new ways of working and the Quadruple Aim. It recommended a 'wider and more creative combination' of national support, incentives, benchmarking, regulation, accountability and transparency. As planning evolves to incorporate delivery plans across all dimensions of the Quadruple Aim, performance management and accountability will need to keep pace.

The continued integration of health and social care services, and the development of new joint models of working, are a real opportunity to take a fresh look at the ways in which the performance of the health and social care system as a whole is measured and reported. It is also an opportunity to shift our emphasis from what the system does to what it achieves for people, in terms of health and wellbeing outcomes. Most importantly, it is an opportunity to develop joint incentives and accountability,

particularly in the context of regional and integrated working. Current ways of working can lead to incentives and sanctions which make sense in the context of individual organisations, but which are in conflict with each other when looked at from a whole system perspective.

The existence of three national outcomes frameworks – for the NHS, for Social Services, and for Public Health – illustrates how our system has evolved in different ways. We will review all of these frameworks and align them to the Quadruple Aim, using shared indicators wherever possible. Both the Social Services and Well Being (Wales) Act and the Wellbeing of Future Generations (Wales) Act require public service delivery partners to take an outcome focussed view of performance, which provides a strong legislative foundation for this approach. A single national health and social care outcomes approach, aligned to the Quadruple Aim, will emphasise the importance of what services actually deliver for communities and individuals.

It is essential that our future approach to outcomes and performance management provides an opportunity for people to themselves report their assessment of health outcomes and their experience of health and social care services. The outcomes we use must be both clinically and professionally informed and understandable for the public. Combining these frameworks will make it far easier to establish joint accountability for providers and commissioners of health and social care services.

As we develop an integrated outcomes framework, we will move also to joint monitoring and inspection.

There is already a willingness to explore partnership working between Inspectorates, and this should move towards a combined approach to ensuring effective scrutiny of health and care delivery. Regional Partnership Boards and their Area Plans are still at a comparatively early stage, but as that work matures the scope of regulatory inspection should include the robustness of regional joint working, assurance of pooled budgeting, joint commissioning arrangements, and the delivery of integrated services.

Action	Date
Introduce a range of 'levers for change', a combination of incentives and sanctions, to drive performance, reward achievement and address failure to deliver.	**By end 2018**
Develop new population health and service user feedback mechanisms, and transparent reporting on outcomes, to support strong citizen engagement.	**By end 2019**
Implement a single national outcomes framework for health and social care aligned to the Quadruple Aim.	**By end 2020**
Introduce joint inspection, to include partnership working, pooled budgets and joint commissioning.	**From 2020**

National Executive Function

Throughout this plan we emphasise the importance of effective joint working at the regional level, particularly planning and operational alignment between regional partnership boards and health boards. We set out how that should be an engine for transformation and how a national transformation programme will help to drive this activity with pace and consistency.

To achieve our future vision for health and social care, our system needs to be dynamic and oriented to change and continuous improvement. Local Health Boards and NHS Trusts will retain their statutory responsibilities, building relationships and delivering for their populations alongside their partners. They must also function effectively within the context of a single national system and contribute to securing benefits for the population of Wales as a whole.

A stronger 'national executive' for NHS Wales, as recommended by the Parliamentary Review, is an essential part of making our system fit for the future. This national executive function will provide the strong leadership and strategic direction which any complex system requires if it is to be capable of change. A national executive function will ensure

a consistent approach to planning, priority setting based on outcomes, performance management and accountability. It will support and challenge health boards and NHS Trusts, and ensure the development of capacity and capability across the system.

Our national health system includes a number of services which are already planned or delivered nationally. Examples include some digital and informatics services, shared administrative services, commissioning of ambulance services, and specialist services. These are important national services, many of which will be key enablers of the strategic change and transformation we need to see. They are currently managed through a variety of mechanisms with complex governance arrangements.

Our system structure and size gives us the opportunity to adopt new technologies and digital approaches

quickly, to secure consistent outcomes for citizens, to use purchasing and commissioning to drive greater value and to find substantial cost-saving efficiencies. We need now to create a national executive function which brings these key services together in a more coherent and streamlined way, and which maximises the benefits of our Welsh system.

This national function will also look outwards, building a positive relationship with local government and other strategic partners within a whole system approach. It will explore ways to secure greater benefits for the wider Welsh economy through more confident engagement with external partners, including industry. This will be an important part of how our whole system of health and care contributes to achieving the cross-sector ambitions set out in the Welsh Government's Prosperity for All strategy.

Action	Date
Bring together appropriate collaborative planning, delivery and performance management activities as an NHS Wales Executive function, reporting directly to the Chief Executive of NHS Wales.	**By end 2018**
Confirm governance relationships between Welsh Government, the NHS Wales Executive, the Transformation Programme, and other key stakeholders.	**By end 2018**
Review specialist advisory functions, hosted national functions (e.g. NWSSP, NWIS, WHSSC, EASC) and other national delivery programmes, with the aim of consolidating national activity and clarifying governance and accountability.	**By end 2019**

Imaging Statement of Intent

This *Statement of Intent* addresses the current challenges in diagnostic and therapeutic imaging in the Welsh National Health Service. It signals the Welsh Government's commitment to adopt a new strategic approach to the development of high quality, effective and sustainable imaging services for NHS Wales that address the needs of the population, respond to current and future policy direction and ensure long term sustainability. The Statement is consistent with the Welsh Government ambitions outlined in Taking Wales Forward: Healthy and Active as well as recommendations made in Parliamentary Review of Health and Social Care in Wales by increasing investment in facilities to reduce waiting times; exploiting digital technologies to help speed up the diagnosis of illness. To achieve this we require a coordinated approach to diagnostic processes such as imaging. Central to our ambition are alternatively configured service models for imaging, including where it is provided, how it is staffed, how it is accessed, workforce development, informatics and information support, thriving research and innovation, and appropriate investment in equipment. We will establish a nationally coordinated, prudent imaging implementation plan to support the provision of imaging services across Wales that are sustainable and provide the best outcomes for Welsh patients.

Diagnostic imaging services provide a significant role in the investigation of disease, helping determine patient management through accurate diagnosis. This is predominantly provided in Radiology Departments (X-Ray) in hospitals with different imaging modalities which include radiographs (x-rays), Ultrasound, CT, MRI and Nuclear Medicine. Highly skilled professionals, mainly Radiographers and Radiologists, undertake and interpret the imaging studies respectively. Imaging investigations need to be carried out in a timely fashion, appropriate for the patient and their medical management. The imaging study then needs to be interpreted and reported promptly to maximise its impact on the patient's care *as* informed by the Welsh Radiology Reporting Standards. These imaging techniques are also used to guide targeted intervention such as liver biopsy, spinal injections and aorta repair (EVAR – endovascular aneurysm repair).

Imaging is a key component in the delivery of prudent health services to the population of Wales and a key enabler to Welsh Government health delivery plans including cancer and stroke. Innovative, state-of-the-art imaging facilities in Wales have established a strong international reputation, including Cardiff University's Brain Research Imaging Centre (CUBRIC) and the Wales Research and Diagnostic Positron Emission Tomography Imaging Centre (PETIC). Exciting new initiatives provide opportunities to enhance this reputation and fully exploit the clinical, research and economic potential of Wales' thriving life sciences sector.

Imaging services are provided by a wide range of different specialty and professional groups and account for a significant proportion of the NHS budget. As demonstrated by a recent Welsh Audit Office review, current services are under increasing pressure with major growth in demand as a result of more effective clinical pathways, increasing numbers of older people, increasing cancer incidence, improved

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technology, new techniques and workforce pressures resulting in delays to patients accessing the appropriate imaging services for their needs.

As demonstrated by the Royal College of Radiologists annual census, the number of Magnetic Resonance Imaging (MRI) and CT scans performed is increasing by over 10% each year yet failing to keep pace with the growth in demand. The increased demand on imaging services come from varied sources: National Institute for Health and Care Excellence (NICE) recommendations, increased number of attendances, increased diversity of investigations, increasing access to diagnostic services, and the developing requirements of interventional radiology. Imaging is also associated with many benefits, for example, minimally invasive interventional radiology procedures have transformed aortic repair with reduced morbidity, mortality and hospital stay, compared to open surgical procedure, and treatment of patients hitherto excluded due to high general anaesthetic risk.

The demand for imaging, both image acquisition (scanning) and prompt clinical interpretation and reporting significantly outstrips current capacity across all types of imaging, compromising high-quality patient care and incurring unnecessary delays in care pathways. Capacity issues are exacerbated by difficulties in recruiting to consultant radiologist, radiographer and sonographer vacancies; the level of difficulty varies according to geographical location. Clinical imaging remains a popular specialty for medical trainees but training capacity does not match current workforce deficits.

Wales has seven radiologists per 100,000 population, compared to a European average of 12, and the 160 whole time equivalent consultant workforce in Wales has the oldest demographic in the United Kingdom; based on a retirement age of 62 years, 26% are anticipated to retire by 2020. The situation for radiographers and sonographers is no better; both professions are on the UK shortage occupations list. Similar challenges exist for other professionals such as cardiologists who spend increasing amounts of their time undertaking diagnostic imaging.

The imaging service in Wales is currently being sustained by outsourcing image reporting to the private sector, at a projected cost of at least £11 million over the next three years, and a heavy reliance on locum appointments, placing additional pressure on NHS resources. Delays in reporting are a major issue; despite an average turnaround of less than ten days, there is unacceptable variation with delays in some reporting of six months or more. In a recent consultation by the Royal College of Radiologists, Wales was the worst area of the UK with respect to access of images in an external picture archiving and communication system, with 83% of respondents reporting difficulty. The provision of clinically appropriate imaging services in Wales is unsustainable without significant change.

There are major opportunities to reconfigure the service model in a way that improves care pathways, is sustainable and cost-effective. This will involve increased primary care access to imaging, improved demand management and the creation of a national imaging network that is integral to a whole system approach to care pathway development and management in NHS Wales. Reconfiguration will require national targeted investment in imaging and a significant proportion of this will be recovered from the introduction of more efficient pathways, earlier diagnosis

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at the appropriate stage of the pathway, reduced waste and savings in other service areas, including through reduced outsourcing.

Key Priorities

1. Public Involvement and Engagement

The public are central to healthcare in Wales and should be at the heart of imaging service development. Facilitating meaningful public involvement and engagement will allow the public, patients and professionals to work together as equal partners to co-produce imaging services for Wales that make a real difference. Co-production will promote a values based approach that focuses on achieving the outcomes that matter to the population of Wales, rather than being over-focused on the service delivery process.

Active public involvement and engagement will be facilitated by providing members of the public access to the support necessary to enable them to be involved.

ACTIONS

- **NHS Wales to develop meaningful linkages with the public to facilitate co-production of imaging services.**

2. Workforce Development

A significant element of the solution to addressing the large workforce shortfalls described above is the establishment of a NHS Wales Imaging Academy sited in South Wales that has an all Wales remit and significantly improves training capacity. The Academy will innovatively facilitate enhanced capacity for training and combine training with regional service provision to address the major but uneven recruitment challenges across Wales. A dedicated building will house state of the art facilities for teaching knowledge and practical skills and provide supervised interpretation of imaging from all NHS Wales Health Boards and Trusts.

Initially, the Academy will focus on training radiologists to perform tasks that only a radiologist can competently undertake, but rapidly extend this to radiographers and other professionals who will be critical to ensuring a sustainable imaging workforce for the future. Development of extended roles for other staff groups, especially radiographer reporting, will increase capacity in a cost-effective and sustainable manner working within the reporting team. Work will also be undertaken to drive skill mix change within the support workforce, including developing and training radiography assistant practitioners. The Academy will be a greenhouse for a prudent multidisciplinary integrated workforce and education.

In parallel with the work of the Academy, a strategic approach will be developed and implemented to increase skills and capacity within other critical imaging workforce groups, for example, breast clinicians, cardiac clinical physiologists and clinical scientists, cardiologists, medical physicists, physiotherapists, podiatrists, nurses and midwives. Development of an optimally configured future imaging workforce to

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deliver the agreed service model will be supported by the *Train/Work/Live in Wales* initiative.

> **ACTIONS**
>
> - **The NHS Wales Imaging Academy will be established to develop a sustainable and flexible imaging workforce to deliver a modern, responsive diagnostic imaging service for Wales.**
>
> - **Health Education and Improvement Wales will facilitate the development of an integrated workforce training strategy for Radiologists, Radiographers, Sonographers, Advanced Practitioners, Assistant Practitioners and other Imaging Healthcare Professionals in Wales.**
>
> - **Welsh Government, in conjunction with NHS organisations, will establish funding models to allow the delivery of a national approach to workforce training that is appropriate for modern, flexible training combined with regional service provision.**

3. Equipment

Reliable, safe and modern imaging equipment is a pre-requisite for an effective and sustainable imaging service. Fit for purpose equipment is expensive, its value rapidly depreciates and its lifetime varies dependent upon its use, technological advances, maintenance and changes in clinical practice. On average, imaging equipment has an expected asset life of eight years. 2014 data published by the OECD in 2016 showed that Wales had ten CT and eight MRI scanners per million population compared with eight and seven for the UK as a whole and an average of 16.7 and 11.7 for France, Germany and Spain. In addition to the shortfall in the number of MRI and CT scanners in Wales compared to other high income countries, there is a need to invest in technologies such as Cardiac CT and MR, and Hybrid Positron Emission Tomography (PET) imaging with either CT or MRI imaging facilities.

In order to strategically plan, identify and address the imaging equipment needs of NHS Wales, a co-ordinated national approach will be established. This will include the identification, evaluation and, when appropriate, prioritisation and adoption of new technologies, and imaging equipment for specialties outside radiology such as cardiology. The national approach will also ensure that necessary complementary workforce developments are progressed in parallel with the evolving equipment infrastructure.

Planning will be based on the needs of the population through scrutiny of data that allows objective appraisal of what is required. Configuration of imaging equipment will be undertaken in a manner that is optimal for Wales as a whole and based on the principles of facilitating equitable access to and timely reporting of imaging wherever an individual lives. This will require a collaborative, regional approach towards demand and capacity planning and resourcing.

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ACTIONS

- **Welsh Government will continue to support the development of a prioritised and sustainable capital replacement programme.**

- **NHS Wales will establish a co-ordinated approach to identifying, evaluating, prioritising and adopting new imaging technologies across NHS Wales.**

- **NHS Wales will ensure that regional utilisation and workforce considerations are central to equipment procurement decisions.**

4. Quality

A strong focus on improving the quality and safety of imaging services will be central to future provision. This will be contributed to by access to appropriate equipment and training and education programmes for staff but changes to the way we work will be vital to drive the transformative change required. Following the principles of prudent healthcare, future imaging services will ensure the public, patients and professionals work together as equal partners through co-production; care for those with the greatest health need first, making the most effective use of all skills and resources; do only what is needed, no more, no less, and do no harm; and reduce inappropriate variation using evidence based practices consistently and transparently.

A values based approach that is driven by health outcomes that really matter requires the development of a service model that is regularly updated as new knowledge emerges and through constant evaluation and monitoring, including benchmarking. The routine use of appropriate patient reported experience and outcomes measures will improve quality and place an emphasis on demonstrating the value of services delivered.

ACTIONS

- **NHS Wales will develop an evidence-based, data-driven and outcomes focused quality improvement framework that is based on the principles of prudent healthcare.**

- **NHS Wales, working with Welsh Government, will commission and evaluate research to support efficient and prudent use of imaging modalities and clinical imaging pathways.**

5. Services

As sophisticated imaging has become more central to the delivery of more effective prudent healthcare, the range of services has diversified and increased. They are now routinely provided both within and outside radiology/radiography departments, in primary and secondary care settings and are integral to many clinical pathways.

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Further work is now required to ensure that imaging services are networked and delivered by the most appropriate people working at the top of their licence, in the most appropriate place as a fundamental element of an integrated and prudent healthcare system. It is vital that imaging experts are centrally involved in the data and evidence driven planning and delivery of all clinical services that rely on imaging and that care pathways are co-produced with all relevant stakeholders, not least the public and primary care providers.

Imaging service will be strengthened as part of a co-ordinated and networked approach to their planning and delivery. We will review service models and clinical pathways to provide optimal imaging services for the adult population of Wales. This will include a greater focus on primary care and expansion of the potential imaging workforce, with development of a strong mixed healthcare professional workforce. Services for such an approach include:

- Cardiac imaging – rapidly expanding service requirement including echocardiography, cardiac MRI and CT
- Interventional Radiology - including management of acute life threatening haemorrhage and the delivery of minimally invasive therapies
- Neuroradiology – includes early diagnostics of stroke and interventional services for minimally invasive therapies such as clot retrieval in stroke
- Nuclear Medicine – including the continuing development of PET-CT services in Wales
- Screening – Imaging is a substantial part of *Breast Test Wales*, *Bowel Screening Wales*, *Wales Abdominal Aortic Screening Programme* and *Antenatal Screening Wales*.

a. Antenatal Imaging and Imaging for Children

Antenatal screening is delivered by Welsh Health Boards in line with agreed policy and standards set by the managed clinical network (*Antenatal Screening Wales*). Equity of access to a high quality, timely and evidence-based service is key to ensuring consistency across Wales for our pregnant population. Sonography capacity has been a limiting factor to roll out some of the UK National Screening Committee recommendation in a timely way such as combined screening for Down's Syndrome Screening. This is now fully rolled out and the external quality assurance undertaken demonstrates the high quality that the sonography service delivers to in Wales.

Obstetric and Doppler ultrasound services are heavily pressured and vital to reduce stillbirth rates and meet guidelines for foetal monitoring. These services will be reviewed and rationalised through a quality assurance programme.

Paediatric radiology is a distinct sub-specialty. A sustainable neonatal and paediatric imaging and interventional radiology service model for children in Wales will be developed, including the provision of a fully staffed out of hours service. A tiered model will be developed where networked centres share images and reports. The level 1 site will be at the Children's Hospital for Wales, supported by the provision of in hours remote and on site image reporting and second opinion at level

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2 sites. Paediatric Services for the population of North Wales will continue to be supported by Alder Hey Children's hospital Liverpool.

c. Imaging in Primary Care

Improved access to imaging through primary care services will reduce missed and delayed diagnosis and improve the efficiency, clinical and cost-effectiveness of many current care pathways. For example, Wales has the worst survival outcome for many cancers compared with similar health systems across three continents of the western world. Several contributing reasons include limited access to diagnostic tests, lengthy diagnostic pathways and a 'gatekeeper' approach from clinicians to protect the limited resource. A programme of work will be developed to support health boards across Wales to deliver key policy commitments to detect cancer earlier. The work programme will be based on models shown to be successful in other countries (e.g. Denmark) and promote a cultural shift in current approaches to cancer diagnosis across both primary and secondary care; ensuring they are aligned with the Welsh Government's vision detailed in the Cancer Delivery Plan 2016-2020. New ways of working to achieve earlier diagnosis will include: improving the diagnostic pathway; piloting new approaches to support earlier diagnosis; empowering radiologists to pro-actively move patients through the diagnostic pathway; developing and strengthening the professional relationship between primary care practitioners and secondary care diagnostic teams; and strengthening the role of the radiologist as a core clinician in multidisciplinary teams.

ACTIONS

- **NHS Wales will develop a regionally networked approach for the delivery of imaging for the population of Wales to ensure equitable access.**

- **NHS Wales organisations, will develop strategic plans for the delivery of imaging services to maximise workforce and imaging capacity utilization.**

- **Integrated service delivery plans for imaging will be delivered across Wales.**

6. Informatics and Information

Effective and high quality informatics systems and information are critical to the delivery of a world-leading, sustainable, effective and efficient imaging service. *Informed Health and Care: A digital Health and Social Care Strategy for Wales (2015)* clearly outlines the vision of improving access to information and introducing new ways of delivering care with digital technologies at the heart of Welsh Government's plans for NHS Wales. Images taken locally will be made available nationally with an interoperable picture archiving and communication system facilitating the drive to common standards and image sharing across Wales. This will make information available at the point of care, reduce unnecessary repeat imaging, allow safer transfer of care, reduce unnecessary delays and provide more efficient care pathways.

