Policies and Provisions for Healthcare Informatics in Scotland and the Electronic Patient Record

Ian M. Thompson

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Based on a report compiled in April 2003 to meet the assessment requirements for the first unit of the MSc in Healthcare Informatics run by the Royal College of Surgeons and the University of Bath. This provides a summary of the status of Healthcare Informatics and the EPR in Scotland.

1 Introduction

This report will consider the topic of healthcare informatics and the electronic patient record from a Scottish perspective. Section 2 reviews current and future strategies for healthcare informatics for the National Health Service in Scotland (NHS Scotland) including a brief background of the political and economic situation (Section 2.1). The concept of the Electronic Patient Record as the linking structure between areas of Healthcare Informatics is discussed in Section 3.

2 Healthcare Informatics

Before going any further it is worthwhile looking at definition for 'what is healthcare informatics?' There are numerous definitions available [1, 2, 3, 4]. The most poignant definition from my own perspective is that of Rose [3],

> *"Medical Informatics is the field which concerns itself with information in Medicine, that is: attempting to understand how information is acquired, organized, retrieved, processed, and communicated in medical settings; developing tools to acquire, organize, retrieve, process, and communicate information better in medical settings."*

As a medical professional who spends around 25% of my time both creating and using clinical information (Audit Commission [5] cited in Taking Action [6]). I see healthcare informatics as being key to helping me use health data, helping to provide *"The right information at the right time in the right place"* [7].

2.1 Scottish Background

Health is a devolved issue in the UK, this allows for variation in health policy between the Holyrood and Westminster governments; As a result the strategy for information in the NHS also differs. In the wider health field an example of this is free nursing personal care [8]. In the informatics field this is demonstrated by the fact that the network infrastructure for NHSnet in Scotland [9] has advanced differently to that in England [10]. This is mainly due to differing polices on funding, such that in Scotland connection and equipment were provided free by the Scottish Office Department of Health (now the Scottish Executive Health Department), whereas elsewhere in the UK users had to provide their own equipment [9].

Identifying the Gross Domestic Product spent on health in Scotland is difficult, because of the way that North Sea Oil revenues are dealt with in the accounting process[1]. However, nearly 23% of Scottish government expenditure is on health and Scotland spends about 20% more per head of population on Health than the UK average [12]. Much of this is due to the differences in the way the health service in Scotland is organised with more nurses per capita and longer in-patient stays resulting from larger numbers of beds in long stay specialties (geriatrics, old age psychiatry, learning disabilities). Also there is a differing burden of disease in Scotland [13].

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[1]Scotland provides service and support for the North Sea Oil industry, but revenues are dealt with separately from other income streams and are accounted only at a UK level making it hard to get accurate GDP estimates [11].

2.2 Review of Healthcare Informatics in Scotland

In 1998 the Scottish Executive Health Department published *'Taking Action 1998-2002. A Strategic Framework for Information Management and Technology in the National Health Service in Scotland'* [6]. This described the vision of National Health Service in Scotland for Information Management and Technology (IM&T) over the following five years. Taking Action had aspirations to provide *"the right information under the right safeguards at the right place and time and using the right ways & means"*.

This was to be achieved though a number of priorities including

- IM&T support to good quality care.

- IM&T support to seamless care between primary and secondary care.

- establishing an universal patient index (UPI).

- maintaining strong confidentiality and security.

- building NHSnet as a secure health service telecommunications network.

- dealing with the 'year 2000' problem [14].

Considering achievement against these targets; in reverse order, both the last two have been achieved; NHSnet in Scotland now includes connections to all GP practices and NHS Trusts. Confidentiality and security has been addressed by the Confidentiality and Security Advisory Group Scotland report [15]. There has been progress towards establishing a national UPI and linking this with the various computer systems in use in GPs and Hospitals though this is not fully implemented [16]. Progress to the first two targets has been limited, seamless care between primary and secondary care is partially supported in some parts of Scotland for certain types of communication by the Electronic Clinical Communication Implementation (ECCI).

In April 2002 Derek Wanless produced a report [17] looking at the long term view for healthcare provision in the whole of the UK, including the devolved nations. One finding significant to healthcare informatics was that spending on information technology (IT) in the NHS UK wide should double. The Barnett formula [18] is used to determine the allocation of UK expenditure to the territorial departments (now devolved nations). This allocates approximately 10% of UK government expenditure to Scotland. Translating the impact of the Wanless report to Scotland, produced a £224 million increase in NHS spending, a similar doubling on IT budgets. The early impact of this is demonstrated by a recent Primary Care Circular (PCA(M)2003/2) [19], describing a programme to upgrade *all* GP computer systems.

