

# The EMR Xchange (EMRX) and Beyond

By A/Prof Goh Lee Gan

The SMA Convention this year focuses on the Electronic Medical Records Xchange (EMRX) that has been launched between the two healthcare clusters in April this year. Titled "**Seamless Healthcare with EMRX**", the Convention is scheduled for **Sunday, 25 July 2004**.

## THE FORTHCOMING SMA CONVENTION PROGRAMME

The Convention programme will examine the electronic highway for healthcare delivery from the perspectives of the EMR Xchange, making EMRX work for doctors and patients, and issues and solutions of consent related to EMRX. This will be followed by a discussion and debate about the dilemmas revolving around EMRX, and a question and answer session.

### What Constitutes Electronic Medical Records?

One definition of Electronic Medical Records (EMR) is simply a repository of clinically pertinent data that may be accessed and searched with relative ease. From a practical perspective, most of us would be extremely content with something easily learned, easily understood, and relatively inexpensive. The most useful EMR have what is commonly referred to as a clinical workstation, where summaries of clinical data and information are accessible from a simple, character-oriented display (Bergeron, 1998)<sup>1</sup>.

### INTRODUCING THE EMR XCHANGE

The Ministry of Health (MOH) conducted a briefing on the EMR Xchange, to the Singapore Medical Association on 10 March 2004. The following are the salient points.

#### What is EMR Xchange?

EMR Xchange is a new computer platform that connects the EMR systems of the two clusters. This allows the doctor treating a patient at a particular hospital or polyclinic to view the EMR of the patient that was created in hospitals of the other cluster. For a start, EMRX will only share Hospital Inpatient Discharge Summaries (HIDS) between clusters, and will only be available to doctors working in the two public sector cluster hospitals. In the long term, EMRX will permit sharing of other information such as laboratory and radiology results.

Plans are also in the pipeline to extend this sharing platform to doctors in the private sector (hospitals and GP clinics). MOH envisions EMRX as the first step to the creation of a genuine National Medical Records System for Singaporeans.

#### Benefits

EMR Xchange is the result of the understanding of the two clusters and MOH on the benefits of having a system for



sharing EMR between healthcare institutions. The benefits of such a system are:

- Better coordinated care for patients moving across different providers (for example, specialists from different disciplines) and levels of healthcare delivery (for example, from the GP to the hospital to the nursing home).
- Better clinical decisions with complete and legible clinical histories and up-to-date test results at the providers' fingertips. The risks of transcription errors and missing records are reduced.
- Cost savings through the avoidance of unnecessary repeat tests/ investigations.
- Better siting of care, for example, patients with conditions that can be effectively managed in a community setting can be discharged from the hospital specialist outpatient clinic and followed up by the GP.
- Facilitation and support of other IT-based applications such as electronic prescriptions and clinical decision support systems.
- Potential for 24-hour access to real-time data for up-to-date results reporting.
- Provision for data security and audit features to be built into the system.

#### Key Features of EMR Xchange

MOH plans to progressively implement EMR Xchange over the course of 2004. The first phase is the sharing of Hospital Inpatient Discharge Summary (HIDS) among public hospitals by April 2004. The list of information items to be shared will be expanded to include Outpatient Discharge Summaries, Polyclinic Discharge Summaries, laboratory test results and radiology reports. EMRX will run off the existing EMR systems in the hospitals, where there is already a provision for record sharing among the various hospitals within the respective clusters.

**Safeguards:** Currently, doctors are already bound by a code of conduct to respect and protect patient confidentiality. On top of this, individual institutions do take additional steps, including putting in place internal rules and checks, to ensure that their medical staff maintain patient confidentiality at all times. Extra safeguards are in place for sensitive information,



**About the author:**  
A/Prof Goh Lee Gan is an Associate Professor of Family Medicine, in the Department of Community, Occupational and Family Medicine in the National University of Singapore. He teaches public health and family medicine.

such as those relating to sexually transmitted diseases and psychiatric conditions. The input of the Singapore Medical Council has been obtained regarding the impact of EMRX on medical practice.

**Guidelines:** In preparation for the rollout of EMRX, Singapore Health Services (SingHealth) and National Healthcare Group (NHG) have drawn up guidelines detailing the policies and procedures for data protection and patient confidentiality within their respective clusters / institutions. These guidelines address various aspects including access controls, staff training and declarations, access audits and monitoring, as well as disciplinary processes for breaches of confidentiality. MOH is in the process of seeking the National Medical Ethics Committee's (NMEC) views as to whether these guidelines would adequately protect patients' rights to have the privacy and confidentiality of their medical records preserved by their healthcare providers.

**Public education programme:** A public communications campaign will be conducted with the launch of EMRX to educate the public on the benefits of EMR sharing and their rights as patients. The campaign will highlight all the measures that will be implemented to check for abuses, and reassure the public that the confidentiality of their records will not be compromised by the implementation of EMRX.

