eHealth Strategies

Country Brief: Wales

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About the *eHealth Strategies* study

The eHealth Strategies study analyses policy development and planning, implementation measures as well as progress achieved with respect to national and regional eHealth solutions in EU and EEA Member States, with emphasis on barriers and enablers beyond technology. The focus is on infrastructure elements and selected solutions emphasised in the European eHealth Action Plan of 2004.

Disclaimer

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Reviewer

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Executive summary

The key strategy and roadmap for eHealth activities in Wales is the "Informing Healthcare Strategy" published in 2003 by the Welsh government. It is also linked to an Implementation Programme. The policy paper defines information-keeping and communication as vital and focuses on electronic support systems for care professionals, patients and patients' representatives. Another more recent document, which influences eHealth in Wales, is the "Delivery Plan 2007-2011" from February 2010. The plan gives details about the commitments made in the "One Wales: A progressive agenda for the government on Wales" policy paper published in 2007.

In order to understand Wales' position in relation to key eHealth objectives this report has looked at various different aspects but particularly patient summary and electronic health record, ePrescription, standards and telemedicine. Here is an overview of Wales' position:

In Wales the Welsh Clinical Portal is the main means for making information, which fits the concept of a single electronic health record, available in secondary care. This portal is currently being rolled out across Wales. One initiative that matches the electronic health record requirements is the Individual Health Record. This makes key information from GP systems available within other healthcare settings. This therefore meets the criteria of a "patient summary" and is also presently being rolled out across Wales.

For ePrescription, Wales is concentrating on bar coding of prescriptions. The new 2D barcode system has been developed by the Welsh Assembly Government Primary Care Informatics Programme to modernise pharmacy services in Wales in collaboration with other services.

For standards NHS Wales Informatics Service provides that the general data standards service focuses on e.g., databases, data sets, data dictionaries, and standard codes. NHS Wales focuses on its architecture and design issues e.g., broadband, infrastructure, and security. Also, the United Kingdom is a member of IHTSDO.

For the development of telemedicine, Welsh regional projects developed applications in areas such as telemonitoring and teleconsultation. At national level, the "Health of Wales Information Service" set up a website in 2003 on telecare/telemonitoring in Wales in order to give appropriate information to its health staff.

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1 Introduction to the report

1.1 Motivation behind the eHealth Strategies study

Following the *Communication* of the European Commission (EC) on "eHealth – making healthcare better for European citizens: An action plan for a European eHealth Area",[1] Member States of the European Union (EU) have committed themselves to develop and issue national roadmaps – national strategies and plans for the deployment of eHealth applications addressing policy actions identified in the European eHealth Action Plan.

The *2004 eHealth Action Plan* required the Commission to *regularly monitor* the state of the art in deployment of eHealth, the progress made in agreeing on and updating national eHealth Roadmaps, and to facilitate the exchange of good practices. Furthermore, in December 2006 the EU Competitiveness Council agreed to launch the *Lead Market Initiative*[2] as a new policy approach aiming at the creation of markets with high economic and social value, in which European companies could develop a globally leading role. Following this impetus, the Roadmap for implementation of the "eHealth Task Force Lead Market Initiative" also identified better coordination and exchange of good practices in eHealth as a way to reduce market fragmentation and lack of interoperability.[3]

On the more specific aspects of electronic health record (EHR) systems, the recent *EC Recommendation on cross-border interoperability of electronic health record systems*[4] notes under "Monitoring and Evaluation", that "in order to ensure monitoring and evaluation of cross-border interoperability of electronic health record systems, Member States should: consider the possibilities for setting up a monitoring observatory for interoperability of electronic health record systems in the Community to monitor, benchmark and assess progress on technical and semantic interoperability for successful implementation of electronic health record systems." The present study certainly is a contribution to monitoring the progress made in establishing national/regional EHR systems in Member States. It also provides analytical information and support to current efforts by the European Large Scale Pilot (LSP) on cross-border Patient Summary and ePrescription services, the epSOS - European patients Smart Open Services - project.[5] With the involvement of almost all Member States, its goal is to define and implement a European wide standard for such applications at the interface between national health systems.

Earlier, in line with the requirement to "regularly monitor the state of the art in deployment of eHealth", the EC already funded a first project to map national eHealth strategies – the eHealth ERA "Towards the establishment of a European eHealth Research Area" (FP6 Coordination Action)[6] - and a project on "Good eHealth: Study on the exchange of good

[1] European Commission 2004

[2] European Commission 2007

[3] European Communities 2007

[4] European Commission 2008

[5] European Patients Smart and Open Services (epSOS)

[6] eHealth Priorities and Strategies in European Countries 2007

practices in eHealth"[7] mapping good practices in Europe - both of which provided valuable input to the present *eHealth Strategies* work and its reports. Member States' representatives and eHealth stakeholders, e.g. in the context of the *i2010 Subgroup on eHealth* and the annual European High Level eHealth Conferences have underlined the importance of this work and the need to maintain it updated to continue to benefit from it.

This country report on Wales summarises main findings and an assessment of progress made towards realising key objectives of the eHealth Action Plan. It presents lessons learned from the national eHealth programme, planning and implementation efforts and provides an outlook on future developments.

1.2 Survey methodology

After developing an overall conceptual approach and establishing a comprehensive analytical framework, national level information was collected through a long-standing Europe-wide network of national correspondents commanding an impressive experience in such work. In addition, a handbook containing definitions of key concepts was distributed among the correspondents to guarantee a certain consistency in reporting. For Wales, Diane Whitehouse provided information on contexts and initiatives, and examples for specific applications. Diane Whitehouse is a former European Commission project officer. She is a partner in The Castlegate Consultancy, a United Kingdom-based policy and systems analysis and design group. She has 25 years' work experience which has included European policy in eHealth and ICT use by persons with disabilities and by older adults, as well as academic research/teaching, social action research, and human and civil rights. Among a variety of eHealth policy commitments, she ensured the early implementation stages of the 2004 eHealth action plan, followed the progress of the i2010 subgroup on eHealth, worked with the associated stakeholder groups on both eHealth interoperability and user engagement, and planned and organised from the Commission side the annual high-level eHealth conferences from 2004 through to 2007. Information on policy contexts and health system situation, policies and initiatives as well as examples for specific applications was collected by the overall project lead - empirica in Bonn, Germany.

The key tool to collect this information from the correspondents was an online survey template containing six main sections:

A. National eHealth Strategy
B. eHealth Implementations
C. Legal and Regulatory Facilitators
D. Administrative and Process Support
E. Financing and Reimbursement Issues
F. Evaluation

[7] European Commission; Information Society and Media Directorate-General 2009

Under each section, specific questions were formulated and combined with free text fields and drop-down menus. The drop-down menus were designed to capture dates and stages of development (planning/implementation/routine operation). In addition, drop-down menus were designed to limit the number of possible answering options, for example with regard to specific telemedicine services or issues included in a strategy document. The overall purpose was to assure as much consistency as reasonably possible when comparing developments in different countries, in spite of the well-know disparity of European national and regional health system structures and services.

Under Section B on eHealth implementation, questions regarding the following applications were formulated: existence and deployment of patient and healthcare provider identifiers, eCards, patient summary, ePrescription, standards as well as telemonitoring and telecare.

The data and information gathering followed a multi-stage approach. In order to create a *baseline* for the progress assessment, the empirica team filled in those parts of the respective questions dealing with the state of affairs about 3 to 4 years ago, thereby drawing on data from earlier eHealth ERA reports, case studies, etc. to the extent meaningfully possible. In the next step, national correspondents respectively partners from the study team filled in the template on recent developments in the healthcare sector of the corresponding country. These results were checked, further improved and validated by independent experts whenever possible.

Progress of eHealth in Wales is described in chapter 3 of this report in the respective thematic subsections. The graphical illustrations presented there deliberately focus on key items on the progress timeline and cannot reflect all activities undertaken.

