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Archwilydd Cyffredinol Cymru
Auditor General for Wales

Informatics systems in NHS Wales



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Mae'r ddogfen hon hefyd ar gael yn Gymraeg.

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Summary report

Summary

- 1 Informatics (**Box 1**) can help the NHS to deliver better outcomes for patients and to make more efficient and effective use of scarce financial and human resources. The importance of informatics to the future sustainability of NHS Wales has been recognised most recently by the Parliamentary Review of Health and Care in Wales¹ and the Health Foundation².

Box 1: about health informatics

Every day in the health sector, information is collected, managed, used and shared. Good patient care depends on this fast and accurate flow of information.

Health informatics is about getting this information to the right person at the right time. Information delivery is crucial to health professionals and patients for the delivery of care. It is also about using information to manage and improve services. For example, collating data on patterns of demand and activity to forecast trends or better organise service delivery.

Source: Wales Audit Office/Health Education England

- 2 International evidence shows that healthcare systems with high-quality informatics systems that feed into an electronic patient record ultimately achieve better outcomes for patients. There are significant risks in continuing to rely on handwritten paper records and referral notes that are not always readily accessible to clinicians. Comprehensive electronic prescribing systems can prevent patients being given drugs they are allergic to or which have adverse reactions with other medicines they are taking. Giving clinicians in secondary care access to patients' GP records can enable them to make better diagnoses and decisions about treatment and, again, helps to reduce adverse incidents.
- 3 Good informatics systems can also help make the NHS more efficient, reducing the amount of time clinicians spend on administrative tasks. Also, comprehensive data about patients' conditions and treatment is key to better understanding demand and planning for service improvement across the NHS.

1 Parliamentary Review of Health and Care in Wales, **Interim report**, July 2017

2 Health Foundation, **The Path To Sustainability, Funding projection for the NHS in Wales to 2019-20 and 2030-31**, October 2016

- 4 Rolling out and maintaining informatics systems across the NHS is inherently challenging. NHS Wales is a large complex system, spread across multiple organisations, with staff operating out of hospitals, GP practices and in the community. To provide a sense of scale: NHS Wales has some 90,000 individual users working off 60,000 devices. There are 7 million emails sent into and out of NHS Wales each month and a further 70 million internal emails. The Welsh Laboratory Information Management System (WLIMS), which manages test results such as blood tests, generates 2.4 million results each month.
- 5 The NHS in Wales has had a long-standing vision of delivering an electronic patient record. This vision was initially described in the 2003 **Informing Healthcare** strategy³. There has been some refinement of the vision since 2003. The new 2015 strategy for digital health and social care (the 2015 strategy)⁴ makes clear that the NHS in Wales is still working towards the goal of delivering a comprehensive electronic patient record. The vision does not involve the creation of a single digital system holding all of the information about a patient. Instead, the vision involves creating an electronic patient record by bringing together information that is held on multiple different systems. Clinicians and, where appropriate, patients, will be able to access the information through ‘patient record applications’ that are able to communicate with each other and the underpinning specialist applications and supporting services⁵.
- 6 **Box 2** and **Figure 1** show how the vision is intended work in practice. **Box 2** describes the four key patient record applications through which information can be accessed in primary, community and secondary care. **Figure 1** shows the four patient record applications and the underpinning applications and services that are intended to enable the creation of an overall patient record. There are impacts for almost all parts of NHS Wales, with changes to administrative and clinical systems that require new and better ways of working to diagnose and treat patients. The development of a community-care information system is also intended to enable changes to the way health and social care services work together.

3 Welsh Government, **Informing Healthcare**, December 2003

4 Welsh Government, **Informed Health and Care – A Digital Health and Social Care Strategy for Wales**, December 2015

5 Throughout the report we refer to the various national applications and services collectively as ‘systems’

Box 2: patient record applications through which information on multiple systems will be viewed

Welsh Clinical Portal (WCP)

When fully implemented the portal will display patient information from a number of computer systems and databases in use throughout Wales, allowing healthcare staff in hospitals to access a personalised workspace with their own patient lists, and allow them to order tests and view results. More features are being added to the portal over time with many hospitals now upgraded to include medicine transcribing, e-Discharge and access to the Welsh General Practice Record.

GP Practice Systems

There are currently two providers of GP practice systems across Wales. These systems give GPs access to their local records as well as to results from hospital tests and other information, such as discharge notes.

Communication between primary care and hospitals is facilitated through the Welsh GP Record. (WGPR). It provides a summary of important information taken from a patient's full GP medical record that will be accessible via the Welsh Clinical Portal. When fully implemented, the record will be able to be accessed by health professionals caring for a patient wherever the patient is in Wales. A patient will give consent for the healthcare professional to access their record every time it is needed, and every access to a WGPR is automatically monitored.

Welsh Community Care Information System (WCCIS)

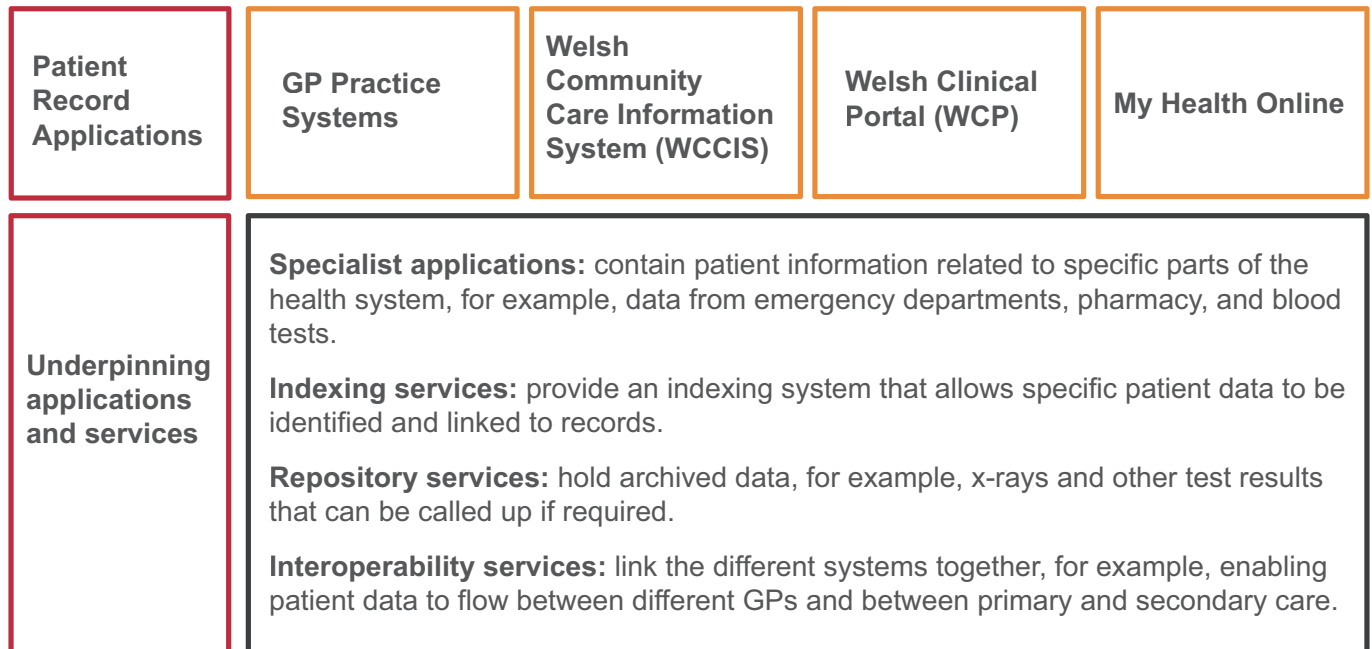
Will allow the sharing of vital information between health and social services in Wales through a single system. It will give frontline carers, therapists, mental health workers and community nurses the ability to co-ordinate patient cases through a shared electronic record of care with the aim of improving treatment. It removes the need for two databases held separately by health boards and local authorities. The extent to which WCCIS will act as a portal to other records is not yet clear and there are issues of what degree of access, for example, social care workers should have to patient's clinical records in primary and secondary care. The WCCIS programme has established an Information Governance Delivery Group and is working with the NHS Wales Information Governance Board and the Information Commissioner's Office on the sharing of information.

My Health Online

Currently, My Health Online provides GP patients with the ability to order prescriptions or repeat prescriptions and to book GP appointments online. However, the next phase of My Health Online is intended to give patients direct access to some of their GP records.

Source: Wales Audit Office

Figure 1: Key component parts of the electronic patient record



Note: this does not include the infrastructure provided by NWIS and NHS bodies and the corporate applications, such as Microsoft Office and Finance/HR systems that do not directly form part of the patient record.

Source: Wales Audit Office

7 The Welsh Government, NHS Wales Informatics Service (NWIS) and NHS bodies work together to deliver informatics systems for the NHS. The Welsh Government provides strategic direction, oversight and funding. Alongside other functions, NWIS develops and delivers specific national systems as well as certain aspects of the national ICT infrastructure, such as email and telephony services (Box 3). NHS bodies provide the hardware and infrastructure necessary to deliver services to staff and patients as well as some bespoke local systems. NHS bodies have a responsibility to support the development of new systems and to ensure that they are ready to receive and roll out national systems locally. They are also responsible for making the wider service and process changes that are needed to get the best out of new informatics systems.

Box 3: the NHS Wales Informatics Service (NWIS)

The Welsh Government established NWIS in 2010 to develop and support information and technology services for healthcare in Wales. NWIS is hosted by Velindre NHS Trust. NWIS brought together several organisations previously responsible for delivering the national information management and technology service in Wales. NWIS provides services across four main areas:

- **Software:** NWIS develops, supports and maintains application systems such as radiology (RadIS2), patient administration (Myrddin), cancer (CaNISC), and hospital pharmacy systems, the Welsh Clinical Portal, Individual Health Record and Child Health 2000.
- **Procurement:** NWIS procures national applications, systems and services on behalf of NHS Wales and supports their national deployment and hosting (for example, My Health Online and LIMS).
- **Information:** NWIS provides data warehousing and business intelligence services supported by the provision of national clinical classification, data standards and data quality standards.
- **Infrastructure:** NWIS provides 24-hour support for email and telephone, network communications, servers, databases, communication systems and access to the internet.

- 8 Several of our reports over recent years have identified problems with NHS informatics systems. For example, our reports on elective waiting times, follow-up outpatient appointments and maternity services have identified concerns about the main patient administration system (Myrddin). We identified concerns about e-prescribing in our 2016 report on medicines management⁶. Our local audit work during 2016 also picked up concerns about systems to support radiology services.
- 9 On behalf of the Auditor General, we reviewed the arrangements for delivering national informatics services. We focused on whether NHS Wales is well placed to achieve the intended benefits from investment in updated clinical informatics systems. For the purposes of this study, we include the Welsh Government's Department of Health and Social Services as part of NHS Wales. We focussed in particular on the arrangements within NWIS to deliver national systems. We looked at six specific systems in more detail as indicators of the wider approach to informatics (Box 4). This work included looking at health boards' engagement with the delivery of national systems.

⁶ Appendix 1 provides full references for these previous reports.

Box 4: informatics systems we looked at in depth

- Radiology systems (RADIS and the Picture Archiving Services – PACS)
- Laboratory system (Welsh Laboratory Information Management System – WLIMS)
- Myrddin – the main patient administration system
- Community systems – My Health Online (GP system for appointments and repeat prescriptions) and Choose Pharmacy

Appendix 2 provides more detail on these systems. Appendix 3 sets out all of the ‘live’ projects that NWIS is currently managing.

- 10 During the period of our review, the NHS Wales Internal Audit Services carried out a review of aspects of NWIS’s, governance and delivery. Where appropriate, we draw on the findings of that work to inform our conclusions. We are also aware that the Parliamentary Review of Health and Social Care is likely to make recommendations on the future of informatics in NHS Wales.
- 11 **Overall, we found that although the vision for an electronic patient record is clear and key elements are being put in place, there have been significant delays in delivery. While there have been some important developments during the period of our review, there are still some key weaknesses in arrangements to support and oversee delivery and to ensure the systems deliver the intended benefits. The NHS has recently identified that significant additional funding will be required to deliver the vision, but further work is required on the detailed plans and to confirm the funding arrangements.**

Strategy: The high-level vision for NHS informatics is clear but, despite some recent developments, there remains a need for greater direction on ‘Once for Wales’, priorities and addressing known barriers to progress

- 12 The overall vision for an electronic patient record made up from multiple component parts is clear and was based on a sound rationale. NHS Wales learnt lessons from problems in England, which had sought to develop a system containing all of a patient’s data on one single system. Nonetheless, in the decade or so since NHS Wales first adopted its approach, the global informatics market has changed significantly. There has been a growth in open source technology, which is available to use and develop for free, and also greater joint working between different providers of applications to ensure they can communicate with each other. It is therefore important that NHS Wales keeps its vision under review in light of changes in the market.
- 13 The Welsh Government’s 2015 Strategy and underpinning implementation planning work have added a degree of clarity on costs and timescales for delivering the vision. However, in our view there remain some key gaps. In particular, we found that:
 - the NHS has not been clear on the strategic priorities for informatics, adding more priorities while taking none away, although there have been recent developments to improve priority setting;
 - there have been disagreements between some NHS bodies and NWIS about what the strategy of developing or procuring systems ‘Once for Wales’ means, although the NHS is now making progress in clarifying this issue⁷;
 - there is not yet an agreed and fully funded plan for delivering the vision; and
 - many of the barriers to progress have been identified in previous reviews of informatics.
- 14 The NHS is taking steps to address many of the gaps through four new work-streams that have been set up to take forwards the delivery of the 2015 Strategy. The four work-streams should lead to clearer priorities and more effective delivery if they meet their objectives. It is too early to assess, at this stage, the likelihood that they will achieve the intended impact.

⁷ The key issues revolve around whether Once for Wales means NHS bodies must have the same national system in all places or different systems that are interoperable – capable of communicating with each other – through adopting common standards across NHS Wales. Paragraphs 1.7 to 1.15 set out the issues in more detail.

Leadership: Despite some positive progress, there remains scope to strengthen leadership of informatics across the NHS

- 15 There has been a strengthening of leadership at a national level in particular. Following a review in 2013, the NHS set up the NHS Wales Informatics Board (NIMB), which provides high-profile leadership and is currently chaired by the Chief Executive of NHS Wales having previously been chaired by the Minister for Health and Social Services. There have also been positive steps to establish national clinical leadership of informatics, through the Welsh Clinical Informatics Council (WCIC), which is supported by NWIS. However, we found that both forums could operate more effectively: NIMB by taking tough collective decisions on priorities for delivery, although recent changes to NIMB are intended to support clearer prioritisation; and WCIC by focusing less on detailed technical issues related to system changes.
- 16 Locally, there is considerable scope to strengthen leadership. NHS Wales lags the private sector in having informatics and ICT expertise represented at Board level. There is also a need to develop local clinical leadership of informatics. Clinicians struggle to find the time away from the day job to support and lead local delivery, which is hampering the design, testing and delivery of systems across Wales. The Wachter⁸ review of informatics in NHS England identified similar issues and called for the development of a cadre of ‘clinician-informaticists’ with knowledge of both clinical and IT issues to lead the development and delivery of change.