A common user interface based on nationally agreed standards with an integrated, once for Wales secure IT infrastructure across NHS Wales will be developed to allow electronic requesting, vetting, processing and reporting. Improved systems and data analytics based on common international standards will enable improved understanding of business demand, provide validated data for service modelling, benchmarking and improve demand management.

A new set of performance indicators will be developed to widen the range of performance information collated and used to deliver and improve the quality and consistency of imaging services. This will include routine measurement and monitoring of the demands on imaging services, the capacity of the services to respond to pressures and reduce risks. Standardisation of measurement will be agreed and adopted across Wales, and clear targets will be set for NHS Wales to achieve. The Welsh reporting standards for radiology services will be revised to ensure they are appropriate for these purposes, for internal and external benchmarking and to inform local and national service developments.

> **ACTIONS**
>
> - **Welsh Government will support the drive to a Once for Wales imaging platform based on agreed national standards across NHS Wales.**
>
> - **NHS Wales will implement state-of-the-art business support informatics and radiology systems that can capture and report data in a consistent way to deliver a modern imaging service.**
>
> - **Welsh Government will revise performance indicators to reflect and support the development and maintenance of a modern imaging service, including time to reporting, not just time to investigation.**

7. Research and Innovation

With its position at the cutting edge of medical science, imaging provides multiple opportunities for research and innovation through collaboration with various partners. There is a tradition of working with partners in the NHS, universities and industry to support high quality research studies, and to pursue new technologies with advances in equipment and techniques, including software development. Despite the opportunities and examples of research excellence in Wales, such as CUBRIC, the world-leading brain research imaging centre at Cardiff University, the potential of imaging research and innovation has not yet been fully realised in Wales. The NHS Wales Imaging Academy will act as a hub for research and innovation activity.

A strategic plan will be developed to ensure research and innovation opportunities are seized and Wales capitalises on its unique selling points. Central to the plan will be the ability to effectively support high quality research, to establish strong collaborations across sectors to undertake novel research and innovation that translates into clinical service change and to evaluate the true potential of new technologies including artificial intelligence/machine learning.

8

> **ACTIONS**
>
> - **Welsh Government will establish a strong research and academic base, with national and international collaboration, for imaging including radiology, radiography and medical physics in Wales.**
>
> - **NHS Wales will provide effective imaging support for high quality service delivery and other research studies and innovation in Wales.**

8. Governance

A *National Imaging Network*, accountable to NHS Wales' Chief Executives, will be developed to co-ordinate imaging service development and provision for the Welsh Government and NHS Wales. This will include: provision of high quality training and education for the imaging workforce; leading the development of a sustainable Imaging Services Accreditation Scheme accredited imaging service across NHS Wales; advocating a nationally coordinated, locally delivered service; developing best practice guidance to reduce variation, improve patient outcomes and experiences; co-ordinating imaging research, development and innovation; supporting standardisation of imaging services, including NHS Benchmarking.

A high level advisory board will bring together chairs of working groups that will provide annual work programmes for imaging that feed into the IMTP process and also support the prudent healthcare agenda. The Medical Imaging Subcommittee will be configured to support the development and publication of best practice guidance to reduce variation, drive standardisation and improve patient experience and outcomes; provide horizon scanning, situational awareness and support research and development. The focus of both the National Imaging Network and Medical Imaging Subcommittee being on continuous improvement.

> **ACTIONS**
>
> - **Welsh Government to create a National Imaging Network, accountable to NHS Wales' Chief Executives, to co-ordinate imaging service development and provision for the Welsh Government and NHS Wales.**
>
> - **Welsh Government to support the creation of a high level advisory board to the National Imaging Network.**
>
> - **Medical Imaging Subcommittee will be reconfigured in order to support the imaging service improvement agenda.**

Next Steps

An imaging taskforce has been established to support the development of a national imaging implementation plan. The taskforce will be jointly chaired by Dr Rob Orford, Chief Scientific Adviser (Health), Welsh Government and Steve Moore, lead Chief

9

Executive for Imaging. The taskforce will engage with the public and other stakeholders and report back to Ministers in summer 2018. The implementation plan will be delivered together with the NHS in Wales, who have endorsed this Statement of Intent.

10

Archwilydd Cyffredinol Cymru
Auditor General for Wales

Radiology Services in Wales

WALES AUDIT OFFICE
SWYDDFA ARCHWILIO CYMRU

This report has been prepared for presentation to the National Assembly under the Government of Wales Act 1998 and 2006.

The Wales Audit Office study team comprised Anne Beegan, Elaine Matthews, Fflur Jones, Katrina Febry, Phillip Jones, Rachel Harries, Tracey Davies and Urvisha Perez under the direction of David Thomas

Wales Audit Office
24 Cathedral Road
Cardiff
CF11 9LJ

Contents

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.

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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.

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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

US
318

MRI
466

X-ray
5,344

CT
599
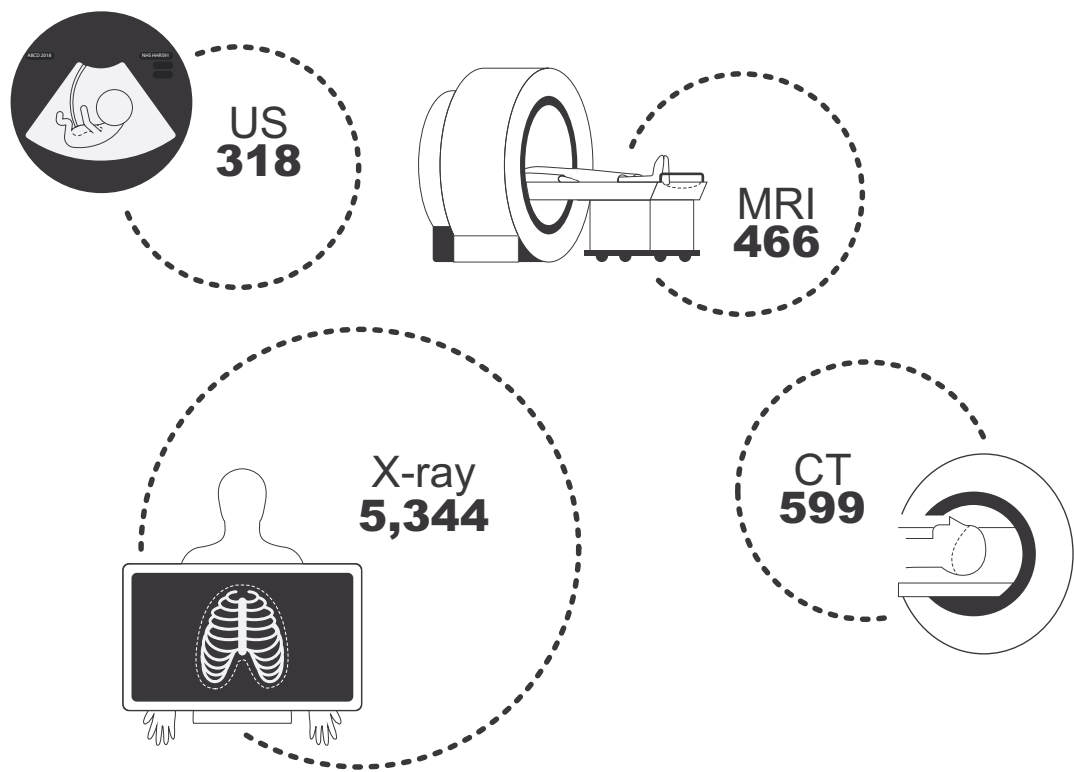
Note:

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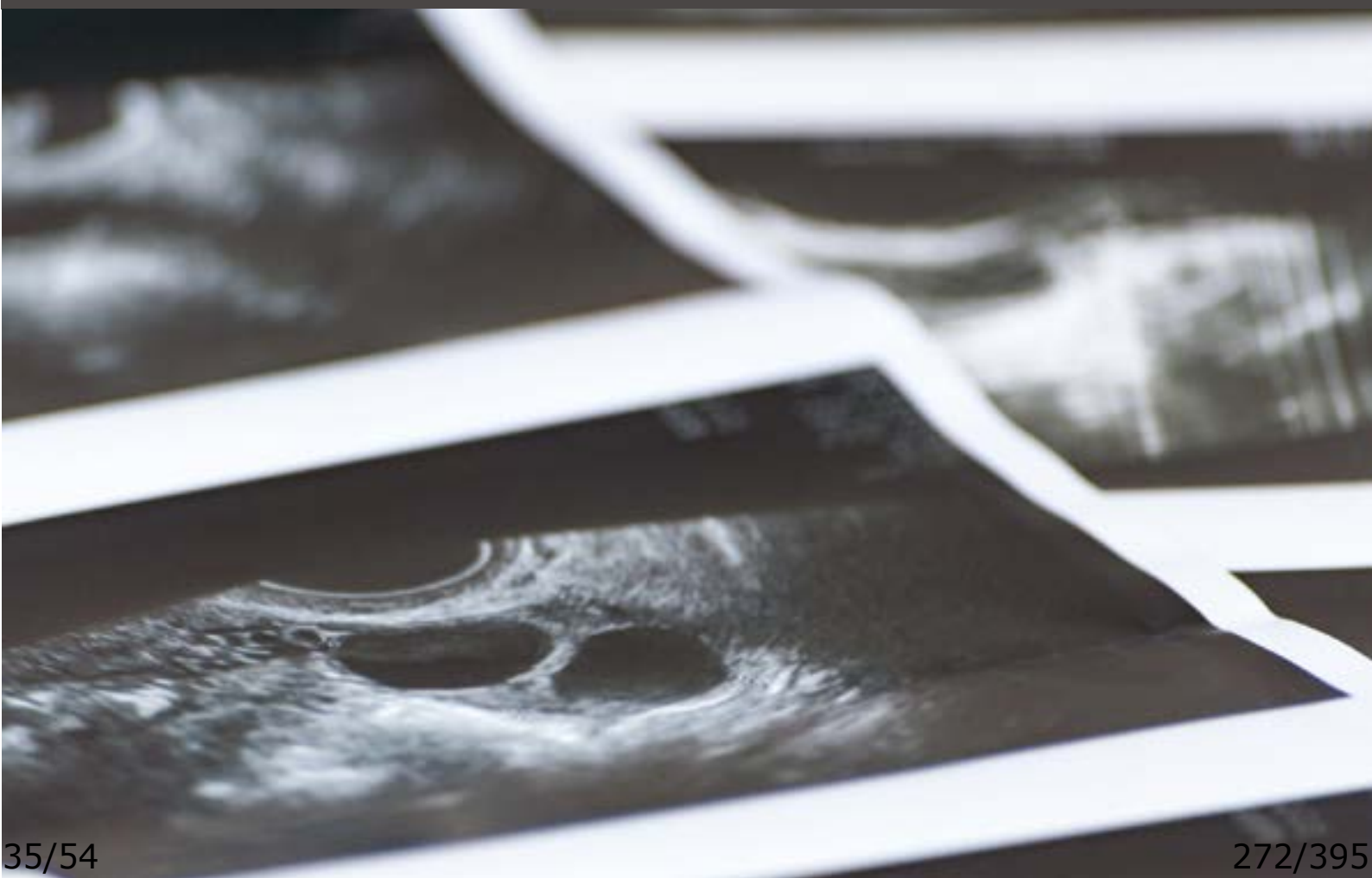
The core radiology management system is not serving health boards' needs, and this is further impeded by weaknesses in local IT infrastructures

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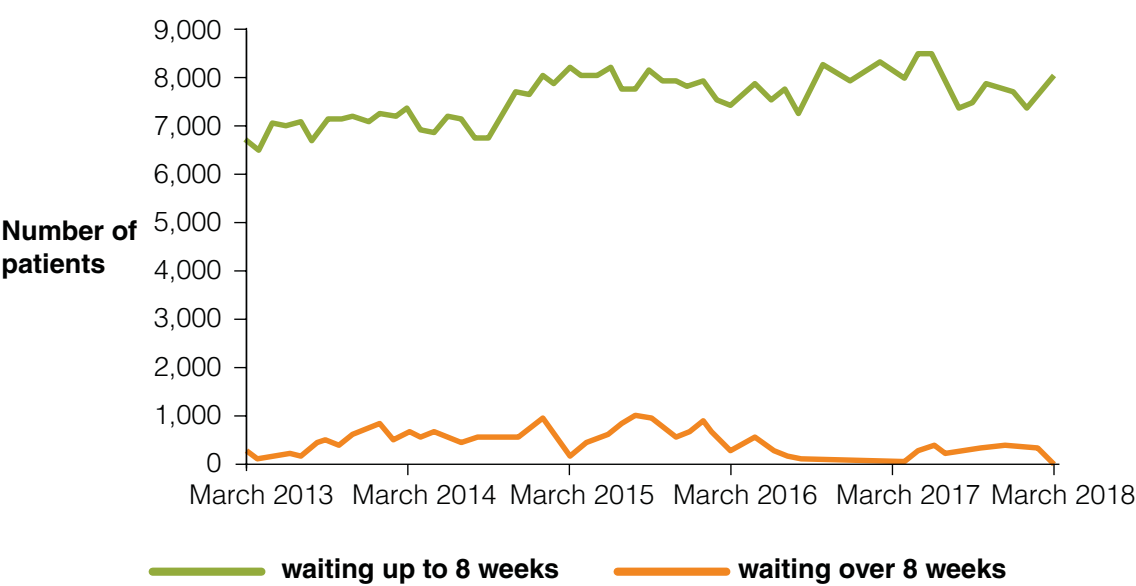
Source: Diagnostic and Therapy Services Waiting Times, Stats Wales, May 2018

Exhibit 14: all-Wales MRI waiting times trend March 2013 to March 2018
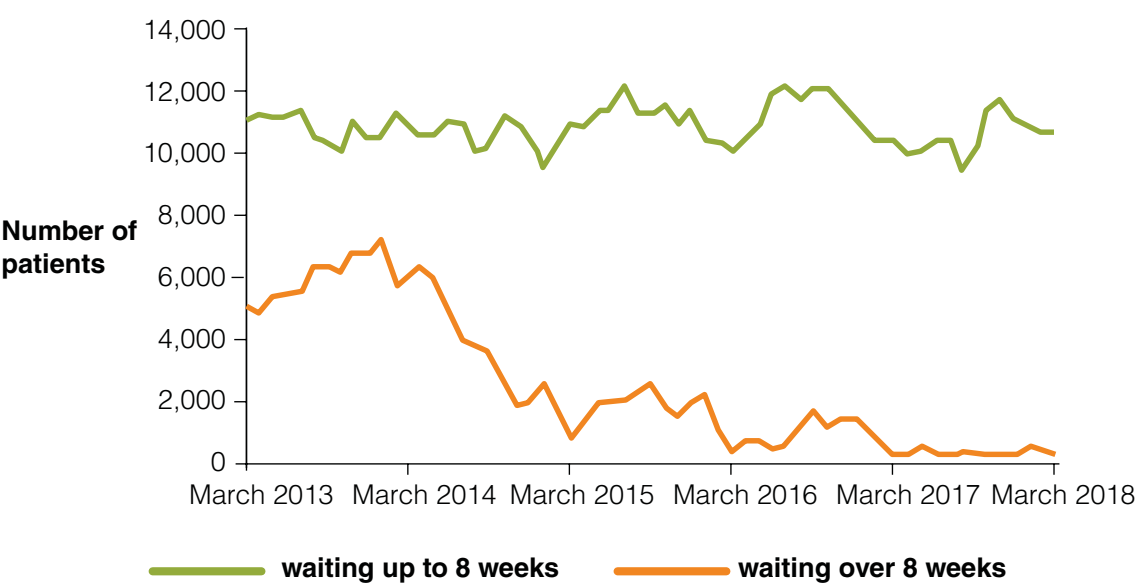
Source: Diagnostic and Therapy Services Waiting Times, Stats Wales, May 2018

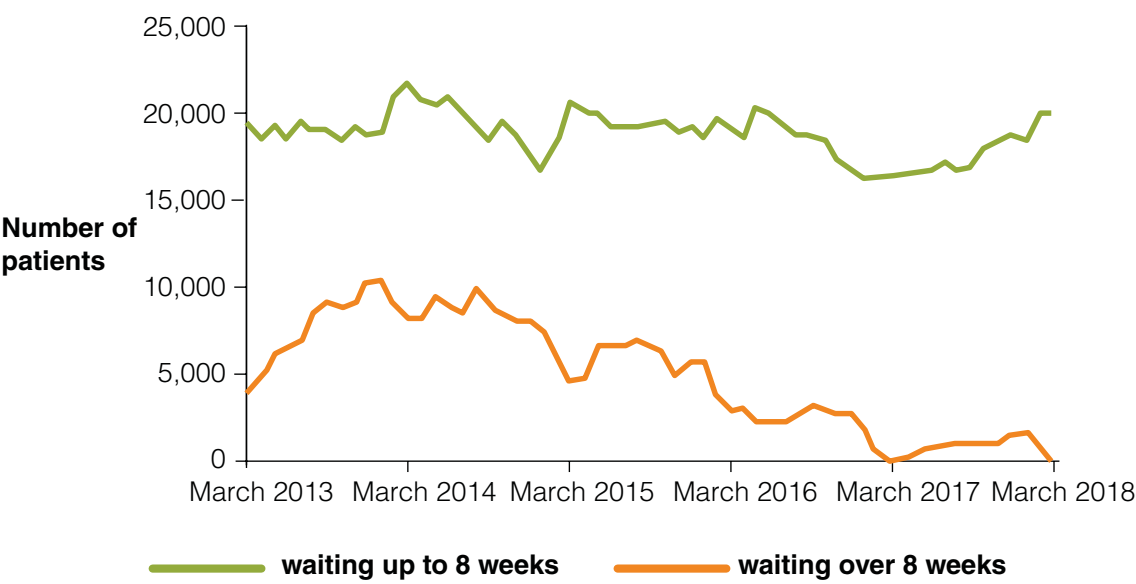Exhibit 15: all-Wales non-obstetric US waiting times trend March 2013 to March 2018

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

Wales Audit Office

24 Cathedral Road

Cardiff CF11 9LJ

Tel: 029 2032 0500

Fax: 029 2032 0600

Textphone: 029 2032 0660

We welcome telephone calls in
Welsh and English.