This report was subjected to both an internal and an external quality review process. Nevertheless, the document may not fully reflect the real situation and the analysis may not be exhaustive due to focusing on European policy priorities as well as due to limited study resources, and the consequent need for preferentially describing certain activities over others. Also, the views of those who helped to collect, interpret and validate contents may have had an impact.

1.3 Outline

At the outset and as an introduction, the report provides in chapter 2 general background information on the *Welsh* healthcare system. It is concerned with the overall system setting, such as decision making bodies, healthcare service providers and health indicator data.

Chapter 3 presents the current situation of selected key eHealth developments based on detailed analyses of available documents and other information by national correspondents and data gathered by them through a well-structured online questionnaire. It touches on issues and challenges around eHealth policy activities, administrative and organisational structure, the deployment of selected eHealth applications, technical aspects of their implementation, legal and regulatory facilitators, financing and reimbursement issues, and finally evaluation results, plans, and activities

The report finishes with a short outlook.

2 Healthcare system setting

2.1 Country introduction

Wales is part of the United Kingdom of Great Britain and Northern Ireland. The UK has many different administrative levels and county/council areas; Wales has 11 county boroughs, 9 counties and 2 cities and counties.

For centuries Wales has shared many political and legal institutions and structures with England. The courts and policing arrangements are identical to those in England and many other aspects of public life: higher education and schools; healthcare; social welfare policy and transport have been characterised much more by their similarity with those of the much larger neighbour than by their differences. However, for much of the latter quarter of the 20th century there was an influential pro-devolution or nationalist presence in Welsh public life, culminating with the enactment of the Government of Wales Act in 1999. Supported by a very narrow margin in a referendum, this created a unicameral National Assembly of 60 members elected partly by proportional representation. Supported by the Welsh Assembly Government, it has responsibility for policy, strategy and delivery in several areas of public services, including health; and powers to create secondary legislation, essentially the detailed implementation of primary legislation which still requires approval from the United Kingdom's Parliament in London. There have been three elections to the Assembly, the latest (2007) resulting in a centre-left (including coalition) government led by the Labour Party in partnership with Plaid Cymru.

Welsh politics are qualitatively different from those of England in several respects, one of which is the substantial (and probably permanent) majority support for centre-left policies that has resulted in significant differences in health policy between Wales and England.[8]

The box below summarises the key demographic and public health figures about the healthcare situation in the United Kingdom:

Key figures with regard to the UK healthcare situation:[9]

Life expectancy at birth: 79.9 years;

Healthcare expenditure as a % of GDP: 8.4% (OECD 2007);

WHO ranking of healthcare systems: rank 18;

Public sector healthcare expenditure as a % of total healthcare expenditure: 82% (OECD 2007).

[8] Longley and Jemiai 2004

[9] Data from World Health Organization 2000; Health Consumer Powerhouse 2008; World Health Organization 2009

2.2 Healthcare governance

Decision making bodies, responsibilities and sharing of power

The National Health Service (NHS) in Wales is the responsibility of the Welsh Assembly Government. The Welsh Assembly is a devolved administration that draws its authority from the British Parliament and has responsibility for a number of issues, including among others health.

Healthcare service providers[10]

A key document ("Informing Healthcare"), which dates from 2001, describes the overall approach to developing NHS services in Wales. It addresses each of the main areas of health and social care policy, and is the basis of a programme that was established to develop new methods, tools and information technologies to transform health services for the people of Wales.

For primary care, it outlines a programme of gradual reform, maintaining the central role of General Practitioners but expanding the roles of others. There is a desire to provide services under a 'single roof' wherever possible, and a call for experimentation in areas such as salaried General Practitioners and nurses' prescribing.

For secondary care, a more revolutionary view is described or, at least, hinted at. The year before "Informing Healthcare " was launched, there was a much less well-highlighted publication, "Access and excellence: acute health services in Wales" (NHS Wales, 2000). This document was the result of an Assembly-commissioned expert study of the current state of secondary (and tertiary) care in Wales, and the direction in which it should develop. It described a series of long-term pressures on acute hospital provision, common to the rest of the United Kingdom (and elsewhere). These were set in the particular context of Wales, where history and geographical peculiarities had combined to bequeath a pattern of acute care. The system is heavily reliant on a relatively large number of small general hospitals, several serving a population of fewer than 100,000 people. Despite the conclusion that, "this report is essentially optimistic" (NHS Wales, 2000, p.56) it called for a radically new vision for acute care, based on "new ways of planning and developing services; a new, more responsive model of hospital care; a new approach to capital; and the prospect of major investment in the infrastructure to support patient care". In summary: it advocated centralisation and hospital closure facilitated by substantial increases in capital investment.

[10] Longley and Jemiai 2004

Figure 1: Important features of primary healthcare organisation in Wales

Political/administrative unit responsible for primary healthcare	Healthcare in Wales is mainly provided by the Welsh public health service, NHS Wales. NHS Wales provides healthcare to all permanent residents. It is free at the point of need and paid for from general taxation.
Consumer Choice	Generally, about 90% of all patient contacts with the NHS occur in primary care. Furthermore, the Welsh Assembly Government has stated that it will give patients a greater say in their services, with a focus on 'patient voice'.[11]
Financing	Financing of healthcare is largely through taxation.
Public or private providers	General Medical and Dental Practitioners (and staff employed by these practitioners) are independent NHS contractors. They are not employed by the national health service of Wales.[12]
Gatekeeping function of the GP	General practitioners are a patient's first contact point. According to the Association of the British Pharmaceutical Industry, "there are over 1,900 family doctors in Wales, over 1,000 dentists, and some 600 opticians. Family doctors are the 'gateway' to the NHS, referring people to hospitals for specialist treatment where necessary."[13]

2.3 Recent reforms and priorities of health system/public health

The White Paper for the NHS in Wales: "Putting Patients First", published in January 1998, sets out the government's plans for reform. Since 1999, the newly-elected Welsh Assembly holds responsibility for health functions previously exercised by the Secretary of State for Wales.[14]

Current reforms in the health and social care systems

Since 2009, the NHS in Wales has seven integrated Health Boards, covering all services in their areas. The move means that Wales has abandoned the internal market system used in England, where primary care trusts currently buy services for their patients from organisations such as acute trusts.

According to Kable data, the 12 largest trusts which have been merged into health boards spent an estimated £59m on ICT in 2008-09.

[11] House of Commons 2009

[12] According to the Association of the British Pharmaceutical Industry: "The NHS is Wales' largest employer, with approximately 91,000 staff which equates to approximately 5% of the working-age population of Wales".

[13] Association of the British Pharmaceutical Industry (ABPI)

[14] Robinson, Dixon et al. 1999

The seven new health boards are Abertawe Bro Morgannwg University (Swansea and environs), Aneurin Bevan (Gwent), Betsi Cadwaladr University (north), Cardiff and Vale University, Cwm Taf (the Valleys), Hywel Dda (south-west), and Powys Teaching.[15]

In addition there are two Trusts which have an all-Wales remit: the Welsh Ambulance Service NHS Trust; and Velindre NHS Trust which provides Cancer and Screening services, among others.

2.4 ICT use among general practitioners

This section gives a brief overview of important ICT related infrastructure and services data. It draws on earlier studies conducted by empirica, notably the Indicators eHealth study. Although the results of this study date from 2007 and may therefore not reflect latest changes, a more recent pan-European survey is not available. In this chapter, the situation in the United Kingdom as a whole is presented (since the previous study did not examine the Welsh situation in detail).

In terms of infrastructure, 97% of UK General Practitioners' practices use a computer. Nearly the same share of practices (95%) has an Internet connection. In the United Kingdom broadband represents the most common form of access to the Internet. Broadband connections are used in 73% of the United Kingdom's General Practitioners' practices.[16]

In General Practitioners' practices, ICT use relates to the local use of computers for consultations, data storage and the networked transmission of patient data. With regard to the availability of a computer in the consultation room (as compared to the actual use of the PC in consultations with the patients), there is nearly no gap between the two. Both availability and use are nearly universal (97% and 95% of practices respectively). Decision Support Systems for either diagnosis or prescribing purposes are also widespread. They are used in around 80% of UK General Practitioners' practices.