Governance and oversight: There are significant weaknesses in NWIS’ governance arrangements including a lack of independent scrutiny and unbalanced reporting of progress

- 17 We consider that the arrangements in place to oversee NWIS are, despite some improvements, weak. NWIS has an ambiguous formal status. It is hosted by Velindre NHS Trust. Velindre NHS Trust is accountable for aspects of NWIS’ governance, such as finances and complying with standing orders, but not for its strategy and performance. In those key areas, NWIS is accountable to the Welsh Government. In our view, these arrangements are unsatisfactory and there is a need to clarify and strengthen lines of accountability between NWIS and the Chief Executive of NHS Wales and the Cabinet Secretary for Health, Well-being and Sport.

8 Report of the National Advisory Group on Health Information Technology in England, **Making IT work: harnessing the power of health information technology to improve care in England**, September 2016. Professor Robert Wachter chaired the National Advisory Group.

- 18 We also found that the reporting of NWIS' progress and performance to the Welsh Government and the public has tended to be partial and overly positive. Examples include selectively reporting information on performance and progress without context and key caveats. We note that there have been some recent improvements to reporting to the NIMB. Nevertheless, we consider that NWIS would benefit from having greater independent challenge and scrutiny and putting more of its internal decision making and progress reporting in the public domain.

Finances: The Welsh Government needs to decide whether and how to provide significant extra funding needed to deliver the vision and work with the NHS to strengthen collective financial planning for informatics

- 19 We estimate that the NHS spends less than 2% of its funding on ICT. That is significantly below the figure of 4% recommended many years ago by Sir Derek Wanless. In 2016, for the first time, NHS Wales has set out indicative costs and timescales of delivering its strategy. The cost over five years is tentatively estimated at £484 million on top of existing budgets. In our view the cost estimates could be optimistic and further work is needed to confirm them.
- 20 The Welsh Government now faces some tough choices in deciding whether and how it can afford the additional costs. Health boards also face a challenge to prioritise funding for informatics. Historically, they have not clearly prioritised this area, with most health boards cutting their spending on ICT in real terms between 2010-11 and 2013-14. In our view, it is important that the Welsh Government and NHS bodies make these financial choices giving due regard to value for money but relatively swiftly in order to enable the NHS to plan effectively for the actions necessary to deliver the new and updated systems in the time period.
- 21 The move to integrated three-year planning across the NHS offers the potential for a more coherent approach to financial planning for informatics. There are some practical challenges in aligning the timing of plans, so that NWIS and NHS bodies can have clear and consistent plans for funding informatics. Also, there is scope for the Welsh Government to provide greater certainty on future spending plans for informatics, over at least a three-year period.

Programme management: Many of the building blocks of the electronic patient record have been, or are being, rolled out but there remains a way to go until it is fully in place and NWIS lacks a clear method for prioritising its work

- 22 NWIS' programme contains the building blocks of the electronic patient record, many of which are being rolled out or are expected to be rolled out over the next five years if the funding is made available. Since the vision of an electronic patient record was first developed in 2003, there has been progress in putting in place electronic systems for GPs. Several national systems are now well advanced in the rollout process, including the national laboratory system and a national radiology system. The Wales Clinical Portal, which will enable hospital staff to access GP records and other data, is partly in place. There are also a wide range of supporting services and infrastructure that are either in place or partially in place, to support the ultimate delivery of an electronic patient record⁹. Nonetheless, there remain some significant gaps where paper records are still used and many informatics systems across the NHS still do not communicate with each other or the national systems.
- 23 Around 10% of NWIS' resources are used for new 'projects' with the rest dedicated to maintaining existing national systems and its other core functions (Box 3). As of May 2017, NWIS has 30 live projects in its programme (Appendix 3). NWIS does not have a clear strategic approach to prioritising which new systems to include in its programme or for prioritising resources to those already in the programme. In part, NWIS' plans reflect the priorities identified by NHS bodies in their three-year planning process. In practice, with limited capacity, NWIS prioritises its resources on the basis of operational needs and towards progressing projects and tasks in order to avoid delays in other areas.

9 Examples include the Wales Clinical Communication Gateway, which enables information to be sent between primary and secondary care and the National Intelligent Integrated Audit Solution which tracks exactly who is accessing patient data.

Project management: for various reasons, many national systems have been significantly delayed which causes widespread frustration

- 24 For a variety of reasons, many of the national systems are significantly delayed and probably cost more than expected. The exact scale and cost of the delay are difficult to quantify. Of the 30 projects that NWIS is currently rolling out, just seven are on target for timing milestones. Some of the seven are showing as on track against revised timescales, but are significantly delayed against the original timeframes. We are aware that some projects have been delayed by many years. There is also some frustration that some projects, such as electronic prescribing, have not yet reached the stage of being reported on because there is not an approved business case, despite the idea being discussed for almost a decade. The reason for the delays include:
- the lack of prioritisation at a national and local level meaning NWIS stretches its resources across too many projects.
 - staff capacity issues, with NWIS carrying vacancies. While it has a lot of initiatives to attract new recruits, restrictions of national pay levels and high demand for developer skills in the private sector can make it difficult to recruit and retain senior software developers and business analyst staff to work with NHS bodies.
 - difficulties within the NHS bodies themselves, including ICT infrastructure that needs upgrading to take national systems or underlying technical issues within NHS bodies' own systems.
 - difficulties engaging and getting a clear direction from clinicians to develop and test systems and upgrades, which results in delays and also can cause rework where the systems developed do not match what the end-users expect.

Benefits management: There are concerns about the quality of some key national systems and a lack of monitoring data means it is unclear whether they are delivering the intended benefits

- 25 We found that there are some concerns about the quality and functionality of many of the national systems and that a lack of monitoring means it is unclear whether the intended benefits are being achieved. Health board staff expressed some concern about the functionality of all of the systems we looked at, with some deeply frustrated that they were not meeting their needs. There are particular concerns that the systems are not providing the important management information that is needed to plan services. NWIS runs Change Advisory Boards for most of its systems, with a view to involving NHS staff in improving systems, but we think these are too bureaucratic and not generally operating as effectively as they should. One health board had found that where NHS staff are not having their needs met by the national systems, they are developing workarounds, such as having their own personal databases, which present information security and governance risks.
- 26 For each of the six systems we looked at, we found that the intended benefits were clearly set out in the business case. However, it is not clear who is responsible for delivering and monitoring the benefits, with NWIS and NHS bodies both telling us that the responsibility lay with the other. A lack of monitoring meant that we found it difficult to track the intended benefits from the beginning of a project through to delivery. Where there is reporting on benefits, this tends to be partial and geared towards telling a positive story, rather than objectively reporting progress against the original intended benefits. The notable exception was the Choose Pharmacy project, which has been subject to a detailed review of actual and potential benefits.

Recommendations

- 27 We are aware that work is ongoing, to review aspects of the approach towards achieving the goal of an electronic patient record, including 'Once for Wales', the governance of NWIS and the level of funding for informatics. The recommendations below are intended to help support the NHS in Wales in reviewing its approach and, ultimately, reaching the goals set out in the 2015 strategy.
- 28 We make some specific recommendations based on the current vision of incremental development of new systems and a national infrastructure delivered by NWIS. We recognise that any changes to those arrangements may make these recommendations less relevant in some cases.

Recommendations

Strategy

- R1 The vision for informatics of incrementally creating an electronic patient record is clear and had a clear rationale when it was first set following the 2003 strategy. However, the informatics market and community have moved on significantly since then. **The Welsh Government, working with NWIS and NHS bodies, should review the informatics market to test whether it offers new opportunities to achieve the aims of the Strategy.**
- R2 NHS Wales has set up a task and finish group to seek to clarify the meaning of the 'Once for Wales' approach to developing and rolling out informatics systems. **The Welsh Government, working with NWIS and NHS bodies, should:**
- a **clearly define the balance and respective responsibilities between national systems led by NWIS and locally led systems;**
 - b **ensure that national and local implementation plans are updated to reflect any implications for the funding, development and roll-out of informatics systems of the clarified approach to Once for Wales; and**
 - c **prioritise the development of a set of common standards to ensure that systems procured or developed locally are compatible with other local systems and the national systems.**
- R3 We found that the NHS has not set clear priorities for informatics. **The Welsh Government, NWIS and NHS bodies should agree a clear and achievable set of priorities for national informatics and resist adding new priorities without either deprioritising something else or adding new resources.**
- R4 Many of the issues and concerns about barriers to progress that we found during our fieldwork have long been recognised. **The Welsh Government, NHS bodies and NWIS should produce an open and honest assessment of what has worked and what has not so far and produce a clear and jointly owned plan for overcoming the known barriers to progress. These documents should be in the public domain so that NHS staff can see that their concerns have been recognised and are being addressed.**

Recommendations

Leadership

- R5 We found that there is considerable scope to strengthen national and local leadership on informatics across the NHS. **The Welsh Government should:**
- a **work with NHS bodies to develop options for strengthening representation of informatics at board level, including reviewing the merits of a board level Chief Clinical Information Officer (or equivalent) role;**
 - b **work with NHS bodies to develop a clear action plan for the development of a cadre of senior clinician-informatics staff, in line with the recommendations of the Wachter review in England; and**
 - c **identify opportunities to strengthen the informatics voice at the most senior level in the Department for Health and Social Services, including reviewing whether and if so, how to strengthen the roles of the NHS Wales Chief Information Officer and Chief Clinical Informatics Officer in NHS Wales' strategic decision-making process.**

Governance

- R6 We found that the governance arrangements for overseeing and challenging NWIS are weak. **While the Welsh Government has written to Velindre NHS Trust requiring it to strengthen governance arrangements for NWIS, we consider that the Welsh Government should carry out a wider appraisal of options to strengthen governance and oversight of NWIS. The final arrangements should ensure that:**
- a **there is independent scrutiny of performance and progress;**
 - b **there is greater transparency, with papers and minutes of discussions placed in the public domain; and**
 - c **there are clear lines of accountability between NWIS and the Chief Executive of NHS Wales and the Cabinet Secretary.**
- R7 We found that the progress reports that NWIS produces for the Welsh Government and the public do not provide a complete or balanced picture. **The Welsh Government should work with NWIS to improve the reporting of performance to tell a more balanced story of what is going well, where there are difficulties and why. Performance reporting should include information about progress against initial project plans, user satisfaction and concerns with existing national services as well as those new systems being rolled out.**

Recommendations

Finances

- R8 The Welsh Government needs to decide whether and how to provide the additional funding that NHS bodies and NWIS have estimated is required to deliver the vision for an electronic patient record. **The Welsh Government should carry out a full cost-benefit analysis of the proposed investment, including the extent to which financial savings from new systems may enable funding to be redirected from existing services to invest in new informatics systems.**
- R9 Despite some recent progress, there remains scope for better integration of medium-term financial planning of informatics across the NHS. **The Welsh Government, working with NHS bodies and NWIS, should set out clear and agreed medium-term funding plans for local and national ICT programmes. This should involve NHS bodies and NWIS working together before NHS bodies complete the first draft of their rolling three-year plans. It should also take account of any future decision on funding required to deliver the strategy.**

Project management

- R10 NWIS is increasingly using the Agile approach to software development. There are potential benefits to this approach in terms of timeliness and quality, but the approach relies on deep engagement with clinicians and other end users, which has often been difficult to secure. **NWIS and NHS bodies should work together to:**
- a **strengthen the relationship between developers and clinicians, particularly in designing and testing new systems and functions, so that there is a better collective understanding of what is wanted and what is possible; and**
 - b **engage with managers to identify their information needs as well as the needs of clinicians.**
- R11 NWIS is developing but does not yet have a full workforce plan, and reports that it struggles to recruit and retain senior developer staff due to competition from the private sector **The Welsh Government, NWIS and NHS bodies should work together to explore options to secure the experienced ICT staff and developers that NWIS needs within the context of a comprehensive workforce plan for NWIS and taking account of the ICT staff available to NHS bodies.**

Recommendations

Benefits management

R12 We found that there is a lack of clarity as to responsibility for delivering the intended benefits of national informatics systems and a lack of monitoring. **The Welsh Government, NHS bodies and NWIS should work together to ensure that:**

- a **there is a clear allocation of responsibility for achieving the benefits; and**
- b **there are clear responsibilities and processes in place for monitoring and reporting progress in delivering those benefits.**

R13 We found that many staff in the NHS are frustrated with some of the functionality and quality of national informatics systems. NWIS has a process for updating national systems, but there are concerns about the slow pace and lack of feedback and the Change Advisory Boards themselves could function more effectively. **NWIS should review its process for managing change requests and where necessary make changes to:**

- a **provide clearer feedback to the service about how their requests have been dealt with and whether and when any changes can be expected;**
- b **remain open to minor changes that could have a significant impact in improving end users' use and perception of the systems; and**
- c **provide clearer agendas and work programmes for the Change Advisory Boards to make them more focussed on enabling impactful improvements to systems.**

Part 1

The NHS has a clear vision for an electronic patient record but there are some key weaknesses in the arrangements to support and oversee delivery



1.1 This part of the report looks at the strategic direction for NHS informatics and the arrangements put in place to support and oversee delivery of that strategy.

Key issues we looked at

Issue	What good looks like
Strategy	A clear vision of what the strategy is aiming to achieve and how available resources will be prioritised to move from the current state to the desired position.
Leadership	High-profile and visible championing of the strategy across the whole system.
Governance and oversight	Clear systems in place to scrutinise and challenge delivery, including transparent reporting of progress and independent review.
Finances	A clear understanding of the costs of achieving the strategy and a plan for how those costs will be met over the period covered by the strategy.

The high-level vision for NHS informatics is clear but, despite some recent developments, there remains a need for greater direction on ‘Once for Wales’, priorities and addressing known barriers to progress

The NHS has set out a clear vision in ‘Informed Health and Care’ for an incremental approach to developing an electronic patient record using portals

1.2 In 2003, the Welsh Government published its **Informing Healthcare** strategy (the 2003 strategy) setting out its vision to transform healthcare through information technology. The 2003 strategy explained that in many cases, fragments of information were held by many professionals in many settings but none had access to the whole record, while patients rarely had access even to the fragments. The 2003 strategy concluded that this was having a damaging impact on patient outcomes as well as hampering the achievement of integrated health and social care. The 2003 strategy made it clear that a ‘single record’ was designed to overcome these problems of fragmentation although it did not specify what form the single record would take.