### What Security Measures does the EMR Xchange System have in Place?

Hospitals have implemented security measures to ensure that EMR are only seen by authorised persons. These are:

- Computer systems handling EMR will only allow access to staff with the right level of clearance. For example, a nurse will have different access rights from a consultant.
- All staff are informed of legitimate uses of EMR, as well as their responsibilities for ensuring the security of the system.
- All accesses to EMR are tracked in an audit log. Active monitoring systems are in place to detect illegitimate access to patient records.
- EMR are digitally signed to ensure that they are not tampered with during transmission.

In addition, to ensure the security of EMR transferred across hospitals, the following measures have been implemented:

- EMR is transmitted over a secure network, and only authorised computers are connected to this network.
- Only requests for EMR from legitimate computers will be processed.
- EMR are digitally signed to ensure that they are not tampered with during transmission.

All staff are also legally bound by the Computer Misuse Act, and professional codes of conduct not to misuse EMR.

### Enabling Factors

The enabling factors for EMR Xchange are information technology (IT), the implied consent model, and the presence of sensitive information safeguards.



**Information technology:** Significant progress has been made in recent years in IT adoption in the healthcare sector to improve work processes and increase efficiency. SingHealth has put in place integrated IT systems and infrastructure, including EMR, e-prescription and other decision support systems across the cluster. NHG is implementing similar systems across their institutions. Technological advancement now allows us to link up different institutions' systems that are on different platforms, without high cost implications.

**Implied consent model:** The adoption of the "implied consent" model, instead of the "expressed consent" model, is important from the legal standpoint. This is elaborated below.

**Sensitive information safeguards:** Most information will be made available on EMRX. However, three types of information will not be shared. They are: (1) information about termination of pregnancies; (2) HIV positive status; and (3) information about mental illness.

### Implied Consent Model

Many in the healthcare industry – administrators and healthcare professionals alike – treated access to patient records for research and treatment as one issue, and took the position that a patient's expressed consent was required before his records could be accessed. Such an "expressed consent" model is unwieldy. It would pose significant operational difficulties for healthcare institutions, including the need to put in place an entire administrative system to gather, store and organise the hard copy consent forms. Given the large patient base of public hospitals, these would add to costs and processing time, and result in an unwieldy system for a nationwide initiative.

The view of NMEC is that present-day healthcare delivery depends critically upon adequate and accurate information flow between healthcare professionals and institutions.

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NMEC had concurred that patients should accept that in order to receive maximum benefit from the healthcare system, they would have to allow the healthcare institution to store and share their medical information with the necessary providers. It was also agreed that an “implied consent” model is acceptable, but the healthcare institutions should ensure adequate data protection measures are in place, and inform their patients how their medical information would be shared, and the safeguards that are in place to protect confidentiality and prevent any misuse of information.

There is a precedent on the “implied consent” model and safeguards in other countries. Canada and Australia have already implemented EMR sharing based on implied consent. Australia, for example, has introduced several additional measures to address privacy concerns, such as requiring doctors to reaffirm their commitment to uphold patient confidentiality in the form of an annual declaration.

The advice of the Attorney-General’s Chambers (AGC) on the legal position on EMR in relation to patient confidentiality and privacy is as follows:

- Under the paper-based system, a patient’s expressed consent need not be sought for the creation and access of his medical record by his attending doctor. The expectation is that the doctor would strive to provide the best treatment possible, and the patient’s consent for the doctor to access his medical records, necessary for the treatment process, is implied through his act of seeking treatment. The principle of functional equivalence applies, and so, the creation and storage of medical records in electronic format should not be treated differently from paper-based records, that is, it is not necessary to take expressed consent for EMR.
- Implied consent does not remove or diminish the obligation of all doctors, who have access to patient information, to protect the confidentiality of the information, and use it in a responsible and appropriate manner for the sole purpose of treating their patients.
- Access to and use of patient information for treatment, is distinct from research purposes. The legal issues pertaining to the use of patient data for research, which rightfully requires a patient’s expressed consent, should be dealt with separately.

### **BEYOND THE EMR XCHANGE**

The EMR Xchange has made it timely to revisit the progress in the development of EMR and identify how progress can be made to serve doctors and patients. The hold-up is no longer technological. Once, we clear the roadblocks, there is nothing stopping every doctor and patient from having the most up-to-date medical information for decision-making.

### **Technological Developments**

The electronic medical record has been around for no less than forty years. The initial version was no more than electronic text

on the computer. The capability of “windows” on the computer screen in the 1990s opened a new vista of innovation. Information can be obtained from different “windows”, which can be opened or closed at will. Now, with dictionary look-ups, there is no need to type in diagnostic labels, drug names and other frequently used information; just click and the desired information will be retrieved. These innovations will reduce typographical errors and save lots of time.