E-mail: info@audit.wales

Website: www.audit.wales

Swyddfa Archwilio Cymru

24 Heol y Gadeirlan
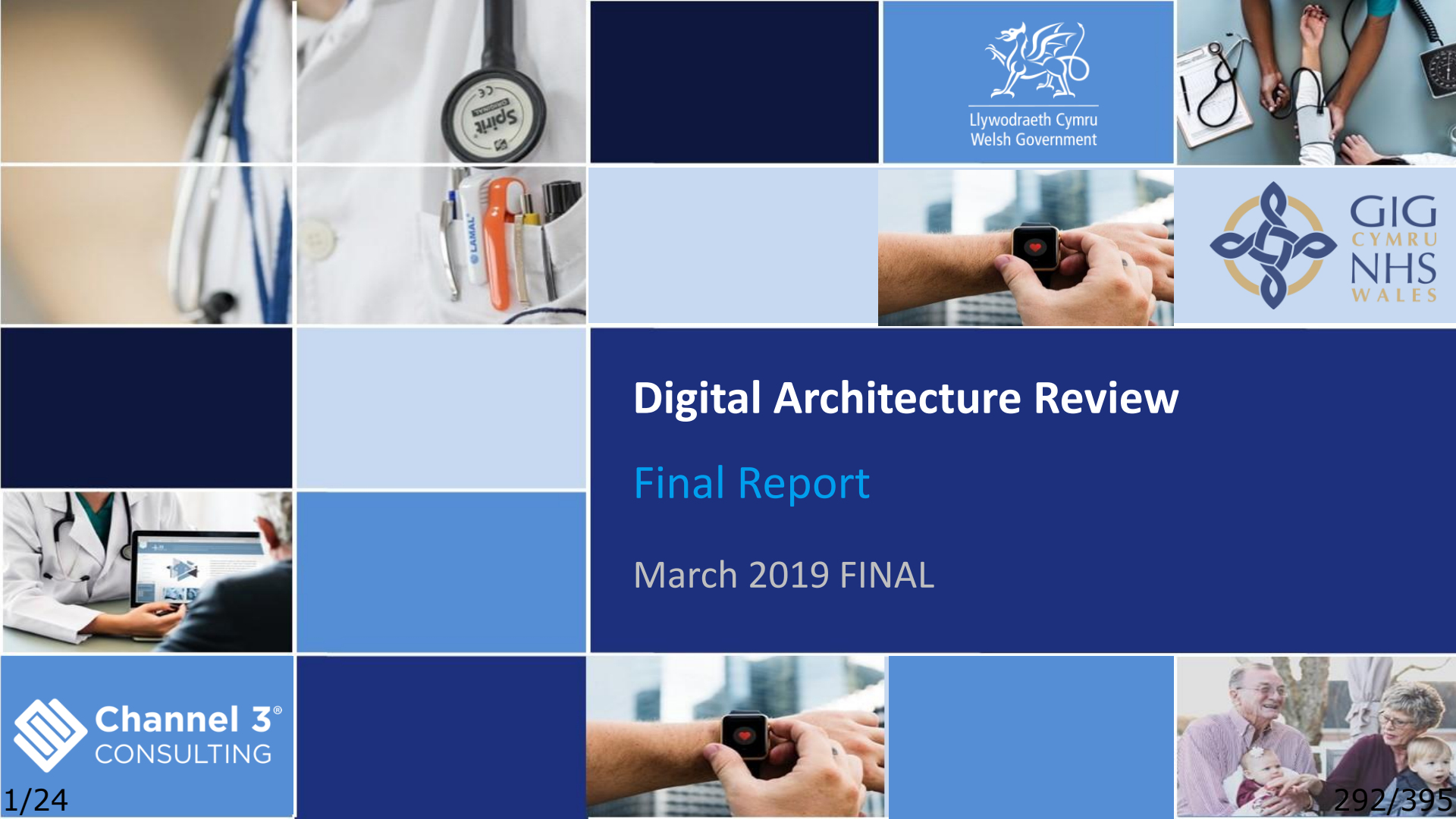
Caerdydd CF11 9LJ

Ffôn: 029 2032 0500

Ffacs: 029 2032 0600

Ffôn Testun: 029 2032 0660

Rydym yn croesawu galwadau
ffôn yn Gymraeg a Saesneg.

E-bost: post@archwilio.cymru

Gwefan: www.archwilio.cymru

Digital Architecture Review

Final Report

March 2019 FINAL

Limitations of our works

This assessment is based on information provided by the Welsh Government and NHS Wales and associated stakeholders and was supported by further clarifications and confirmations.

Channel 3 Consulting have not undertaken a comprehensive audit nor have Channel 3 subjected the information upon which we have relied to verify assessments. Accordingly, Channel 3 assume no responsibility and make no representations with respect to the accuracy or completeness of the information in the report.

Channel 3 cannot guarantee that we have had sight of all relevant documentation or information that may be in existence and

as such, our assessment is based on the information Channel 3 have been provided. Any documentation or information brought to our attention subsequent to the date of the assessment may require us to adjust our assessment accordingly. Channel 3 also note that, given the sample nature of some of the testing which we have conducted, we cannot guarantee that we have identified all information that may be relevant.

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2

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Introduction

Channel 3 Consulting was engaged by the Welsh Government and NHS Wales to undertake a review of the NHS Wales Digital Architecture, recognising the ambition for digital transformation across Wales at pace.

The focus of this review was to assess the extent to which the current Digital Architecture of NHS Wales is ready to meet the ambition set out in "A Healthier Wales", and whether it is scalable to support digital transformation across Welsh health and social care.

The review involved technical reviews with NWIS and workshops and interviews with over 100 key stakeholders from NWIS, all Health Boards, and the universities, augmented by three "deep dives" at Aneurin Bevan and Cwm Taf Heath Boards, and Public Health Wales Trust. It involved three phases of work, the reports for which are annexed to this final report

01

Annex A - Current state assessment
Reviews the extent to which the current digital architecture is fit for purpose for delivering the Welsh ambition.

02

Annex B - Future state assessment
Provides a vision for the NHS Wales Digital Architecture that would address the longer term aims of the NHS Wales, that builds on the current state.

03

Annex C – Improvement options
Provides a set of shorter-term options to improve the current NHS Wales Digital Architecture that would provide a stepping stone towards the future vision and /or address immediate gaps or risks in the current state.

3

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We have reached three major conclusions

01

Current state

The current approach to digital architecture in NHS Wales is unsustainable and will not enable the ambition set out in A Healthier Wales to be achieved as things stand

The focus on centrally led projects and platforms is now starting to limit the ambitions of the system and of individual organisations within it. This in turn is impeding advances in care and innovation in the system. There is widespread frustration in Health Boards and more widely, but an acknowledgement that a collective approach is required. There is also an acknowledgement of the scale of the task, and the commitment and skills of the teams in NWIS and locally.

02

Opportunity

There is a significant opportunity for digital transformation in health and social care in Wales and the timing is optimal

Globally, there has been recognition in the last two years, that traditional approaches to digital technology in health and social care are no longer fit for purpose. The technology vision set out in A Healthier Wales aligns with this global thinking and is achievable. The ingredients are there in terms of the digital building blocks required, and the overall commitment and capability at a system level. The challenge is more tractable in Wales than in many health economies, and could enable the nation to become a true global exemplar.

03

Approach

A digitally transformed NHS in Wales is achievable, but achieving the ambition requires a fundamental change of approach and focus

There needs to be a twin track approach so that resilience and innovation proceed in tandem, and at pace. There will need to be a keen focus on three major architectural building blocks alongside taking the opportunity to seize some immediate opportunities to make a real difference to patient care. The work should be undertaken as a collaborative, whole system approach and make use of all of the available capacity and capability.

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4

The current approach is unsustainable

The current Digital Architecture of NHS Wales has grown organically and is now too complex, whilst the intent to develop something along open standards guidelines is clear, the reality is that insufficient progress is being made towards achieving this. There is a lack of clear standards and controls and it is becoming a constraint for the system.

The National Data Resource work is however moving in a direction that is fully aligned with Once for Wales and making progress, the challenge is likely to be on gaining early benefits from that work.

The integration layer is in need of some work to bring to a level where a more open approach could be adopted. There are also core capabilities that need to be added to that.

There is an application level focus in the National plans that is leading to a diversion from the intent of Once for Wales to expose the systems information assets for the benefit of the population as a whole, and a considerable impediment to agility as the system develops new care models and innovates.

The underpinning infrastructure represents a risk to the system as a whole both at the level of core networks, but also at the level of core software and the levels of support for that – for example with respect to patching. As data volumes transmitted across the system increase, the ability of the core infrastructure to be sustainable is a considerable area of risk.

There are however many positives that would help to address these risks, including the skills and capabilities in the system, and the knowledge and understanding of the core technologies both in NWIS and in Health Boards.

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The current approach is unsustainable

Digital Architecture Characteristics
(Derived from A Healthier Wales and discussions with stakeholders including NIMB and the Advisory Group)
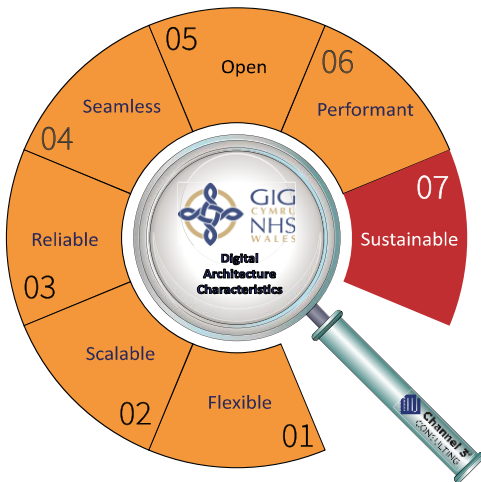
Digital Architecture Components
(Derived from Channel 3 best practice model)

Key
Capable of supporting ambition:

| Now | In <2 years | In >2 years |

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There is a significant opportunity

There is a need to recognise and accept that the approach taken to date was right at the time for Wales, but that the world has changed. Globally, t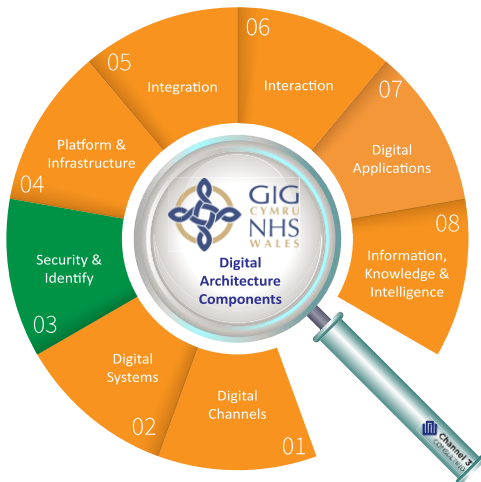here has been widespread recognition, particularly in the last two years, that more traditional approaches to digital technology in health and social care are no longer fit for purpose.

The pace of innovation in healthcare, its use of digital technology and digital innovation more generally combined with the demand for agility on the one hand, and resilience on the other is near universal. There has been a significant movement towards embracing fully open digital platforms in response to these challenges.

Wales is almost uniquely placed to capitalise on this shift. It is tractable in terms of size and will. It has a skilled and capable digital workforce both in the NHS and more widely. It has a number of leading universities. Economically the national focus on growth and inward investment makes it an ideal environment in which to innovate at pace.

The timing is right for a digital health and social care transformation in Wales. The technology vision set out in A Healthier Wales aligns with global thinking, and it is achievable.

The key to making this vision a reality is a clear target digital architecture and a clear focus on the components within that that need priority development.

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There is a significant opportunity

The model below translates the Components set out in the Current State Assessment into a high level Target Architecture that is designed to meet the requirements of a Healthier Wales and embodies open design principles.

Digital channels
Interaction with customers, citizens and patients through digital media (e.g. via smart phones).

Digital systems
Components that support digital applications/digital customer interactions with our services (e.g. web chat). Enable boundaryless operations across digital transactions; monitor channel to system throughput.

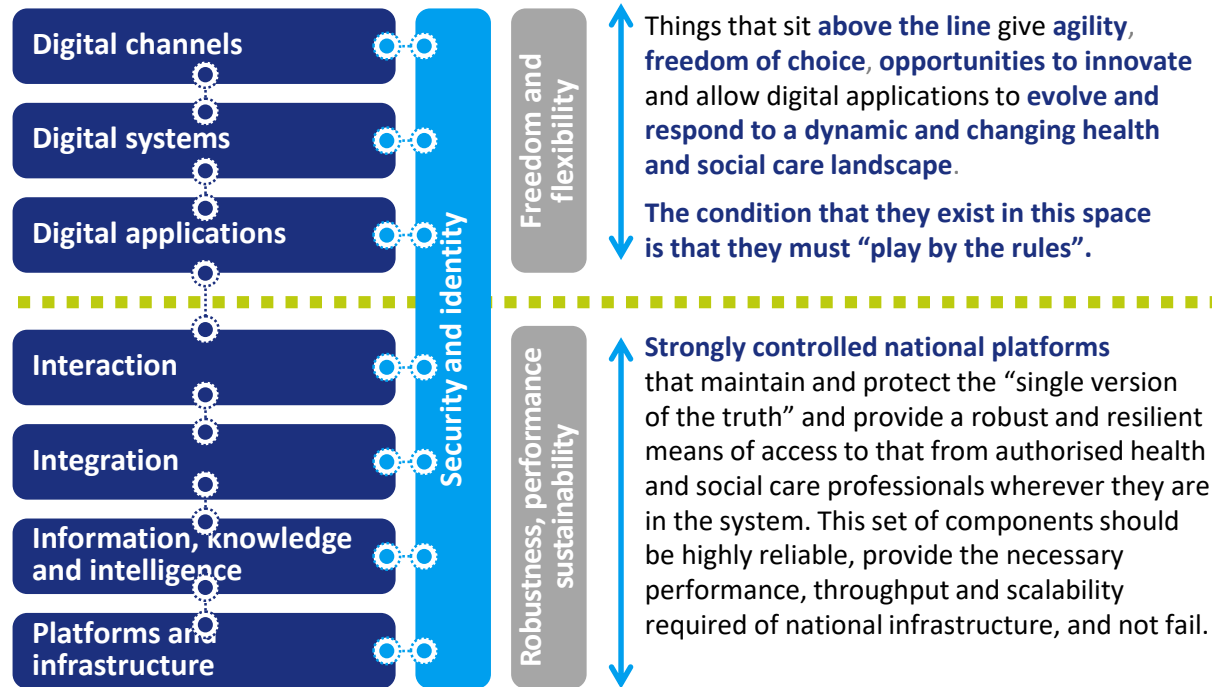**Digital applications**
Key application components that will be required to support digital enablement of the platform components (e.g. a clinical portal).

Interaction
Components that support interaction with digital customers, manage requests, state, case requests and co-ordination, communication and engagement (e.g. a directory of patients).

Integration
Components that support the integration and interoperability of applications, their co-ordination, workflow and monitoring (e.g. application programming interfaces).

Information, knowledge and intelligence
Components that support digital applications, services and orchestration through the collection, development and provision of reference information, knowledge and intelligence based on string reference data definitions (e.g. a data warehouse).

Platforms and infrastructure
Core network and storage infrastructure to support digital enablement of the platform components (e.g. national networks and data centres).

Security and identity
Components that support the Identification of users (citizens, patients and staff), protect their information and ensure appropriate access. (e.g. single sign-on).

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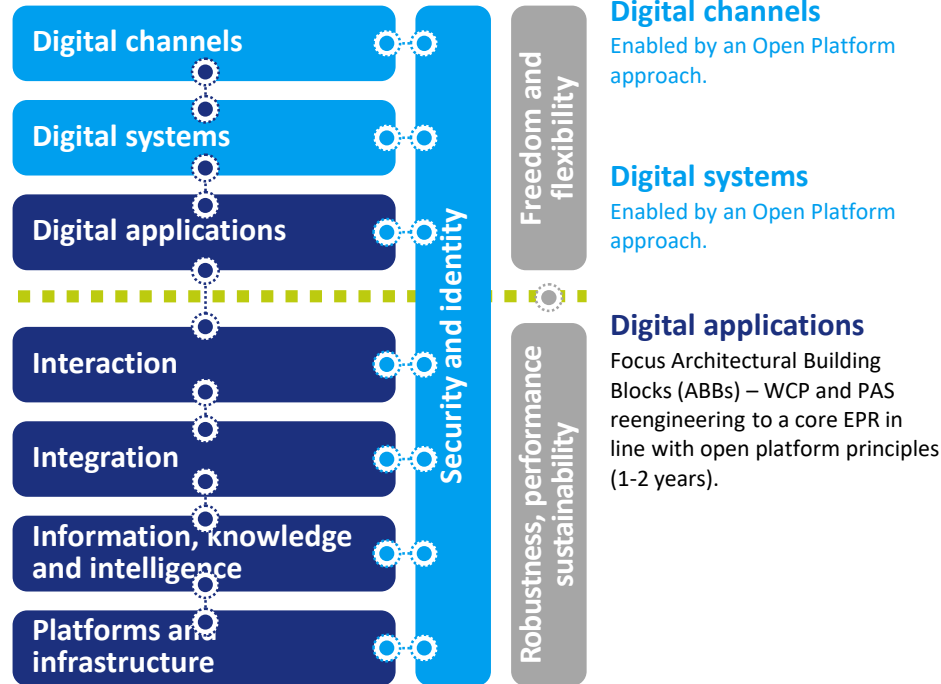299/395

There is a significant opportunity

The model forces a clear separation between components "above the line" that allow for diversity, choice and agility within a set of clear rules, and those "below the line" that are defined, managed and protected.

Freedom and flexibility

Things that sit **above the line** give **agility**, **freedom of choice**, **opportunities to innovate** and allow digital applications to **evolve and respond to a dynamic and changing health and social care landscape**.

The condition that they exist in this space is that they must "play by the rules".

Robustness, performance sustainability

Strongly controlled national platforms that maintain and protect the "single version of the truth" and provide a robust and resilient means of access to that from authorised health and social care professionals wherever they are in the system. This set of components should be highly reliable, provide the necessary performance, throughput and scalability required of national infrastructure, and not fail.

A highly modular approach is key. It means that individual components can be stress-tested and monitored for performance independent of the whole. It would permit health boards to integrate national functionality into existing workflows and help convergence work.

Above the line:
- Digital channels
- Digital systems
- Digital applications

Below the line:
- Interaction
- Integration
- Information, knowledge and intelligence
- Platforms and infrastructure

Security and identity

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There is a significant opportunity

The key Building Blocks necessary for an Open NHS Wales Platform are located in the high level Target Architecture as below:

Digital channels | Digital systems | Digital applications | Security and identity | Freedom and flexibility | Interaction | Integration | Information, knowledge and intelligence | Platforms and infrastructure | Robustness, performance sustainability

Digital channels
Enabled by an Open Platform approach.

Digital systems
Enabled by an Open Platform approach.

Digital applications
Focus Architectural Building Blocks (ABBs) – WCP and PAS reengineering to a core EPR in line with open platform principles (1-2 years).

Interaction
Focus ABB – Enhance NHS Wales EMPI along open principles to facilitate a more developed Patient/Citizen identification strategy. (1 year with early wins in 3 months).

Integration
Focus ABB – Enhance Integration and Interaction Engine (possibly including sourcing options) to provide a truly open platform for Wales (1 year target).

Information, knowledge and intelligence
Focus ABB – Clinical Data Repository. Focus the work of the National Data Resource (NDR) programme on the creation of a National Clinical Data Repository in line with open principles as a key part of the programme. (1 – 2 years).

Platforms and infrastructure
Focus ABBs – All core network and storage infrastructure, both local and national, to support digital enablement of the platform components. Build on the final recommendations of the Trustmarque review of networks to move towards a modern (possibly multi-sourced) software managed national network and storage infrastructure (3-5 years).

Security and identity
Enhance in line with other Open Platform work and national cyber security requirements.

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The ambition is achievable

The high level roadmap for achieving the Target Architecture defined in the Future State Assessment is estimated to be a three year transition from financial year 19/20 to financial year 21/22. A fully open and resilient Target Architecture should be achievable in that timescale, but its development will have to be balanced against:

- Maintaining day to day service throughout the transition.

- Available capacity and funding.

- Other priorities for the system that will require functionality to be enhanced or developed.

Within that overall transition, there are however some aspects of the transition that can be achieved much more quickly than others.

We estimate that, with an appropriate focus, the majority of the transition to an open architecture could realistically be achieved within a 2 year period to the end of financial year 20/21. This will require considerable focus, along with some key priority calls, however it will enable the pace of innovation on the front line to be accelerated. The aspects that will take longer will principally relate to core infrastructure change that will be a major undertaking and require considerable investment for a resilient national platform.

In addition, the roadmap includes some much shorter term architectural adjustments that could yield shorter term benefit in 19/20 to early 20/21, along with some candidate "challenge" projects that could be accelerated to test and signal digital transformation to patients, service users and staff across the system.

11

Achieving the ambition requires a fundamental change of approach and focus

Underpinning our recommendations is a set of assumptions that are critical to success.