From a central perspective the Scottish Executive Health Department is using the Performance Assessment Framework [20] to ensure the development of local IM&T plans based on the national IM&T strategy [6]. The aim being to recognise "the need to make substantial and collaborative investment in modern information systems and related services in support of *Our National Health* objectives" [20].

Our National Health [21] sets out a commitment to update the NHS Scotland strategic programme for modernising information management; and commits to investing £50 million a year specifically in Information Technology for 2000–2003. It outlines plans for integrated patient records, electronic transmission of prescriptions, and continues support for the ECCI project mentioned below; support to telemedicine projects for remote and rural areas. *Our National Health: Delivering Change* [22] (Section 4, Page 39) explains what has been achieved in the 2 years since the objectives were originally set; a draft of the strategic programme for modernising information management in the NHS is available; some progress has been made on electronic transmission of prescriptions and electronic clinical communication. (Section 4 Page 14 *Our National Health: Delivering Change*).

2.3 Strategies for Health Informatics in Scotland

Plans for healthcare informatics in Scotland are part of the NHS Scotland IM&T Strategy 2001-2005 described in "Strategy for Information: NHS Scotland National Strategic Programme for IM&T" [7]. Future aspirations are included in the new white paper to the Scottish parliament from the Scottish Executive, 'Partnership for Care' [23].

Strategy for Information, describes 21 national programmes for IM&T, there are 3 general headings for both local and national action;

1. **Support for direct patient care** (13 programmes) including local action on

   (a) an *unique patient identifier*, the Community Health Index (CHI) for use throughout NHS Scotland

   (b) *clinical information systems* which support clinicians and add to the development of Electronic Patient Records and Electronic Health Records.

   (c) *patient confidentiality* relating to security of information.

2. **Providing Information** (2 programmes) to deliver relevant and timely information to all health service staff and users.

3. **Supporting the necessary Infrastructure** (6 programmes) both in terms of technology and the staff required to support and maintain it.

Each programme [24] is designed to support local progress in the context of national policy; there are specific targets describing progress to be achieved by a specified date at either local or national level. In terms of healthcare informatics the key projects include;

Programme 1: Electronic Patient Records (EPR) and Electronic Health Records (EHR) Development of EPR and EHR systems and procedures for healthcare staff and patients to allow data consistency in communication between organsiations. This is still in relative infancy of producing framework [25] and draft policy [26].

Programme 3: Electronic Clinical Communications Implementation (ECCI) Aiming to provide electronic communication between primary and secondary care in 6 fields; outpatient appointment booking, electronic discharge and referral letters, clinical e-mail between primary and secondary care, online test requesting and result reporting, and improving shared care for chronic disease [27, 28]. Implemented differently through local projects in each health board area with widely varying levels of success in the 6 fields. Successes have occurred where there is involvement of stakeholders in existing administrative and clinical work practices. Problems arise due to lack of additional funding for equipment above existing IM&T budgets.

Programme 4: Telemedicine The Scottish Telemedince Initiative [29] supports various projects, including links between A&E departments and community hospitals providing emergency cover to remote and rural areas; use of videoconferencing for medical education; and pilots in Teledermatology in NHS Grampian and Teleradiology linking remote and island hospitals with a radiologist (Fort William, Orkney, Shetland).

Programme 5: Electronic Transmission of Prescriptions (ETP) Electronically connecting GPs and community pharmacists and the Common Services Agency (CSA) for prescribing, dispensing and reimbursement of prescriptions; achieved through use of SCI Prescriptions. NHS Ayrshire and Arran has progressed the pilot with relative success [22].

Programme 10: Scottish Care Information (SCI) SCI aims to develop and make available the necessary technical components and standards. SCI [30] includes various products for stand-alone or integrated use, including

SCI Outpatients managing outpatient appointments and clinics.

SCI Store providing a repository for laboratory results and other information from legacy systems.

SCI Gateway aimed to be the national platform for electronic communication for clinical messages (referral or discharge letters)

Unfortunately SCI products have been dogged by technical failures and practical implementation problems, possibly as a result of concentrating on the what technology can do rather than modeling and improving the existing clinical (paper) systems involved and there has been only limited take up of them as a result. SCI has also contributed to the creation of XML [31] standards [32] and the use of Scottish Health XML standards [33]

Other relevant programmes include those for health promotion information and websites for the public (SHOW [34], HEB-SWEB [35], and NHS24 Online [36]). As well as support for public health and clinical governance through the Information and Statistics Division [37].