- 1.3 In December 2015, the Welsh Government published **Informed Health and Care: A Digital Health and Social Care Strategy for Wales** (the 2015 strategy). The 2015 strategy restated the commitment to the vision developed through the 2003 strategy. It recognised that the NHS had not yet achieved the ambition of creating a single patient record, and outlined the intention to build on existing work to continue to pursue this overall vision.
- 1.4 The 2015 strategy highlighted that in Wales, the adoption of new technology has been incremental and has aimed at being consensual. The NHS in Wales has sought to learn lessons from England, where there had been problems involved in developing a single integrated record held on one system¹⁰. The vision for Wales was different. Rather than a single system, information would be held on multiple systems, for example, systems for x-rays or blood tests, which could be accessed and brought together through ‘portals’ which clinicians can access anywhere, any time. GPs can access information through their systems, clinicians in hospitals will be able to access the information through the Welsh Clinical Portal. The extent to which the joint social care and community care system will act as a portal to enable access to all of a patient’s information is not yet clear.
- 1.5 We consider that the overall vision of a single record, made up of multiple parts which clinicians and potentially patients can access, is clear. In our survey, Assistant Directors of Informatics overwhelmingly agreed with the statement that the Welsh Government had set a clear and consistent direction for clinical ICT systems across Wales. We also think that the vision of a cautious approach was based on a sound rationale. The healthcare informatics market was less mature at the time and there were multiple examples of new systems that were not working as intended. In particular, the NHS in Wales was right to learn lessons from approaches elsewhere, notably England’s approach to a single system that held all of a patient’s information.
- 1.6 Nonetheless, it is important that NHS Wales remains open to updating the vision in light of progress and changes in the informatics market. It has been more than a decade since NHS Wales adopted its vision. In that time, the global informatics market has changed significantly. In the USA, in particular, there has been rapid progress in rolling out electronic health records, albeit in a very different healthcare system. More generally, there has been a growth in open source technology, which is available to use and develop for free, and also greater joint working between different providers of applications to ensure they can communicate with each other.

10 See for example, National Audit Office, *The National Programme for IT in the NHS: an update on the delivery of detailed care records systems*, May 2011

The NHS is now making progress in clarifying what 'Once for Wales' means but still needs to agree what some of the key details mean in practice

- 1.7 The 2015 strategy uses the concept of 'Once for Wales' as a way of bringing together and deploying local and national resources. The importance of the Once for Wales concept has been emphasised by Ministers with responsibility for NHS Wales. The 2015 strategy states that a Once for Wales approach 'will create a solid platform for common standards and interoperability between systems and access to structured, electronic records in all care settings to join up and co-ordinate care for service users, patients and carers'. The strategy notes the Welsh Government's intention to 'build a more 'open' technical platform to allow greater flexibility in the development of new applications based on clear national standards, system interoperability and maintaining the partnership approach which has been a driving feature of our success so far'.
- 1.8 While there is general support for the principle of Once for Wales, there is disagreement within the NHS about what it means in practice. The description of Once for Wales and interoperability in the 2015 strategy are ambiguous and there are competing interpretations across the NHS. On the one hand, there is a view that Once for Wales means that all organisations must accept national systems developed or procured by NWIS. However, there is also a view that the emphasis on interoperability means individual organisations can develop or procure their own systems, provided they are compatible with national systems and those in other organisations.
- 1.9 There are valid arguments on both sides. For example, NWIS argues that having one system in all health boards is the better approach as interoperability is inherently more complicated and expensive to achieve, and becomes more so over time as systems diverge. There are potential cost savings from purchasing a system once for the whole NHS, rather than individual procurement at each NHS body. NWIS also argues that having one system is clinically safer as all clinicians will be familiar with it. In particular, it highlights that many clinicians, especially locums, will work in different hospitals and that having to be familiar with different systems introduces complexity and risk.

- 1.10 Others point to the greater flexibility, local ownership and faster pace that can be achieved by having different but compatible systems. They also point to changes in the market for digital healthcare systems, where suppliers are increasingly working in an open way and sharing their code in order to enable systems to communicate with each other. There are also concerns that the Once for Wales approach restricts NWIS and NHS bodies' flexibility and ability to utilise the latest technology. Several health board staff and board members were concerned that the pace of technological change compared to the pace of delivery of all-Wales systems, meant that NHS Wales was committed to a programme of work that was becoming increasingly out of date.
- 1.11 The debate over local autonomy versus central direction is not unique to Wales. In England, the Wachter review concluded that the NHS should learn, but not overlearn, the lessons of the previous centralised approach. It found that there are some circumstances where centralisation can be beneficial, such as efforts to improve the usability of systems, developing business cases, contracting and guaranteeing interoperability.
- 1.12 In mid-2017, NHS Wales set up a task and finish group in order to agree and communicate a clear definition of Once for Wales. The group will also agree which systems will be part of the core national system that organisations will be obliged to adopt, and will initiate work to establish a set of common standards to enable integration and interoperability. The task and finish group has agreed a broad definition of what Once for Wales means for patients, clinicians and service development, which has been approved by the NIMB. The group defined Once for Wales as 'being about all parties involved in health and care in Wales working collaboratively to add value and deliver the strategy of a single electronic patient record, ensuring that information is entered once and is made available to all those who need it, at the time and place they need it'.
- 1.13 The task and finish group recognises that further work is required to agree exactly which applications should be delivered on a national basis and also to define common standards. Also, further work is required to set out criteria for deciding which future systems should be developed or procured Once for Wales. The group agreed that there are benefits from having a single system in place across Wales, especially for those that work across organisational boundaries. However, it notes that other factors such as the pace of delivery, useful lifespan of the systems and pricing also need to be considered. As such, the tension between local versus national systems is not fully resolved but there is now a clearer framework for the debate.

- 1.14 Going forwards, it is important that the agreed position on Once for Wales is translated through into the strategic direction and detailed planning of system delivery, finances and staffing capacity. It is possible that decisions on Once for Wales will have an impact on the role and future resourcing of NWIS, especially if these decisions involve a shift away from a national approach to applications.
- 1.15 A more flexible approach will also require a rapid acceleration of efforts to set common standards across NHS bodies (**Box 5**). Despite the emphasis on interoperability for over a decade, at present, there are not common standards to ensure that the systems NHS bodies develop or procure are able to communicate with the other key systems, especially the national systems. In line with the recommendations of the task and finish group, the Welsh Government intends to set up a national board to take forwards work on developing common standards to enable the development of the electronic patient record.

Box 5: how common standards enable systems to be interoperable

In order for different informatics systems to be able to communicate with each other, there needs to be a common set of standards in place. Standards enable two important types of interoperability:

Technical interoperability – is the process of moving data between two systems. It is not dependent on the type of the information being moved or the distance between systems; it is concerned with the reliable delivery of information between systems.

Semantic interoperability – is the process of ensuring that one system can understand the information received from another. It must ensure that information can be used and interpreted without ambiguity. Critical to this is the need for aligning both data models as well as terminology.

The NHS is starting to fill in some gaps in the 2015 strategy but there remains a need for clearer strategic direction on applying lessons learned from past problems and priorities

- 1.16 The development of the 2015 strategy was informed by a Welsh Government stocktake of the Informing Healthcare Programme. The stocktake identified that it would take around four to five years to deliver the plans for an electronic health record and also identified a number of weaknesses that needed to be addressed.
- 1.17 In developing the 2015 strategy, the Welsh Government also engaged extensively across the NHS. Welsh Government officials gathered views from Chief Executives, Executive Leads and Assistant Directors of Informatics about progress to date and the key issues going forwards. Collectively, the stocktake and the combined views of senior executives across the NHS provided an insight into the problems that were hampering progress and a relatively clear picture of what needed to be done going forwards. Some of the key messages were as follows:
 - a there was support for the national approach but there were tensions over what needed to be delivered nationally and retaining the scope for local innovation;
 - b frustration with the pace of delivery;
 - c NWIS had over promised and under delivered; their resources were limited so they needed clear priorities to focus on delivering fewer things more quickly and be more transparent in their reporting of timescales and delivery plans;
 - d a loss of clear focus on the single patient record;
 - e no flexibility to make minor changes that would make clinicians' work easier; and
 - f concern about the lack of clarity regarding decision making about national systems, leading to the risk that those who shout loudest had a disproportionate influence.

- 1.18 However, the final 2015 strategy does not itself reflect on the barriers identified by NHS Executives or the issues identified by the stocktake and does not set out how the NHS can address them. There are also some key gaps in the strategy, notably around priorities, timescales and resources. As part of the process of developing the strategy, many senior NHS executives identified that NWIS had too many priorities which it was struggling to deliver. However, rather than clearly prioritise already stretched resources, the strategy added new priorities without taking any away.
- 1.19 Other than short-term commitments on a small number of areas, the strategy does not set out a timetable for delivery in any detail. The strategy notes that it is not a delivery plan, but greater clarity on timescales was one of the intended benefits of the refreshed strategy. While the comments from NHS executives highlighted the resource constraints that NWIS was under, there was no detailed financial analysis underpinning the strategy and it does not refer to finances.
- 1.20 The NHS is now moving towards greater clarity on some of these areas through more detailed implementation planning. Each NHS body has produced a Strategic Outline Plan, showing what further work is required to deliver the vision of an electronic patient record locally. In summer 2016, the NHS produced an implementation report which aggregated the local plans alongside NWIS' plans for national systems that support the local plans.
- 1.21 The implementation report provides some information on finances and timescales ([paragraph 1.49](#)), setting out indicative costs of delivery over five years. The cost estimates are not fully finalised as the Welsh Government has not committed to providing the necessary funding and further work to refine the plan is ongoing. This ongoing work will inform the production of a new NHS Wales national plan for informatics, covering 2018 to 2021.
- 1.22 While the implementation report was a step forward, it did not address the issues that have hindered progress to date. While there appears to have been some prioritisation, there is no supporting information about how and why some actions have been prioritised over others, so it is not clear whether the plan is based on operational practicalities or a more strategic approach. In our view, there is not yet a sufficiently clear direction on getting from the current position to the desired end goal.

1.23 Over recent months, the NHS has set up four delivery work-streams based around the themes set out in the 2015 Strategy (Figure 2). The four work-streams have developed draft roadmaps and should lead to clearer priorities and more effective delivery if they meet their objectives. It is too early to assess, at this stage, the likelihood that they will achieve the intended impact. In our view, in addition to detailed plans and roadmaps, there needs to be a full, open and transparent recognition of the lessons to be learnt as regards barriers to progress and a clear and agreed plan for overcoming them. Many of the issues known to have impeded progress in the past were still being reported to us as part of our review.

Figure 2: Work-streams taking forwards the delivery of the 2015 Strategy

Workstream 1: Information for You

Objective: focus on reducing duplication across projects/organisations and ensuring patients have a simple, clear 'electronic' way to move through health and care services.

Workstream 2: Supporting the Professional

Objective: to focus on mechanisms to help informed local and national clinical engagement about ICT, collaboration of development of national systems and promote an increase in usage of these systems.

Workstream 3: Improvement and Innovation

Objective: deliver Information Task Force aims, supported by infrastructure and innovation initiatives:

- a framework to share and use information, developing new digital solutions, ensuring we have skilled resources, and improvements in data quality;
- infrastructure to enable information to be shared and stored safely, eg cloud computing and cyber security; and
- an Ecosystem set up to promote innovation and provide flexibility in procuring/developing new digital applications.

Workstream 4: A Planned Future

Focus on mechanisms to improve informatics planning, partnership working and stakeholder engagement at a local, regional and national level to help ensure that the opportunities in the strategy are prioritised and their delivery planned effectively. The workstream's purpose is therefore to accelerate the pace of delivery of agreed service/business goals by accelerating the effective delivery of informatics improvements to enable and support the agreed service/business goals.

Note: the Information Task Force referred to under work-stream 3 was set up to develop guidance on making better use of health and care data. In October 2017 it issued a Statement of Intent 'Better use of health and care data for safe, effective care and efficient services'.

Source: National Informatics Management Board papers

Despite some positive progress, there remains scope to strengthen leadership of informatics across the NHS

The National Informatics Management Board is enabling stronger collective leadership but there is scope for it to become more directive and challenging on priorities

- 1.24 Following a review of NHS informatics in 2013¹¹, which identified a lack of collective leadership, the Welsh Government set up the NHS Wales Informatics Board (NIMB) in 2015. Initially, the then Minister of Health and Social Services chaired the Board but it is now chaired by the Chief Executive of NHS Wales. NIMB membership includes the executive leads with responsibility for informatics from NHS bodies, and senior officials from NWIS and the Welsh Government. The Board oversees Information Management and Technology in NHS Wales and drives the strategic agenda for a data-driven system, which can support improved access to information and the introduction of new ways of delivering care with digital technologies. The NIMB has played an important role in providing leadership in informatics. In particular, it has been a key driving force behind the development of the detailed planning to support implementation of the strategy (paragraph 1.20).
- 1.25 Several of the staff we met with during our health board visits reported that the NIMB meetings were getting more effective. They reflected that during the period the meetings were chaired by the Minister it helped them to get a clearer steer on some priorities and also helped the Minister to understand the practical issues. However, there were concerns about whether NHS bodies felt fully able to be candid about problems in front of the Minister. They felt that, with the Chief Executive of the NHS now acting as chair, there is a move towards a greater willingness to discuss difficult issues. NWIS considers that it is positive that NIMB now discusses priorities more but had found it frustrating that these discussions generally result in NWIS having more, not fewer, priorities.

11 Mel Evans, **Review of NHS Informatics in Wales**, November 2013 unpublished

1.26 We observed a meeting of the NIMB in September 2016. We observed many positive aspects of the meeting, including the wide range of issues covered and the opportunity to look at progress across the whole NHS. However, in our view there is scope for a tougher focus on collectively resolving difficult issues. Our observations suggest that there was, at the time, validity in NWIS' concerns that NIMB tends to add more priorities rather than identify what should be deprioritised. However, since we observed the meeting in 2016, the arrangements for NIMB have been amended, with new terms of reference and a focus on overseeing the four work-streams that are taking forwards delivery of the Strategy (paragraph 1.20). NIMB intends this work to provide greater clarity on priorities.

There has been a strengthening of national clinical leadership of informatics but there may be scope for greater representation of clinical informatics within the Welsh Government's Department of Health and Social Services

1.27 Clinical leadership is critical to the successful delivery of an electronic patient record. Good informatics systems enable clinicians to embed new ways of working and communicating with their colleagues. Often clinicians in the same field have different ways of working, both within and between different health boards. Clinical leadership is therefore required in standardising processes so that the ICT systems are developed to meet clinicians' needs, rather than requiring clinicians to change their practice to fit with the ICT. NWIS reports that clinicians complain about, and resist using, systems that have been developed without a high degree of clinical engagement and for which they feel little ownership.

1.28 In recognition of these challenges, NWIS has supported the development of stronger clinical leadership on informatics. In 2015, NWIS appointed a new Medical Director, who also became NHS Wales' Clinical Chief Information Officer, to lead on clinical engagement. NHS bodies commented positively on the role and the increased engagement of clinicians as a result. The equivalent role of Clinical Chief Information Officer is different in England and Scotland. In England, the Chief Clinical Information Officer has a clear place in NHS England's senior management structure, whereas in Wales the role sits in NWIS, albeit that there is a direct line of accountability to the Chief Medical Officer¹². The Scottish Government is in the process of appointing its first Chief Clinical Information Officer, who will be a senior civil servant. In our view, there is scope for the Welsh Government to consider whether there are lessons to learn from the other parts of the UK.