The storage of electronic patient data is common practice in the United Kingdom. Medical patient data is stored in digital form in nearly all practices.

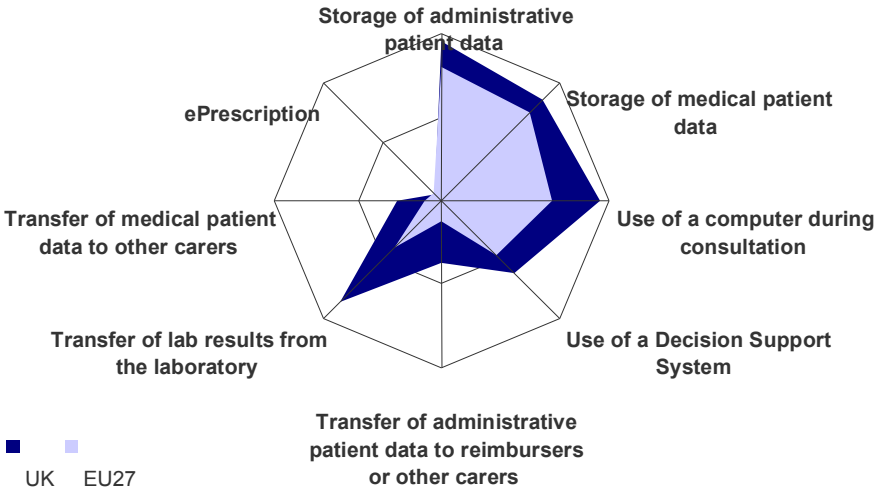
The networked transmission of identifiable electronic patient data is also comparatively well established in the United Kingdom. One out of three practices exchange administrative data with other care providers. Already, 85% of General Practitioners' practices receive results from laboratories via electronic networks. 26% of practices exchange data with other healthcare providers.

Only ePrescription (as defined in 3.3.2) is not yet established in the United Kingdom. In 2007, it was used by just 5% of UK practices, none in Wales. The relatively low use rate of ePrescription uncovered can be attributed to the fact that, at that time, an ePrescription system had only been introduced in England just two years earlier. Section 3.3.2 of this report, however, outlines the current situation on ePrescription in Wales.

[15] SmartHealthcare.com 2/10/2009

[16] ICT and eHealth use among General Practitioners in Europe 2007

Figure 2[17]: eHealth use by General Practitioners in the United Kingdom



Indicators: Compound indicators of eHealth use (cf. annex for more information), % values. Source: empirica, Pilot on eHealth Indicators, 2007.

3 eHealth Strategies survey results

The following sections present the results of the eHealth Strategies country survey. In the first section (3.1), the eHealth policy actions undertaken in Wales are presented. This is followed in section 3.2 by a presentation of administrative and organisational measures taken. Section 3.3 presents results on key eHealth applications. Section 3.4 focuses on the technical side of eHealth, namely the role of patient and healthcare provider identifiers and the role of eCards. Legal and regulatory facilitators as well as financing and reimbursement issues are presented in sections, 3.5 and 3.6. The report concludes with evaluation activities (3.7) in the country and an outlook (4). While the initial two sections provide a general overview, more specific details on developments are to be found in each of the successive sections.

3.1 eHealth policy action

The eHealth strategies of EU and EEA countries are not always labelled as such. Some countries may indeed publish a policy document which refers to the ICT strategy in the healthcare sector. Other countries such as France and Germany have enshrined the central eHealth activities in legislation governing the healthcare sector. In Germany, the

[17] The notion of „compound indicator“ designates an indicator built from a set of other indicators/survey questions regarding the same topic. The compound indicator reflects an average calculated from different values (see Annex). The final results of the study on eHealth Indicators is available at www.ehealth-indicators.eu.

relevant law is the law on the modernisation of healthcare; in France the introduction of an electronic medical record is included in a law concerning social security.

Sometimes, also documents from domains such as eGovernment or Information Society strategies may contain provisions which concern eHealth. In cases where the healthcare system is decentralised, i.e. where power is delegated to the regional level, there may even be strategy documents regarding eHealth from regional authorities.

3.1.1 Current strategy/roadmap

In Wales, there are several relevant documents that date back to 2003. These documents are generic and address different issues on health and social care on the one hand and eServices on the other.

One Wales – Delivery Plan 2007-2011

The most recent document, which influences healthcare in Wales, is the "Delivery Plan 2007-2011"[18] from February 2010. Overall the plan provides information on each commitment made in the "One Wales: A progressive agenda for the government on Wales"[19] policy paper published in 2007. Of special interest in these two documents is the focus on healthcare in general as well as a planned charter for patient rights.

Designed for Life (2005)

Another document, which is important for developments in Welsh healthcare, is "Healthcare standards: Making the connections, Designed for Life"[20] from 2005. This policy paper targets citizens and healthcare professionals in order to redesign the healthcare system towards ICT supported services. It is stated that:

"Greater use of technology and telehealth will reduce the need for hospital visits or residential care and home testing kits will be used more. The result of these developments will give individuals greater control over their own quality of life. Electronic records will make care faster and safer and allow people to monitor the quality of their own care. Assessment and investigations will be conducted locally and results stored electronically so that they do not need to be repeated. Front-line and specialist care will be closely integrated."[21]

Informing Healthcare Strategy (2003)

In 2003, the Welsh government published the "Informing Healthcare Strategy"[22], which remains the key strategy and roadmap for eHealth activities. It is further connected to an Implementation Programme. The policy paper defines information-keeping and communication as crucial and focuses on electronic support systems for care professionals, patients and patients' representatives. The following ICT healthcare services are identified as especially helpful:

- Electronic communication
- Requesting and reporting of tests
- Picture archiving and communication systems (PACS)
- ePrescribing and
- scheduling.

[18] Wales Assembly Government 2010

[19] Welsh Assembly Government 2010

[20] Welsh Assembly Government 2005

[21] see above, p. 21-22

[22] Welsh Assembly Government 2003

Furthermore, Informing Healthcare is the "fruition of Welsh Assembly Government commitments made in 'Improving Health in Wales – A Plan for the NHS with its partners'[23]. It is a significant and strategic approach to investing in information and communications technologies infrastructure and to modernising service delivery by supporting new ways of working with better information support and access to knowledge in the care process"[24].

Overall, as key benefit areas, the following fields are highlighted:

[1] A single record

[2] Workforce empowerment

[3] Patient and carer empowerment

[4] Service improvement

[5] Knowledge and information management.

Improving health in Wales, the future of primary care (2001)

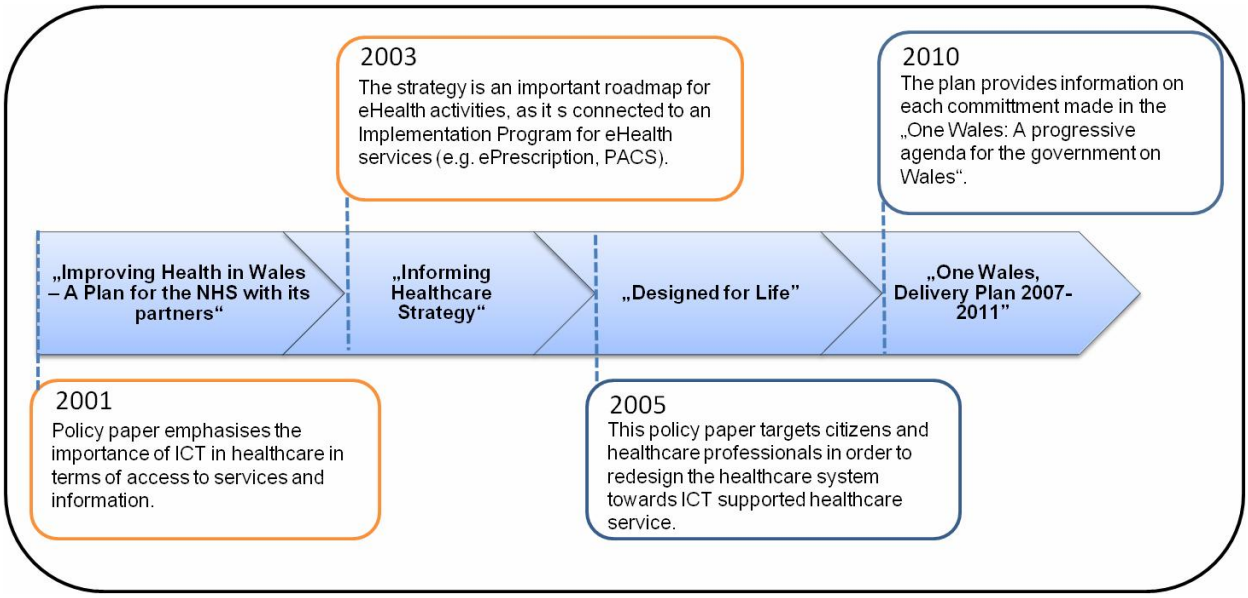
Already in 2001, the "Improving health in Wales. The future of primary care"[25] paper emphasised the importance of ICT in healthcare. It was stated:

"New information technology has the potential to revolutionise the way first line advice is given. The development of the E-health sector is likely to be a major consideration over the next ten years and has the potential to alter radically (and positively) the way in which people access healthcare services and gain health information."[26]

Regarding specific eHealth applications, the policy paper targets the development of a single electronic health record with appropriate levels of access to the General Practitioner, individual primary care team members and patients themselves.

The figure below summarises the different approaches in recent years.

Figure 3: Welsh policy documents related to eHealth



[23] National Assembly for Wales 2001

[24] see above, p.3

[25] Health and Well-Being Strategy and Planning Team 2001

[26] see above, p.13

3.2 Administrative and organisational structure

The national eHealth structure in Wales is supported by the Government programme "Informing Healthcare"[27] which dates from 2003 and which involves a Programme[28] and an Implementation Board[29] as well as stakeholder involvement and funding options.

"Informing Healthcare Programme" defines eHealth administration

This Welsh Assembly Government Programme is one of the key enablers for "Designed for Life"[30], the national ten-year strategy to deliver world class health and social care for Wales (see section 0 above). It was set up to improve health services in Wales by introducing new ways of accessing, using and storing information. It is a national programme that develops new methods, tools and information technologies to transform health services for the people of Wales. Its aim is to modernise health service delivery, promoting new ways of working through better access to information and knowledge for shared decision making. The programme is delivering a single electronic record for patients in Wales.

The Welsh Assembly Government outlined the activities and responsibilities of this programme as follows:

"Informing Healthcare will be a project-based strategy. The Programme will identify individual projects and products and ensure that they are delivered in a coherent way in support of the overall change programme. The Programme will not undertake ongoing information or IT service provision. Such provision will be the domain of national and local health organisations in Wales and, where appropriate, private sector suppliers."[31]

"While the Programme will be responsible for delivering strategic products and overseeing health service-wide projects – enabling, supporting and monitoring progress on the strategy – it will not take responsibility for organisational and professional change. This responsibility will continue to rest with Chief Executives and Boards of health organisations."[32]

The Informing Healthcare Strategy is to be achieved through a series of healthcare service improvement projects and investment in information communication technologies to create Wales-wide information and infrastructure services. The aim of the Informing Healthcare Programme is to enable health information to be securely shared between the nation's health service and social care. The right health information will be made available to clinicians and patients wherever care needs to be provided.

The Programme Board of Informing Healthcare has an important role to play in overseeing future development of the Individual Health Record and other service improvement programmes. Programme Board members, who represent a wide range of NHS and stakeholder organisations, also serve as ambassadors for the Informing Healthcare programme. Its Implementation Board's responsibilities include determination of priorities, phasing, investment, communication and financial planning. Informing

[27] Informing Healthcare

[28] Informing Healthcare

[29] Informing Healthcare

[30] Welsh Assembly Government 2005

[31] Welsh Assembly Government 2003, p.13

[32] Welsh Assembly Government 2003, p.17

Healthcare also has an International Advisory Board: more details on it are outlined in section 4.7 on evaluation.

In April 2010 the work of the Informing Healthcare programme became part of the NHS Wales Informatics Service[33].

From 2007 onwards, Informing Healthcare has received a part of the Ministry of Health and Social Services budget. Further details on funding are located in section 4.6.

In the course of the Informing Healthcare Programme, the Welsh Assembly also emphasised the incorporation of stakeholder views in the development of eHealth, as chief executive Dr Gwyn Thomas states, "[i]t gives us more opportunities to engage the users in testing. We've learned a huge amount about information governance, consent, patient safety"[34].

Stakeholder involvement

Furthermore – dating back to 2004 – a strategy[35] was developed that described how stakeholders would be involved in Informing Healthcare. Generally, the strategy describes four key principles of stakeholder involvement:

[1] All stakeholders should have an opportunity to be involved;

[2] Involvement will focus on delivering Informing Healthcare;

[3] Stakeholder involvement must be effective;

[4] The process of involvement encourages wider engagement over time.

The engagement process was to involve local clinicians and other stakeholders directly in projects. It was intended to help to distribute ownership across health services in Wales. The strategy was open for commentary: it was displayed on a Welsh Intranet site and a public Internet site, with an email address as a first contact point.

In general, stakeholders have been involved in many aspects of including eHealth in the NHS in Wales through e.g. conferences, workshops, and consultations. Different stakeholder groups have been represented on the Informing Healthcare's Programme Board e.g. representatives of general practitioners' committees; regional medical advisory committees; and the Royal College of Nursing.

This form of stakeholder involvement by the Informing Healthcare initiative in Wales has also been recognised by different academic articles[36], where the importance of this involvement is again emphasised.

Beyond the national programme, specific project proposals are put forward by regional or local NHS trusts. These trusts then also manage the initiatives.

The Welsh Assembly Government also places an emphasis on the benefits of its taking a small-scale, local, user-led, incremental approach to eHealth in order to face any remaining challenges.

[33] NHS Trust

[34] Cross 29/1/2009

[35] NHS Wales 2004

[36] Juciute 2009, Thomas 2006

The fact that the Informing Healthcare programme was intended to address challenges related to the administrative and organisational structure of eHealth in Wales was outlined by Health Minister Jane Hutt during the initiative's official launch:

Wales now has a clear direction of travel for modernisation with ICT and it already has some good stories to tell. I want to signal strong Government commitment to the long-term developments set out in Informing Healthcare and the funding announced today confirms this. We need to catch up after decades of piecemeal under-investment but just as importantly this investment reflects the scale of our ambitions for the future of the people of Wales. I'm sure its implementation will put Wales at the forefront of innovative care delivery for the generations of the 21st century.[37]

3.3 Deployment of eHealth applications

The following sub-sections give information about specific eHealth applications, but there are some general points to be made.

eHealth applications in Wales form part of an Enterprise Architecture known as the "(NHS Wales) National Architecture". Conformance of proposals, designs and developments to this architecture is governed by a National Architecture Design Board with members covering technical, clinical and other stakeholder viewpoints.

Although responsibility for healthcare in Wales is devolved to the Welsh Assembly Government, healthcare provision includes a significant amount of cross-border services, especially with NHS England. To this end, the National Architecture recognises the need for this aspect to be covered in eHealth applications, and some specific examples are given in this section.

As well as eHealth applications, there are national Infrastructure services, many of which are shared across the wider Welsh Public Sector, such as the Public Sector Broadband Network and National Data Centres. In addition, there are enabling services to support integration: these include a Messaging Fabric for message-oriented middleware and the Data Transport Service (shared with NHS England) for file transfer, especially to and from GP systems.