Furthermore, storing medical records in a database format allows sorting and selection by specific characteristics, such as name, date of visit, tests ordered to be done, and the necessary set of records will be retrieved in no time.

The inexorable and quantum leaps of electronic storage space being made available means that more and more information can be stored in very small objects. It is highly possible to store one’s medical records, including pictures and scanned documents, in a credit card size card, USB memory stick or similar devices. What is more important is that readers of such devices are now standard hardware, so the infrastructure needed to implement a patient held portable computer record is eminently possible.

The development of the ability to scan documents in readable formats both to the human eye and machines such as the XML (Extensible Markup Language) format means that a truly paperless record is possible. If you want an ECG report to be part of the medical records, just digitalise it in XML and it can go into the medical records. Photographs can be treated the same way. Heart and lung sounds can be digitalised too and stored in EMR. It is truly amazing.

XML is a critical enabler to type healthcare e-records together. It provides a standard architecture that allows one to include text, numbers, metadata, and explanatory materials – as well as X-ray images, electrocardiograms and voice recordings. Since other standards bodies are dealing with XML, the healthcare community, including HL-7 (Health Level 7) and CDISC (Clinical Data Interchange Consortium), can use it without having to reinvent the wheel.

### **Clearing the Roadblocks**

There are many roadblocks. However, they are slowly giving way to solutions so that the real potential of the EMR and the EMRX can await mankind. And, of course, the security and authorisation checks must be imposed to ensure confidentiality and privacy of information.

**Common data standards:** The first roadblock to clear is the agreement on common data standards and formats so that the different hardware systems can share information. The world is working rapidly to standardise these data standards. Two key standards bodies in healthcare are the HL-7 and CDISC. Both are non-profit. HL-7 focuses on its Clinical Document Architecture (a standard for clinical vocabularies) and on developing data standards for clinical trials. CDISC is committed to the development of industry standards to support the electronic acquisition, exchange, submission and archiving of clinical trials data for medical and bio-pharmaceutical

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product development. (Source of information on data standards: <http://www.DCLab.com/atmshealthcare.asp>)

**Working with vendors:** In order to help doctors acquire cheaper EMR solutions, the American Academy of Family Physicians (AAFP) initially embarked on the idea of open source systems where the source codes are available for modification by the users in 2003. However, this has fallen through, and the AAFP will not be developing their own open source EMR, nor doing so in concert with other medical specialty societies as was the plan initially. Instead, it will be working with many different vendors, the government, health plans, and national IT firms, to help create a breakthrough in price, service, and standards that will make it possible for family physicians and others to acquire and use this technology in their offices for the first time. They will also be making additional AAFP resources available to their members to assist them in selecting, implementing, and making good use of EMR.

**The continuity of care record:** One innovative thinking of EMR is the continuity of care record, or CCR. This is an XML document standard that will contain a core set of health information on each patient – problem list, medications, allergies, and so on – which will be capable of being imported and exported from a number of vendors' software products, or carried by a patient on a smart card, USB memory stick, or via secure email attachment.

Think of CCR as a referral document, "fact sheet", or mini-medical history, which can be read by a universal reader, an internet browser, in PDF file format or in Microsoft Word 11. The standards under development is the CCR document standard, which the AAFP is co-sponsoring with ASTM, the Mass Medical Society, HIMSS, and others. Several EMR vendors have already agreed to use CCR as the first step in EMR interoperability.

CCR can become a record that the patient holds, and it can be transferred into the EMR system of his or her doctors. So, until national EMR systems are set up, CCR may well be the way into the future.

CCR can be designed to plot graphs, so that the patient can see for himself or herself, the pictorial representation of blood pressure control, blood sugar control, cholesterol control and even BMI, the components of the deadly quartet or the metabolic syndrome. Pictures speak louder than words. The real understanding that moves behaviour to control these four deadly fiends is not far away.

**Steps in EMR development:** Even when the software is available and affordable to clinics and hospitals, the roadmap towards EMR needs to be understood. There are several steps in the process. Start with the capture of basic information and the receipt of CCR information. Go through the four phases of computerisation of: (1) evaluating clinic needs; (2) specifying requirements; (3) selecting a computer system which works; and (4) working out an implementation timetable, which includes training of staff and testing out the system. Once the basic system is up, one can work towards a paperless system with the capability of digitising documents, pictures and sounds. By then, the electronic highway will be ready for sharing information of patients, if needed. ■

## KEEP THE DATE

So, please keep the date **Sunday, 25 July 2004** free. Participate in the **SMA Convention** on "Seamless Healthcare with EMR Xchange".

### References:

1. MOH. *Data protection policies and procedures for exchange of electronic medical records (EMRX) between clusters. 10 March 2004 (Briefing paper).*
2. Bryan P. Bergeron. *Can electronic medical records really achieve information sharing? Postgraduate Medicine July 1998, 104:7.*