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Implementation of EHR/EPR in England: a model for developing countries

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Abstract

This article reviews the electronic health record and electronic patient record in England, which is being implemented at present. This is one of the biggest projects of its kind and facing many different issues at various levels. There are many lessons to be learnt from this experience for countries and organisations that plan to follow in their footsteps.

Keywords: Electronic health record (EHR), Electronic patient record (EPR), England, National Health Service (NHS), developing countries.

Introduction

One of the objectives in the care of a patient is to have continuity of care. Every time a patient is seen in a clinic or offered help by social services or admitted to the hospital, the first question is what is wrong with him/her? Is this something new or an old problem? What happened last time? Are there any concurrent problems? Many a times our or patient's memory fail to answer the question in a precise manor. Many details and important information are lost, and many a times the whole process of investigation and diagnosis is to be repeated again with waste of time, money and effort.

The progress in medical science is in step with the progress in other fields; especially the developments in the field of computer science have influenced it in a big way. I will not be wrong to say that in this age of information, medical care needs computer technology and in future will only thrive if healthcare staff is at ease and at same pace with the progress in computer sciences.

National Programme for IT

Before any further discussion, it is important to define terms, Electronic Health Record (EHR) and Electronic Patient Record (EPR). "EPR refers to a record of periodic care, held by a single provider about a single individual and is patient centric"[1] [2], where as EHR refers to "The fully integrated record of the patient's complete medical history," [2] NHS describes it as "the concept of electronic longitudinal collection of patient's health and health care – from cradle to grave."[1] EHR combines information from different care settings held in different systems and in some instances aggregates the data and shows them as a single record.

It was in 1957, British Computer Society was established. [3] In September 1998, the Department of Health (DoH) strategy document 'Information for Health' committed the NHS to lifelong electronic health records for everyone, with round-the-clock, on-line access to patient records and information. [4] National Information Authority (NHSIA) was established in 1999 by an Act of Parliament, it merged all the IT and information bodies. Later in 2002, National Programme for IT (NPfIT) was announced by Department of Health (DoH) and NHSIA was replaced by NHS Connecting for Health (NHS CFH) in 2005, with the responsibility to deliver the programme.[4],[5]

The strategic vision for NPfIT is to have a single, centrally mandated electronic record by 2010 [4] and to bring together 30,000 General Practice surgeries (GPs), 300 hospital and other agencies involved in patient care.[5]

NPfIT is tactically divided into sub programmes; NHS Care record Service (NHS CRS), Choose and Book, Electronic Transmission of Prescriptions (ETP), National broadband IT network for NHS (N3), Picture Archiving and Communications Systems (PACS), IT supporting GPs including Quality Management and Analysis System (QMAS) and systems for GP to GP transfer of records (GP 2 GP) and finally a communication network NHSmail.[4],[6]

The Spine is a national database for NHS CRS and is divided in to three parts; The Personal Demographics Service (PDS), The Personal Spine Information Service (PSIS) and The Secondary Uses Service (SUS).[4],[7]

These parts are interlinked by; The Transaction Messaging Service to allow clinical messages from

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NHS CRS users to be securely routed to the service and to manage the response to their requests, the web-based Clinical Spine Application to provide healthcare professionals with access to the NHS CRS to access patient information provided by the PDS and the PSIS, the Spine User Directory and Spine Accredited Systems are Services to ensure that transactions/messages are only processed from authorised users and systems - a key component of the security of the Spine and a Access Control Framework (ACF) to registers and authenticate all users. ACF will provide a single log-in and a record of each healthcare professional accessing a patient's NHS Care Record.[7]

PDS is the central and single source for patient demographic information, such as NHS number, name, address and date of birth. PSIS is central database containing clinical records for each NHS patient and provides an up to date summary of information and key events in a patient's life and care – drug allergies, operations, conditions, medication history – as well as details of contacts with care providers. When current treatment generates essential information for continuing care, such as discharge information or notes of visit to a walk-in centre, specified summary information is added to the PSIS record. In this way the person based PSIS record gives information to, and receives it from local systems as the patient experiences healthcare. SUS will provide timely, anonymous patient data and other information for purposes other than direct clinical care. This includes looking at public health trends, analysing the effectiveness of treatments and planning the number of beds and staff the NHS needs. SUS will support a number of national initiatives, the first being Payment by Results, a key government initiative which is changing the way money flows through the NHS.[7]