3.3.1 Patient summary and electronic health record (EHR)

In this study, the epSOS project's definition[38] *of a patient summary was used as a general guideline. There a patient summary is defined as a minimum set of a patient's data which would provide a health professional with essential information needed in case of unexpected or unscheduled care (e.g. emergency, accident), but also in case of planned care (e.g. after a relocation, cross-organisational care path).*

Lacking a standard definition, a patient's electronic health record (EHR) is here understood as an integrated or also interlinked (virtual) record of ALL his/her health-related data independent of when, where and by whom the data were recorded. In other words, it is an account of his diverse encounters with the health system as recorded in patient or medical records (EPR or EMR) maintained by various providers like GP, specialists, hospitals, laboratories, pharmacies etc. Such records may contain a patient

[37] Health of Wales

[38] European Patients Smart Open Services

summary as a subset. As of yet, fully-fledged EHR systems rarely exist, e.g. in regional health systems like Andalucia in Spain or Kronoberg in Sweden, or in HMOs (health maintenance organisations) like Kaiser Permanente in the USA.

It should be noted that in most policy documents reference is made simply to an "EHR" without any explanation of what is meant by it, thereby in reality even a single, basic electronic clinical record of a few recent health data may qualify. As a consequence, this section can only report on national activities connected to this wide variety of health-related records without being able to clearly pinpoint what (final) development stage is actually aimed for or has been reached so far.

Within Wales, the concept of the "Single Record" is used to describe various initiatives which will make all relevant healthcare information available wherever and whenever it is needed, subject to governance rules. This matches the understanding of the term "EHR" described above. The primary method for making this information available in secondary care is the Welsh Clinical Portal, which provides common facilities for clinicians and is being rolled out across Wales. The current version provides access to patient lists, an event summary, and laboratory results, as well as facilities to order tests, etc. Additional functionality is being developed, including wider clinical document management and Medicines Management (described in 3.3.2 below).

One specific initiative within the Single Record / EHR objective is the Individual Health Record. This makes available key information from GP systems within other healthcare contexts, initially unscheduled care encounters such as out-of-hours services and emergency care units. This therefore meets the criteria of a "patient summary" although contains more detailed information than the word "summary" implies, e.g. laboratory results. This is also being rolled out across Wales.

Over time patients will also be able to view their own medical history, book appointments and order repeat prescriptions online through a secure web page known as "My Health Online"[39]. This figure describes the plans in 2009 for Wales.

Planned Welsh Single Record data

Administrative/demographics

Electronic medication record

General Practitioner record/summary

Medical history

Discharge letters

Laboratory results

Emergency care data

Regarding condition-specific summaries, there are various systems available in Wales that were introduced within the past two-year period.

[39] Informing Healthcare

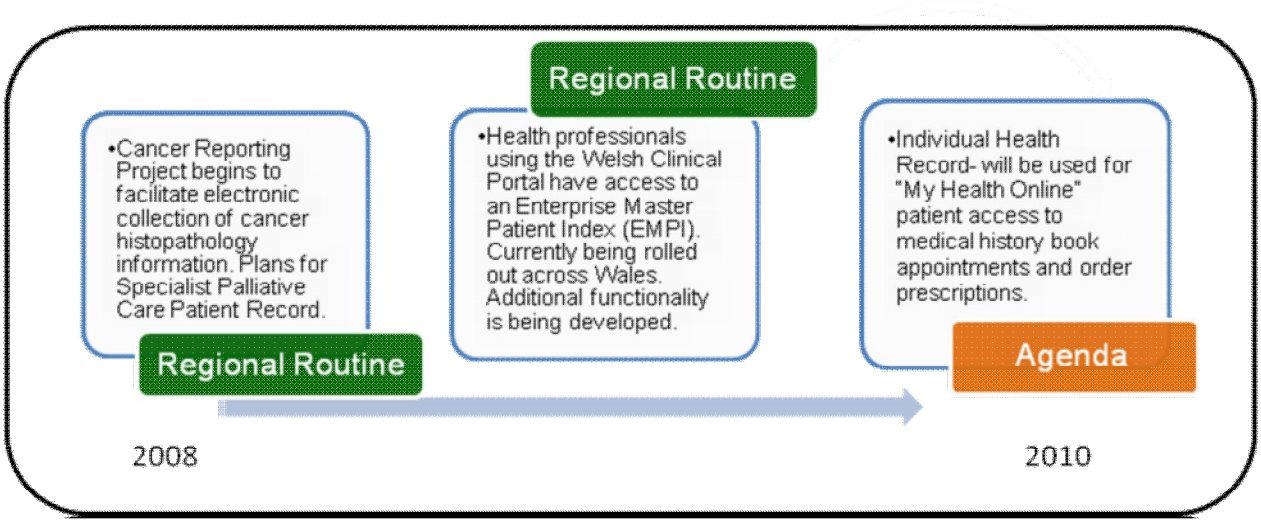
Summary electronic case record by CANISC

The CAncer Network Information System Cymru[40] (CANISC) is an online computer system holding information about patients with cancer. Information is entered into CANISC by cancer units and centres in Wales. It was launched in April 2009. This summary electronic case record is available at all times and covers both emergency and elective care. This information will eventually become part of a patient's individual health record.

There are also plans to implement and support a Specialist Palliative Care Patient Record on CANISC that will be accessible to palliative care organisations and services via the NHS Intranet.

The Cancer Histopathology Reporting Project began in April 2008 to facilitate the electronic collection of cancer histopathology information from the Laboratory Information Management Systems in trusts and integrate it into CANISC.

Figure 4: Patient summary / EHR in Wales



3.3.2 ePrescription and ePrescribing

In the framework of this study and following work developed in epSOS[41], ePrescription is understood as the process of the electronic transfer of a prescription by a healthcare provider to a pharmacy for retrieval of the prescription by the patient. In this strict sense, only a few European countries can claim to have implemented a fully operational ePrescription service. ePrescribing is a much wider concept including the electronic transcription of medication information and the management of medication information.

Bar coding of prescription leads to new 2D system

For ePrescription, Wales is concentrating on bar coding of prescriptions to ensure an improvement in patient safety. Over 1.5 million physical prescription items are processed each week in Wales by local pharmacies. Hence, in September 2009, it was anticipated that these new barcodes will help to rule out errors that can occur when information is keyed in from the paper prescriptions. The new 2D barcode system has been developed by the Welsh Assembly Government Primary Care Informatics Programme to modernise

[40] Informing Healthcare

[41] European Patients Smart Open Services

pharmacy services in Wales in collaboration with other services. Since April 2010, this programme is also managed by the NHS Wales Informatics Service.

Wales has been engaged in ePrescribing development since 2001 and has focused on such elements as:

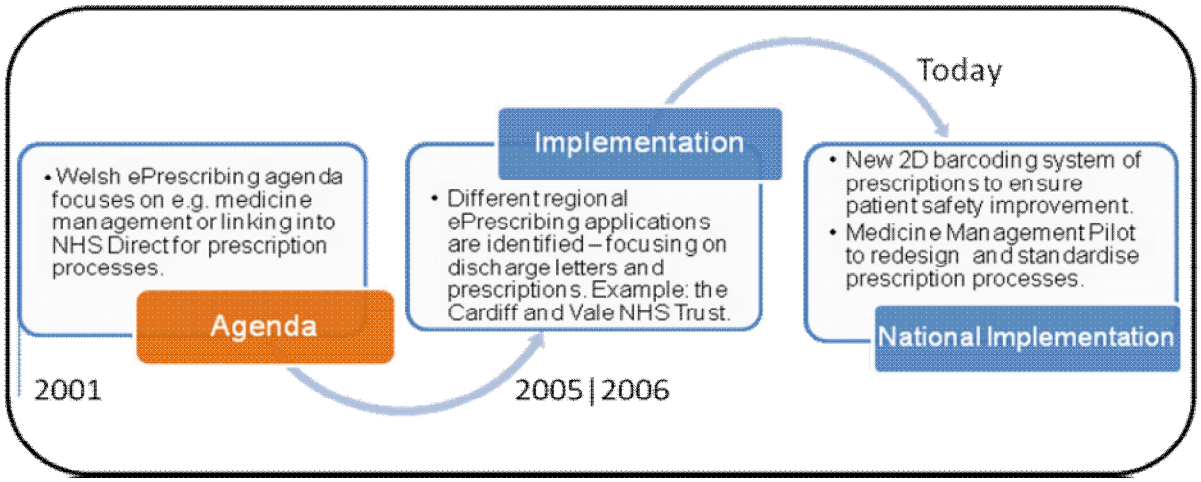
- Adopting a more strategic approach to medicines management
- Closer working between General Practitioners and community pharmacists to ensure that skills are used in a complementary and synergistic way
- Developing Local Pharmaceutical Services to encourage new ways of working
- Linking into NHS Direct using community pharmacies as access/delivery points
- Developing the prescribing role of pharmacists through repeat prescribing, substance misuse and harm minimisation/reduction schemes.