¹² Direct comparison with England is complicated by the very different governance arrangements, with the senior managers of NHS England being part of an independent management structure compared to Wales where they are part of the Welsh Government's Department for Health and Social Services.

- 1.29 The NWIS Medical Director/Chief Clinical Information Officer set up the Wales Clinical Informatics Council (WCIC) in 2015. The WCIC brings together senior clinicians with some responsibility for informatics in their organisations. Its aims include providing NWIS with advice and guidance on issues that practitioners will be more knowledgeable about; for example, professional standards and information requirements, as well as communicating with others in their organisations about what to expect at each stage of developing and implementing a new system.
- 1.30 While there is much support for the WCIC in principle, there are concerns that it is not fulfilling its potential to provide strategic clinical leadership. In part, this is because the WCIC also acts as a Change Advisory Board¹³ to the Wales Clinical Portal. Some WCIC members consider that it spends too much of its time managing technical requests for changes to systems rather than focusing on the big challenges and difficult issues around clinical input to system design, development and delivery.
- 1.31 There is also scope to clarify how the Director of NWIS, who is also NHS Wales' Chief Information Officer, fits into the leadership structure of NHS Wales. The role is not represented at the NHS Wales Executive Leadership Board, which comprises all NHS Chief Executives. Instead, informatics is represented by the Chief Executive of Velindre NHS Trust as the Chief Executive with lead responsibility for informatics. Under previous arrangements, set up in 2010 after the health boards were first formed, the then Chief Information Officer sat on the equivalent of the NHS Wales Executive Leadership Board to input informatics expertise and leadership into key strategic discussions and decisions.

Within NHS bodies, informatics is not well represented at Board level and there is a need to strengthen local clinical leadership on informatics

- 1.32 The Welsh Government requires health boards to have nine Board-level Executive Directors covering defined areas¹⁴. These nine areas do not include informatics. As a result, no NHS body in Wales has a dedicated IT Executive Director post. Responsibility for informatics is always in addition to other aspects of a director's portfolio, so the priority given to informatics can vary as can the backgrounds of those responsible. While each health board has a non-executive Board Member with responsibility for IT, the specific role and responsibilities vary. It usually forms a small part of the relevant Board non-executive's remit and they do not necessarily have particular expertise in this area.

¹³ Paragraph 2.30 discusses the role of the Change Advisory Boards in greater detail

¹⁴ For NHS trusts, there are five mandated Executive Director roles.

- 1.33 Across NHS Wales, the IT lead sits with different Executive Directors including the Medical Director, Director of Primary Care and Mental Health, Chief Operating Officer, Finance Director. Executive and non-Executive leads are supported and briefed by the Assistant Directors for Informatics. However, this is not a substitute for having the expertise available during the board's discussions. In the private sector, an increasing number of companies have Chief Information Officers, or equivalent, that are members of the Board.
- 1.34 There is frustration both within NHS bodies and NWIS that clinicians are too busy with the day job to engage fully with the process of designing, testing and rolling out systems. While NWIS can financially compensate health boards for the use of clinicians' time to support national systems, the payments do not fully cover the actual costs of backfilling that post. There are a small number of very engaged clinicians across Wales, which is positive, but there is a risk that the informatics agenda then gets driven by the particular interests or priorities of a narrow group.
- 1.35 This challenge of clinical leadership is not unique to Wales. In England, the 2016 'Wachter' review called for the development of a cadre of 'clinician-informaticists' with knowledge of both clinical and IT issues to lead the development and delivery of change. The review notes that without the right people and skills, digital healthcare is likely to fail, or not realise its full potential. In our view, the lessons from the Wachter review apply equally to Wales. There is a considerable amount of work to do to enable the emergence of a group of clinicians that have both the time and the informatics training to lead locally and support the delivery of national systems.

There are some significant weaknesses in NWIS' governance arrangements including a lack of independent scrutiny and unbalanced reporting of progress

NWIS has an ambiguous formal status and there is a lack of independent scrutiny

- 1.36 NWIS has its own identity and management structure but has no formal independent status. It is not a standalone organisation with its own board and governance structures. In 2011, the Welsh Government and Velindre NHS Trust agreed that NWIS would be a 'hosted' body within Velindre. NWIS must comply with the Trust's standing orders and HR policies and reports to the Trust's audit committee. The Trust receives funding from the Welsh Government to carry out this role. However, the Trust's role does not involve holding NWIS to account for its strategy, performance or delivery. Day-to-day responsibility for this oversight role rests with the Welsh Government's Deputy Director, Digital Health and Care. NWIS is also held to account through twice-yearly review meetings chaired by the Welsh Government's Director of Primary Care and Innovation. While NIMB looks at progress across the NHS, it is not its role to hold NWIS to account. In late 2016, the Welsh Government concluded that NWIS' position as part of Velindre NHS Trust meant it had an ambiguous formal status in relation to key governance developments, such as the Putting Things Right agenda to manage serious incidents and concerns¹⁵.
- 1.37 In our view, NWIS' ambiguous status is unsatisfactory and risks creating confusion about accountabilities. NWIS does not have some of the key elements of good governance that come with a more formal status. It does not benefit from the open challenge that comes from having independent board members scrutinise its performance and strategy. NWIS chooses what papers to put in the public domain, and there is very limited public reporting of its progress and performance (paragraphs 1.40 to 1.42). Also, in other NHS bodies the chair of the organisation is accountable to the Cabinet Secretary for Health and Social Services. Without an independent chair, the link between NWIS and the Cabinet Secretary is unclear.

¹⁵ The NHS in Wales follows the management of concerns process known as Putting Things Right. This process aims to: make it easier for people to raise concerns and for the NHS to better investigate, respond to and learn from those concerns.

1.38 The Welsh Government has taken some steps to strengthen its oversight of NWIS. In 2015, the Welsh Government asked its own internal audit function to look at the oversight of NWIS, focusing in particular on the monitoring of NWIS' performance. In addition, and at the request of the Welsh Government, NWIS commissioned NHS Wales internal audit services to review its funding and arrangements to secure value for money. The NHS Wales internal audit report reflects our own findings in key areas, including the need for strengthened oversight arrangements. Velindre NHS Trust and NWIS are in the process of agreeing an action plan to address the recommendations of the review. In July 2017, following a Joint Executive Team meeting, the Welsh Government wrote to Velindre NHS Trust stating that 'clearer arrangements for governance of NWIS' were required.

NWIS' reporting of performance and progress is not balanced and has tended to paint an overly positive picture

- 1.39 NWIS produces a monthly report to Welsh Government officials and the Cabinet Secretary, which summarises progress for each project. In response to the reviews by the Welsh Government and NHS Wales internal audit services, NWIS has amended its progress reports. It has included some additional data on finances, risks and its response to incidents and suggestions from NHS staff.
- 1.40 In our view there is scope to further strengthen progress reports to provide a more balanced picture of progress. The reports use a RAG (red, amber, green) system. However, the statuses are not always clearly explained. In some cases, projects are marked as 'green' for timing milestones despite being years behind schedule. This apparent anomaly is because NWIS has amended its timescales to reflect actual progress and set out a more realistic timeframe. These updates go through a proper change control process. However, this process and these changes are not fully explained in the reports. Although the reports include some data on operational performance, they focus primarily on projects that are currently being rolled out, which only account for around 10% of NWIS' resources. They therefore do not reflect some of the concerns and issues with existing national systems that are being reported to NWIS.

- 1.41 Performance reports in the public domain tend to depict a positive and optimistic picture. For example, NWIS's three-year plan for 2016-2019 reports on the progress made on delivering the 2015-16 plan but it lists positive outcomes only. It does not report the extent to which the previous plan has been delivered or whether actions remain outstanding. Where detailed figures are given, the context required to understand the data is missing. For example, the plan reports that patient registrations to My Health Online are in excess of 170,000, but does not reflect that this represents only 5.6% of the Welsh population and is significantly below the original aim of 872,000 patients¹⁶. NWIS' annual review also focuses only on the positive view. The review describes each of the main projects that NWIS is developing and delivering, but does not provide any information or context that would allow the reader to evaluate how well projects are progressing.
- 1.42 In our view, NWIS would benefit from taking a more balanced approach to reporting its performance. We do not think the information gives those responsible for overseeing NWIS and the public sufficient balanced information to understand progress. The lack of balanced information also contributes to reputational risks. NHS staff using NWIS' systems are acutely aware of instances when a system has taken longer to deliver, or has not delivered all the benefits it originally intended. That these issues are not reflected in NWIS's assessment of its own performance contributes to frustration and a perception that NWIS does not listen. A more balanced reporting style would allow NWIS, the Welsh Government and the wider NHS to have a more constructive conversation about where the issues affecting performance and delivery lie and how they can be resolved. We note that the most recent (October 2017) progress reports to the NIMB have been improved to give a more balanced picture of progress and actual use of systems.

¹⁶ Paragraph 2.39 provides further, more up-to-date, detail on the reporting of My Health Online benefits.

The Welsh Government has strengthened its oversight of business cases for new national informatics systems

- 1.43 NWIS follows the Five Case¹⁷ approach to developing business cases for national systems. This approach is commonly used in the public sector and we have commented on its use in other reports¹⁸. We reviewed NWIS' business cases for several systems and found that they were generally clear and in line with guidance on estimating costs, allowing for optimism, setting out intended benefits and comparing different options. In some cases, the options included the relative costs and benefits of procuring a service or developing it in house.
- 1.44 While the capital funding elements of the business cases are generally clear, we consider that NWIS could be clearer on the revenue implications. In particular, the business cases we reviewed in relation to the six products were generally unclear as to the scale, and cost, of NWIS staff time in developing and supporting the new systems. They were also unclear as to the amount of staff time required in the health boards to support local roll-out of the systems. Staff at health boards told us that the amount of time they had to spend supporting the roll-out of a new system was far in excess of their expectations.
- 1.45 Historically, the processes for approving NWIS' business cases have varied. Because of the timescales involved, most of the systems we focused on were prepared many years ago. Some were developed iteratively, using NWIS' own discretionary capital funding, so did not require any approval from the Welsh Government. Also, some projects were funded through different initiatives, including Invest to Save, with different scrutiny processes.

¹⁷ The five 'cases' are: strategic, financial, economic, commercial, management.

¹⁸ See Auditor General for Wales reports on **Welsh Government Acquisition and Ownership of Cardiff Airport**, January 2016, and **21st Century Schools and Education Programme**, May 2017

- 1.46 We looked in detail at the My Health Online business case scrutiny as a relatively recent project. We found that Welsh Government officials made detailed comments on the My Health Online Outline business case in 2010. These included some critical comments on the detail in the options appraisal. The intended next stage was for the Department of Health and Social Service's Infrastructure Investment Board to see a final amended business case and make a decision on whether to recommend funding. However, NWIS subsequently amended the business case and, in 2013, decided to fund My Health Online from its own discretionary capital. As NWIS needed no additional Welsh Government funding, the business case did not require formal Welsh Government sign-off. We found no evidence that the final amended business case was signed off by anybody outside of NWIS.
- 1.47 The Welsh Government has strengthened the approach to reviewing business cases. Since 2015, NIMB has had a role in approving all business cases for national systems. The Welsh Government has emphasised that it expects NHS bodies to have a stronger collective role in developing business cases for national applications. In 2016-17, the Welsh Government introduced a new distinct capital funding stream for ICT projects and new approval processes. Business cases will be reviewed by the Digital Health and Care Team within the Department. The business cases will be subject to further review by the Informatics Planning and Delivery sub-group of the NIMB. The Business Case will subsequently be reviewed by NIMB which will decide whether to endorse funding. The final decision will be taken by the Cabinet Secretary, on the basis of advice from officials.

The Welsh Government needs to decide whether and how to provide significant extra funding needed to deliver the vision and work with the NHS to strengthen collective financial planning for informatics

NWIS' core funding from the Welsh Government has fallen by 22% in real terms since 2010-11 and it appears that spending on ICT across the NHS is some way below recommended levels

- 1.48 An independent review of NHS informatics in 2013 found that in 2010-11, total spending on ICT across the NHS (including by NWIS) was around 2% of total expenditure. The review noted that this figure was some way lower than the 4% that Sir Derek Wanless had recommended that the NHS across the UK should be spending on ICT in 2003¹⁹. NWIS' 2016-17 budget is around 0.8% of health spending (excluding depreciation).
- 1.49 Our local diagnostic reviews of NHS bodies' ICT capacity and resources found that NHS bodies reported spending an average of 0.8% of their budget on ICT in 2013-14. That figure varied from 0.61% to 0.9%. Between 2010-11 and 2013-14, all health boards, apart from Cardiff and Vale University Health Board²⁰, had reduced their spending on ICT in real terms. The reduction varied from 3% to 31%. Assuming that spending position has risen in line with overall NHS budgets in the period since 2013-14, we estimate spending on ICT to be in the order of 1.6% of total spending. This is a broad estimate and meeting a spending target is no guarantee of effective delivery.
- 1.50 In 2016-17, NWIS' total revenue budget, excluding depreciation, was around £54 million. It had £4.9 million in discretionary capital and also secured £1.9 million in capital from the Welsh Government for specific projects and systems. The largest component of NWIS' budget is the £27.9 million of programme funding from the Welsh Government, which covers most of NWIS' core functions, including developing and supporting national informatics systems (Figure 3)

19 The Report of the Project Team advised by Derek Wanless, **The Review of Health and Social Care in Wales**, June 2003

20 Cardiff and Vale University Health Board noted that the increase over the period was due to one-off capital spending on ICT fixtures at the National Children's Hospital and two new buildings. It reports that without these one-off items, spending would have fallen over the period.