This demonstrates a clear commitment at a Scottish national level to healthcare informatics, from EPR through to population level information, to provision of health information to patients via on-line media. Within this national context it has been recognised that to achieve real progress action must occur at a local level and have a degree of local ownership and involvement, so programmes have both national and local action to be achieved.

Partnership for Care [23] details a wish to promote an e-Health Culture driven by clinical leaders aiding the provision of "the right information at the right time". Chapter 5, *Partnership Integration and Redesign*, mentions intentions to use telemedicine to support managed clinical networks; the use of NHS 24 [36] to provide health advice and information to the general public. Chapter 6, *Empowering and Equipping Staff*, discusses an Integrated Care Record "jointly managed by patients and professional NHS staff" and describes plans to establish "agreed data sets and codes to be used in all exchanges so that information is correctly interpreted by everyone who shares it". It is proposed that "Standardisation of definitions and integration between data sets will be clinically-driven in future to ensure that NHS Scotland's information systems support national clinical priorities." This commitment to clinical involvement will prove key to the success of wider use of informatics within NHS Scotland.

Importantly there are a number of specific projects, such as online access to laboratory tests and radiology images, e-Pharmacy, mentioned in the white paper that must be supported by NHS Scotland information and communication systems. The aim is to reduce the time spent searching for information so helping relive pressures on healthcare staff. The inclusion of these issues in a government white paper illustrates the political support behind healthcare informatics development in Scotland.

3 Electronic Patient Record

To consider the Electronic Patient Record (EPR) or more generally the Electronic Health Record (EHR) as linking structure between all areas of informatics, it is worth first considering some definitions. An EPR can be described as "*a dynamic collection of messages, held electronically, created by healthcare professionals principally to inform themselves and others about the provision of healthcare of an individual patient*" [25], one individual may have multiple EPR with various healthcare providers, as with paper based records at present. The EHR is a longitudinal cradle to grave record of relevant care and health issues for an individual patient. i.e. complete, life-long unlike an EPR which is by nature episodic.

Figure 1 illustrates how EPRs, and specialty based clinical information systems could interconnect to produce the (summary) EHR. Detail stored the source systems and can be requested if required. The key feature in this web of connections is the principle of "enter once use many", though this must include appropriate confidentiality and security considerations to protect inappropriate access to sensitive patient data.
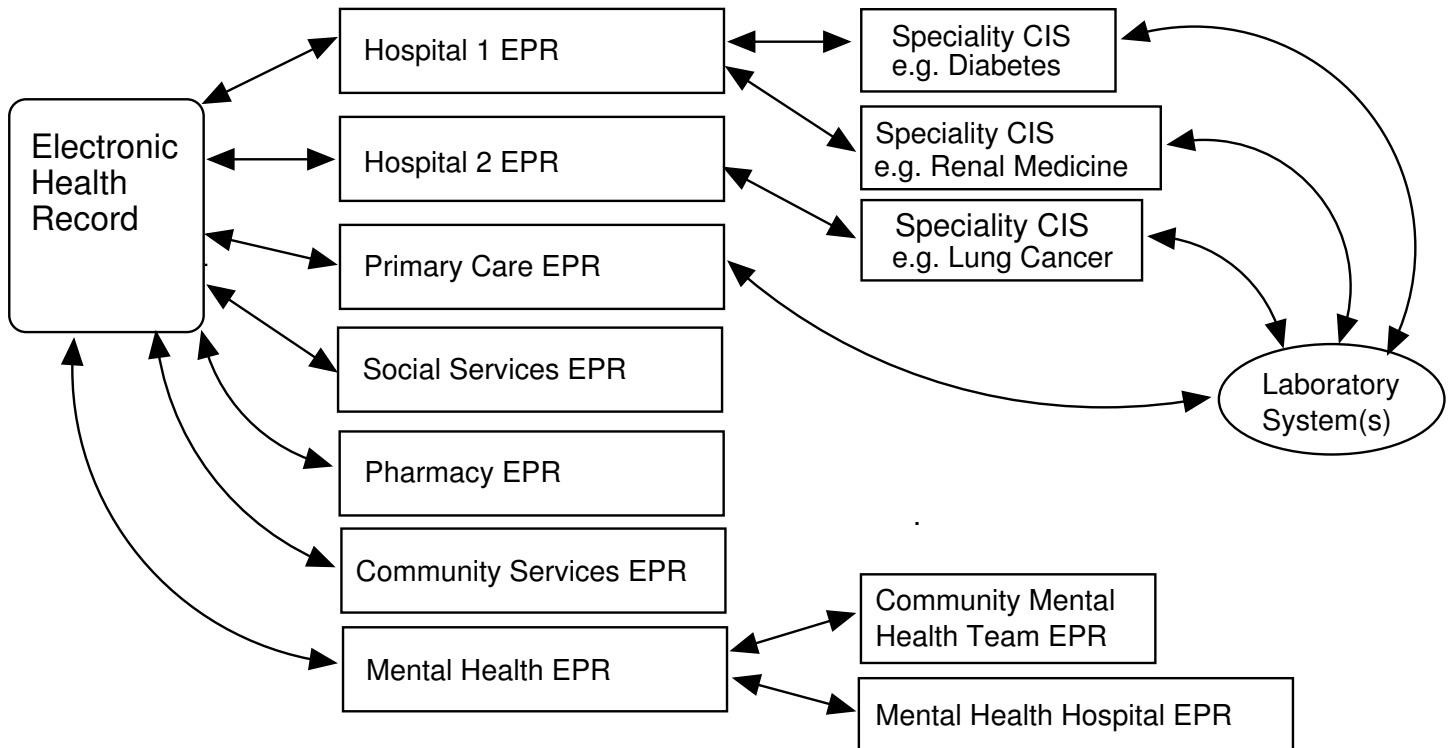