In 2005 and 2006, the Healthcare Commission Medicines Management Review of Best Practice Sharing of the Care Quality Commission (England) identified eight ePrescribing applications that were underway or applied in Wales. The focus is on discharge letters and discharge prescriptions from hospitals or specialist care centres, and on cancer-based care.[42]

On March 18, 2010, the Welsh Assembly Government's Minister for Business and Budget, Jane Hutt announced that the Medicines Management Pilot, led by Informing Healthcare, will redesign and standardise the medicines management processes in Wales. The aim is to eliminate delays and to deliver patient medicines earlier, and the standardised aspect reflects the strategic focus mentioned above.[43]

The figure below summarises the ePrescription development in Wales.

Figure 5: ePrescribing progress in Wales



3.3.3 Standards

Standards are not only crucial to enable interoperable exchange of meaningful information in the healthcare system; they also ensure secure access to patient records by healthcare providers and citizens. This study aims to identify, among other usage,

[42] Care Quality Commission 2007

[43] Welsh Assembly Government 18/3/2010

standards related to the domain of health informatics, such as the SNOMED Clinical Terms or the LOINC terminology.

Health Solutions Wales provides specialist services

"Health Solutions Wales"[44], now part of the NHS Wales Informatics Service, provides a range of specialist services at local, regional and all Welsh levels. Its staff have been providing information, information technology, telecommunications and consultancy services to the NHS (Wales) for the past 30 years. The general data standards service focuses on e.g., databases, data sets, data dictionaries, and standard codes. NHS Wales focuses on its architecture and design issues e.g., broadband, infrastructure, and security.

Furthermore, the United Kingdom is a member of IHTSDO. IHTSDO covers all four of the home countries of the United Kingdom, including Wales.

International standards, which are used in Wales, include the following:

International standards used in Wales

- HL7 v2 and v3
- Web Services and SOAP
- READ Clinical Coding
- dm+d Drug Coding
- ISO/IEC 17799:2005 - A code of practice for information security management
- ISO/IEC 27001:2005 - Information security management systems - requirements
- Information Technology Infrastructure Library (ITIL) for service management

3.3.4 Telemedicine

The use of telemedicine applications is recognised as beneficial to enable access to care from a distance and to reduce the number of GP visits or even inpatient admissions. Commission services define telemedicine as "the delivery of healthcare services through the use of Information and Communication Technologies (ICT) in a situation where the actors are not at the same location"45. In its recent communication on telemedicine for the benefit of patients, healthcare systems and society, the Commission re-emphasises the value of this technology for health system efficiency and the improvement of healthcare delivery[46].

For the development of telemedicine, Welsh regional projects led to patient and health professionals' services, which address applications such as telemonitoring and teleconsultation. For example the "South West Wales Cancer Network"[47] was a telehealth project launched in 2005 which has now become a service. It is pivotal to the

[44] Health Solutions Wales

[45] Europe's Information Society, http://ec.europa.eu/information_society/activities/health/policy/telemedicine/index_en.htm

[46] European Commission 2008

[47] South Wales Cancer Network 2009

infrastructure of tumour site specific cancers multidisciplinary teams, which has also expanded into non-cancer services. The service mainly includes videoconferencing to improve communication and collaboration between professionals.

Furthermore, the European Community funded project "Better Breathing"[48], which was part of the European eTEN programme, was launched in 2007. In general, it aimed for the creation of a new model for continuous care of patients living with chronic obstructive pulmonary disease (COPD). Participants were Denmark, Norway, Spain and Wales. In Wales, a Health Monitor (DOKOBO) questionnaire and monitoring devices made it possible for healthcare personnel to follow and monitor patients from a distance and thus intervene if their condition worsened. The service was offered to patients at the Carmarthenshire NHS Trust and Informing Healthcare Wales. Today, telemedicine in Wales can be used for longer term monitoring of the natural history of COPD e.g. unreported exacerbations, fluctuations in symptoms and physiology or tried in less stable / optimised patients with COPD, such as those unable to complete a pulmonary rehabilitation programmes or those with recurrent admissions. A larger telehealth trial is currently being developed. This project will assess the feasibility of implementing telehealth and telecare to patients with COPD, heart failure, diabetes, or any co-morbidity across these diseases who do not meet the criteria for a rehabilitation programme or are unable to access rehabilitation programmes.[49]

National level initiatives and budget plans

At national level, the "Health of Wales Information Service" set up a website in 2003 on telecare/telemonitoring in Wales in order to give appropriate information to its health staff.[50] In 2005, First Minister Rhodri Morgan outlined the importance of telemedicine in Wales, as he stated:

Wales has a remarkable story to tell in this area. We have been at the forefront of Telemedicine development in the UK for a number of years. A number of Telemedicine projects were pioneered in Wales such as the Tele Education and Medicine Team Project in the mid 1990s which looked at the potential of Telemedicine in providing medical support for rural communities.[51]

This was followed by the announcement by NHS Wales to spend a budget of £33 million on telemedicine in 2008.

Telemedicine challenges

Initial concerns expressed by the Welsh Assembly Government regarding the development and deployment of telemedicine services included the understanding on the part of the people in the country of the utility of telecare and telemonitoring. In the benefits realisation report from 2004 it is stated that:[52]

[…]although some benefits can be measured, few benefits result in direct and tangible gains. Most are qualitative in nature and lead to improved quality but no direct cost saving or productivity gain, an example being "increased response times. Another factor is that the lessons from the introduction of new clinical techniques indicate that:

most benefit realisation is the result of solving problems that have occurred through introduction of new ways of working

[48] Better Breathing Project

[49] Rasmussen and Beck

[50] eHealth Insider 28/1/2003, NHS Wales

[51] Welsh Assembly Government 18/5/2005

[52] Healthcare Alliances 2004, p.5

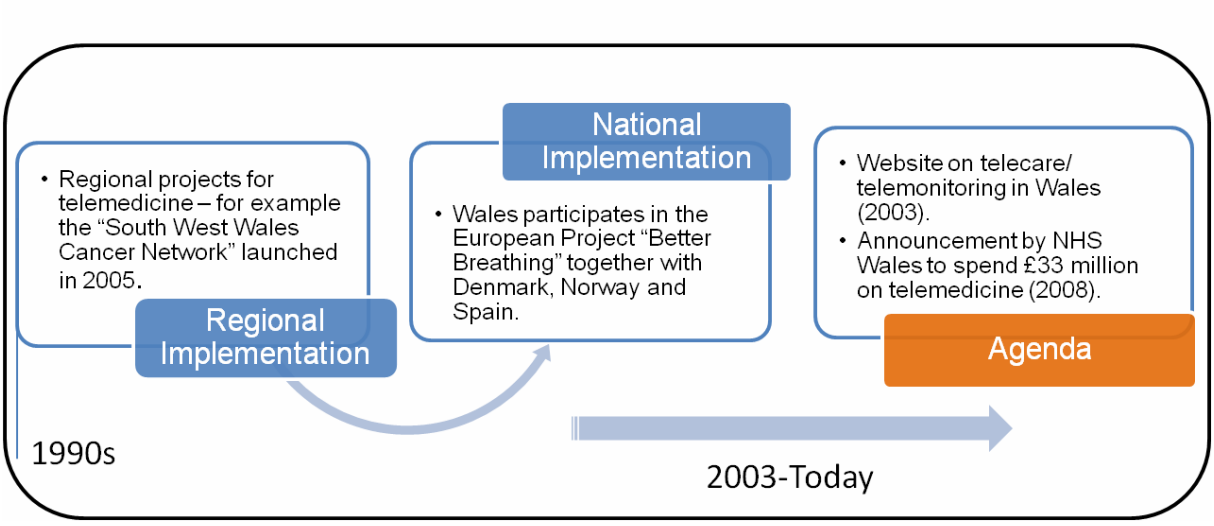
those problems then lead to specific action being taken to address the problems

those actions are then measured against the problem

and, therefore, tend to be reactive rather than proactive.