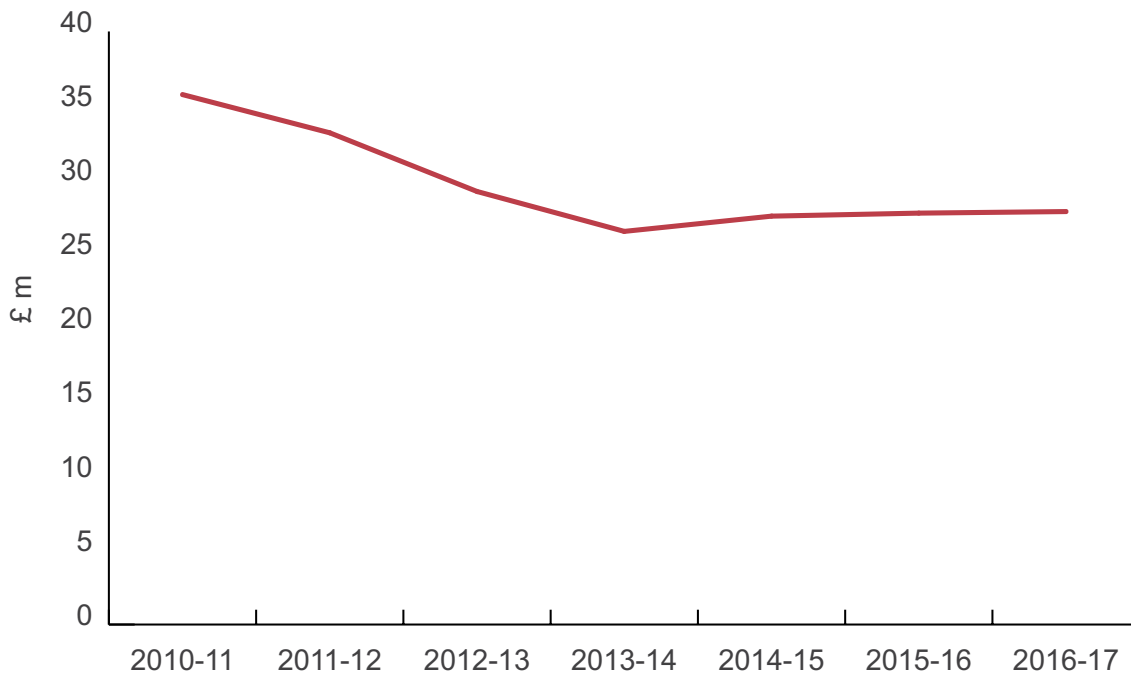
Figure 3: Sources of NWIS income, 2016-17 budget

Type and source	Income (£ million)
Revenue	
Programme funding from the Welsh Government	27.9
Primary care services for supporting national systems	13.3
NHS bodies' services for supporting national systems	9.7
Other, includes funding from the Welsh Government for specific initiatives and income from services to the NHS in England, Northern Ireland and the private sector	3.3
Total revenue	54.2
Capital funding (all from the Welsh Government)	
Discretionary capital	4.9
Specific project funding	3.4
Total capital	8.3

Source: NWIS and Welsh Government data

1.51 **Figure 4** shows that, in real terms, the programme funding from the Welsh Government was considerably lower (22%) in 2016-17 than in 2010-11. There has been a small real-terms increase each year since 2014-15 but these increases have not brought the funding back to levels seen at the start of the decade.

Figure 4: NWIS programme funding from the Welsh Government in real terms, 2010-11 to 2016-17 (at 2016-17 prices)



Source: Wales Audit Office analysis of data supplied by NWIS

1.52 The July 2017 **Interim Report** of the Parliamentary Review of Health and Care set out that it had heard concerns about the lack of resources for ICT. While it did not reach any conclusions as to whether those concerns were indeed founded, it pointed to concerns that NWIS had insufficient capacity to develop new systems. In particular, it identified that most of NWIS' staff were required to support existing infrastructure and systems and had little time to dedicate to new systems. NWIS made a similar point to us in terms of its budget. It reports that around 90% of its budget is largely ring-fenced for pre-existing or contracted services. Its figures show that just 10% of its budget is allocated to what it calls 'projects'. However, 'projects' only includes national systems that are in the process of being rolled out. Some of the 15% of its funding that is allocated to application development and support will be used for improving and adding new functionality to existing systems to make them work more effectively.

For the first time, the NHS has an estimate of the cost of achieving the vision, currently an extra £0.5 billion, although the Welsh Government and NHS bodies have not yet committed to providing the funding

1.53 During 2016, NHS bodies and NWIS developed the strategy implementation report which, for the first time, sets out indicative costs and a timeframe for delivery of the strategy. The report brings together the collective costs of all of the Strategic Outline Plans for delivering the vision in each NHS body and NWIS' contribution to national systems. The total cost over the five-year period 2016-17 to 2020-21 is tentatively estimated at £484 million on top of existing budgets, with £195 million capital and £288 million revenue (Figure 5). Of the £484 million, £196 million (40%) is identified as needed by NWIS, with the rest required by health boards and NHS trusts. The Welsh Government has not yet committed to providing this funding.

Figure 5: Additional investment required to deliver the strategy between 2015-16 and 2020-21

	Required funding (£ million)		
	Capital	Revenue	Total
NWIS	40.0	155.8	195.9
Health boards and NHS trusts	155.3	132.5	287.8
Total NHS Wales	195.3	288.4	483.7

Source: NHS Wales strategy implementation report

1.54 In our view, some of the timing assumptions in the draft plan seem highly optimistic in light of recent experience. Given that there are fixed costs involved in delays by NWIS, it seems reasonable to plan for costs to be higher than anticipated if there are any significant delays, along the lines of those experienced in the programme to date. There is further work to be done to develop the cost estimates into clear business plans and it will be important for those plans to be realistic about timings and costs in light of progress to date.

- 1.55 The Welsh Government and NHS bodies will need to make some tough decisions as to whether they can prioritise investment in the delivery of the vision. This is a particular challenge in an environment where public funding is tight due to austerity, there are significant cost demand pressures on services and there is uncertainty about future revenue budgets.
- 1.56 In the draft budget for 2018-19, the Welsh Government set out that it is reducing spending on the Efficiency Through Technology Fund²¹ from £10 million to £6 million. The Welsh Government expects NHS bodies to increasingly fund ICT improvements from their core funding. Given the wider pressure on the Welsh Government and NHS bodies' core budgets, we consider that the Welsh Government should, as a matter of priority, set out clearly whether and if so, how, the delivery of the plan will be funded over the five years.

Three-year integrated planning and local three-year digital health and social care plans are a step forwards but there is a need to strengthen arrangements for collective financial planning

- 1.57 NWIS is trying to work in line with the three-year planning framework for other NHS bodies set out in the NHS Finances (Wales) Act 2014. Under that Act, each year NHS bodies are required to produce a rolling three-year integrated plan covering finances, service delivery and workforce. To meet the duty under the Act, NHS bodies need to produce a plan that is signed off by the Welsh Ministers. Although NWIS is not required to produce a three-year plan, it does so in order to provide consistency and as part of good medium-term financial planning.

²¹ Efficiency Through Technology was set up in 2015 to accelerate the demonstration, evaluation and adoption of new products and services into practice, increasing efficiency and providing patients with better outcomes in accordance with the principles of prudent healthcare.

- 1.58 There are some practical challenges to joining up planning across NHS bodies and NWIS. NWIS uses the first iterations of NHS bodies' three-year plans to identify where they imply commitments from NWIS, including financial or staff commitments. However, it can be difficult for NWIS to keep track of, and respond to, changes as the plans evolve. Also, just three out of the seven health boards have approved three-year plans, with four working to one-year plans²². The different statuses of the plans add further complexity for NWIS in trying to plan over a three-year period. NWIS officials report that they have had difficulties getting timely feedback from the Welsh Government on NWIS' three-year plan. The Welsh Government tends to provide feedback during the middle of the financial year which focuses primarily on the budget rather than the operational detail of the plan.
- 1.59 Going forwards, the development of local Strategic Outline Plans and the development of a national informatics plan should provide greater certainty on expectations over the medium term that NWIS can factor into its plans. Nonetheless, we consider that there is scope for NWIS, the Welsh Government and NHS bodies to work together better to better integrate the three-year planning process.
- 1.60 The Welsh Government is making some good progress in strengthening its approach to capital funding for ICT. For 2016-17 onwards, the Welsh Government has introduced a specific capital funding stream and approval process for ICT projects ([paragraph 1.47](#)). Previously, there was a tendency for ICT capital to be allocated late in the year to ensure that funding allocated to other projects but not spent was used up in the year. For example, there was a round £10 million of such funding across the NHS in 2014-15. The introduction of a distinct capital funding stream should help to encourage a more strategic approach although there will always be a need for NHS bodies to have contingency plans to make use of capital funding where it becomes available at short notice.

²² See our report, [Implementation of the NHS Finances \(Wales\) Act 2014](#), July 2017

Part 2

Key elements of an electronic patient record are being put in place but significant delays and issues with functionality cause frustration and it is unclear whether intended benefits are being achieved



2.1 This part of the report looks at progress in rolling out the various applications and securing the benefits they are intended to bring. We look in particular at the overarching programme of systems that will ultimately go into producing an electronic patient record. We then consider the management of individual projects to time and cost, focusing in particular on the sample of six systems that we focused on ([Appendix 2](#)). Finally, we look at the issue of the quality of the systems and the extent to which the NHS can demonstrate that they are delivering the intended benefits.

Key issues we looked at

Issue	What good looks like
Programme management	A clear process for selecting the right projects to deliver the over-arching goals and for prioritising projects and actions.
Project management	Planning and delivery of projects so that they are on time and budget.
Benefits management	There is clear ownership by the right people of the intended benefits and a clear approach to ensuring those benefits are achieved and measured.

Many of the building blocks of the electronic patient record have been, or are being, rolled out but there remains a way to go until it is fully in place and NWIS lacks a clear method for prioritising its work

NWIS' programme contains the building blocks of an electronic patient record and many of the key features are being rolled out but there is still a long way to go until a full electronic record is in place

2.2 There is a widespread recognition that progress towards the patient record has been slower than expected. The NHS has never set a formal deadline by which time it expected a full record to be in place. However, there is widespread disappointment across the NHS that the vision has not yet been realised, nearly 14 years after the NHS committed itself to developing an electronic patient record.

- 2.3 Although slow, there has been progress over the past 14 years. Many of the NHS staff we met with highlighted that progress has been quicker in developing systems for primary care. The GP portal has been in place for several years, although it is not fully linked up to other systems. Several national systems are now well advanced in the rollout process, including the national laboratory system and a national radiology system. The Welsh Clinical Portal is live in every health board, although not on all wards within the health boards and with limited functionality. There are also a wide range of supporting services and infrastructure that are either in place or partially in place, to support the ultimate delivery of an electronic patient record. Examples include the Wales Clinical Communication Gateway, which enables information to be sent between primary and secondary care and the National Intelligent Integrated Audit Solution which tracks exactly who is accessing patient data.
- 2.4 The 30 live projects within NWIS' current programme of work will start to fill in some of the remaining gaps in functionality. There are gaps where services are still managed through handwritten notes and forms. For example, there is not a system for electronic prescribing, although NWIS has recently developed a business case which will aim to fill this gap by 2023 (paragraph 2.12). Also, there are still informatics systems within NHS bodies that do not communicate with each other or the national systems so the patient data cannot be shared and viewed electronically.
- 2.5 The strategy implementation report and the four workstreams set out a pathway to a largely complete electronic patient record by 2021. However, the resources are not yet in place to achieve that goal and there is considerable further work to be done to verify the timings and costs of the various systems (paragraph 1.54).

NWIS' prioritisation within its programme is weak and there is no clear process for determining which projects to prioritise during times of capacity constraint

- 2.6 As at May 2017, NWIS was involved in managing the delivery of 30 different projects which in some way contribute to the achievement of an electronic patient record (Appendix 3). These 30 live projects form a small part of NWIS' total work, accounting for just 10% of NWIS' resources (paragraph 1.52).

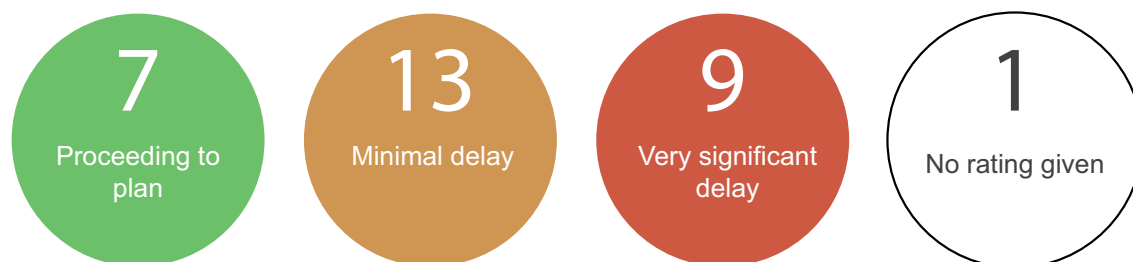
- 2.7 In [paragraphs 1.17 and 1.26](#), we noted that the NHS has struggled to provide a clear set of priorities for informatics and for NWIS and that in practice the list of national priorities keeps growing. These difficulties of prioritisation are also translated through to NWIS' work programme. We found that NWIS itself, does not have a clear process for prioritising projects. NWIS sent us a document which sets out its priorities. However, the document is largely a list of everything NWIS does or is planning to do. In effect, everything is a priority.
- 2.8 Senior NHS executives identified that NWIS was struggling to deliver its existing priorities when the strategy was developed during 2014 ([paragraph 1.17](#)). We heard the same concerns during our fieldwork. If anything, the situation has got more challenging as more projects and priorities have been added to its programme. The number of systems that NWIS is involved in implementing and developing is large and its capacity to deliver them is finite. There is a widespread frustration among NHS bodies that NWIS is juggling too many projects and developing new systems without fully implementing existing ones.
- 2.9 In practice, NWIS prioritises staff resources to projects where there are operational 'dependencies'. For example, it will prioritise resources towards a project or task that is needed because other systems or projects are reliant on making progress with that task. That seems a reasonable approach from an operational perspective, as it prevents knock-on delays. However, the approach means NWIS is often in a fire-fighting mode to try to limit knock-on consequences. In our view, a more strategic approach to prioritising, including not taking on more projects and stopping those of lower priority until the top priority systems are completed, may be more sensible.

For various reasons, many national systems have been significantly delayed which causes widespread frustration

Many systems are very delayed against the original timescales

2.10 NWIS' monthly report to the Welsh Government from May 2017 shows that, out of 30 current projects currently being implemented only seven are rated as green on milestones being achieved (Figure 6). As noted in paragraph 1.40, some of those ratings reflect progress against milestones that have been amended, following NWIS' internal change control process. For example, the project to merge instances²³ of RADIS 2 at three health boards is rated as green. In fact, this project has been significantly delayed against the original planned timescales by problems with the radiology coding at Cwm Taf University Health Board (paragraph 2.21).

Figure 6: NWIS project status against milestones, as at May 2017



Source: NWIS

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 boundaries.

- 2.11 For many systems, the delays have been substantial. For example, WLIMS was intended to be delivered by January 2013 but still has modules outstanding more than four and a half years later. Health board staff identified concerns about another system called GP2GP, which was being discussed six to eight years ago but is still not scheduled to be fully implemented until 2020. Similarly, NHS staff reported that the implementation of GP test requesting was being discussed over 10 years ago. Nonetheless, these two systems are rated as 'green' in NWIS' progress report. NHS bodies also pointed to slow progress with newer systems such as the Welsh Community Care Information system, which is intended to bring together information between health and social care.
- 2.12 The delays to systems referred to in **Figure 6** relate to projects that have already commenced. Additional ICT initiatives have also been delayed in the early planning phase and do not therefore feature in NWIS's monitoring. For example, our 2016 report on medicines management highlighted that the NHS has had an intention to implement an electronic prescribing system since 2007. Progress has been slower than anticipated, partly because other pharmacy-related IT projects in NWIS have taken precedence. Although a business case for a national electronic prescribing system has been drafted by NWIS, the rollout of the system is not due until 2023. Progress in developing this system has only been included in the most recent update reports, despite the longstanding commitment.