An open Digital Architecture, as described in this report, is necessary for the achievement of the ambition set out in A Healthier Wales. To deliver an open architecture is not enough on its own. An open architecture requires a significant transformation in the ways of working within the digital community.

To ensure the benefits of an open architecture are realised a transformation programme is needed to drive the changes in operational practice, standards and collaboration across health and social care in Wales. This will require a commitment to the development of an Open Digital Platformthat

can be matched by the focus required to accelerate the journey.

Delivering these changes in a relatively short timeframe will require additional, short term, resources with a focus on the planning for a programme of this scale and laying the foundations to ensure the benefits are available to all Health Boards, Trusts, Social care and ultimately the population of Wales.

An open digital architecture is equally about changing the interactions between the providers and consumers of systems and data. This change will require a new operating model, revised governance, clear responsibilities and transparent oversight.

There will need to be collaboration and different working arrangements between all parties involved in Digital to maximise the use of the expertise in the system in the short term.

There will also be a need for an adjustment to delivery priorities in the next financial year in order to make progress.

Although we make no specific recommendations on these points as they are outside the remit of this review, they are fundamental to success.

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The recommended architectural steps

The prize of a digitally enabled health and social care system in Wales is within reach, but it cannot be achieved without a change in approach, focus and energy.

Digital architecture
3 - 9 months

- Adopt a core set of Digital Design Principles.
- Adopt and publish a TOGAF® (or similar) framework, locating Digital Architecture in a business context for the NHS in Wales.
- Define the all Architectural Building Blocks (ABBs) for the NHS Wales Digital Architecture.
- Define all candidate open national applications (e.g. WCP, WCCIS etc.)
- For the key ABBs required for an Open Digital Architecture (EMPI, Integration and Interaction, and CDR) develop a consistent set of core products that are agreed and published nationally.
- Start to focus on some early wins.

Open digital platform
1 - 2 years

- Enhance the NHS Wales EMPI along open principles to facilitate a more developed Patient/Citizen identification strategy.
- Enhance the NHS Wales Integration and Interaction Engine to provide a truly open platform for NHS Wales.
- Focus the work of the National Data Resource (NDR) programme on the creation of a National Clinical Data Repository in line with open principles whilst progressing the programme as a whole.
- Make migrating the WCP to an open architecture the highest priority for the product in the next 12 months. This will need to address any impacts on the current work programme.

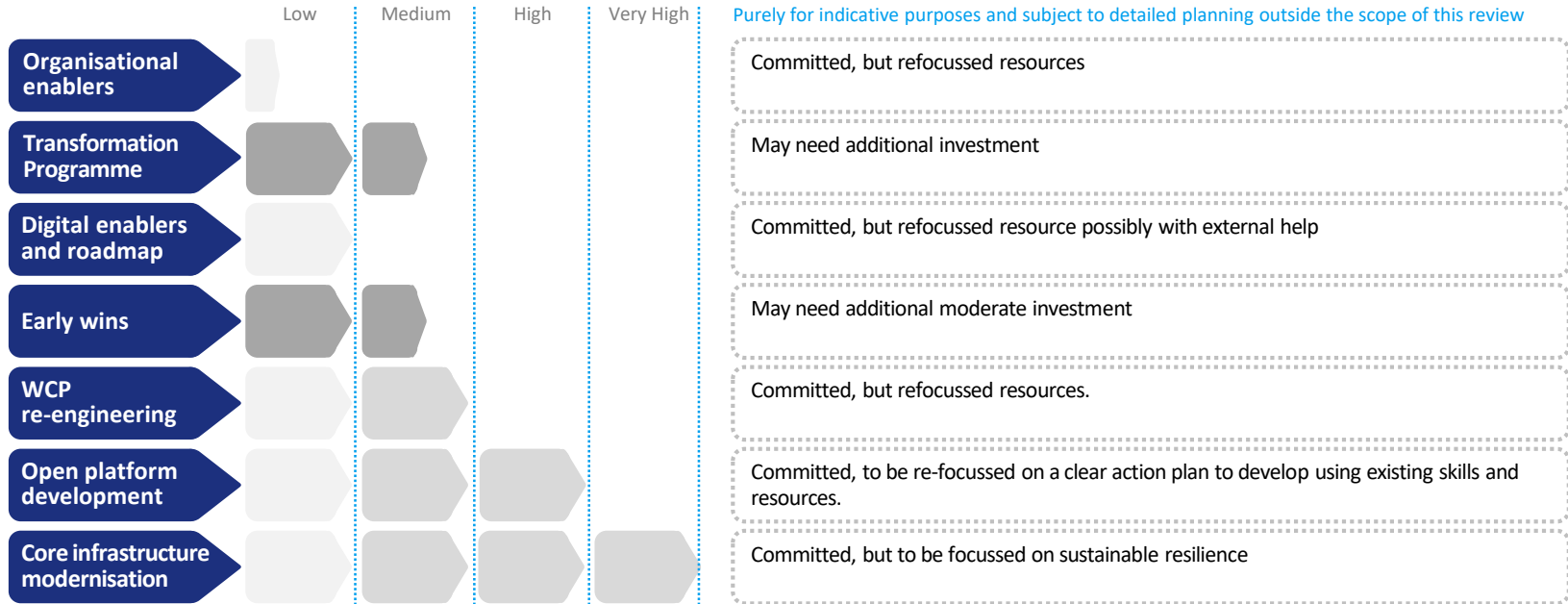## Stabilisation and resilience
2 - 3 years

- Build on the final recommendations of the Trustmarque review of networks to move towards a modern (possibly multi-sourced) software managed national network and storage infrastructure.

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Achieving the ambition requires more

	3 months	9 months	1 year	2 years	3 years

Organisational enablers — *Commitment, collaborative working arrangements, priority setting*

Digital architecture enablers — Architectural Governance model aligned with Enterprise Architecture principles and best practice in clinical leadership of digital technology design

Digital blueprint and roadmap — *Digital Blueprint and Roadmap for Health and Social Care in Wales. National Clinical Systems Strategy. National Networks and Storage Strategy*

Early wins — Selected "challenge" projects using open principles with existing API layer as proofs of concept

WCP re-engineering — WCP aligned with open platform as a leading exemplar

Open platform development — Fully developed Open NHS Wales Digital Architecture in line with future state recommendations

Core infrastructure modernisation — *Fully modernised network and storage solution for national scale including software defined networks, possible use of Cloud/hybrid solutions, and potentially different sourcing*

Milestones:
- Digital architecture enablers in place and early wins started
- Digital and clinical systems roadmaps agreed and early wins
- WCP robust and open
- **Fully open Digital Architecture in place**
- Modernised resilient national infrastructure

Note: *Italicised workstreams are outside the formal scope of this review but essential to meeting the ambition.*

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Indicative resourcing implications

	Low	Medium	High	Very High	

Purely for indicative purposes and subject to detailed planning outside the scope of this review

Organisational enablers	Low				Committed, but refocussed resources
Transformation Programme	Low	Medium			May need additional investment
Digital enablers and roadmap	Low				Committed, but refocussed resource possibly with external help
Early wins	Low	Medium			May need additional moderate investment
WCP re-engineering	Low	Medium			Committed, but refocussed resources.
Open platform development	Low	Medium	High		Committed, to be re-focussed on a clear action plan to develop using existing skills and resources.
Core infrastructure modernisation	Low	Medium	High	Very High	Committed, but to be focussed on sustainable resilience

Whilst there may be some incremental additional funds needed for early wins and transformation, we would recommend a refocussing of existing plans, resources and funding to achieve the goals of A Healthier Wales

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Target "challenge" projects

We have identified a small number of projects where a different approach could start the journey towards an open digital platform for Wales. The purpose of these projects is to challenge the NHS in Wales and its supply chain to work in a different way around a national architecture, at the same time delivering short and medium term patient benefits. There will need to be a level of resolve and commitment to making these work for all parties involved.

Patient Knows Best (PKB) and Dr Doctor

Patient facing solutions such as Dr Doctor (proposed in Aneurin Bevin University Health Board) and PKB (in Cardiff and Vale University and Hwywel Dda Health Boards, and Swansea but with different implementations) have significant advantages in term

of patient engagement and care. They are largely proven products and can co-exist. The challenge we are setting is to align all instances of PKB and Dr Doctor with the open principles outlined in this report, and to focus on them accessing the same, national, patient record rather than local instances. This will test the concept of working with suppliers in a new, open, digital architecture and test the progression of local solutions with national potential.

ABUHB Portal

Discussions on portal convergence between NWIS and Aneurin Bevin University Health Board have struggled to progress. Our proposal is to challenge the acceleration of the convergence by moving to an open systems approach for the ABUHB Portal (CWS) that would facilitate user pull to convergence rather than supply side push. It would focus on making sure that CWS is able to access the "single version of the truth" for the patient record,

and align with the approach outlined in the "innovation pyramid" in A Healthier Wales. We know that this represents a significant challenge to all parties, but the current approach does not appear to be working.

There is an opportunity to develop the CWS into a truly open platform alongside the WCP to test the concept of this approach, and to build a resilient "plug and play" open environment. Similar to the recommendation for the WCP, ABUHB would need to align the portal with the open architecture recommended in this report.

16

Target "challenge" projects

WCCIS (in ABUHB)

The WCCIS implementation in ABUHB represents a significant opportunity to test the pathways and use of shared information between health and social care in Gwent However, the project is experiencing some difficulty in progressing because of architectural concerns around differing views on how the implementation could be delivered. Some of this is related to the issues mentioned above around convergence of the different portal estates. The prize of a test of the new ways of working across health and social care in Gwent is potentially being impeded by this and we suggest that all parties involved work towards an open systems approach as the end game with a possible tactical stepping stone towards

that which maximises the likelihood of success for patients and the front line. We are aware of the options being considered and that would suggest that the challenge is set to resolve the short term issues to the benefit of the system, with a longer term game plan towards a truly open implementation of WCCIS that can be adopted nationally.

This will not be an exhaustive list, but represents a few early examples where a task and finish approach that examines the options in an accelerated timescale using a more agile approach could yield early benefits, some as early as three months.

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Action plan

Recommendation		Suggested timing	Suggested ownership
Digital architecture	Commit to the development of an NHS Wales Open Digital Architecture.	Immediate	**Welsh Government**
	Adopt a core set of Digital Design Principles.	3 months	**NHS Wales**
	Adopt and publish TOGAF ® (or similar) framework to locating Digital Architecture in a business context for the NHS in Wales.	3 months	**NHS Wales**
	Define all Architectural Building Blocks (ABBs) for the NHS Wales Digital Architecture.	3 months	**NHS Wales**
	For the key ABBs required for an Open Digital Architecture (EMPI, Integration and Interaction, and CDR) develop, publish a consistent product set of core products that are agreed across Wales and published nationally.	3 months	**NHS Wales**
	Start work to focus on some early wins in line with open architecture principles.	3 months	**NHS Wales**

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Action plan

Recommendation		Suggested timing	Suggested ownership
Open digital platform	Enhance the NHS Wales EMPI along open principles to facilitate a more developed Patient/Citizen identification.	1 year with early wins in 3 months	**NHS Wales**
	Enhance the NHS Wales Integration and Interaction Engine (possibly including sourcing options) to provide a truly open platform for Wales.	1 year target	**NHS Wales**
	Focus the work of the National Data Resource (NDR) programme on the creation of a National Clinical Data Repository in line with open principles in a balanced way that ensures that the programme as a whole is progressed but the CDR is given priority.	1-2 years with a series of shorter term transition architectures	**NHS Wales**
Stabilisation and resilience	Make resolving the performance problems of the WCP and migrating to an open architecture that can take advantage of the architecture proposed in the Future State the highest priority for the product in the next 12 months.	1 year	**NHS Wales**
	Build on the final recommendations of the Trustmarque review of networks to move towards a modern (possibly multi-sourced) software managed national network and storage infrastructure.	2 - 3 years	**NHS Wales**

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Final Report – MARCH 2019 *Final*

Action plan

Recommendation		Suggested timing	Suggested ownership
Digital health and social blueprint and roadmap	Develop and publish an end to end Digital Blueprint and Roadmap for Health and Social Care in Wales that develops the high level ambition articulated in "A Healthier Wales" into an actionable roadmap setting out the evolution of the digital architecture and how will deliver on the ambition for the system.	6-9 months	NHS Wales
National clinical systems strategy	As observed in the Current and Future State Assessments, the Welsh Clinical Portal and other national systems sit within a complex landscape of other clinical systems used at the level of Health Boards. The ability to maintain a direction that relies on scarce national capacity to develop all clinical solutions is one that is likely to be unsustainable. In addition, some of these platforms are regarded as being in direct competition and the focus is on convergence rather than openness. An open platform approach would enable more freedom and flexibility to meet Health Boards' local needs in addition to innovation, whilst taking advantage of shared records across Wales. We strongly recommend the development of a national clinical systems strategy that takes account of the full range of clinical systems across Wales and charts an agreed roadmap for their development against an Open Platform model.	6-9 months	NHS Wales

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Final Report – MARCH 2019 *Final*

Action plan

Recommendation		Suggested timing	Suggested ownership
Architectural controls	There is a need for Architectural Governance mechanisms to be built into the wider Governance of Digital technology in Wales including clinical and non-clinical design authorities, and a leadership model for collective clinical leadership of the Digital Architecture in Wales. We therefore recommend the development and implementation of an Architectural Governance model aligned with Enterprise Architecture principles and best practice in clinical leadership of digital technology design. In this there need to be decision making mechanisms that are inclusive but binding.	6-9 months	**NHS Wales**
Market relationships	Whilst we have seen strong contract management skills evident in the NHS in Wales, a digital model against an open architecture requires amore commercial mindset that will enable the NHS in Wales to partner with the market in more innovative and collaborative ways whilst still observing the necessary legal and contractual frameworks. NHS Wales should consider approaches to building relationships with the market in a way that works towards mutual alignment behind the ambition and outcomes set out by A Healthier Wales, as opposed to contracting for digital outputs and products.	6-9 months	**NHS Wales**

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Future State

With the right focus a target digital architecture that supports the ambition for A Healthier Wales could be achievable.
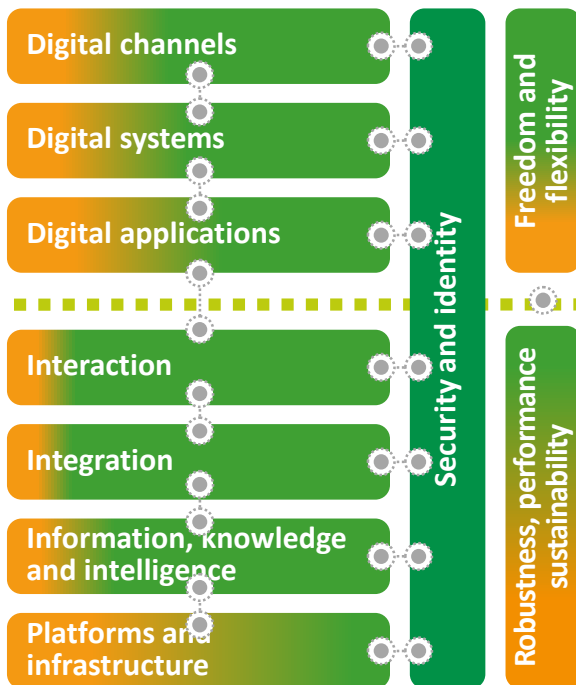
Digital channels

Multi-channel working environment for clinicians and non-clinicians in most Health Boards. Patient access on line to a variety of services.

Digital systems

Supporting infrastructure to orchestrate channels and use modern customer interaction technologies such as web chat.

Digital applications

Majority of national platforms use open principles. Multiple examples of clinical, non-clinical and patient applications in use that comply with the Welsh standards and make use of the open platform. Acceleration of pace towards an eco-system of suppliers, innovators and academic institutions driving innovation.

Interaction

Fully open architecture with supporting published standards and available test and accreditation environments and developer support in place.

Integration

Significant progress towards integrated working across health and social care through the digital architecture in place. Strong digital workflow.

Information, knowledge and intelligence.

National Clinical Data Repository with associated intelligence and research capability. Strong data standards. Advanced business intelligence.

Platforms and infrastructure

Significant progress towards a modernised network and storage infrastructure providing resilience and stability nationally and making appropriate use of software defined network and clouds technologies.

Security and identity

Ongoing development in line with threat levels and capabilities required.

Key

Capable of supporting ambition:

| Now | In <2 years | In >2 years |

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Conclusions

The recommendations set out in this document build on the current digital architecture of the NHS in Wales. They set out a clear and achievable plan to deliver an architecture that will fully enable Wales to embrace a digital future, support innovative practices in front line care, to plan services, and facilitate research and public health.

An open architecture as recommended in this report will provide the flexibility and pace for innovation using local, national and commercial resources, thus accelerating pace. The digital teams in Wales will be able to respond to changes in front line care delivery and organisational structures rapidly, without changes to underlying systems or data.   This model protects against supplier lock-in, preventing constraints, and providing freedom to select the best solution to meet the needs of the Welsh people.

The immediate recommendations set out in the Improvement Options also suggest real demonstrable examples that will engage directly with patients and support clinicians in their delivery of high quality care. These will help set the tone for the future of digital service in Wales.

It is also recognised that to deliver a transformation as impactful as this requires resources to support the programme of change and deliver an infrastructure that will ensure reliability resilience and sustainability for the health and social care services for Wales.

Final Report – MARCH 2019 *Final*

Academy of Medical Royal Colleges

Alerts and notification of imaging reports
Recommendations

Contents

Foreword

Timely communication and the actioning of urgent and unexpected findings is a crucial part of ensuring patient safety. There is an expectation that radiology departments will produce timely reports, flag up urgent and or critical findings and the clinical teams will acknowledge they have received and understood the reports and appropriate action has then taken place.

Over many years it has become apparent that for a variety of reasons, related to both organisational and human factors, this does not always occur, resulting in patient harm. This cannot continue as highlighted in the HSIB report referenced in this document, and failsafe systems need to be in place in all organisations undertaking diagnostics. It is clear that an IT failsafe solution would be optimal in ensuring that these reports are communicated efficiently as well ensuring the reports have been read and actioned.

These have been set up on an ad hoc basis by some trusts, but there is no robust nationwide system available or currently being planned which continues to put patients at risk. Until such time that these systems are widely available this document provides optimal and usable guidance to trusts which will help ensure patient safety.

I am grateful to Dr Teik Choon See for leading a multidisciplinary, intercollegiate team in developing the following guidance which sets the minimum standards that all organisations should achieve. Some organisations may already have these in place or be well in advance of these, but ultimately we need a robust national technology based IT failsafe system established throughout the NHS.

Dr Raman Uberoi
Medical Director Professional Practice, The Royal College of Radiologists

As the HSIB report recognised, this is a clear example of where a problem which arises in one area of medicine requires a solution developed and delivered across specialties and professions. That is precisely the role that the Academy can play to ensure college support and buy-in to enable a cross-profession response.

The recommendations produced here were considered and approved by the Academy Council which comprises the presidents of all the medical royal colleges and faculties in the UK. Colleges will therefore support and promote the recommendations among their members.

We hugely appreciate the work of the RCR in convening the multi-organisation team to look at this important issue and, more importantly, to come up with cross professional solutions which, if fully implemented and supported by the proper digital systems can ensure these dangerous errors do not continue. That will obviously be a significant improvement in patient safety — a goal we all support.

Professor Dame Helen Stokes-Lampard
Chair of Council, Academy of Medical Royal Colleges

Introduction

The Healthcare Safety Investigation Branch [HSIB] report, *Failures in communication or follow-up of unexpected significant radiological findings*[1] highlights the case of a patient with lung cancer on a chest radiograph that was not reported and acted upon promptly by several different clinical teams leading to delayed diagnosis and poor outcome. This case is by no means isolated. Similar incidents still occur despite a well-established electronic notification system and the referrer being notified in a timely fashion about the abnormal report. There is a clear need to address some of the areas of concern regarding the existing result notification system to ensure there are no opportunities for missed or delayed communication and action. To achieve this, the process and the responsibility to act on abnormal radiology findings needs to be clearly defined and standardised across multiple specialties. A fail-safe result notification system will require oversight and facilitation by healthcare organisations.