The Spine will also provide support for Choose and Book programme and EPT. The new electronic booking service, Choose and Book allows GPs and other primary care staff to make initial hospital or clinic outpatient appointments at a convenient time, date and place for the patient. GPs will access the NHS CRS via the Spine to retrieve and update patient records as part of the booking process. Hopefully this will remove the lengthy wait between visiting the GP and receiving an appointment from a hospital. Patients will be able to choose and book appointments with one of four or five hospitals or other healthcare providers, commissioned by their Primary Care Trust (PCT). ETP will allow prescriptions generated by GPs to be transferred electronically from their surgeries to pharmacies; GPs will send prescriptions to the Spine to make them available for dispensing. At the same time, prescribed medication details are added to patient's electronic records held by the NHS CRS. The pharmacist will obtain the electronic prescription from the spine via the pharmacy's computer system. Once the pharmacist has dispensed the medicine or appliance, a message will be sent back to the Spine, recording what has been dispensed to the patient.[7]

The vast network will be provided by N3, the new national network for the NHS in England. N3 is a broadband service, provided by BT plc, and it replaces NHSnet, provided jointly by BT and Cable & Wireless, which formally closed in March 2007. [4],[8]

Organisation of EPR at hospital trusts is at six different levels;[1] Level 1 is Patient Administration System (PAS) and Departmental Systems, level 2 is integrated patient administration and departmental systems, level 3 is clinical activity support and noting, allowing doctors to order a clinical investigation and receive lab results, X-rays and other investigations, Clinical Information Systems (CIS) and Picture Archiving Communications System (PACS) are part of it.[9] Level 4 is clinical knowledge, decision support and integrated care pathways, computer system have an intelligent input into the patient care, like preventing prescribing a medicine to a patient who is allergic to it,[9] level 5 is advanced clinical documentation and integration and level 6 is full multi-media EPR on line. These levels are being gradually introduced to the hospitals, and most hospitals in England are at level three of EPR. [1]

Presently an in depth evaluation programme is being conducted by University College London by a Ministerial Taskforce at selected sites in England, called Early Adopter Programme.[10] The taskforce comprises representatives of organisations, including clinicians, hospital managers, patients and ambulance services. The idea is to create one logical record of all information about a particular patient. Parts of this record will be held in local databases and parts in the national database. The record will be known as the Summary Care Record (SCR). Five, Early Adopter Site in England are taking part in this exercise. In these PCTs, GP surgeries have Book and Choose and EPT options available to the patients, as these patients continue to receive treatment, supplementary details are added to the SCR, with patient's agreement, thus building up the record.

Benefits and challenges

Once complete, NPfIT promises lot of benefit for patients and healthcare organisations.[7], National Audit Commission reported in 2000 "NHS spends £3.6 billion in medical negligence claims a year". [11] The Audit Commission report, 'A Spoonful of Sugar' estimated "1,000 deaths annually are caused by medical errors - most notably by clinicians not having the right patient information at the point of care".[11] The report concluded "The use of modern computerised systems could save 75% of these lives."[11] The Audit Commission also concluded "Clinicians spend over 25% of their time finding, recording and communicating information, mainly on paper. A saving of just 10% of clinical time spent on patient administration could release circa £6 billion per annum to be re-invested in patient care."[11] The average acute hospital in the UK spends circa £8 million per annum pushing paper around the organisation. Modern computer systems can reduce this inefficient paper chase to a minimum and provide the electronic case notes at the point of care. [11]

Before any promised benefits can be reaped, there are many difficulties and problems which need to be sorted. On its inception, the programme for

England was suppose to be £ 2 billion, it is now estimated that its price tag is going to be up by 440% to 770% of original estimated cost. [5] Then, the computer technology is constantly changing, what is state of the art today, will be out dated very soon, the cost of this change in technology will be high and difficult to keep up. Constant technical vigilance and training will be required as time and technology changes.

The ownership, control and consent for data are big issues. It is very import to clearly define the consent procedure for this data and its commercial and political use, new legislations will be needed to prevent abuse of data by people in power or with commercial interests.