There is widespread frustration at the delays to delivery of systems and, while a lack of information makes it difficult to quantify, some systems are over-budget

- 2.13 We found that NHS bodies are deeply frustrated over the slow speed of delivery of national systems. NWIS staff also reported some frustration at what they saw as a lack of direction and engagement from health boards, particularly clinicians, in designing and rolling out new systems (**paragraph 2.17**). These frustrations are, in our view, having a significant negative impact on the relationships between NWIS and NHS bodies.

- 2.14 The delays to systems are also having an impact on the costs of delivering the systems. For those systems that NWIS develops in-house, the main cost is staff time. NWIS has not consistently identified expected staff time and costs in business plans ([paragraph 1.44](#)) and does not measure the amount of staff time allocated to each project. It is therefore not possible to verify whether costs have exceeded the original plans. However, the scale of delays across the programme suggest that systems have generally required more staff input than expected and therefore have cost more.
- 2.15 There are also additional costs for those delayed projects where NWIS has led on a national procurement on behalf of the NHS. For example, until WLIMS is fully implemented, NWIS and NHS bodies have had to bear the dual running cost of legacy systems which host the outstanding modules. However, the terms of the contract mean that the costs of the additional system development and re-development associated with WLIMS will fall to the supplier.

NWIS has strengthened its methods for developing and improving systems but a lack of end-user engagement in design and testing contributes to delays

- 2.16 NWIS follows a range of recognised international standards for developing and supporting informatics systems. It has accreditation from the International Standards Organisation and adopts the industry standard ITIL²⁴ framework for service management. NWIS has recently started moving towards using the 'Agile' method for developing new systems ([Box 6](#)). The UK Government's Digital Service Standard²⁵ requires use of Agile methods for its online digital services. One of the key benefits of Agile is that it should lead to systems that better meet the expectations of the end user. Effective use of the Agile method should help NWIS to ensure that there is greater clinical ownership of systems and, as a result, less resistance to their use.

²⁴ ITIL stands for Information Technology Infrastructure Library and is a set of processes for aligning ICT services with organisational strategy and needs.

²⁵ [UK Government Digital Service Standard webpage](#)

Box 6: agile methods for software development

Agile is an approach to software development. It emerged to counteract what were seen as weaknesses in the more traditional 'waterfall' approach. Waterfall involves spending a lot of time up front to determine the specifications for a system in detail and then building the system. The criticism of this approach was that the systems delivered often matched the specification but did not do what the end user actually wanted. They therefore required complex and expensive re-engineering.

Agile involves working closely with the end user to develop the system. It is an iterative process that places an emphasis on early development of prototypes that can be tested and refined in intensive bursts of activity. The key is the involvement of end users with the development team at all stages.

There are a host of specific techniques associated with Agile, but the general principles identified in the UK Government's Digital Service Standard are:

- Focus on user needs
- Deliver iteratively
- Keep improving how your team works
- Fail fast and learn quickly
- Keep planning

2.17 While the move to Agile is sensible and could deliver more cost-effective systems, the whole approach depends on getting greater clinical engagement. NWIS' system developers expressed frustration that they have very little contact with end users of their systems. Within NWIS, business analysts act as a conduit between the end users and the system developers. However, NWIS' business analyst resource is limited, with several vacancies at the time we carried out our fieldwork. And clinicians struggle to find the time away from their day jobs to contribute. As a result, NWIS staff are frustrated that once they have developed a system or new functionality in the absence of a clear steer from the end-user, clinicians come back wanting changes and refinements that require considerable re-work that adds to costs and delays.

2.18 Alongside the engagement of clinicians, there are also lessons for NWIS to learn about choosing the right clinical environment for testing new systems. For example, WLIMS was piloted in Hywel Dda University Health Board. We understand that the pilot was considered a success. However, on rolling out the system nationally, it became apparent that what worked in the pilot area did not work nationally as it did not cover the broader range of more complex tests undertaken in some other health boards. As a result a considerable amount of additional work was required, which has added to delays.

Difficulties locally within NHS bodies during the implementation of systems have contributed to delays

- 2.19 The roll-out of national systems can also be delayed by factors within the NHS bodies themselves. As of May 2017, out of 30 projects currently being implemented, 14 were rated as green in terms of dependencies. Dependencies cover issues that are outside of the direct control of NWIS.
- 2.20 NWIS reports that some delays have occurred due to incompatibility of existing ICT infrastructure in health boards. NWIS explained to us that ICT systems and functionality can be developed, system tested and quality assured internally by them. However, they have found on some occasions that the health board's local ICT infrastructure can prevent the new system or functionality from working properly, which can cause unexpected delays.
- 2.21 We were also informed that on some occasions, delays were down to technical issues in the NHS bodies. An example is the delay to rolling out a single instance of RADIS at Cwm Taf University Health Board. The health board had inherited two different instances of RADIS from the time of predecessor NHS Trusts. As well as two different instances, the two main hospital sites had not historically been using consistent codes when entering radiology activity to those systems. As a result, NWIS and the health board spent considerable time and effort working together to standardise and merge the databases that underpin RADIS following restructuring of the NHS in 2009. The bulk of the activity to merge the databases took place after 2013-14. The health board moved onto a new single instance of RADIS in June 2017.

- 2.22 The delays at Cwm Taf had a knock-on effect in that the NWIS team could not be released until the implementation of RADIS was complete at Cwm Taf. The planned merging of different instances of RADIS at Hywel Dda is now significantly behind time. However, Hywel Dda University Health Board has been doing preparatory work, learning the lessons from the experience of Cwm Taf and is working with NWIS on a plan to start implementation of the project in April 2018.
- 2.23 Our local reports on ICT capacity pointed to other local constraints that could hinder roll-out locally. There is variation in the number of ICT staff employed by health boards. Our local reviews found that in 2013-14 the number of ICT staff at the Health Board varied from 6.8 to 9.8 per 1,000 total staff members. Some health boards had more staff at lower grades while some have fewer staff but at a higher grade. There are also challenges with ICT equipment. We found that in March 2014, that there was a backlog of £68 million of ICT equipment classed as 'out of life', with that figure expected to rise in later years. We also found in 2015 that 33% of doctors and 48% of nurses reported that access to computers is problematic on a daily or weekly basis²⁶.

Staff capacity is a constraint and while NWIS is being creative in attracting junior technical staff it struggles to retain senior IT developers and does not have a clear workforce plan

- 2.24 NWIS faces some specific challenges with its workforce. NWIS' performance reports to the Welsh Government consistently state that it is carrying significant vacancies and that staff capacity is a cause of delays. NWIS' reports to the Welsh Government suggest that it plans on the basis of having a workforce of around 670 but actually has around 550 employees. We were unable to confirm the basis for NWIS' workforce assumptions as, despite our requests, NWIS did not provide us with a workforce plan²⁷. The NHS Wales Internal Audit review (paragraph 1.38) was also unable to confirm NWIS' baseline assumptions. However, our assessment suggests that NWIS' delivery plans are based on a much larger workforce than it can actually afford to employ.

26 As part of our Diagnostic Review of ICT Capacity and Resources we surveyed NHS staff in spring 2015 and the findings are set out in the individual reports for each NHS body.

27 NWIS has very recently started work on a workforce plan. It provided us with information showing that it has identified the key workforce risks and options going forwards. NWIS intends to develop detailed plans and actions during 2018.

- 2.25 There are potential signs that some NWIS staff may be struggling with the amount of work they have to deliver. In NWIS' most recent staff survey, over a third of respondents (37%) agreed or strongly agreed with the statement 'I find it difficult to meet all the conflicting demands on my time at work'. A similar percentage of respondents (34%) disagreed or strongly disagreed, while 29% of respondents neither agreed nor disagreed.
- 2.26 NWIS faces a challenge in recruiting and retraining highly skilled technical staff due to competition, especially from the private sector. NWIS staff salaries are set in line with national pay scales for NHS clinical and administrative staff. ICT skills are highly prized in the private sector and NWIS finds that competitors are able to offer higher salaries. In an effort to address the recognised staff capacity constraints NWIS have developed a range of activities and initiatives (Box 7).

Box 7: NWIS activity to recruit and retain new developers

NWIS focuses the majority of its recruitment activity on recent graduates. It has worked with University of Wales Trinity Saint David (UWTSD) to create the Wales Informatics Institute (TWII) which seeks to co-ordinate NWIS's work and the work of the university, for example, by offering internships and work placements to students, as well as influencing the curriculum to ensure graduates will have the skills NWIS is looking for. NWIS has been shortlisted for a 2017 Times Higher Education award for this work.

NWIS also runs its own graduate programme, which includes a short placement within a health board, for example, in medical records or a GP surgery.

The TWII provides staff with continuing professional development. In addition, NWIS provides a number of further opportunities for professional development, such as a talent management programme and training for managers. NWIS is accredited by Investors in People and also runs the British Computer Society NWIS Development Programme.

2.27 The NWIS software developers we met with believed that NWIS offers good opportunities to graduates and new starters. However, they felt that NWIS struggles to attract and retain more experienced staff. This leads to an increased use of contractors, which can be frustrating as they are unlikely to have the depth of knowledge that a long-serving staff member would have developed, and what knowledge they have leaves with them at the end of their contract. NWIS staff felt that, compared to other employers, NWIS offers good terms and conditions and a good work life balance but will always be beaten on salary.

There are concerns about the quality of some key national systems and a lack of monitoring data means it is unclear whether they are delivering the intended benefits

There are concerns that some systems do not fully meet NHS bodies' needs and some staff are developing their own workarounds

2.28 NHS bodies are concerned that a number of national systems do not fully meet their needs. Staff at health boards raised concerns with the functionality of all the national systems that we focused on in our review ([Appendix 2](#)). Other reviews have also flagged concerns with the quality of systems we looked at:

- NWIS carried out a survey of registered users on the WLIMS between September 2016 and January 2017. Based on 344 responses, 73% said that they strongly disagreed or disagreed that the WLIMS provides the functionality they need.
- NWIS's internal review of the services offered by My Health Online has identified that the system's functionality must be improved in order to achieve its intended benefits.
- in our recent local audit work on radiology services across all health boards in Wales, we found that many frontline staff are dissatisfied with the functionality of RADIS in particular. Our reports concluded that, generally, radiology ICT systems do not serve health boards' needs.

- 2.29 Some of the concerns about functionality related to a widely held view that NWIS considers projects as completed at too early a point. The point at which NWIS considers a system to be delivered or available is not necessarily the same as when a health board considers a system delivered or available. A system might largely be in place, but is not necessarily being used properly (or at all). For example, NWIS considers the Welsh Clinical Portal to be 'live', including the functionality that allows GPs to make electronic referrals. However, health boards reported that doctors find the referral process difficult and time consuming to use, so many are instead continuing with paper referrals.
- 2.30 NWIS provides updates to improve the functionality of existing systems regularly. These changes are managed through Change Advisory Boards (CABs) which are in place for most of its systems. The CABs are made up of representatives from NWIS and NHS bodies and their purpose is to oversee and prioritise requests for changes to the system. They are therefore the main mechanism by which NHS staff can attempt to adapt systems to their needs, providing that such adaptations do not cause problems for other health boards.
- 2.31 We found that the change management process and CAB meetings are not as effective as they could be. Some NHS staff report that they receive no information about whether their request has been agreed or not, nor about how long they might expect to wait before a change is implemented. At the CAB meetings we observed, the health boards taking part offered little guidance to NWIS about prioritisation and it was not clear at the end of the meetings what the decisions and outcomes of the meeting were. However, the CABs we observed spent quite a significant amount of time discussing changes that were described as 'minor'. Some NWIS staff expressed frustration about the approach to 'minor' changes, noting that they had been prevented from making changes that would have taken little time but which they recognised would make the work of NHS staff easier.
- 2.32 In some instances where systems do not, ultimately, meet their needs, NHS staff are developing their own workarounds to compensate. Hywel Dda University Health Board carried out a detailed review and found that staff had created their own separate databases because they did not feel they could rely on the national systems. This situation results in duplication of effort and also poses information governance risks.

Many senior executives and clinicians reported that a number of the national systems we considered do not provide them with the information they need to plan and manage services

- 2.33 NHS bodies are generally struggling to get good management information out of the national systems to enable them to monitor performance, understand demand and plan services for the future. Senior NHS officials who had experience of working in England were keen to emphasise that there they had access to much better information, generally in the form of a 'dashboard', than was available in Wales.
- 2.34 NHS bodies raised specific concerns about 'DeepSee' – the business intelligence function of WLIMS – which staff told us was not working as they expected and was not meeting their needs (Figure 12, Appendix 2). There are concerns that staff have to make lots of manual adjustments to be able to get management information from the RADIS system. Some health boards also expressed frustration at not being able to get good management information from Myrddin. While Cwm Taf University Health Board reported that it could get the information it needed from Myrddin, the time spent generating the information is, essentially, equivalent to a full-time post.

The intended benefits of investment were clearly set out in the early stages of the projects we examined but it is not clear who is responsible for achieving them

- 2.35 As noted in paragraph 1.43, NWIS generally develops business cases using a commonly used approach. The business cases for each of the systems that we looked at for this review clearly set out the expected benefits that the investment should deliver (Figure 7). Although there is some difference of language, they follow some common themes of improved patient safety, improved clinical practices and reduced costs.

Figure 7: intended benefits expected to be achieved from the six systems we reviewed

System	Intended benefits
My Health Online	<ul style="list-style-type: none"> Patient safety increased Increased positive health outcomes Patient confidence increased Increased convenience of care Health system efficiency increased
Choose Pharmacy	<ul style="list-style-type: none"> Improved patient safety Patient confidentiality/security improved Cost savings Efficiency
Welsh Laboratory Information System	<ul style="list-style-type: none"> Compliance with clinical evidence-based practice increased Comparable results created across NHS Wales Clinical risk decreased Unit production costs decreased Single pathology record for each patient created System management costs decreased Analyser interface costs decreased
Welsh Patient Administration System	<ul style="list-style-type: none"> Patient safety increased Positive patient outcomes increased Convenience of care increased Patient confidence increased Legal/policy compliance maintained Health system efficiency increased Overall health system costs decreased

System	Intended benefits
Welsh Radiology Information System	Improved clinical governance Improved operational efficiency, flexibility and adaptability Improved demand management and forward planning Saved current and future costs Improved working environment and facilities for staff
Welsh Picture Archiving and Communication System	Cost of media, postage and packing decreased PACS Manager administration time on providing CDs decreased Patient waiting time decreased Time to diagnosis and treatment decreased Decreased risk of patient confidentiality being breached Decreased clinical risk because of availability of diagnostic information Reduced cost of repeat imaging

Source: Original business cases supplied by NWIS

2.36 While business cases have been clear on what benefits the systems should deliver, there is confusion about who is responsible for ensuring those benefits are indeed achieved. Evidence from a gateway review of WLIMS and feedback from NHS staff clearly demonstrate that there is a lack of clarity on whose responsibility it is to achieve and monitor the benefits. NWIS considers that it has clearly set out that responsibility for monitoring and achieving benefits rests with the NHS bodies. NHS staff we spoke to either felt that the responsibility for measuring the achievement of benefits was never set out clearly or was NWIS' responsibility.