Figure 1: **Electronic Health Record** Diagram illustrating linkages between the various Clinical Information Systems (CIS), various service/institutional Electronic Patient Records (EPR) and the Electronic Health Record

As outlined in Section 2 healthcare informatics concerns itself with health information flows, both in relation to patient based data and research based evidence and other guidelines. The EPR and in the wider context the EHR forms the key to linking many of these flows together [38], through a patient centered approach. Starting at basic elements of informatics such data quality, clinical coding, master patient indices, security and confidentiality, which are essential to the foundation of electronic records. Through more complex systems of clinical patient systems, electronic order communications, electronic referrals and discharges, to the high level decision support systems, including expert systems, knowledge mining, context based clinical guidance and evidence to full blown multimedia applications of telemedicine, including remote patient monitoring and videoconferencing (which can provide specialist input in remote localities). Electronic records hold the data which is needed for these process of healthcare informatics to occur. The description by Cheung *et al* [39] of "the state of the art in the Hospital Authority" provides practical description of how healthcare informatics is used in EPR development.

3.1 Scottish Electronic Patient Record Implementation

In practical terms EPR implementation in Scotland is relatively limited, there are a few paperless GP practices across the country (mostly not using the national GPASS product), most hospitals only have independent departmental and administration systems (English NHS "Level 1 EPR") [38]. A framework [25] and draft policy [26] have been created and EPR/EHR are amongst national IM&T programmes [24]. However, despite limited progress to date, the philosophy behind

the strategy could lead to success. The SCI philosophy[30] is one of "middle-ware" between legacy systems, a very practical approach building on existing technology rather than trying to replace systems wholesale. As mentioned in Section 2.3 SCI has contributed to the development of XML standards for health data communication, paving the way for their future use in electronic records. Similarly Scotland should be well placed to implement electronic records having a national GP system (GPASS [40]) with nearly 80% market share.

Unfortunately despite this potentially good position success has not been forthcoming, recent independent reviews of GPASS [41, 42] provided significant criticism of the clinical functionality and ownership of the GPASS system, though there were some strengths identified (appointments interface and "free" end user cost). In it's response [43] the Scottish Executive Health Department looks to build on the strengths of the system and urgently address the significant shortcomings identified.

The challenge for the future of EHR/EPR is to develop systems that support clinicians in their working practices, rather than based purely on technological capabilities. To achieve this there must be good clinical functionality and clear clinical involvement through ownership and leadership at both local and national levels of the various interlinked programmes (GPASS, XML, SCI, ECCI) which are gradually building the EHR/EPR in Scotland.

4 Summary and Conclusions

Scotland has clear NHS and governmental level priorities in Healthcare Informatics. It should be well placed strategically to implement EPR and EHR. However, performance to date has been patchy and limited (ECCI, GPASS); there is an apparent commitment to tackle this situation through investment in basic infrastructure and clinical involvement.

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