The figure below summarises the development and deployment of telemedicine services in Wales from the earlier part of this decade until today.

Figure 6: Telemedicine services in Wales



3.4 Technical aspects of implementation

A key prerequisite for the establishment of an eHealth infrastructure is the ability to uniquely identify citizens/patients and healthcare professionals. This part of the survey deals with identifiers and how they are stored. This section does not deal with the tokens through which identification can or will take place, although one such possibility would be via an eCard. The current section focuses solely on whether or not unique identifiers are in place in Wales and for which purpose.

3.4.1 Unique identification of patients

The NHS number is a unique patient ID for health purposes

The NHS number is a unique patient ID for health purposes. In its current 10-digit form, it was formally adopted in Wales on 1 November 1997. From September 2009, the NHS number, as the unique national patient identifier, is to be used more widely in records and correspondence by all NHS organisations in Wales, to improve patient safety. Babies born in Wales are given an NHS number at birth. Any individual who does not have an NHS number is given one when he or she registers at an NHS general practitioner's surgery or health centre.

NHS England continue to issue and maintain the NHS numbers assigned to people in Wales, and the Welsh Demographic Service (WDS) is the facility for aligning Welsh databases with this assignment. This link also allows Welsh healthcare organisations to "trace" the NHS number and demographic information of English patients.

In addition, NHS Wales is implementing a common Enterprise Master Patient Index (E-MPI) facility. This will link to the NHS number via WDS and will manage regional and departmental identifiers allocated in information systems, thus supporting the process of bringing information together.

In terms of challenging aspects to identification, it should be noted that, as a country, Wales has high proportions of individuals with common first and family names, and so the need to distinguish between individuals is important. Further, agreement on what information is needed in order to issue or validate an identifier, and what patients and healthcare professionals are willing to provide, is an obstacle.

3.4.2 Unique identification of healthcare professionals

Professionals must register with the British General Medical Council

Generally, all qualified doctors who wish to practice in the United Kingdom (UK) must be registered with the General Medical Council (GMC). When doctors first make contact with the GMC they are given a unique, seven-digit reference number which they keep throughout their professional career. Further, the Nursing and Midwifery Council (NMC) registers all nurses, midwives and specialist community public health nurses who wish to practice in the UK. The NMC ensures that these nurses are properly qualified and competent to work in the UK. When they first join the register, each person is issued a unique personal identification number (PIN).

The Health Professions Council (HPC) is a regulator that, since 2001, keeps a register of health professionals who meet HPC standards for their training, professional skills, behaviour and health. It regulates 14 health professions: arts therapists, biomedical scientists, chiropodists/podiatrists, clinical scientists, dieticians, occupational therapists, operating department practitioners, orthoptists, paramedics, physiotherapists, practitioner psychologists, prosthetists/orthotists, radiographers, and speech and language therapists.

Welsh General Medical Council regulates 11,000 registered doctors

As part of the UK, Wales participates in the registers described above. In Wales specifically, the General Medical Council (GMC) regulates 11,000 doctors registered. These registers are the basis for identifying healthcare professionals in some eHealth environments (in particular within GP systems), but not universally across Wales. An open issue for the identification of healthcare professionals is the frequency of revalidation of the IDs. A similar obstacle to that already mentioned in relation to patient identifiers is related to agreement on the information needed for ID validation and what professionals are willing to provide.

3.5 Legal and regulatory facilitators

Legal and regulatory issues are among the most challenging aspects of eHealth: privacy and confidentiality, liability and data-protection all need to be addressed in order to make eHealth applications possible. Rarely does a country have a coherent set of laws specifically designed to address eHealth. Instead, the eHealth phenomenon has to be addressed within the existing laws on professional liability, data protection etc.

In 2006, the National Assembly of Wales was granted further powers by the Parliament of the United Kingdom, including the field of health and health services. The “Government of

Wales Act"[53] regulates that the Assembly has the competence to pass legislation on those matters.

The NHS (General Medical Services) Amendment (Wales) Regulations

At that time, no specific legislation has been enacted on patient data record systems in Wales. It should, however, be noted that – before the establishment of he National Assembly for Wales – in 2001, a statutory instrument for Wales No 833 (W.38) with regard to NHS Wales first stipulated procedures vis-à-vis patient records and other computerised records. The instrument was "The National Health Service (General Medical Services) Amendment (Wales) Regulations"[54].

Recently, the Welsh National Assembly also passed a regulation on pharmaceutical services, including electronic signature and ePrescription. The "National Health Service (Pharmaceutical Services) (Amendment) (Wales) Regulations"[55] from April 2010 defines that:

[…] advanced electronic signature means an electronic signature which is:

uniquely linked to the signatory;

capable of identifying the signatory;

created using means that the signatory can maintain under his sole control; and

linked to the data to which it relates in such a manner that any subsequent change of data is detectable.

3.5.1 Patient rights

Specific procedure to collect patient consent

In Wales, there is a specific procedure in relation to the Individual Health Record (see 4.3.1 above) to collect patient consent by asking patients for their approval. This implies that medical staff are only able to see the individual health record when 1) the patient allows it; and 2) they are responsible for this patient and the treatment is an Out of Hours Service[56] or other service supported by the Individual Health Record. Each time a patient contacts one of these services, the medical staff involved in his/her care will ask for the patient's permission.

If a patient cannot give her/his permission, for example if s/he is unconscious, the Out of Hours medical staff will always act in the patient's best interests when deciding whether they need to access the patient's Individual Health Record. Any decision to access a patient's Individual Health Record when the patient is not able to give her/his permission will be recorded on the system with an explanation of why the decision was taken.

In general, a patient can see his/her medical record subject to certain conditions. The Data Protection Act 1998 (in the United Kingdom) allows a person to find out what information about her/him is contained in her/his medical record.

A new service called "My Health Online" will be available in 2010[57]. "My Health Online" will give patients the opportunity to book appointments with General Practitioners, order

[53] National Assembly for Wales 2006

[54] National Assembly for Wales 2001

[55] National Assembly for Wales 2010

[56] The out-of-hours period is between 6.30pm and 08.00am on weekdays, and all weekends and bank holidays.

[57] The business case was approved in January 2010.

repeat prescriptions, update their general details such as a change of address, keep a health diary and make it easier to organise their healthcare, all from their home computer. In future, features will also be developed to include alerts, access to the patient's own medical record and links to personalised health content.[58]

3.6 Financing and reimbursement issues

The Welsh Assembly Government is dependent on the UK government for an overall funding allocation. In turn, the Welsh Assembly allocates this funding allocation to those areas for which it is responsible (such as health, local government, education, transportation).

Independent Commission for Funding & Finance in Wales

The Independent Commission for Funding & Finance[59] in Wales has been created to review the funding and finance of the Welsh Assembly Government. It submitted its first report in July 2009, "Funding devolved government in Wales: Barnett & beyond"[60].

Regarding public budget proceedings, the 2010-11 draft budget proposal for Health and Social Services in Wales was £5.1billion. However, no detailed breakdown of this budget is provided. Generally, eHealth costs are part of Wales' capital expenditure figures (which also include hospital construction and the procurement of new and replacement medical equipment).