Majority of the population is not ready for any national ID card, will they accept a NHS card with equally important and relevant information as it is proposed for national ID card. Will people have the faith in the system to reveal every detail about their life or will they withhold the information and have the right to do so? All this information may affect their future insurances, mortgage, jobs and many other things in their life. Data about minors, patients in coma, mentally handicapped and vulnerable individuals will need special handling and legislation about the authority to access their data and for how long and for what purpose?

The data itself is complex with inherent difficulties; it will be a very large database of over 50 million people, it will be part fixed and part changeable, with dynamic elements. It will be a mammoth task to keep it updated, maintained and working all the time. The problem of illegal immigrants, visitors and temporary worker in the country will need a consideration as how to get their data and what to do with it once the person is out of country? Private hospital with foreign patients will need separate consideration.

The important thing to remember is, all good things come at a price, some time compromises have to be done, and old systems and procedures have to give way to new thoughts and new processes. Attitudes have to be changed and behaviours need to be modified with new knowledge. What it really needed at this point is to work on public awareness and education, as the system is being installed. The healthcare workers need to be trained for this change in the system and supporting bodies and relevant schools/colleges need to include this aspect in the curricula to prepare the next generation of healthcare workers who are competent to use this technology effectively. At present, the whole programme is very difficult to comprehend; it will take time for the people to fully grasp the idea and understand the details and then to have trust and faith in it. The project is one of the biggest of its kind and very ambitious and I believe the success resides in simplicity. There is a need to devolve the programme to a local level, yet keeping the compatibility and interconnectivity at the heart of the programme. The easier solutions will be to break it down in to small regional programmes at PCT level, linked to Strategic Health Authorities (SHA) rather than three or five regional programmes. [12] Each SHA should have a completely independent database but compatible with nationwide programme, so that the information about any patient can be stored locally and when needed may be provided in different regions or authorities.

Lesson should be learnt from other organisations like online banking. Online banking is a good comparison, banks deals with equally sensitive and confidential information and the population base is the same. The customer service of UK banks is exemplary and many things can be learnt from their experience of going online.

The benefits of EHR/EPR are well established. It means that the patients have more choice and less waiting time, the clinicians save time and have instantly available information on past history, concurrent problems and relevant information, thus ensuring safe, efficient, consistent and continuous healthcare for the patients. Health systems save time and money by stream lining the system, cutting down on repeat prescription and pilferage of medicine with no unnecessary repeat investigations or wasted clinical sessions and episodes, fewer errors and less medical negligence cases.

Lessons for developing countries

England and other developed countries have reached the present state of healthcare informatics after nearly half a century of effort and development. They have gradually developed the technology and technique over a period of time. Not only this, they have also developed the culture and social values for information science and systems to flourish. The developing countries do not need to invent the wheel again, but must join in 'now' to share and contribute their achievements to the new global village - intimately tied together by information technology. They really need to begin their journey as soon as possible. Their way will be much shorter if they follow in the footsteps the right way.

As we can appreciate the numerous benefit of the healthcare informatics, there are many difficulties encountered by the English system which may be avoided by the developing countries.

English model is very well designed and excellent in detail, but when I see the enormity of the task; I tremble to see it lagging behind in time and unbearable sky high financial figures. This will not be possible for any third world country to follow easily. What they need to do is to have a 'Lego' like structure instead of one monolithic grand design for the IT system. Each unit can be developed individually and complete but at the same time fully compatible with each other. To make this work, the need will be to develop 'standards' for the information system which must be met by any vendor or health care facility. These 'standards' will make sure that the information systems are compatible and fulfil the requirements of the organisation and fit into the strategic vision. The advantage for such system will not only be that it will develop step by step in a controlled way but also that when it comes to repair or change of technology in future, which is bound to happen, each unit will be independent and can be dealt with in isolation. The financial costs will be bearable and private sector will also be able to contribute. Another area developing countries need to work hard is to prepare the work force. They need to introduce healthcare informatics in all the health related institutions as an essential subject. An atmosphere of trust and confidentiality has to succeed along with necessary legislation. Public awareness need to be raised and transparency with freedom of information need to be introduced. All these measure will be the rich soil in which the healthcare informatics will blossom, not by buying the latest technology from the west!

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