In addition to the standard result notification process, some imaging findings may require an alert system to prioritise actions. The time frame and the mode of communication will depend on the acuity of the findings. A system should also be in place to define responsibility for communicating results to patients.

The principles of a safe and effective imaging result notification process should encompass a fail-safe system from initiation of the report by the imaging department to appropriate action of the report by the referrers. Patients that are under the care of multiple clinical teams are most at risk of falling outside the completion of this system. Healthcare organisations should ensure a robust governance system to maintain patient safety by ensuring that all investigations are justified, completed and acted upon. Regular audits are essential to ensure compliance with the recommendations.

A robust digital infrastructure in combination with human interactions is essential to ensure the success of the fail-safe notification system.

Principles and recommendations of a Fail-Safe Result Notification System:

1. Prompt notification of all imaging reports by the Imaging department.

2. Prompt review, acknowledgement and action on all imaging reports by the referrers.

3. A system to facilitate identification and action of reports which have not been read, acknowledged and acted upon.

Current standards and considerations for imaging report notification

The recommendations for imaging report notification are highlighted by The Royal College of Radiologists (RCR) publications on the *Standards for interpretation and reporting of imaging investigations*[2] and the *Standards for the communication of radiological reports and fail-safe alert notification.*[3] The relevant recommendations include the following:

— It is the responsibility of employing organisations to ensure appropriate reporting and fail-safe systems are in place and to audit regularly.

— It is the responsibility of employing organisations to ensure that reports can be communicated to other information technology (IT) systems using HL7 standards. HL7 is a set of international standards for the transfer of clinical and administrative data between software applications used by various healthcare providers.

— It is the responsibility of the requesting doctor and/or their clinical team to read and act upon the report findings and fail-safe alerts as quickly and efficiently as possible. This extends to ensuring robust mechanisms are in place and suitably resourced to cover leave within clinical teams or practices.

— Fail-safe systems should be IT-based to reduce error and increase efficiency, but if facilities are not available, alternative manual processes should be in place.

— If manual processes (for example, telephone calls and emails) are required, administrative staff should be available to support radiologists and reporting radiographers at all times of the day or night.

The Quality Standard for Imaging,[4] published by the RCR and the College of Radiographers has a quality standard for managing unexpected diagnoses and potential medical emergencies (XR 510) which requires services to have processes in place for:

— Alerting referrers to unexpected findings.

— Ensuring acknowledgements of the alert are received by the service.

— Management of non-acknowledgement of receipt.

— Management of alerts when reporting out of hours.

An RCR audit to determine the compliance of UK healthcare organisations with published guidance on the communication of critical, urgent, and unexpected significant findings identified a wide variation in practice across the UK concerning the communication

and monitoring of reports with many organisations not fully compliant with published UK guidance. Despite the widespread use of electronic systems, only a minority of organisations have and use electronic tracking to ensure reports have been read and acted upon.[5]

The European Society of Radiology guidelines for the communication of urgent and unexpected findings highlighted that good communication helps to improve patient safety and that referrers should be aware of their responsibility to read and act on radiological reports.[6] It encouraged 'enhanced communication' for emergency and unexpected findings but raised concern that referrers will rely on alert mechanisms, and assume that the other reports are normal or have no significant findings. There is also a concern that the responsibility for ensuring that imaging reports are acted upon and even legal responsibility will transfer to radiologists, even though they have only limited information about the patient at the time of reporting. It should also be recognised that all alert mechanisms take additional time, effort and resources, so there are associated productivity costs.

The Parliamentary and Health Service Ombudsman highlighted learning related to failings in the imaging pathway in their report, *Unlocking Solutions in Imaging: working together to learn from failings in the NHS*.[7] One of the four recommendations specified that digital infrastructure must now be treated as a patient safety issue, and that The Department of Health and Social Care and NHS England and Improvement (NHSE/I), working with the NHS Transformation Directorate and NHS Digital, should prioritise improvements to digital reporting capabilities across the imaging system.

Healthcare Safety Investigation Branch report safety recommendations[1]

a. It is recommended that The Royal College of Radiologists [RCR], working with the Society and College of Radiographers [SCoR] and other relevant specialties through the Academy of Royal Medical Colleges, develops:

   —   principles upon which findings should be reported as 'unexpected significant', 'critical' and 'urgent'

   —   a simplified national framework for the coding of alerts on radiology reports

   —   a list of conditions for which an alert should always be triggered, where appropriate and feasible to do so.

b. It is recommended that the NHSE/I patient safety team takes steps to ensure providers are aware of the safety recommendations in this report and act to implement the key findings regarding risk controls such as a monitored acknowledgement system for critical, urgent and unexpected significant findings.

c. It is recommended that the NHS Transformation Directorate develops a method of digitally notifying patients of results. This should be used to inform patients of unexpected significant radiological findings after an agreed timeframe. It should be developed in conjunction with The Royal College of Radiologists. The notification system should be tested and evaluated.

d. It is recommended that the Care Quality Commission amends all appropriate core service frameworks to include risk controls identified in this report, to mitigate the risk of significant abnormal findings not being followed up.

A collaborative approach

This document is a collaborative effort from The Royal College of Radiologists, the Society of Radiographers, the Royal College of Emergency Medicine, the Royal College of General Practitioners, the Royal College of Physicians, the Royal College of Surgeons of England, the Royal College of Paediatrics and Child Health, the Academy of Medical Royal Colleges, and NHS Digital. It represents a collective consensus from clinical and published practices on the process of notification of expected or unexpected findings, which include cancer diagnoses or critical findings that may require immediate or urgent attention. Further collaborative work is being carried out by the NHS Transformation Directorate and NHSE/I and this document will be reviewed accordingly.

The main objective of this document is to ensure prompt and effective imaging result notification and its subsequent action to protect patient safety. It includes:

— Definitions of the different categories of imaging findings that require an alert notification

— A list of critical findings for which an alert should be triggered

— Simplified national alert text codes for imaging reports. These text codes refer to canned text codes used in proprietary radiology information systems.

The three main categories for imaging alerts are:

— New cancer diagnoses or newly detected cancer recurrences

— Critical findings that are time-critical

— Significant addenda in the report that may alter clinical management.

Individual healthcare organisations may incorporate additional imaging alerts, subject to their local governance processes.

The main objective of a robust notification process is to ensure that the imaging reports are reviewed and understood so that further clinical actions can be taken if required. It is the responsibility of the healthcare organisations to adopt a fail-safe system that enables the identification of reports that have not been reviewed and acted upon (or plan to act) and embed a mechanism to follow up on these reports. This may involve a digital system, a Results Coordination Team, or a combination. This should not solely become the responsibility of the imaging department. Funding and support should remain the responsibility of the healthcare organisations.

Every imaging referral must include a valid contact detail to which an urgent communication can be made if required, including an out of hours' contact. The system can also be pre-agreed between the referrers and the imaging department.

A **Results Coordination Team** is a team of staff employed by the healthcare organisation to optimise the alert notification system. The team is reportable to the local patient safety department, or other unit deemed appropriate by the healthcare organisation. They may also be responsible for other support services in escalating alerts and should at least be available from 9:00-17:00, 7 days a week.

The aim of the Result Coordination Team is to ensure that no patient suffers adversely because of delayed or miscommunicated radiology reports. The Results Coordination Team should be primarily focused on patient outcomes and not merely concerned with institutional compliance around alert and acknowledgement systems.

The function of a Results Coordination Team should include, as a minimum:

— Verbal communication to the referrers that an imaging report containing a critical finding which may require immediate intervention is now available. This includes inpatients, outpatients, and primary care. The role here is to escalate the review of the imaging report, and not communicate the actual report findings.

— Support the results notification system to ensure that reports are returned to the correct clinical team caring for the patient.

— Identify and escalate imaging alerts (for example a new cancer diagnosis or a significant addendum) that have not been reviewed and acted upon (or plan to act). A 48-hour interval before escalation is reasonable but this may vary depending on clinical urgency and should be agreed upon by the healthcare organisation.

It is important to acknowledge that this document should not be used to establish the legal standard of care in any particular clinical scenario.

A collaborative approach

1. A safe and effective result notification system requires a concerted effort from all involved, using an electronic system and supported by human interactions.

2. Alerts should be in place in three imaging categories: new cancer diagnoses or new recurrences, critical findings that are time-critical, and significant addenda that may alter clinical management.

3. It is the responsibility of the healthcare organisations to adopt a fail-safe system that enables identification of reports that have not been reviewed and acted upon (or plan to act) and embed a mechanism to follow up these reports.

4. Every imaging referral (or through a pre-agreed system) must include a valid contact detail to which an urgent communication can be made if required, including an out of hours contact.

5. A Results Coordination Team should help ensure reports are returned to the correct clinical team, verbally inform the referrers that critical reports are available for immediate review and escalate imaging alerts that have not been reviewed and acted upon (or plan to act).

Categories of imaging findings and their notification processes

1. **New cancer diagnosis or newly detected cancer recurrence suspected from imaging, expected or unexpected**

This includes expected or unexpected imaging findings that suggest new or probable new cancer and new or probable new cancer recurrence.

Examples of new cancer diagnoses:

Examination:	*Chest radiograph*
Clinical indication:	*Breathlessness. Heart failure?*
Report:	*A spiculated right upper lobe lesion concerning for an underlying malignancy*

Examination:	*CT kidneys, ureters and bladder*
Clinical indication:	*Painless visible haematuria. Renal cancer?*
Report:	*A 2cm left upper pole renal lesion with imaging features of renal cell cancer*

Example of a newly detected cancer recurrence:

Examination:	*CT chest, abdomen and pelvis*
Clinical indication:	*Lymphoma in remission for 12 months. Now tiredness and abdominal fullness. Relapse?*
Report:	*Splenomegaly, enlarged mediastinal and para-aortic lymph nodes in keeping with recurrent disease.*

Cancer disease progression does not fall into this category e.g. growing tumour or new nodules in a known cancer.

- Cancer pathway imaging examinations and reporting should be prioritised.

- An alert should be triggered for all new cancer diagnoses or newly detected cancer recurrences. This includes expected diagnosis as the perception of what is expected or unexpected may not be clear. Reinforcing the result via the alert notification process will also help to ensure all the results are reviewed and acted upon promptly.

- The alert (alert text code: **CANCER**) should be immediately apparent on the report e.g. the red alert CANCER be stated at the top or bottom of the radiology report. The preferred format is at the discretion of the healthcare organisations. This notification should be triggered *immediately* upon completion of the report and be conducted via a digital platform incorporating a system for acknowledgement of receipt of the reports and subsequent actions (or plan to act). The actions from the CANCER alert notification may include clinic review, further investigations, or treatment plan.

Recommendation on cancer imaging alerts

1. All imaging reports with expected or unexpected new cancer diagnosis or newly detected cancer recurrence should be notified to the referrers with a **CANCER** alert in the report via a digital platform immediately upon completion of the reports.

2. Referring teams must ensure a valid contact detail (or through a pre-agreed system) is available, including out of hours, on all imaging referrals. They must also ensure that all reports are read, acknowledged and acted upon (or plan to act).

3. Healthcare organisations must ensure a fail-safe system that enables identification of reports that have not been read, acknowledged and acted upon (or plan to act).

4. Healthcare organisations must embed a mechanism to follow up on these reports that have not been read, acknowledged and acted upon (or plan to act). This may involve a digital system, a Results Coordination Team, or a combination.

2. Critical imaging findings where clinical management is time critical, expected or unexpected

— Imaging and reporting for patients with critical conditions should be prioritised.

— Critical imaging findings are those with diagnoses that may result in immediate or acute harm to the patient and therefore will require immediate or urgent clinical attention. The findings may be expected or unexpected.

— The list in Table 1 may be considered as critical imaging findings which may require an alert, if these are new findings, depending on severity. It is not intended to be definitive and may be subject to adaptation by local governance.

Table 1

System / Specialty / Region	New critical conditions
Central nervous system	— Cerebral or spinal haemorrhage — Intracranial mass with significant mass effect — Herniation syndrome — Acute stroke — Intracranial infection / empyema — Unstable spine fracture — Tension pneumocephalus — Spinal cord compression
Neck	— Airway compression or impending obstruction — Carotid artery dissection
Thorax	— Tension pneumothorax — Central pulmonary embolism — Mediastinal emphysema — Large pericardial effusion with suspected tamponade

System / Specialty / Region	New critical conditions
Abdomen	— Bowel perforation — Ischaemic bowel — High grade or closed loop bowel obstruction — Portal venous air — Acute volvulus — High grade traumatic visceral injury — Active intra-abdominal or retroperitoneal haemorrhage
Uro-genital	— Ectopic pregnancy — Placental abruption or placenta praevia — Uterine rupture — Foetal demise — Testicular or ovarian torsion
Musculoskeletal	— Necrotising fasciitis — Suspected physical abuse
Vascular	— Acute aortic dissection, injury or ruptured — Acute aortic aneurysm rupture — Suspected impending aortic aneurysm rupture — Deep vein thrombosis
General	— Significant misplacement of line, tube or other implanted devices of immediate clinical concern — Retained surgical foreign body — Foreign body with potential immediate clinical concern — Infection of immediate clinical concern e.g. open tuberculosis

System / Specialty / Region	New critical conditions
Paediatrics	— All conditions listed above where relevant — Significant congenital anomalies — Rib fracture — New fracture on follow up from skeletal survey — Metaphyseal fracture — Slipped upper femoral epiphysis — Significant dilatation of the upper urinary tract (requiring a paediatrician to prescribe antibiotic prophylaxis) — Preoperative radiography changes that may affect surgical planning (consolidation on a pre-op scoliosis CXR)

— The critical nature of the diagnoses means that imaging reports must be accessed or communicated as soon as they are made available.

— Due to the critical nature of some diagnoses, the radiologist or the diagnostic radiographer may have notified the referrers verbally before the examination being formally reported. Such communication including the name of the receiver and the time of notification needs to be documented in the patient record, the radiology information system, or the radiology report.

— An alert (alert text code: **CRITICAL**) should be triggered *immediately* upon completion of the report and be conducted via a digital platform incorporating a system for acknowledgement of receipt of the reports and subsequent actions.

— A critical finding may be identified along with a new cancer diagnosis in a single examination e.g. acute spinal cord compression from a new metastatic lung cancer. A single CRITICAL alert can be triggered or in combination with a CANCER alert. The important aspect is to provide timely notification to the clinical teams.

— **If immediate intervention is required**, for example, tension pneumothorax or ruptured aortic aneurysm, the **alert should be supplemented by direct verbal communication**. The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

— The majority of critical imaging findings are identified from investigations performed for patients undergoing assessment or treatment in the hospital setting for example, Emergency Department or in-patients. However, some unexpected critical imaging findings may be identified in the out-patients setting or after the patient has been discharged from the hospital. This latter group of patients are at a higher risk of delayed diagnosis or treatment due to a potential delay in communicating, accessing or acting on the imaging reports. Therefore, for critical findings involving **out-patients, a verbal communication may be required in addition to the alert report notification.** The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

— Verbal communication of the critical report to the referrers may be conducted by the reporter or the Results Coordination Team. In the event where the critical finding is life threatening, or during out of hours when the Results Coordination Team may not be available, it is recommended that the reporter communicates the result directly.

— An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

Recommendation on critical imaging alerts

1. All imaging reports with expected or unexpected new critical findings that may result in immediate or acute harm to the patient should be notified to the referrers with a **CRITICAL** alert in the report via a digital platform immediately upon the completion of the reports.

2. If immediate intervention is required, the alert should be supplemented by direct verbal communication.

3. For new critical findings involving out-patients, a direct verbal communication may be required in addition to the alert report notification.

4. The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

5. If verbal communication is required, this can be conducted by a Results Coordination Team notifying the clinical team that the report is now available for review. The reporter may need to make direct communication if life threatening or out of hours when the Results Coordination Team may not be available.

6. An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

7. Referrers must ensure a valid contact detail is available, including out of hours, on all imaging referrals. They must also ensure that all reports are read, acknowledged and acted upon (or plan to act).

8. Healthcare organisations must ensure a fail-safe system that enables identification of reports that have not been read, acknowledged and acted upon (or plan to act).

9. Healthcare organisations must embed a mechanism to follow up on these reports that have not been read, acknowledged and acted upon (or plan to act). This may involve a digital system or a Results Coordination Team, or a combination.

3. Significant addenda in imaging reports where clinical management may be altered

A significant addendum includes findings that are interpreted differently compared with a preceding report of the same examination that may result in immediate or acute harm to the patient or may result in adverse outcomes if timely action is not taken. This is a separate entity compared to an addendum containing new findings or a revised report which does not affect clinical management.

Examples of a significant addendum:

Examination:	*CT head*
Clinical indication:	*Right sided weakness. Loss of balance. Stroke?*
First report:	*No CT features of acute stroke*
Addendum:	*Loss of grey-white interface and loss of insular ribbon in keeping with early features of ischaemia.*

Examination:	*CT liver*
Clinical indication:	*Post radiofrequency ablation assessment*
First report:	*High attenuation nodule in ablation site concerning for residual tumour*
Addendum:	*The high attenuation area is also seen in the unenhanced series in keeping with a haematoma. No features of residual tumour.*

— Significant addenda may include but are not exclusive to cancer diagnoses or the conditions listed in Table 1. They may also include reports that reduce the significance of an original report.

— The previous interpretation could be a preliminary report that is accessible to the clinical teams or a verified report. Addenda added to radiology reports, or as part of radiology quality and governance processes also fall into this category.

— Individual healthcare organisations should have an internal process on managing discrepancies, near misses and errors as well as sharing good practice according to RCR standards on radiology events and learning meetings (REALMs).[8] This includes compliance with the professional duty of candour.

— As the significant imaging findings are identified after the original report has been issued or reviewed by the referrers, a potential delay may occur for the referrers to review the addended report. This delay may significantly impact clinical management. An alert notification is therefore required.

— The alert (alert text code: **ADDITION**) should be triggered *immediately* via a digital platform and supplemented by direct verbal communication if immediate intervention is required. This applies to in-patients, out-patients and primary care. The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

— A Results Coordination Team is best placed to take over the role for verbal communication to highlight that the report containing a significant addendum that may require immediate intervention is now available for review.

— An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

Recommendation on significant addenda alerts

1. All addended imaging reports that may alter clinical management should be notified to the referrers with an **ADDITION** alert in the report, via a digital platform immediately upon completion of the reports.

2. If immediate intervention is required, the alert should be supplemented by verbal communication which should be documented in the imaging report or patient record.

3. If verbal communication is required, this can be conducted by a Results Coordination Team notifying the clinical team that the addended report is now available for review.

4. An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

Roles and responsibilities of clinical teams and healthcare organisations

— The majority of imaging referrals will be requested by the junior medical teams or non-medical registered healthcare professionals, under the authorisation of the responsible consultant.

— The imaging reports and alerts will be directed to the original referrers for the examination.

— In the context of electronic alert notifications, this will be the referring consultant and may also include the junior staff or the registered healthcare professional that requested the examination.

— In the context of verbal notification for critical alerts, this will be the requester or the clinical professionals responsible for the patient at that moment.

— It is the responsibility of the referrers to ensure that a valid contact detail is available on all imaging referrals, including out of hours. The system can also be pre-agreed between the referrers and the Imaging department. They must also ensure that all imaging reports are read, acknowledged and acted upon. This should be documented on the patient record. This extends to ensuring robust mechanisms are in place and suitably resourced to cover leave within clinical teams or practices.

— A patient journey may involve multiple clinical teams, whether it be in-patients, out-patients, or primary care. A clinical team may request an imaging examination but the team may no longer be involved in the patient's care when the imaging report is completed.