International Funding

In terms of international funding, there are project budgets available from the European Commission and the Structural Funds: Institutions in Wales have received occasional funding from the European Commission – such as the Bro Morgannwg (Wales) pilot. It took part in the eTen co-financed Better Breathing project which took place between 2007-2009. Funding is further available from the Structural Funds, 2007-2013, Convergence Funding, although not explicitly vis-à-vis eHealth.

Programme Funding

The national programme to develop new methods, tools and information technologies to transform health services for the people of Wales called "Informing Healthcare" was to receive £91 million over its first three years of operation.[61] This has been reduced to reflect actual needs in implementing eHealth applications, and major projects are subject to specific approval via the production of a Business Case. Recently, for example, the Welsh Assembly Government recently approved £12m for a new national Laboratory System.

3.7 Evaluation results/plans/activities

From a public policy perspective, evaluation is a key activity in the policy-cycle. It provides insights into the success or failure of a policy or project and leads to new policy goals and new methods of implementation. The need for evaluation of eHealth policies and projects has been stressed time and again by the EC, not least in order to further the spread of eHealth in the process of healthcare delivery.

[58] Informing Healthcare

[59] Independent Commission for Funding & Finance

[60] Independent Commission on Funding & Finance for Wales 2009

[61] Davies and Sayed

eHealth evaluation through pilot assessment in collaboration with research centres and universities

Welsh eHealth evaluation is mainly based upon the assessment of different pilots, issued by the programme implementing the "Informing Healthcare" Strategy.

One example is the Welsh Predictive Risk service and PRISM tool[62], **which** are being developed by Informing Healthcare working with Health Dialog (the organisation responsible for developing the Patients At Risk of Re-hospitalisation (PARR) and Combined Predictive Model risk stratification tools for the Department of Health, Health Solutions Wales, Primary Care Information Management and Technology, and Swansea University. The evaluation was undertaken by the pilot itself. Swansea University was closely involved. Its Centre for Health Information Research and Evaluation[63] (CHIRAL) often does work in collaboration with Informing Healthcare. The two entities are working together to create a world class Health Informatics Research Laboratory.

For example, in the School of Health Science at Swansea University, two academics (CJ Phillips and S Davies) were involved in the Evaluation of PRISM – a risk management tool for managing patients with chronic conditions. It was funded by Informing Healthcare (for the sum of £25,000) during 2007-08.

Further examples of evaluation activities include the International Advisory Group. The Group is an independent review body established by the Informing Healthcare programme and composed of top health informatics specialists from all over the world.

Each year the Group members are brought together at the International Advisory Group conference, where they put Informing Healthcare under the microscope and publicly peer review the programme's progress and achievements.

In 2009, the international experts said that "Informing Healthcare is on the right track". The Group's members were themselves considered to be "bringing the world to Wales".

Several organisations were involved in this process, rather than a single organisation. Among the institutions represented by international experts on the International Advisory Board were the Danish Centre for Health Telematics, Denmark; the Dutch National ICT Institute for Healthcare (NICTIZ), Netherlands; and the Science University of Victoria, British Columbia, Canada (Dr Denis Protti chairs the Board).

4 Outlook

The Welsh Informing Healthcare programme is not only one of the central facilitators of eHealth in Wales, but also an administrative component of the technical health system infrastructure. It aims for a national approach to such health initiatives as a single universal care record and the efficient use of existing structures in Wales. This practical and project-based structure leads to regional pilots, pilot assessment, within a level of

[62] PRISM is a software tool aimed at predicting people who are most likely to need emergency healthcare. Identifying people in the community most vulnerable to emergency hospital admissions can enable appropriate and effective early intervention from a community care team and so can prevent the distress and disruption to both the patient and their family caused by emergency admission. Informing Healthcare , http://www.wales.nhs.uk/IHC/page.cfm?orgid=770&pid=33635

[63] Informing Healthcare

national administration which oversees health service-wide applications: it thereby enables, supports and monitors progress on the country's strategy.

The Welsh approach embodies a flexible incremental strategy and ensures that the needs of both patients and health professionals are included. This can be seen in the major developments of the Welsh Clinical Portal, the Individual Health Record, My Health On-Line, and in the procurement of new national systems. In addition, social care services will be able to link to the national infrastructure.

Overall, the country's national infrastructure depends on several key facilities, such as the Public Sector Broadband Network and the National Data Centres, integration services such as the Messaging Fabric and Data Transport services, and enabling applications such as the Welsh Demographic Service (which in turn relies on information from General Practitioners' systems[64]) and the Enterprise Master Patient Index,

[64] SmartHealthcare.com 11/11/2009

5 List of abbreviations

CANISC	CAncer Network Information System Cymru
CHIRAL	Centre for Health Information Research and Evaluation
COPD	Chronic Obstructive Pulmonary Disease
DRG	Diagnosis Related Group
EC	European Commission
EEA	European Economic Area
EHR	Electronic Health Record
E-MPI	Enterprise Master Patient Index
EMR	Electronic Medical Record
EPR	Electronic Patient Record
epSOS	European patients Smart Open Services
ERA	European Research Area
EU	European Union
GDP	Gross Domestic Product
GMC	General Medical Council
GP	General Practitioner
HCP	Healthcare Provider
HL7	Health Level Seven International (authority on standards for interoperability)
HPC	Health Professional Card
HPC	Health Professions Council
ICT	Information and Communication Technology
ID	Identification (e.g. number, card or code)
IHTSDO	International Health Terminology Standards Development Organisation
IT	Information Technology
LSP	Large Scale Pilot
NHS	National Health Service
NICTIZ	The Dutch National ICT Institute for Healthcare
NMC	Nursing and Midwifery Council
OECD	Organisation for Economic Co-operation and Development

PACS	Picture archiving and communication systems
PARR	Patients At Risk of Re-hospitalisation
PIN	Personal Identification Number
PHS	Personal Health System
R&D	Research and Development
UK	United Kingdom
WDS	Welsh Demographic Service
WHO	World Health Organization

6 Annex

6.1.1 Annex 1: Compound indicators of eHealth use by GPs

Compound indicator name	Component indicators	Computation
Overall eHealth use	- Electronic storage of individual medical patient data - Electronic storage of individual administrative patient data - Use of a computer during consultation with the patient - Use of a Decision Support System (DSS) - Transfer of lab results from the laboratory - Transfer of administrative patient data to reimbursers or other care providers - Transfer of medical patient data to other care providers or professionals - ePrescribing (transfer of prescription to pharmacy)	Average of component indicators
Electronic storage of individual medical patient data	- A2a - Symptoms or the reasons for encounter - A2c - Medical history - A2c - Basic medical parameters such as allergies - A2d - Vital signs measurement - A2e - Diagnoses - A2f - Medications - A2g - Laboratory results - A2h - Ordered examinations and results - A2i - Radiological images - A2j - Treatment outcomes	Average of component indicators
Electronic storage of individual administrative patient data	- A1 - electronic storage of individual administrative patient	A1 value
Use of a computer during consultation with the patient	- B2 - Computer use during consultation	B2 value
Use of a Decision Support System (DSS)	- B3a - Availability of DSS for diagnosis - B3b - Availability of DSS for prescribing	Average of component indicators
Transfer of lab results from the laboratory	- D1e - Using electronic networks to transfer prescriptions electronically to dispensing pharmacists?	D1e value
Transfer of administrative patient data to reimbursers or other care providers	- D1a - Using electronic networks to exchange of administrative data with other healthcare providers - D1b - Using electronic networks to exchange of administrative data with reimbursing organisations	Average of component indicators
Transfer of medical patient data to other care providers or professionals	- D1c - Using electronic networks to exchange medical data with other health care providers and professionals	D1c value
ePrescribing (transfer of prescription to pharmacy)	- D1d - Using electronic networks to transfer prescriptions electronically to dispensing pharmacist	D1d value

Dobrev, Haesner et al. 2008

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