Weaknesses in monitoring mean that it is not clear whether the overall investment in digital healthcare is delivering the intended benefits

- 2.37 In 2013, NWIS produced a report on the anticipated economic return on investment that NHS Wales should expect to derive from NWIS's programme of work. However, that report intentionally did not consider qualitative benefits such as increased patient safety. NWIS's analysis concluded that due to the time saved by using more efficient IT solutions, for every £1 invested, NHS Wales could expect an economic return of £2.36. We did not undertake detailed analysis of these figures but note that they were based on theoretical savings and benefits rather than being built up from actual savings delivered in Wales.
- 2.38 In our survey of NHS Assistant Directors of Informatics, six out of ten respondents disagreed with the statement 'my organisation and NWIS are making progress in achieving the intended benefits from investment in clinical ICT services'. Only one of the ten Assistant Directors agreed with the statement while three neither agreed nor disagreed. These views show a combination of concerns about the lack of impacts and a potential lack of clarity as to whether the intended benefits from investment in clinical ICT services are being achieved.
- 2.39 NWIS produces evaluation reports at the end of projects (project closure) and also commissions reviews of systems. We would expect these documents to provide some detail on whether the intended benefits were achieved. However, the examples of reports that NWIS sent us did not make clear links between the benefits set out in the business case and what the system had achieved. Rather, they focused more on the project management and technical lessons for NWIS. NWIS produces some ad hoc reporting of achievements and benefits, for example, through annual reports. But as noted in [paragraph 1.41](#), these tend to be partial, lack context and are more about presenting a positive picture rather than a hard analysis. An example of the partial approach to reporting benefits is My Health Online ([Box 8](#)).

Box 8: reporting the benefits of My Health Online

NWIS reports emphasise that the system has been rolled out to 100% of GP practices and that 222,000 patients have registered. Taken in isolation those numbers seem impressive but the underlying story is more mixed.

- **Not all practices actually offer all parts of the system.**

100% of practices have the system. As of July 2017, just over half of practices (51%) offer online appointments and 90% were offering online repeat prescriptions. Some 9% of practices were not offering any part of the system to their patients.

- **While growing, the number of patients registered is significantly below expectations.**

The number of patients registered on the system is growing and increased from 179,000 to 222,000 between March 2016 and July 2017. Having 222,000 registered patients is significantly below the figure of 872,000 set out in the 2009 business case and represents just 7% of the Welsh population. It is not possible to assess how many of the 222,000 registered individuals have actually used the system since it was set up.

- **A limited amount of primary care activity is carried out through My Health Online**

NWIS reports that an average of 44,000 prescriptions are ordered each month through the system. That accounts for less than 1% of prescriptions across Wales each month²⁸. We also estimate that the 12,000 appointments booked each month on the system represent less than 1% of GP appointments booked across Wales²⁹.

2.40 The exception on benefits monitoring, among the systems we examined, appears to be Choose Pharmacy. The project had a detailed evaluation by the Welsh Government's Knowledge and Analytical Services following the pilot phase. The review identified specific benefits of fully rolling out the project, which would likely outweigh the costs.

²⁸ This is based on a total of 79.5 million prescriptions each year, as set out in our report on Medicines Management.

²⁹ There are no official statistics on the number of GP appointments in Wales. NHS England estimates that there were around 340 million GP appointments in England in 2012-13. Extrapolating that figure to Wales, would give around 19 million appointments a year. We are looking in more depth at the evidence around demand for GP services as part of our review of primary care services, which we intend to publish next year.

2.41 The NHS Wales Internal Audit review of NWIS identified that there is a need to strengthen the monitoring of benefits. NIMB recognises that the approach to benefits realisation needs improvement and has set up a task and finish group to develop a new benefits realisation framework. More robust benefits monitoring would help NWIS and NHS bodies better understand the impact of their collective investment, and enable them to better plan and prioritise delivery of systems for the future.

Appendices



Appendix 1

Audit methods

We reviewed a range of documents such as:

- Business cases, project briefs, project initiation documents, project closure reports and assurance quality plans in relation to various NWIS projects and systems
- NWIS performance reports to the Welsh Government
- Papers, minutes and terms of reference for a range of NWIS boards such as NIMB, the Delivery and Implementation Group and various Strategic Management Boards and Change Management Boards
- Velindre NHS Trust audit committee papers
- Welsh Government strategy documents
- Correspondence setting out accountability and financial arrangements between NWIS and the Welsh Government
- Reports by the Welsh Government and NHS Wales Internal Audit Services

We took account of our own recent work that covered issues related to informatics, including the following reports:

- **Managing Medicines in Primary and Secondary Care**, December 2016
- **A Review of Orthopaedic Services**, June 2015
- **NHS Waiting Times for Elective Care in Wales**, January 2015

We also drew from our local audit work which provided a diagnostic review of ICT capacity and resources at each NHS body. This work was carried out in 2014-15 and published following consideration by each body's audit committees during 2015-16. It drew on financial, workforce and other data for the financial year 2013-14 as well as other sources, including a Wales Audit Office survey of NHS staff carried out in 2015.

We considered the National Audit Office's series of reports on the National Programme for IT in the NHS in England. We spoke to Audit Scotland about Scotland's approach to managing large IT projects.

We interviewed a range of people including:

- Welsh Government officials
- NWIS staff including:
 - Senior managers
 - Software developers
 - Staff involved in the development, implementation and ongoing maintenance of specific systems

We visited Hywel Dda, Cwm Taf and Cardiff and Vale health boards and met with a range of officers, including:

- Senior managers, including Chief Executives, lead directors for informatics and Assistant Directors of Informatics
- Board members
- Representatives of primary care
- Clinicians and administrators using specific systems

We conducted a survey of NHS Assistant Directors of Informatics to seek their views on whether investment in clinical ICT services is on course to achieve the anticipated benefits to the NHS in Wales. The survey was sent to all seven health boards and the three NHS trusts, all of whom responded.

We observed meetings of Change Advisory Boards (these are made up of representatives from NWIS and NHS bodies and their purpose is to oversee and prioritise requests for changes to individual systems) and a September 2016 meeting of the National Informatics Management Board.

Appendix 2

The six systems we examined in more detail

NWIS develops and supports a large number of complex ICT systems. We decided that we would select six systems to look at in greater detail and use as examples to illustrate our findings.

We chose the following systems:

- RADIS (also called Welsh Radiology Imaging System (WRIS))
- PACS
- MHOL
- Choose Pharmacy
- WLIMS
- Myrddin

The selection included products of varying ages and stages of development, from Myrddin which was first developed 25 years ago, to Choose Pharmacy, which at the time of writing was still in the pilot phase. The section also included examples that had been developed by NWIS, such as RADIS, as well as systems that were wholly or partly developed and delivered by a third party (WLIMS and PACS).

Figure 8: System: RADIS 2

System: RADIS 2	
Key functions	RADIS is the Radiology Information System used in all health boards. It is sometimes referred to as WRIS or the Welsh Radiology Information System. RADIS is the IT system that practitioners use to manage the service and keep track of which patients have received which scans.
History	<p>NWIS developed the RADIS system 'in-house'. It rolls out updates and upgrades across the NHS. NWIS did not have a clear timetable or budget at the outset and has not monitored how much delivery of RADIS has cost so far. NWIS started rolling out the RADIS 2 system in 2005.</p> <p>There has been a challenge to ensure that all health boards have a single instance of RADIS. 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.</p> <p>Having numerous instances of RADIS 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. Currently, two health boards still have more than one instance of RADIS. They are:</p> <ul style="list-style-type: none"> • Hywel Dda University Health Board • Betsi Cadwaladr University Health Board <p>Work to ensure that all health boards have a single instance of RADIS had been delayed due to issues in Cwm Taf University Health Board (paragraph 2.21). NWIS intends to start merging the three instances of RADIS at Hywel Dda University Health Board in April 2018, but no date has yet been set for the work at Betsi Cadwaladr University Health Board.</p>
Time	Clear timescales were not established at the outset. From the start of rollout in 2005, it took 11 years to get all health boards onto the RADIS 2 system. However, two health boards still have multiple 'instances' of RADIS 2, which do not communicate with each other.

System: RADIS 2

Cost	<p>We did not find any clear assessment of the expected costs at the outset and NWIS has not measured the total costs of delivery. NWIS reports that since 2010, there has been an investment of £230,000 in capital, related to upgrades to hardware. NWIS reports the annual running costs of RADIS are currently £1.2 million.</p>
Quality and functionality	<p>There are particular concerns amongst those health boards that have multiple instances of RADIS 2. They report that it 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.</p> <p>Even without multiple instances, other health boards told us that it is difficult and time consuming to extract management and business planning information from RADIS. There are concerns that RADIS does not link to other systems. In particular, it does not link to data on patient waiting times, which makes it more difficult to ensure patients get their tests in the right order. Some health boards also had concerns about the accuracy of the information extracted from RADIS.</p>

Figure 9: System: PACS

System: PACS	
Key functions	<p>PACS is a picture archive and communication system where all the images for MRI scans, CT scans, x-rays and ultrasound scans are stored electronically. The system is provided by a third party, Fujifilm, with NWIS providing contract and relationship management support. Fujifilm supplies hardware and software to health boards for 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. Fujifilm also provides software and hardware within NWIS data centres for provision of a centralised archiving solution for data sharing between each health board. NWIS provides the necessary infrastructure in the data centres along with network links to each health board.</p>
History	<p>Prior to PACS, there were 10 separate systems in operation across Wales. Existing contracts were due to expire from 2012 so the National Imaging Programme Board decided to procure one national system, with NWIS as the procurement lead to take this forward. The installation of PACS was project managed locally by each health board.</p> <p>The system is now in place across six of the seven health boards in Wales. Cardiff and Vale University Health Board is the last to take on the system, having been instructed by the Welsh Government to accept it. The health board had previously intended to develop its own approach to an integrated end-to-end system for imaging, rather than adopt the national PAC system which provides one element. The health board is now working with Fujifilm to develop some of the additional functionality it considers necessary.</p>
Time	<p>It was planned that the system would be rolled out across different sites between June 2012 and November 2016. NWIS told us that implementation had taken longer than anticipated. In part this was because some of the assumptions NWIS made regarding the readiness of the existing infrastructure to merge with PACS proved to be overly optimistic. The overall timetable was also impacted by the issues at Cardiff and Vale University Health Board (see above).</p>

System: PACS

Cost	<p>The full business case identified the cost of implementing PACS at £25 million over seven years. The terms of the framework contract mean that Fujifilm bore the cost of any delays. In practice, some NHS bodies have agreements lasting longer than the seven years and have also included additional functionality and hardware at extra cost. In total, the value of the PACS contracts around Wales is £29.4 million.</p>
Quality and functionality	<p>During 2016, NHS Wales commissioned ImprovIT Consulting Ltd to perform a benchmark study to ascertain whether the service was offering value for money. Their conclusion was that Fujifilm delivered a service with high availability and low levels of incidents and changes at below market cost, representing good value for money. However, no formal evaluation has taken place in regard to intended benefits set out in the original business case:</p> <ul style="list-style-type: none">• Cost of media, postage and packing decreased• PACS Manager administration time on providing CDs decreased• Patient waiting time decreased• Time to diagnosis and treatment decreased• Decreased risk of patient confidentiality being breached• Decreased clinical risk because of availability of diagnostic information• Reduced cost of repeat imaging <p>NHS staff told us that they had experienced some relatively minor issues with PACS, for example, the use of voice recognition, around the time of implementation, but these had largely been resolved. The system is provided by a large and established company and is used across the world.</p>

Figure 10: System: Myrddin

System: Myrddin	
Key functions	Myrddin is a patient administration system (PAS), also known as the Welsh PAS. It is a core part of a hospital's IT infrastructure. It holds patient contact details, records inpatient and outpatient appointments and generates letters for patients about their appointments
History	<p>Myrddin was originally developed in 1991 for Carmarthenshire NHS Trust. In time, it became the only system in use in Carmarthenshire (later Hywel Dda University Health Board) and was rolled out in other health boards. NWIS took over management responsibility for the team of staff responsible for Myrddin in 2013.</p> <p>In July 2006, a review of in-house systems in use in the NHS in Wales found that both Myrddin and PMS (Cardiff and Vale University Health Board's system) could be used elsewhere and compared favourably with the commercial systems available. At that time, Myrddin had already been rolled out to three other health boards. Cardiff and Vale University Health Board had proved that their system, PMS, could be rolled out elsewhere as it had introduced it to Llandough hospital following re-organisation. NHS Wales therefore has two home grown patient administration systems, both of which are able to be rolled out more widely, if required. However, it appears that Myrddin's readiness to provide a solution to outdated commercial systems has led to it becoming the de facto PAS for most of Wales, although NWIS and the Welsh Government were not able to provide evidence of a strategic decision to that effect.</p> <p>NWIS is currently rolling out the system across Betsi Cadwaladr University Health Board, with an estimated completion date of October 2017 for Betsi Cadwaladr University Health Board East and October 2018 for the West. This will leave only Velindre NHS Trust and Cardiff and Vale University Health Board who do not use Myrddin.</p> <p>Cardiff and Vale University Health Board still use PMS, which they developed in house. They currently have no plans to adopt Myrddin in its place as they are happy that the PMS system meets their needs.</p>
Time	Myrddin has evolved over many years. There were no clear timeframes for roll-out identified in advance. The system is currently a live project as it is being rolled out in Betsi Cadwaladr University Health Board.

System: Myrddin

Cost	NWIS was not able to identify the total costs of rolling out Myrddin as a national system. NWIS reports that since 2010, there has been a capital investment of £4.1 million in Myrddin, related to licences, hardware and some additional staff costs. NWIS reports the annual running costs of Myrddin are currently £1.4 million.
Quality and functionality	Evidence suggests that the process for making changes and improvements to Myrddin is time consuming and not always well understood by health boards. Some health boards told us that they found the system difficult to use while others did not report this. For example, Cwm Taf Health Board told us that Myrddin was meeting their needs, but they had made a significant investment in their in-house capacity to train staff and deal with queries. From this review and others we have identified that several staff would like to see minor changes made to the system in order to make it more user-friendly or efficient. These changes are either not made or take a very long time to be delivered. In either circumstance, health board staff told us that they were not kept up to date with the progress of their requests or informed when and why they were not taken forward.