— It is the responsibility of the referrer receiving the radiology alert to act or redirect the alert accordingly. This should be documented on the patient record. The clinical team deciding to redirect a report should be clear that this action is safe and appropriate. A Results Coordination Team may help to ensure that the current responsible clinical team receives the report.

— It is the responsibility of healthcare organisations to adopt a fail-safe result notification system to protect patient safety. This includes the identification of imaging reports that have not been acted upon (or plan to act) and embedding a mechanism to ensure these reports are acted upon. This may involve a digital system, a Results Coordination Team, or a combination.
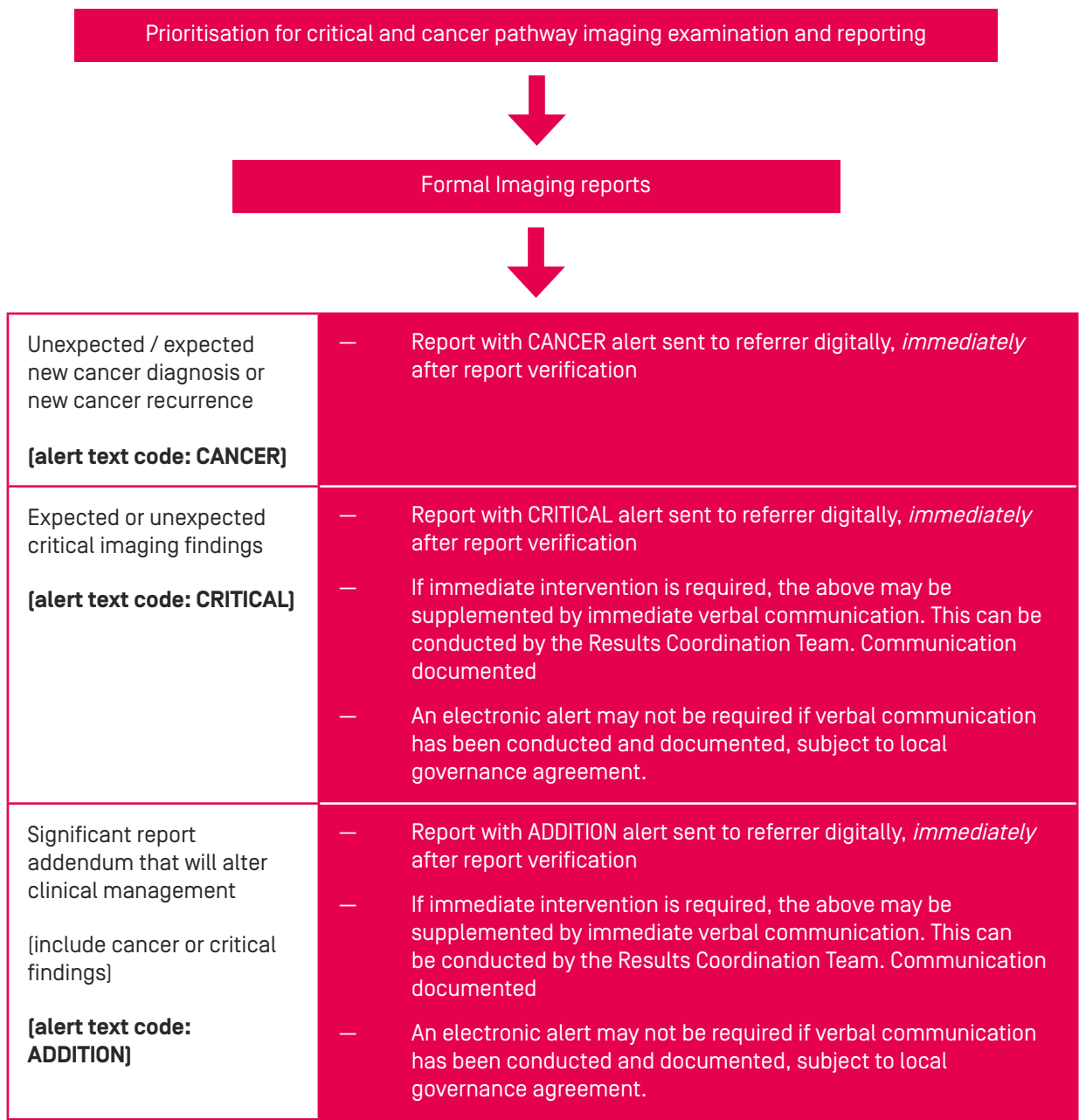
Recommendation on clinical teams and healthcare organisations

1. Referrers must ensure a valid contact detail (or through a pre-agreed system) is available, including out of hours, on all imaging referrals. They must also ensure that all reports are read, acknowledged and acted upon.

2. When multiple clinical teams are involved in the care of a patient, the receiver of the alert should act or re-direct the alert accordingly if they are no longer part of the teams looking after the patient.

3. Healthcare organisations must ensure a fail-safe system that enables the identification of reports that have not been read, acknowledged, and acted upon.

4. Healthcare organisations must embed a mechanism to follow up on these reports that have not been acted upon. This may involve a digital system, a Results Coordination Team, or a combination.

Patient communication

— The complexity surrounding the communication of imaging results directly to the patient by the Imaging Department is well recognised.[9]

— HSIB recommended that NHS Transformation Directorate in conjunction with RCR, develops a method of digitally notifying patients of results including unexpected significant radiological findings after an agreed timeframe. This development is at an early stage.

— Notifying the patients of imaging results containing alerts will require a high degree of sensitivity, empathy, and understanding. This is best done by the clinical team caring for the patient.

— Patients should be informed of when and how they will receive their imaging results. This is particularly relevant for outpatient examinations. Healthcare organisations should have a system in place to increase patient awareness of the process, for example, during a clinic consultation when the imaging request is made, via the imaging appointment letter, or the information could be displayed in the waiting area.

— All communication to the patient should be documented in the patient record.

— It is important to recognise that increasingly many patients can access their electronic medical records. It is recommended that the system embargoes the release of alert reports to the patient until the referrer reviews the report and authorises the release (or release at a pre-agreed timeline) where appropriate.

Recommendation on patient communication

1. The referrer or clinical team who cares for the patient is best placed to inform the patient of the imaging results.

2. Communication needs to be conducted sensitively via verbal, written, digital or a combination of approaches.

3. The IT system embargoes the release of alert reports to the patient until the referrer authorises the release.

Summary of result notification system

A robust system for reporting, notification, and action of cancer diagnoses, critical findings and significant addenda involves the following:

Prioritisation for critical and cancer pathway imaging examination and reporting

↓

Formal Imaging reports

↓

Unexpected / expected new cancer diagnosis or new cancer recurrence **[alert text code: CANCER]**	— Report with CANCER alert sent to referrer digitally, *immediately* after report verification
Expected or unexpected critical imaging findings **[alert text code: CRITICAL]**	— Report with CRITICAL alert sent to referrer digitally, *immediately* after report verification — If immediate intervention is required, the above may be supplemented by immediate verbal communication. This can be conducted by the Results Coordination Team. Communication documented — An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.
Significant report addendum that will alter clinical management [include cancer or critical findings] **[alert text code: ADDITION]**	— Report with ADDITION alert sent to referrer digitally, *immediately* after report verification — If immediate intervention is required, the above may be supplemented by immediate verbal communication. This can be conducted by the Results Coordination Team. Communication documented — An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

⬇

Delivery of the alert report +/- verbal communication as above

⬇

Acknowledgement and documentation by the referrer upon receiving the report, and that action will be or has been taken including patient communication.

⬇

A fail-safe system to follow up on reports that have not been acknowledged. This may involve a digital system or a Results Coordinator Team, or a combination

Examples of innovative and progressive practices currently available in the UK

Scope	Mechanism
Alert codes	Different alert codes and patient tracking options are inserted at the end of reports dependent on findings. These enable identification and subsequent escalation.
Alert mechanism	An automated alert email is generated as soon as the report is authorised. The system continues to send reminder emails every 24 hours if no acknowledgement is received. If no acknowledgment is received after 96 hours, escalation emails are sent to the relevant clinical service lead. The system also allows for additional emails to be sent to multidisciplinary teams (MDT) if required.
Alerts escalation	The Trust's information team conducts weekly checks on reports which have not been reviewed and acted upon. The team emails the referrer and if there is still no action, call the referrer directly.
Clinical follow up	If a chest radiograph is suspicious of malignancy, an immediate Computerised Tomography (CT) is performed. The patient also sees the respiratory physician on the same day.
Full clinical integration	If a chest radiograph is suspicious of malignancy, the reporting radiographer contacts the patient directly to organise blood tests, book chest CT and schedule an appointment with the lung cancer nurse specialist.
Emergency Department (ED) alerts	If a fracture is identified on a radiograph, the reporting radiographer will check the ED electronic notes to see if the reviewing clinician has also detected this. If it has been missed a red alert electronic system is triggered to inform the ED team to recall the patient.

Multi-Disciplinary Team meeting (MDT) referral	Radiologists, reporting radiographers, and sonographers can refer the patient directly to an MDT for abnormal findings. These facilitate the care pathway and avoid delayed or missed results notification or action.
Patient communication	Patients are informed as soon as they check in at the reception for a chest radiograph that they may go on to have a CT that day (code 1), asked to make an appointment with their GP (code 2), or go home and no need to see a GP (code 3). The code is inserted at the end of the imaging report.
Patient involvement	Healthcare organisation conducts focus group work with patients and carers to explore how best to communicate findings and minimise anxiety.
Primary care hotline	A hotline is available in primary care to receive any urgent communication including critical radiology reports.
Prompt radiology reporting	The radiology information team conducts daily checks on unreported examinations. Any unreported examinations of over 1 week are escalated for urgent reporting.
Significant Incidental findings	If a CT shows incidental pulmonary embolism, the result is immediately conveyed to specialist nurses who see the patient on the same day.

Conclusion

A prompt and effective imaging result notification system, in combination with robust audit and governance procedures, is essential to minimise patient harm and improve outcomes. The system should be practical, sustainable, and reliable. This requires a collaborative approach among healthcare organisations, the availability and functionality of information technology, funding support, and human oversight. Adopting the recommendations outlined in this document will protect patient safety, reduce variations and move towards a nationally recognised system achievable by all involved.

Glossary

Alert notification system	A system which highlights and sends out an alert to the recipient. The system could be electronic, manual, or a combination of both.
Alert text codes	These are canned text codes used in proprietary radiology information systems. The text code is inserted in the radiology report to highlight an alert.
Critical imaging findings	Findings which may result in immediate or acute harm to the patient that will require immediate or urgent clinical attention.
Healthcare organisations	Any organisation that provides healthcare services. These include public and independent organisations that provide primary, secondary, and tertiary care.
Imaging departments	Departments (including third-party providers) that provide any imaging services.
Radiology information systems	A networked software system for managing medical imaging and associated data. It is commonly used in conjunction with PACS (Picture Archiving and Communication Systems).
Referrers	Clinical professionals or teams from healthcare organisations that refer patients for imaging investigations. In the context of electronic alert notifications, this will be the referring consultant and may also include the junior staff that requested the examination. In the context of verbal notification for critical alerts, this will be the requester or the clinical professionals responsible for the patient at that moment.
Results Coordination Team	A team of staff employed by the healthcare organisation to optimise the alert notification system. The team can provide verbal communication to the referrers to escalate an alert with critical findings, ensure reports are returned to the correct clinical team and escalate alerts that have not been reviewed or acted upon.

Working Group membership

Failures in communication or follow-up of unexpected significant radiological findings Working Group membership.

Dr Teik Choon See, Chair	Patient Safety Advisor, The Royal College of Radiologists
Professor Mark Callaway	Medical Director Professional Practice for Clinical Radiology, The Royal College of Radiologists [2018-2021]
Dr Raman Uberoi	Medical Director Professional Practice for Clinical Radiology, The Royal College of Radiologists
Dr William Ramsden	Vice President for Clinical Radiology, The Royal College of Radiologists
Dr Amanda Martin	Lead Radiographer, Bolton Hospital NHS FT, representing The Society of Radiographers
Mrs Alexandra Lipton	Professional Officer, The Society of Radiographers
Mrs Sue Johnson	Professional Officer, The Society of Radiographers
Mr Alastair Henderson	Chief Executive, Academy of Medical Royal Colleges
Dr Katherine Henderson	President, Royal College of Emergency Medicine
Dr James France	Chair Best Practice Committee, Royal College of Emergency Medicine
Dr Richard Roope	Clinical Advisor, Royal College of General Practitioners
Dr Simon Clark	Vice President for Health Policy, Royal College of Paediatrics and Child Health
Dr John Dean	Clinical Director for Quality Improvement and Patient Safety, Royal College of Physicians
Professor Neil Mortenson	President, Royal College of Surgeons of England
Mr Tim Goodacre	Vice President, Royal College of Surgeons of England

Dr Natasha Phillips   Chief Nursing Information Officer & Director Mission 4 –Digital Safety, NHSX

Dr Kelsey Flott   Deputy Director of Patient Safety NHSX

Ms Gill Foley   Data and Clinical Content Standards Lead, NHSX

Ms Moira Crotty   Programme Manager/ Clinical Imaging SME NHS Digital

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Academy of Medical Royal Colleges

Alerts and notification of imaging reports
Recommendations

Contents

Foreword

Timely communication and the actioning of urgent and unexpected findings is a crucial part of ensuring patient safety. There is an expectation that radiology departments will produce timely reports, flag up urgent and or critical findings and the clinical teams will acknowledge they have received and understood the reports and appropriate action has then taken place.

Over many years it has become apparent that for a variety of reasons, related to both organisational and human factors, this does not always occur, resulting in patient harm. This cannot continue as highlighted in the HSIB report referenced in this document, and failsafe systems need to be in place in all organisations undertaking diagnostics. It is clear that an IT failsafe solution would be optimal in ensuring that these reports are communicated efficiently as well ensuring the reports have been read and actioned.

These have been set up on an ad hoc basis by some trusts, but there is no robust nationwide system available or currently being planned which continues to put patients at risk. Until such time that these systems are widely available this document provides optimal and usable guidance to trusts which will help ensure patient safety.

I am grateful to Dr Teik Choon See for leading a multidisciplinary, intercollegiate team in developing the following guidance which sets the minimum standards that all organisations should achieve. Some organisations may already have these in place or be well in advance of these, but ultimately we need a robust national technology based IT failsafe system established throughout the NHS.

Dr Raman Uberoi
Medical Director Professional Practice, The Royal College of Radiologists

As the HSIB report recognised, this is a clear example of where a problem which arises in one area of medicine requires a solution developed and delivered across specialties and professions. That is precisely the role that the Academy can play to ensure college support and buy-in to enable a cross-profession response.

The recommendations produced here were considered and approved by the Academy Council which comprises the presidents of all the medical royal colleges and faculties in the UK. Colleges will therefore support and promote the recommendations among their members.

We hugely appreciate the work of the RCR in convening the multi-organisation team to look at this important issue and, more importantly, to come up with cross professional solutions which, if fully implemented and supported by the proper digital systems can ensure these dangerous errors do not continue. That will obviously be a significant improvement in patient safety — a goal we all support.

Professor Dame Helen Stokes-Lampard
Chair of Council, Academy of Medical Royal Colleges

Introduction

The Healthcare Safety Investigation Branch (HSIB) report, *Failures in communication or follow-up of unexpected significant radiological findings*[1] highlights the case of a patient with lung cancer on a chest radiograph that was not reported and acted upon promptly by several different clinical teams leading to delayed diagnosis and poor outcome. This case is by no means isolated. Similar incidents still occur despite a well-established electronic notification system and the referrer being notified in a timely fashion about the abnormal report. There is a clear need to address some of the areas of concern regarding the existing result notification system to ensure there are no opportunities for missed or delayed communication and action. To achieve this, the process and the responsibility to act on abnormal radiology findings needs to be clearly defined and standardised across multiple specialties. A fail-safe result notification system will require oversight and facilitation by healthcare organisations.

In addition to the standard result notification process, some imaging findings may require an alert system to prioritise actions. The time frame and the mode of communication will depend on the acuity of the findings. A system should also be in place to define responsibility for communicating results to patients.

The principles of a safe and effective imaging result notification process should encompass a fail-safe system from initiation of the report by the imaging department to appropriate action of the report by the referrers. Patients that are under the care of multiple clinical teams are most at risk of falling outside the completion of this system. Healthcare organisations should ensure a robust governance system to maintain patient safety by ensuring that all investigations are justified, completed and acted upon. Regular audits are essential to ensure compliance with the recommendations.

A robust digital infrastructure in combination with human interactions is essential to ensure the success of the fail-safe notification system.

Principles and recommendations of a Fail-Safe Result Notification System:

1. Prompt notification of all imaging reports by the Imaging department.

2. Prompt review, acknowledgement and action on all imaging reports by the referrers.

3. A system to facilitate identification and action of reports which have not been read, acknowledged and acted upon.

Current standards and considerations for imaging report notification

The recommendations for imaging report notification are highlighted by The Royal College of Radiologists (RCR) publications on the *Standards for interpretation and reporting of imaging investigations*[2] and the *Standards for the communication of radiological reports and fail-safe alert notification.*[3] The relevant recommendations include the following:

— It is the responsibility of employing organisations to ensure appropriate reporting and fail-safe systems are in place and to audit regularly.

— It is the responsibility of employing organisations to ensure that reports can be communicated to other information technology (IT) systems using HL7 standards. HL7 is a set of international standards for the transfer of clinical and administrative data between software applications used by various healthcare providers.

— It is the responsibility of the requesting doctor and/or their clinical team to read and act upon the report findings and fail-safe alerts as quickly and efficiently as possible. This extends to ensuring robust mechanisms are in place and suitably resourced to cover leave within clinical teams or practices.

— Fail-safe systems should be IT-based to reduce error and increase efficiency, but if facilities are not available, alternative manual processes should be in place.

— If manual processes (for example, telephone calls and emails) are required, administrative staff should be available to support radiologists and reporting radiographers at all times of the day or night.

The Quality Standard for Imaging,[4] published by the RCR and the College of Radiographers has a quality standard for managing unexpected diagnoses and potential medical emergencies (XR 510) which requires services to have processes in place for:

— Alerting referrers to unexpected findings.

— Ensuring acknowledgements of the alert are received by the service.

— Management of non-acknowledgement of receipt.

— Management of alerts when reporting out of hours.

An RCR audit to determine the compliance of UK healthcare organisations with published guidance on the communication of critical, urgent, and unexpected significant findings identified a wide variation in practice across the UK concerning the communication

and monitoring of reports with many organisations not fully compliant with published UK guidance. Despite the widespread use of electronic systems, only a minority of organisations have and use electronic tracking to ensure reports have been read and acted upon.[5]

The European Society of Radiology guidelines for the communication of urgent and unexpected findings highlighted that good communication helps to improve patient safety and that referrers should be aware of their responsibility to read and act on radiological reports.[6] It encouraged 'enhanced communication' for emergency and unexpected findings but raised concern that referrers will rely on alert mechanisms, and assume that the other reports are normal or have no significant findings. There is also a concern that the responsibility for ensuring that imaging reports are acted upon and even legal responsibility will transfer to radiologists, even though they have only limited information about the patient at the time of reporting. It should also be recognised that all alert mechanisms take additional time, effort and resources, so there are associated productivity costs.

The Parliamentary and Health Service Ombudsman highlighted learning related to failings in the imaging pathway in their report, *Unlocking Solutions in Imaging: working together to learn from failings in the NHS*.[7] One of the four recommendations specified that digital infrastructure must now be treated as a patient safety issue, and that The Department of Health and Social Care and NHS England and Improvement (NHSE/I), working with the NHS Transformation Directorate and NHS Digital, should prioritise improvements to digital reporting capabilities across the imaging system.

Healthcare Safety Investigation Branch report safety recommendations[1]

a. It is recommended that The Royal College of Radiologists [RCR], working with the Society and College of Radiographers [SCoR] and other relevant specialties through the Academy of Royal Medical Colleges, develops:

    —   principles upon which findings should be reported as 'unexpected significant', 'critical' and 'urgent'

    —   a simplified national framework for the coding of alerts on radiology reports

    —   a list of conditions for which an alert should always be triggered, where appropriate and feasible to do so.

b. It is recommended that the NHSE/I patient safety team takes steps to ensure providers are aware of the safety recommendations in this report and act to implement the key findings regarding risk controls such as a monitored acknowledgement system for critical, urgent and unexpected significant findings.

c. It is recommended that the NHS Transformation Directorate develops a method of digitally notifying patients of results. This should be used to inform patients of unexpected significant radiological findings after an agreed timeframe. It should be developed in conjunction with The Royal College of Radiologists. The notification system should be tested and evaluated.

d. It is recommended that the Care Quality Commission amends all appropriate core service frameworks to include risk controls identified in this report, to mitigate the risk of significant abnormal findings not being followed up.

A collaborative approach

This document is a collaborative effort from The Royal College of Radiologists, the Society of Radiographers, the Royal College of Emergency Medicine, the Royal College of General Practitioners, the Royal College of Physicians, the Royal College of Surgeons of England, the Royal College of Paediatrics and Child Health, the Academy of Medical Royal Colleges, and NHS Digital. It represents a collective consensus from clinical and published practices on the process of notification of expected or unexpected findings, which include cancer diagnoses or critical findings that may require immediate or urgent attention. Further collaborative work is being carried out by the NHS Transformation Directorate and NHSE/I and this document will be reviewed accordingly.

The main objective of this document is to ensure prompt and effective imaging result notification and its subsequent action to protect patient safety. It includes:

— Definitions of the different categories of imaging findings that require an alert notification

— A list of critical findings for which an alert should be triggered

— Simplified national alert text codes for imaging reports. These text codes refer to canned text codes used in proprietary radiology information systems.

The three main categories for imaging alerts are:

— New cancer diagnoses or newly detected cancer recurrences

— Critical findings that are time-critical

— Significant addenda in the report that may alter clinical management.

Individual healthcare organisations may incorporate additional imaging alerts, subject to their local governance processes.

The main objective of a robust notification process is to ensure that the imaging reports are reviewed and understood so that further clinical actions can be taken if required. It is the responsibility of the healthcare organisations to adopt a fail-safe system that enables the identification of reports that have not been reviewed and acted upon (or plan to act) and embed a mechanism to follow up on these reports. This may involve a digital system, a Results Coordination Team, or a combination. This should not solely become the responsibility of the imaging department. Funding and support should remain the responsibility of the healthcare organisations.

Every imaging referral must include a valid contact detail to which an urgent communication can be made if required, including an out of hours' contact. The system can also be pre-agreed between the referrers and the imaging department.

A **Results Coordination Team** is a team of staff employed by the healthcare organisation to optimise the alert notification system. The team is reportable to the local patient safety department, or other unit deemed appropriate by the healthcare organisation. They may also be responsible for other support services in escalating alerts and should at least be available from 9:00-17:00, 7 days a week.

The aim of the Result Coordination Team is to ensure that no patient suffers adversely because of delayed or miscommunicated radiology reports. The Results Coordination Team should be primarily focused on patient outcomes and not merely concerned with institutional compliance around alert and acknowledgement systems.

The function of a Results Coordination Team should include, as a minimum:

— Verbal communication to the referrers that an imaging report containing a critical finding which may require immediate intervention is now available. This includes inpatients, outpatients, and primary care. The role here is to escalate the review of the imaging report, and not communicate the actual report findings.

— Support the results notification system to ensure that reports are returned to the correct clinical team caring for the patient.

— Identify and escalate imaging alerts (for example a new cancer diagnosis or a significant addendum) that have not been reviewed and acted upon (or plan to act). A 48-hour interval before escalation is reasonable but this may vary depending on clinical urgency and should be agreed upon by the healthcare organisation.

It is important to acknowledge that this document should not be used to establish the legal standard of care in any particular clinical scenario.

A collaborative approach

1. A safe and effective result notification system requires a concerted effort from all involved, using an electronic system and supported by human interactions.

2. Alerts should be in place in three imaging categories: new cancer diagnoses or new recurrences, critical findings that are time-critical, and significant addenda that may alter clinical management.

3. It is the responsibility of the healthcare organisations to adopt a fail-safe system that enables identification of reports that have not been reviewed and acted upon (or plan to act) and embed a mechanism to follow up these reports.

4. Every imaging referral (or through a pre-agreed system) must include a valid contact detail to which an urgent communication can be made if required, including an out of hours contact.

5. A Results Coordination Team should help ensure reports are returned to the correct clinical team, verbally inform the referrers that critical reports are available for immediate review and escalate imaging alerts that have not been reviewed and acted upon (or plan to act).

Categories of imaging findings and their notification processes

1. New cancer diagnosis or newly detected cancer recurrence suspected from imaging, expected or unexpected

This includes expected or unexpected imaging findings that suggest new or probable new cancer and new or probable new cancer recurrence.

Examples of new cancer diagnoses:

Examination:	*Chest radiograph*
Clinical indication:	*Breathlessness. Heart failure?*
Report:	*A spiculated right upper lobe lesion concerning for an underlying malignancy*

Examination:	*CT kidneys, ureters and bladder*
Clinical indication:	*Painless visible haematuria. Renal cancer?*
Report:	*A 2cm left upper pole renal lesion with imaging features of renal cell cancer*

Example of a newly detected cancer recurrence:

Examination:	*CT chest, abdomen and pelvis*
Clinical indication:	*Lymphoma in remission for 12 months. Now tiredness and abdominal fullness. Relapse?*
Report:	*Splenomegaly, enlarged mediastinal and para-aortic lymph nodes in keeping with recurrent disease.*

Cancer disease progression does not fall into this category e.g. growing tumour or new nodules in a known cancer.

— Cancer pathway imaging examinations and reporting should be prioritised.

— An alert should be triggered for all new cancer diagnoses or newly detected cancer recurrences. This includes expected diagnosis as the perception of what is expected or unexpected may not be clear. Reinforcing the result via the alert notification process will also help to ensure all the results are reviewed and acted upon promptly.

— The alert (alert text code: **CANCER**) should be immediately apparent on the report e.g. the red alert CANCER be stated at the top or bottom of the radiology report. The preferred format is at the discretion of the healthcare organisations. This notification should be triggered ***immediately*** upon completion of the report and be conducted via a digital platform incorporating a system for acknowledgement of receipt of the reports and subsequent actions (or plan to act). The actions from the CANCER alert notification may include clinic review, further investigations, or treatment plan.

Recommendation on cancer imaging alerts

1. All imaging reports with expected or unexpected new cancer diagnosis or newly detected cancer recurrence should be notified to the referrers with a **CANCER** alert in the report via a digital platform immediately upon completion of the reports.

2. Referring teams must ensure a valid contact detail (or through a pre-agreed system) is available, including out of hours, on all imaging referrals. They must also ensure that all reports are read, acknowledged and acted upon (or plan to act).

3. Healthcare organisations must ensure a fail-safe system that enables identification of reports that have not been read, acknowledged and acted upon (or plan to act).

4. Healthcare organisations must embed a mechanism to follow up on these reports that have not been read, acknowledged and acted upon (or plan to act). This may involve a digital system, a Results Coordination Team, or a combination.

2. Critical imaging findings where clinical management is time critical, expected or unexpected

— Imaging and reporting for patients with critical conditions should be prioritised.

— Critical imaging findings are those with diagnoses that may result in immediate or acute harm to the patient and therefore will require immediate or urgent clinical attention. The findings may be expected or unexpected.

— The list in Table 1 may be considered as critical imaging findings which may require an alert, if these are new findings, depending on severity. It is not intended to be definitive and may be subject to adaptation by local governance.

Table 1

System / Specialty / Region	New critical conditions
Central nervous system	— Cerebral or spinal haemorrhage — Intracranial mass with significant mass effect — Herniation syndrome — Acute stroke — Intracranial infection / empyema — Unstable spine fracture — Tension pneumocephalus — Spinal cord compression
Neck	— Airway compression or impending obstruction — Carotid artery dissection
Thorax	— Tension pneumothorax — Central pulmonary embolism — Mediastinal emphysema — Large pericardial effusion with suspected tamponade

System / Specialty / Region	New critical conditions
Abdomen	— Bowel perforation — Ischaemic bowel — High grade or closed loop bowel obstruction — Portal venous air — Acute volvulus — High grade traumatic visceral injury — Active intra-abdominal or retroperitoneal haemorrhage
Uro-genital	— Ectopic pregnancy — Placental abruption or placenta praevia — Uterine rupture — Foetal demise — Testicular or ovarian torsion
Musculoskeletal	— Necrotising fasciitis — Suspected physical abuse
Vascular	— Acute aortic dissection, injury or ruptured — Acute aortic aneurysm rupture — Suspected impending aortic aneurysm rupture — Deep vein thrombosis
General	— Significant misplacement of line, tube or other implanted devices of immediate clinical concern — Retained surgical foreign body — Foreign body with potential immediate clinical concern — Infection of immediate clinical concern e.g. open tuberculosis

System / Specialty / Region	New critical conditions
Paediatrics	— All conditions listed above where relevant — Significant congenital anomalies — Rib fracture — New fracture on follow up from skeletal survey — Metaphyseal fracture — Slipped upper femoral epiphysis — Significant dilatation of the upper urinary tract (requiring a paediatrician to prescribe antibiotic prophylaxis) — Preoperative radiography changes that may affect surgical planning (consolidation on a pre-op scoliosis CXR)

— The critical nature of the diagnoses means that imaging reports must be accessed or communicated as soon as they are made available.

— Due to the critical nature of some diagnoses, the radiologist or the diagnostic radiographer may have notified the referrers verbally before the examination being formally reported. Such communication including the name of the receiver and the time of notification needs to be documented in the patient record, the radiology information system, or the radiology report.

— An alert (alert text code: **CRITICAL**) should be triggered *immediately* upon completion of the report and be conducted via a digital platform incorporating a system for acknowledgement of receipt of the reports and subsequent actions.

— A critical finding may be identified along with a new cancer diagnosis in a single examination e.g. acute spinal cord compression from a new metastatic lung cancer. A single CRITICAL alert can be triggered or in combination with a CANCER alert. The important aspect is to provide timely notification to the clinical teams.

— **If immediate intervention is required**, for example, tension pneumothorax or ruptured aortic aneurysm, the **alert should be supplemented by direct verbal communication**. The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

— The majority of critical imaging findings are identified from investigations performed for patients undergoing assessment or treatment in the hospital setting for example, Emergency Department or in-patients. However, some unexpected critical imaging findings may be identified in the out-patients setting or after the patient has been discharged from the hospital. This latter group of patients are at a higher risk of delayed diagnosis or treatment due to a potential delay in communicating, accessing or acting on the imaging reports. Therefore, for critical findings involving **out-patients, a verbal communication may be required in addition to the alert report notification.** The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

— Verbal communication of the critical report to the referrers may be conducted by the reporter or the Results Coordination Team. In the event where the critical finding is life threatening, or during out of hours when the Results Coordination Team may not be available, it is recommended that the reporter communicates the result directly.

— An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

Recommendation on critical imaging alerts

1. All imaging reports with expected or unexpected new critical findings that may result in immediate or acute harm to the patient should be notified to the referrers with a **CRITICAL** alert in the report via a digital platform immediately upon the completion of the reports.

2. If immediate intervention is required, the alert should be supplemented by direct verbal communication.

3. For new critical findings involving out-patients, a direct verbal communication may be required in addition to the alert report notification.

4. The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

5. If verbal communication is required, this can be conducted by a Results Coordination Team notifying the clinical team that the report is now available for review. The reporter may need to make direct communication if life threatening or out of hours when the Results Coordination Team may not be available.

6. An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

7. Referrers must ensure a valid contact detail is available, including out of hours, on all imaging referrals. They must also ensure that all reports are read, acknowledged and acted upon (or plan to act).

8. Healthcare organisations must ensure a fail-safe system that enables identification of reports that have not been read, acknowledged and acted upon (or plan to act).

9. Healthcare organisations must embed a mechanism to follow up on these reports that have not been read, acknowledged and acted upon (or plan to act). This may involve a digital system or a Results Coordination Team, or a combination.

3. Significant addenda in imaging reports where clinical management may be altered

A significant addendum includes findings that are interpreted differently compared with a preceding report of the same examination that may result in immediate or acute harm to the patient or may result in adverse outcomes if timely action is not taken. This is a separate entity compared to an addendum containing new findings or a revised report which does not affect clinical management.

Examples of a significant addendum:

Examination:	*CT head*
Clinical indication:	*Right sided weakness. Loss of balance. Stroke?*
First report:	*No CT features of acute stroke*
Addendum:	*Loss of grey-white interface and loss of insular ribbon in keeping with early features of ischaemia.*

Examination:	*CT liver*
Clinical indication:	*Post radiofrequency ablation assessment*
First report:	*High attenuation nodule in ablation site concerning for residual tumour*
Addendum:	*The high attenuation area is also seen in the unenhanced series in keeping with a haematoma. No features of residual tumour.*

— Significant addenda may include but are not exclusive to cancer diagnoses or the conditions listed in Table 1. They may also include reports that reduce the significance of an original report.

— The previous interpretation could be a preliminary report that is accessible to the clinical teams or a verified report. Addenda added to radiology reports, or as part of radiology quality and governance processes also fall into this category.

— Individual healthcare organisations should have an internal process on managing discrepancies, near misses and errors as well as sharing good practice according to RCR standards on radiology events and learning meetings (REALMs).[8] This includes compliance with the professional duty of candour.

— As the significant imaging findings are identified after the original report has been issued or reviewed by the referrers, a potential delay may occur for the referrers to review the addended report. This delay may significantly impact clinical management. An alert notification is therefore required.

— The alert (alert text code: **ADDITION**) should be triggered *immediately* via a digital platform and supplemented by direct verbal communication if immediate intervention is required. This applies to in-patients, out-patients and primary care. The verbal communication including the name of the person who receives the results should be documented in the imaging report or patient record.

— A Results Coordination Team is best placed to take over the role for verbal communication to highlight that the report containing a significant addendum that may require immediate intervention is now available for review.

— An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

Recommendation on significant addenda alerts

1. All addended imaging reports that may alter clinical management should be notified to the referrers with an **ADDITION** alert in the report, via a digital platform immediately upon completion of the reports.

2. If immediate intervention is required, the alert should be supplemented by verbal communication which should be documented in the imaging report or patient record.

3. If verbal communication is required, this can be conducted by a Results Coordination Team notifying the clinical team that the addended report is now available for review.

4. An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

Roles and responsibilities of clinical teams and healthcare organisations

— The majority of imaging referrals will be requested by the junior medical teams or non-medical registered healthcare professionals, under the authorisation of the responsible consultant.

— The imaging reports and alerts will be directed to the original referrers for the examination.

— In the context of electronic alert notifications, this will be the referring consultant and may also include the junior staff or the registered healthcare professional that requested the examination.

— In the context of verbal notification for critical alerts, this will be the requester or the clinical professionals responsible for the patient at that moment.

— It is the responsibility of the referrers to ensure that a valid contact detail is available on all imaging referrals, including out of hours. The system can also be pre-agreed between the referrers and the Imaging department. They must also ensure that all imaging reports are read, acknowledged and acted upon. This should be documented on the patient record. This extends to ensuring robust mechanisms are in place and suitably resourced to cover leave within clinical teams or practices.

— A patient journey may involve multiple clinical teams, whether it be in-patients, out-patients, or primary care. A clinical team may request an imaging examination but the team may no longer be involved in the patient's care when the imaging report is completed.

— It is the responsibility of the referrer receiving the radiology alert to act or redirect the alert accordingly. This should be documented on the patient record. The clinical team deciding to redirect a report should be clear that this action is safe and appropriate. A Results Coordination Team may help to ensure that the current responsible clinical team receives the report.

— It is the responsibility of healthcare organisations to adopt a fail-safe result notification system to protect patient safety. This includes the identification of imaging reports that have not been acted upon (or plan to act) and embedding a mechanism to ensure these reports are acted upon. This may involve a digital system, a Results Coordination Team, or a combination.

Recommendation on clinical teams and healthcare organisations

1. Referrers must ensure a valid contact detail (or through a pre-agreed system) is available, including out of hours, on all imaging referrals. They must also ensure that all reports are read, acknowledged and acted upon.

2. When multiple clinical teams are involved in the care of a patient, the receiver of the alert should act or re-direct the alert accordingly if they are no longer part of the teams looking after the patient.

3. Healthcare organisations must ensure a fail-safe system that enables the identification of reports that have not been read, acknowledged, and acted upon.

4. Healthcare organisations must embed a mechanism to follow up on these reports that have not been acted upon. This may involve a digital system, a Results Coordination Team, or a combination.
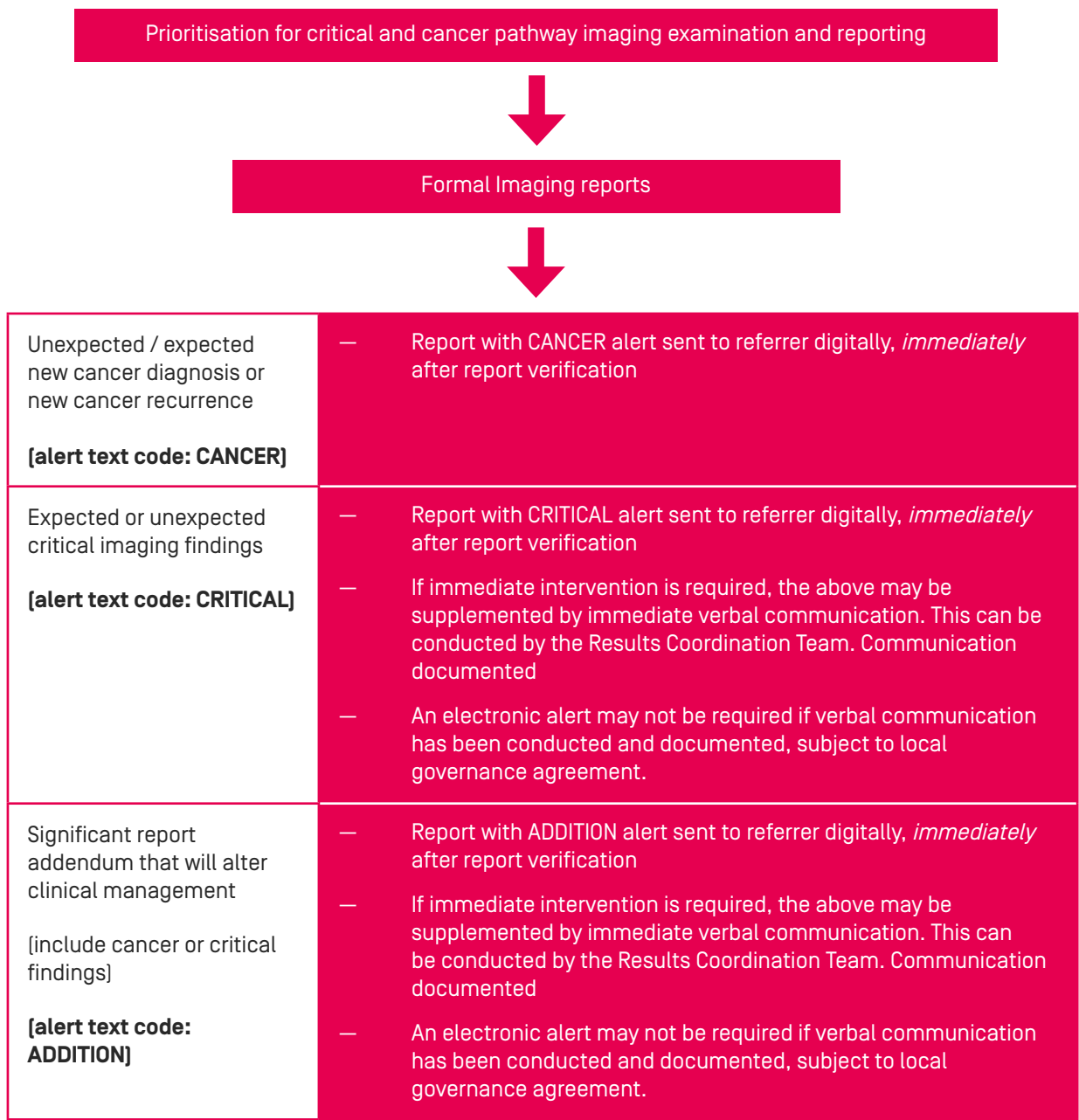
Patient communication

— The complexity surrounding the communication of imaging results directly to the patient by the Imaging Department is well recognised.[9]

— HSIB recommended that NHS Transformation Directorate in conjunction with RCR, develops a method of digitally notifying patients of results including unexpected significant radiological findings after an agreed timeframe. This development is at an early stage.