Figure 11: System: My Health Online

System: My Health Online	
Key functions	My Health Online (MHOL) is a bilingual NHS Wales website, which allows patients to undertake various health-related tasks and access their personal health information securely via the internet. Currently the system allows patients to book GP appointments and order repeat prescriptions, if both they and their GP practice have registered to do so.
History	<p>The introduction of MHOL was intended to pave the way for the creation of a platform for greater convenience for patients, encouraging empowerment and self-care. It was anticipated it would free up time for both the patient and the NHS and increase patient safety.</p> <p>Originally, it was proposed that patients would be able to access their health records and manage a health diary online, as well as book appointments and order repeat prescriptions. Access to medical records was not developed due to concerns about governance issues. The health diary option was not progressed due to concerns around the risk to patients that they would record information in the diary that required an urgent response, but the GP or practice would not immediately be aware of this and would not therefore respond.</p> <p>NWIS plans to develop the system and increase uptake by making it possible for patients to register online (currently patients have to go to the GP surgery to get a reference number) and developing a smartphone app, although no timetable or budget for delivery has been set out.</p>
Time	The majority of the detailed milestones for rolling out the system were met by 2013. However, the key milestone for rolling out to all GPs took some time but was achieved during 2016.
Cost	The Outline Business Case from 2009 estimated total costs over five years of £8.3 million. However, the scope of the project was reduced in 2011 and costs revised down to £1.7 million over seven years. Actual costs were £2.5 million over eight years.

System: My Health Online

Quality and functionality

A review of MHOL found that GPs were cautious about offering MHOL services for a number of reasons, such as:

- it may disadvantage vulnerable patients who do not have access to the internet;
- it may result in additional workload, for example supporting patients to register and use the system, or increased online ordering of prescriptions;
- potential misuse of the appointments system for example, booking multiple appointments; and
- MHOL does not reflect the way some practices work – for example, not all practices offer advance booking of appointments.

We found similar issues, particularly around incompatibility with existing working practices. For example, many practices operate a triage system to try and control demand, and it was not clear how online appointment booking could run alongside this. GPs we spoke to were concerned that in many areas, the demand for appointments outstrips availability; increasing access to booking systems does not address this issue and may exacerbate it.

Figure 12: System: WLIMS

System: WLIMS	
Key functions	<p>The Welsh Laboratory Information System (WLIMS) is a national application for Pathology Laboratories. The system records patient tests and test results across a number of disciplines: Clinical Haematology; Blood Transfusion; Clinical Biochemistry; Histopathology; Cytopathology; Medical Microbiology; Immunology; Mortuary.</p>
History	<p>The then Minister for Health and Social Services agreed the procurement of a national LIMS in June 2010, to replace 13 separate, outdated systems.</p> <p>Following a procurement process, an independent supplier, InterSystems Corporation, was contracted by NHS Wales to develop and deliver a software product. NWIS oversaw the procurement process and manages the contract.</p> <p>The development and implementation of WLIMS has been difficult. A number of issues were raised with us, including:</p> <ul style="list-style-type: none"> • The amount of work required to standardise procedures nationally was significantly underestimated by NHS Wales. More of this work should have been done in advance of procurement. • There were capacity constraints. Health boards agreed that they would provide resources to help configure the system. Over the course of the procurement, the laboratory services across NHS Wales were restructured which meant that there was much less capacity available. Eventually, NWIS recruited individuals to fulfil this role as the health boards were no longer in a position to do so. Also, NWIS told us that after winning the contract, it took InterSystems longer than anticipated to recruit and train the staff they needed. • Pathology budgets have been under pressure and departments no longer have the additional capacity that they thought they would have to assist in implementation, so health boards have not been able to provide the resources that they originally agreed to. • The national requirements for some modules have changed and become more rigorous over the course of the contract, with the result that systems have required further development to maintain compliance with regulations. • There was a national lead officer for pathology at the time of the procurement but not during much of the implementation phase as the role was not filled when the post holder moved to another job. • Modules were piloted in a smaller health board, but it would have been better to pilot in a larger health board, as they are now discovering that what worked in the pilot area does not cover the broader range of more complex tests undertaken in a larger department.

System: WLIMS

Time	Seven years after the agreement to procure a national system, it is not yet fully rolled-out. The transplantation and immunogenetics, and blood transfusion modules are not in place. The histology module has been rolled out at three health boards and the mortuary module is in place at one health board. The contract expired in July 2017 but NWIS has taken up the option to extend it for three years.
Cost	In 2009, the estimated cost of investment over 10 years was £27.6 million. This includes some maintenance costs as the intention was to implement the system by 2013. NIWS reports that to the end of 2016-17, the costs have been £29.4 million. Delays in implementation have resulted in extra costs. For example, NWIS has covered the costs, totalling £1.4 million, of double running WLIMS and legacy systems until March 2017. Since March 2017, health boards have covered the additional costs of double running.
Quality and functionality	During our fieldwork, health board staff told us that they were not using Deep See, the business intelligence tool, because they felt it did not meet their needs. NWIS told us that from a contractual point of view the functionality had been delivered as per the terms of the contract. Health boards reported to us that the digital dictation system that has been delivered is so difficult to use it has largely been abandoned. Health boards have now agreed to submit a bid to the Welsh Government's Innovation and Technology Fund in order to purchase an off-the-shelf dictation system.

Figure 13: System: Choose Pharmacy

System: Choose Pharmacy	
Key functions	<p>Choose Pharmacy consists of a range of software modules which aim to improve communication between community pharmacies and other areas of NHS Wales. The modules are provided via an electronic platform securely hosted by NWIS.</p> <p>Current live modules are:</p> <ul style="list-style-type: none"> • Common Ailments Service (CAS). A facility for patients to go to a chemist rather than a GP to get advice on minor ailments and still get access to free medicine. • Discharge Medicine Review (DMR). Allows electronic sharing of discharge information from hospitals to pharmacies rather than paper sharing so improved checks can be carried out to ensure patients are being given the correct medicines. • Emergency Medicines Service (EMS). The provision of repeat prescriptions through a pharmacy rather than having to use Accident and Emergency (A&E) or Out of Hours (OOH) services.
History	<p>The project commenced in October 2013 in pilot sites in Cwm Taf and Betsi Cadwaladr University Health Boards, focused on the CAS module. National rollout of the programme (including the additional modules) is now underway with an intention to implement within 50% of pharmacies in Wales by March 2019.</p> <p>The project is intended to free up GP time to deal with patients with the greatest need, reduce the number of medication discrepancies that occur when patients transfer from primary to secondary care and ensure repeat medicine requests are dealt with by pharmacies rather than OOH or A&E services.</p> <p>The EMS module is currently live but without access to the Welsh GP record, so it is not clear how pharmacists will be able to authorise repeat prescriptions. The delay in accessing the GP record is due to concerns over the potential for misuse and viewing records inappropriately. The National Intelligent Integrated Auditing Solution (NIIAS) will be used to regulate and monitor this.</p>
Time	<p>The aim is for 370 sites to be live by March 2018.</p>

System: Choose Pharmacy

Cost	NWIS were provided with £300,000 to develop an IT system to record pharmacist consultations for the CAS module initially in the pilot sites. Funding for £956,000 was secured via the Welsh Government Efficiency Through Technology Fund (ETTF) to support the national roll out which incorporates the additional modules.
Quality and functionality	The Welsh Government published an evaluation of the Choose Pharmacy CAS module in July 2015. It recommended that the Welsh Government, health boards and NWIS needed to work to improve the usability of the IT system developed by NWIS to record details of consultations by pharmacists. A number of pharmacists consistently reported that refinements to the ICT system were required to improve service delivery. Many expressed frustration that despite providing feedback about how to make the system more user-friendly, no amendments had been made and the system remained unnecessarily complex. NWIS reports that many of these concerns have now been addressed.

Appendix 3

NWIS' overall programme of projects

Figure 14: NWIS' overall programme of projects

Project	NWIS description
All Wales Accelerating Cardiac Informatics (AWACI)	This project supports the strategic delivery of 'The Heart Disease Delivery Plan', which sets out actions to improve health outcomes to meet population demands, whilst tackling variation in service accessibility and reducing inequalities in health outcomes.
Betsi Cadwaladr University Health Board Welsh Patient Administration System (BCU WPAS)	WPAS (also known as Myrddin) is one of the six systems we looked at in detail (Appendix 2).
Cancer Informatics Programme	The Cancer Network Information System Cymru (CANISC) is used to support the management and treatment of cancer patients in NHS Wales. The CANISC system has been in use for many years and is now 'end of life'. This Programme will deliver an infrastructure refresh for the current system and also a new Cancer Informatics solution using national systems and architecture.
Child Health	CYPrIS (Children and Young Persons Integrated System) is the redevelopment project of the national child health system. This system will be implemented in Cwm Taf University Health Board first. Implementation to all Welsh sites will follow.
Choose Pharmacy	Choose Pharmacy is one of the six systems we looked at in detail (Appendix 2).
Dental E-Referrals	This project is designed to deliver a proof of concept as outlined within the scope of the dental connectivity project to enable electronic referrals to be processed via the Welsh Clinical Communication Gateway system for oral surgery extraction referrals only. The project will deliver the pilot for the dental e-referrals process within five dental practices in one hospital site within Cwm Taf University Health Board. Oral maxillofacial electronic prioritisation will be processed through the Welsh Administration Portal.

Project	NWIS description
Electronic Transmission of Prescription Claims (ETC)	Electronic Transmission of Claims (ETC) will automate the existing prescription pricing system between community pharmacies in Wales and the Prescribing Services Unit) within NHS Wales Shared Services Partnership.
GMS Systems and Services Procurement	The existing GP IT systems framework agreement, from which the current systems and service are procured, has recently expired. Whilst support will continue until July 2020 there is a requirement to start a new procurement, to enable continuity and further development of General Medical Services (GMS) IT systems.
GP Links Implementation	With the introduction of the new single, national All Wales Pathology Laboratory Information Management System there is a requirement to consolidate the messaging solution to General Practices; this will also include the transmission of radiology reports and other ad hoc information. IUVO Limited and their Clin-eConnect solution is the supplier. The project is in the implementation phase.
GP2GP	GP2GP enables patients' electronic health records to be transferred directly and securely between GP practices.
GP Test Requesting	GP Test Requesting is an NWIS application whereby GPs can electronically request and view test results. The project is in two stages: stage one GP results reporting only, stage two GP reporting and requesting.
Master Patient Index (MPI)	This project provides an enterprise master patient index that links patient identity records across a range of information systems. The result is a single 'gold standard' identity record to be used by new national systems, which will help minimise the number of duplicate records and support health board system mergers.
My Health Online (MHOL) Phase 2	MHOL is one of the six systems we looked at in detail (Appendix 2). Phase 2 involves new functionality being built around online registration, mobile versions and access to medical records.
My Health Text National Implementation	My Health Text is a new service being offered across Wales where all GP practices will be provided with the ability to send SMS messages to patients to remind them about their upcoming appointments and invite them to contact the surgery for seasonal flu vaccinations or regular clinic appointments.
PACS Framework Implementation	PACS is part of the radiology systems we looked at in detail (Appendix 2).

Project	NWIS description
PROMS and PREMS – Phase 1	PROMs (Patient Reported Outcome Measures) and PREMs (Patient Reported experience Measures) is a programme of work take forward patient reported measures within NHS Wales, which includes the development of a technical means to capture PROMs data, utilising existing national NWIS architecture, available to practicing clinicians and for secondary information.
Welsh Care Records Service (WCRS)	This project will build upon existing functionality within the Welsh Clinical Portal to provide a national clinical document repository that can be accessed by WCP users in any health board to view existing documents and to create new documents using eForms. This project will also build and configure the national infrastructure to support roll-out across Wales. The project will progress in conjunction with the Welsh Results Reporting Service (WRRS) for diagnostic reports and the Image Sharing project for images.
Welsh Clinical Communications Gateway (WCCG)	<p>The main objective of the WCCG is to introduce efficiencies and safer working practices around sending electronic clinical communication between healthcare settings across all of Wales.</p> <p>Phase 1 completed the rollout of e-referrals to all health boards from primary care GP practices to secondary care medical records using one generic referral template.</p> <p>Phase 2 will include additional message types (for example clinical and administrative letters and cross border referrals).</p>
Welsh Clinical Communication Gateway Optometry Referrals	The purpose of this project is to improve communication between optometry practices and secondary care by sending electronic referrals.
Welsh Clinical Portal (WCP)	The WCP is a secure health space, uniting key patient information from the different computer systems and databases used in NHS Wales, to support clinical decisions and key tasks. The Portal's current functionality includes patient lists, electronic pathology test requesting and results viewing, radiology reports and image viewing, creation of discharge letters and medicine transcribing, prioritisation of GP referrals, document viewing plus the viewing of the GP summary record in WCP.
Welsh Community Care Information System (WCCIS)	A joint health and social care procurement process has concluded resulting in a call off framework, which all health boards and local authorities in Wales can use for delivering a community information solution for community health staff and social workers. Implementation planning is underway.

Project	NWIS description
Welsh Demographic Service Phase 2	WDS Phase 2 will deliver a Welsh Birth Notification System (WBNS) to replace the English NHS Numbers for Babies (NN4B) service that closed in January 2015.
Welsh Emergency Department System (WEDS)	WEDS is a national emergency department (A&E) system. It is a nationally agreed master services agreement with EMIS Health (formerly Ascribe) which can be called for by health boards as required. NWIS is responsible for hosting the infrastructure, integration with other national systems, co-ordinating implementation projects and managing the national contract.
Welsh Hospital E-Prescribing Pharmacy and Medicines Administration (WHEPPMA)	This project will enable the computerisation of the processes of prescribing, processing, stock control and recording the administration of medicines in secondary care hospitals. It will replace the current paper prescription and administration record chart normally completed for every in-patient as well as discharge and outpatient prescription forms used by clinicians. The project will deliver both an e-prescribing system as well as an integrated replacement pharmacy system.
Welsh Imaging Archive Service (WIAS)	This project is linked to the Welsh PACS Framework roll-out of the Fujifilm PACS system (above). Part of the Fujifilm service is the provision of a central archive called a Welsh Imaging Archive Service (WIAS). The image sharing project is to take forward all aspects of image sharing including the various mechanisms to be used for the retrieval of images from the WIAS.
Welsh Information System for Diabetes Management (WISDM)	The aim of the project is to deliver a diabetes ICT solution for Wales. This will provide a clinical, multidisciplinary record and share information across primary, secondary and community healthcare settings
Welsh Laboratory Information Management System (WLIMS)	WLIMS is one of the six systems we looked at in detail (Appendix 2).
Welsh Patient Referral Service (WPRS)	The Welsh Patient Referral Service (WPRS) covers a number of components. The WAP (Welsh Admin Portal) enables electronic referrals sent by a GP via WCCG to be created seamlessly in hospital patient administration systems. Subsequently, via the Welsh Clinical Portal (WCP) the WAP application generates the necessary information needed for a consultant to prioritise the referral. WCP provides electronic updates back to the WAP and WCCG.

Project	NWIS description
Welsh Radiology Information System 2 (WRIS) mergers	WRIS, also known as RADIS 2 is one of the six systems we looked at in detail (Appendix 2).
Welsh Results Reports Service (WRRS)	The WRRS will provide Welsh Clinical Portal and GP Test Requesting users the ability to view diagnostic reports and requests for their patients, regardless of where in Wales these were produced.

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