— Notifying the patients of imaging results containing alerts will require a high degree of sensitivity, empathy, and understanding. This is best done by the clinical team caring for the patient.

— Patients should be informed of when and how they will receive their imaging results. This is particularly relevant for outpatient examinations. Healthcare organisations should have a system in place to increase patient awareness of the process, for example, during a clinic consultation when the imaging request is made, via the imaging appointment letter, or the information could be displayed in the waiting area.

— All communication to the patient should be documented in the patient record.

— It is important to recognise that increasingly many patients can access their electronic medical records. It is recommended that the system embargoes the release of alert reports to the patient until the referrer reviews the report and authorises the release (or release at a pre-agreed timeline) where appropriate.

Recommendation on patient communication

1. The referrer or clinical team who cares for the patient is best placed to inform the patient of the imaging results.

2. Communication needs to be conducted sensitively via verbal, written, digital or a combination of approaches.

3. The IT system embargoes the release of alert reports to the patient until the referrer authorises the release.

Summary of result notification system

A robust system for reporting, notification, and action of cancer diagnoses, critical findings and significant addenda involves the following:

Prioritisation for critical and cancer pathway imaging examination and reporting

⬇

Formal Imaging reports

⬇

Unexpected / expected new cancer diagnosis or new cancer recurrence **[alert text code: CANCER]**	— Report with CANCER alert sent to referrer digitally, *immediately* after report verification
Expected or unexpected critical imaging findings **[alert text code: CRITICAL]**	— Report with CRITICAL alert sent to referrer digitally, *immediately* after report verification — If immediate intervention is required, the above may be supplemented by immediate verbal communication. This can be conducted by the Results Coordination Team. Communication documented — An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.
Significant report addendum that will alter clinical management [include cancer or critical findings] **[alert text code: ADDITION]**	— Report with ADDITION alert sent to referrer digitally, *immediately* after report verification — If immediate intervention is required, the above may be supplemented by immediate verbal communication. This can be conducted by the Results Coordination Team. Communication documented — An electronic alert may not be required if verbal communication has been conducted and documented, subject to local governance agreement.

↓

Delivery of the alert report +/- verbal communication as above

↓

Acknowledgement and documentation by the referrer upon receiving the report, and that action will be or has been taken including patient communication.

↓

A fail-safe system to follow up on reports that have not been acknowledged. This may involve a digital system or a Results Coordinator Team, or a combination

Examples of innovative and progressive practices currently available in the UK

Scope	Mechanism
Alert codes	Different alert codes and patient tracking options are inserted at the end of reports dependent on findings. These enable identification and subsequent escalation.
Alert mechanism	An automated alert email is generated as soon as the report is authorised. The system continues to send reminder emails every 24 hours if no acknowledgement is received. If no acknowledgment is received after 96 hours, escalation emails are sent to the relevant clinical service lead. The system also allows for additional emails to be sent to multidisciplinary teams (MDT) if required.
Alerts escalation	The Trust's information team conducts weekly checks on reports which have not been reviewed and acted upon. The team emails the referrer and if there is still no action, call the referrer directly.
Clinical follow up	If a chest radiograph is suspicious of malignancy, an immediate Computerised Tomography (CT) is performed. The patient also sees the respiratory physician on the same day.
Full clinical integration	If a chest radiograph is suspicious of malignancy, the reporting radiographer contacts the patient directly to organise blood tests, book chest CT and schedule an appointment with the lung cancer nurse specialist.
Emergency Department (ED) alerts	If a fracture is identified on a radiograph, the reporting radiographer will check the ED electronic notes to see if the reviewing clinician has also detected this. If it has been missed a red alert electronic system is triggered to inform the ED team to recall the patient.

Multi-Disciplinary Team meeting (MDT) referral	Radiologists, reporting radiographers, and sonographers can refer the patient directly to an MDT for abnormal findings. These facilitate the care pathway and avoid delayed or missed results notification or action.
Patient communication	Patients are informed as soon as they check in at the reception for a chest radiograph that they may go on to have a CT that day [code 1], asked to make an appointment with their GP [code 2], or go home and no need to see a GP [code 3]. The code is inserted at the end of the imaging report.
Patient involvement	Healthcare organisation conducts focus group work with patients and carers to explore how best to communicate findings and minimise anxiety.
Primary care hotline	A hotline is available in primary care to receive any urgent communication including critical radiology reports.
Prompt radiology reporting	The radiology information team conducts daily checks on unreported examinations. Any unreported examinations of over 1 week are escalated for urgent reporting.
Significant Incidental findings	If a CT shows incidental pulmonary embolism, the result is immediately conveyed to specialist nurses who see the patient on the same day.

Conclusion

A prompt and effective imaging result notification system, in combination with robust audit and governance procedures, is essential to minimise patient harm and improve outcomes. The system should be practical, sustainable, and reliable. This requires a collaborative approach among healthcare organisations, the availability and functionality of information technology, funding support, and human oversight. Adopting the recommendations outlined in this document will protect patient safety, reduce variations and move towards a nationally recognised system achievable by all involved.

Glossary

Alert notification system	A system which highlights and sends out an alert to the recipient. The system could be electronic, manual, or a combination of both.
Alert text codes	These are canned text codes used in proprietary radiology information systems. The text code is inserted in the radiology report to highlight an alert.
Critical imaging findings	Findings which may result in immediate or acute harm to the patient that will require immediate or urgent clinical attention.
Healthcare organisations	Any organisation that provides healthcare services. These include public and independent organisations that provide primary, secondary, and tertiary care.
Imaging departments	Departments (including third-party providers) that provide any imaging services.
Radiology information systems	A networked software system for managing medical imaging and associated data. It is commonly used in conjunction with PACS (Picture Archiving and Communication Systems).
Referrers	Clinical professionals or teams from healthcare organisations that refer patients for imaging investigations. In the context of electronic alert notifications, this will be the referring consultant and may also include the junior staff that requested the examination. In the context of verbal notification for critical alerts, this will be the requester or the clinical professionals responsible for the patient at that moment.
Results Coordination Team	A team of staff employed by the healthcare organisation to optimise the alert notification system. The team can provide verbal communication to the referrers to escalate an alert with critical findings, ensure reports are returned to the correct clinical team and escalate alerts that have not been reviewed or acted upon.

Working Group membership

Failures in communication or follow-up of unexpected significant radiological findings Working Group membership.

Dr Teik Choon See, Chair	Patient Safety Advisor, The Royal College of Radiologists
Professor Mark Callaway	Medical Director Professional Practice for Clinical Radiology, The Royal College of Radiologists [2018-2021]
Dr Raman Uberoi	Medical Director Professional Practice for Clinical Radiology, The Royal College of Radiologists
Dr William Ramsden	Vice President for Clinical Radiology, The Royal College of Radiologists
Dr Amanda Martin	Lead Radiographer, Bolton Hospital NHS FT, representing The Society of Radiographers
Mrs Alexandra Lipton	Professional Officer, The Society of Radiographers
Mrs Sue Johnson	Professional Officer, The Society of Radiographers
Mr Alastair Henderson	Chief Executive, Academy of Medical Royal Colleges
Dr Katherine Henderson	President, Royal College of Emergency Medicine
Dr James France	Chair Best Practice Committee, Royal College of Emergency Medicine
Dr Richard Roope	Clinical Advisor, Royal College of General Practitioners
Dr Simon Clark	Vice President for Health Policy, Royal College of Paediatrics and Child Health
Dr John Dean	Clinical Director for Quality Improvement and Patient Safety, Royal College of Physicians
Professor Neil Mortenson	President, Royal College of Surgeons of England
Mr Tim Goodacre	Vice President, Royal College of Surgeons of England

Dr Natasha Phillips	Chief Nursing Information Officer & Director Mission 4 –Digital Safety, NHSX
Dr Kelsey Flott	Deputy Director of Patient Safety NHSX
Ms Gill Foley	Data and Clinical Content Standards Lead, NHSX
Ms Moira Crotty	Programme Manager/ Clinical Imaging SME NHS Digital

Acknowledgements

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Academy of Medical Royal Colleges
10 Dallington Street
London
EC1V 0DB

United Kingdom

Website: aomrc.org.uk

Registered Charity Number: 1056565

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Safer practice notice 16

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Notice

5 February 2007

Immediate action	☐
Action	☑
Update	☐
Information request	☐

Ref: NPSA/2007/16

Early identification of failure to act on radiological imaging reports

Patient safety incidents are being caused by a failure to acknowledge and act on radiological imaging reports. Radiology imaging tests are requested by a registered health professional who relies on a report and image usually generated by a radiologist or radiographer. The report and image are sent to the referring health professional, who then acts on the result. The system for requesting radiology imaging tests and sending reports to the referring health professional is unreliable and has been proven to fail.

Between November 2003 and May 2006, the National Patient Safety Agency (NPSA) received 22 reports where failing to follow up radiological imaging reports led to patient safety incidents, most of which involved fatalities or significant long-term harm. NHS Litigation Authority data for the 10 years up to May 2006 identified 69 cases logged on their database, some of which involved significant harm and monetary claims.

This safer practice notice advises healthcare organisations to make changes to ensure that radiology imaging results are communicated and acted on appropriately.

Action for the NHS and other healthcare organisations

The NPSA is recommending that all healthcare organisations providing or commissioning radiological imaging services should:

1 ensure that the radiological imaging reports of all patients are communicated to, and received by, the appropriate registered health professional and, where necessary, action is taken in a manner appropriate to their clinical urgency;

2 ensure registered health professionals design 'safety net' procedures for their specialty;

3 make it clear to patients how and when they should expect to receive the results of a diagnostic test;

4 review relevant policies and procedures in line with the safer practice recommendations outlined in this safer practice notice.

For response by:
- All NHS acute and foundation trusts and local health boards in England and Wales
- Commissioners of radiology services
- Independent sector providers of radiology services

For action by:
- Medical directors
- Nursing directors
- Radiology departments
- Clinical leads
- Registered health professionals

The NPSA recommends NHS organisations inform and involve:
- Risk managers

- Patient advice/liaison service staff in England and Wales
- Clinical governance leads
- Complaints and legal services managers
- Radiology staff
- Nursing and midwifery staff
- Other healthcare staff that order or receive radiology reports
- IT leads

The NPSA has informed:
- Chief executives of acute, primary care and foundation trusts
- Chief executives/regional directors and clinical governance leads of strategic health authorities (England) and regional offices (Wales)
- Healthcare Commission

- Healthcare Inspectorate Wales
- Medicines and Healthcare products Regulatory Agency
- Royal colleges and societies
- NHS Direct
- Relevant patient organisations and community health councils in Wales
- Independent healthcare advisory services
- Relevant education providers
- Health Protection Agency
- NHS Litigation Authority
- Quality Improvement Scotland and DHSSPS Northern Ireland
- NHS Connecting for Health
- Informing Healthcare (Wales)
- Relevant professional bodies

Action deadlines for the Safety Alert Broadcast System (SABS)

Deadline (action underway): 28 April 2007
Action plan to be agreed and actions started

Deadline (action complete): 28 February 2008
All actions to be completed

Further information about SABS can be found at
www.info.doh.gov.uk/sar2/cmopatie.nsf

National Reporting and Learning System data

A review of data from the NPSA's National Reporting and Learning System (NRLS) between May 2006 and October 2006 indicated a significant rise in reporting rates, which may have been connected to publicity about this project. During this period, 31 incidents were reported of which the outcome for the patient was severe in eight cases and moderate in nine, with the remaining cases resulting in low or no harm.

Recommendations for action

Recommendations for action by referring registered health professionals

- Ensure your name and/or code is clearly identified on the request form along with an adequate clinical history and reason for the radiology image.

- Ensure systems are in place to provide assurance that requested images are performed, (or alternatively that the request has been assessed by the radiology department as unjustified) and the results of these are viewed, acted upon accordingly and recorded. It is the referring registered health professional's responsibility to ensure this is followed.

- Ensure your specialty or disease group designs a 'safety net' procedure in case these systems fail. This is particularly important in accident and emergency departments and assessment areas.

- Always access electronic systems using your allocated log-on and, if acknowledgement functions for the receipt of results or reports exist, use them.

- In the absence of electronic tracking systems, adopt hard copy tracking systems such as ward books or results acknowledgement sheets.

- When using hard copies of reports, ensure they are reviewed, signed, timed and dated, and any clinical decision noted before filing in patients' records.

- Inform patients of all results, positive or negative, and document that this has been done. A standard letter to patients could be an additional safety mechanism.

- If a patient's radiology imaging report is not available at the time of accident and emergency attendance, in-patient discharge or out-patient consultation, check the results as soon as possible and ensure the patient is informed of them. Patients may be informed through standard letters, phone calls or other appropriate means.

- Ensure patient information and contact details are correct and clear.

- Provide patients with details of when test results are expected and how they will be communicated, giving contact details for enquiring about any concerns or delays.

- Audit your communication tracking systems to ensure compliance with these recommendations.

**Recommendations for action by radiology departments and reporting
radiographers and radiologists**

- Ensure systems are in place to assure your organisation that radiological imaging reports
  are accurately and effectively communicated to the responsible health professional.
  These should include:

  i   defining and developing a policy for radiological imaging reports which require
      particularly timely and reliable communication, for example, abnormal, unexpected
      and/or critical ranges;

  ii empowerment to reject inadequately completed requests for studies where appropriate;

  iii explicit timeframes for reporting results;

  iv regular audits of compliance with the above points.

- Consider providing standard letters to patients if an examination is abnormal. These could
  be generated at the same time as an alert is sent to the referring health professional.

- Introduce minimum data set requirements for requests, in line with the Royal College
  of Radiologists standards and Ionising Radiation (Medical Exposure) Regulations
  [IR(ME)R 2000], for example, clinical history and reason for test.

- Ensure the identity of the requesting health professional and their contact details are on
  all requests.

- Ensure processes are in place to provide assurance that all results are reported and that
  there are clear policies and/or service level agreements for the management of any results
  that will not be reported by a radiologist or appropriately trained radiographer.

- Radiology reports should ensure that critical findings are emphasised and obvious, and
  that the degree of urgency for action by the referring health professional is clear.

- Define and document 'safety net' procedures, for example, copy reports to the GP, cancer
  services multidisciplinary team or other identified health professional in consultation with
  the referring health professional.

- Where acknowledgement or audit functions exist on electronic systems, for
  example, Patient Administration System (PAS), Electronic Patient Record (EPR), Order
  Communications, Picture Archiving and Communications System (PACS) and work lists,
  use them where feasible.

- Audit compliance with these recommendations regularly.

Recommendations for action by medical and nursing directors

- Ensure existing policies, procedures and 'safety net' mechanisms for the management of
  radiological imaging reports are reviewed and developed, where necessary, to meet the
  requirements of this safer practice notice.

- Ensure timely and accurate data entry and tracking of patients and their information
  through PAS, Hospital Information System (HIS) or Radiology Information System (RIS)
  throughout the organisation, including the responsible clinical team.

- Ensure health professionals are adequately trained in the use of their organisation's
  software systems, for example, RIS, PACS and Order Communications.

- Enforce and audit the use of individual NHS email addresses and individual log-on by
  registered health professionals to ensure clear communication channels that are consistent
  throughout the organisation.

- Advise patients, through leaflets, posters and/or inserts in letters, to check how their test
  results will be communicated to them.

Reporting incidents

All healthcare staff should report incidents via their local risk management reporting system. This will enable both local and national monitoring of the incidence of failure to act on diagnostic test reports, and can inform future understanding of these issues.

Keeping patients informed

To assist in the early identification of failure to follow up on radiological imaging reports, it is recommended that patients are given the NPSA patient briefing (available at **www.npsa.nhs.uk/health/alerts)** and the following guidance:

- to ask when and how they will be informed of test results;

- to be aware of how to get their results;

- to have the relevant health professional's contact details and to speak to them if they are in doubt;

- to ensure that their, and their next of kin's, contact details are recorded correctly in their health records and that contact arrangements are clear;

- not to assume their results are okay if they do not hear anything.

  Key information could be included in patient leaflets. The NPSA has produced a flyer to encourage patients to follow up results of their x-rays. This can be downloaded from **www.npsa.nhs.uk/health/alerts** and hard copies can be ordered from the NHS response line (08701 555 455) using stock code XRAYPF. A Welsh language version is also available, to order please use stock code XRAYPFWelsh.

  Patient leaflets are also available from a variety of other sources including the Royal College of Radiologists (**www.rcr.ac.uk/index.asp?PageID=323**).

Cost implications of implementing the NPSA recommendations

Given the diversity of existing resources, systems and practices within healthcare organisations, it has not been possible to estimate the cost implications of these recommendations. However, the NPSA anticipates that all acute trusts will have PACS in place by the end of 2007 and that many will have Order Communications, both of which assist in achieving compliance with these recommendations.

Evaluation

It is the responsibility of healthcare organisations to evaluate the implementation of this safer practice notice locally. However, to analyse the effect of the recommendations nationally, the NPSA will:

- undertake, through the NRLS, routine monitoring of patient safety incidents involving failure to act on radiological imaging reports;

- liaise with selected trusts to audit the degree of implementation of these recommendations and their perceived outcome.

  The impact will also be evaluated in England through the Safety Alert Broadcast System 12 months after issue, and in Wales through the Regional Offices of the Welsh Assembly Government. The Healthcare Commission and the Regional Office in Wales will also monitor the implementation of the recommendations in this safer practice notice.

Future action

In the long term, it is proposed that radiological imaging reports should be routinely provided in a comprehensive EPR system and that this should include functionality to acknowledge receipt of the information. An automatic alert through the system for early notification of unread reports/results should also be provided. The timescale of the electronic alert should be configured to appropriately match the clinical requirements. The NHS Connecting for Health and Informing Healthcare (Wales) programme recognises the need to include the functionality described above within its systems and it is recognised that this may present the programme with a major challenge in the development of different regional systems.

Further details

For further details about this safer practice notice please contact:

Lesley Stuart
Project Manager
National Patient Safety Agency
4-8 Maple Street
London
W1T 5HD

Email: lesley.stuart@npsa.nhs.uk

Further background information, supporting documents and examples of best practice are available on the NPSA website at **www.npsa.nhs.uk**

Acknowledgements

The NPSA would like to thank the Royal College of Radiologists, and the many NHS acute trusts, staff and other organisations and individuals who have contributed to this safer practice notice.

A safer practice notice strongly advises implementing particular recommendations or solutions.

This safer practice notice was written in the following context:

It represents the view of the National Patient Safety Agency, which was arrived at after consideration of the evidence available. It is anticipated that healthcare staff will take it into account when designing services and delivering patient care. This does not, however, override the individual responsibility of healthcare staff to make decisions appropriate to local circumstances and the needs of patients and to take appropriate professional advice where necessary.

5 February 2007

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