Electronic Health Records:
A Global Perspective

Overview

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INTRODUCTION

Healthcare IT is a sleeping giant. Although healthcare budgets contribute to the bulk of worldwide industrialized government spending, healthcare information technology lags far behind other global IT businesses including banking, telecommunications and the media.

Local and countrywide efforts to implement electronic health record (EHR) systems have been intermittently reported. The common threads, however, that link these efforts and how they contribute to the success, barriers or failure of implementation have not been identified. These threads can be compared to similar efforts within the U.S. In the final analysis we can explain why the U.S. lags behind other industrialized countries in the implementation of EHR, what constitutes those gaps, and how we can avoid some of the mistakes while capitalizing on the success of other countries' efforts.

The HIMSS Global Task Force investigated a battery of EHR components within each country, including security, quality, financing sources and barriers. Four common threads that hinder EHR implementation and produce a kinship between every effort around the globe were identified. These are: Communication, Standardization, Funding, and Interoperability.

The need to harness and deploy this information is readily apparent. It can be used to predict the future success of efforts to imbed IT into the world of healthcare whether those efforts are parochial, countrywide or global.

FUNDING

Funding for healthcare IT can be through national or local governments, the private sector, or combinations of both. Canada Health Infoway, for example, an independent not-for-profit corporation, leads the national effort with all 14 federal, provincial and territorial governments as shareholders. By 2003, the government of Canada had invested $1.2 billion in Infoway and by March, 2007, Infoway will have committed more than $1 billion in co-investment within the jurisdictions.

Australia's national approach combines both centralized and decentralized components to create an interoperable electronic health information infrastructure. Building on their experience from Health*Connect*, the Council of Australian Governments created the National E-Health Transition Authority (NEHTA). NEHTA is a not-for-profit company limited by guarantee and jointly funded by all state, territorial and national governments. To date, NEHTA has received $160AUD million in funding.

England is a worldwide leader in the development of healthcare infrastructure and its funding has been through the government-funded National Health Service (NHS).

EHR funding in South Africa, Sweden, Germany, France and the Netherlands continues to be an international problem due to the significant cost of implementation. Each country is moving forward with a plan for appropriate funding. All are providing government funding to support committees that are developing EHR strategies for a national system. Sweden, France and South Africa have already moved towards a government- funded national system, while Germany and the Netherlands have not yet formally committed to this model.

Additional countries are at an earlier stage of development and are making progress despite not having a formal national program. Japan currently does not have a government-centered EHR; however, some local, regional and single hospitals have installed digital patient records sharing data between hospitals, clinics and patients.

Norway is conducting research that is expected to lead to a national EHR program. The Research Council of Norway awarded Norwegian University of Science and Technology (NTNU) a contract to establish The Norwegian Electronic Health Record Research Centre (NSEP). The center receives annual funding of NOK 5 million to strengthen and develop an interdisciplinary research group with competence in health research, ICT and social sciences. The main goal of the center is to conduct research that contributes to the development and implementation of an EHR system.

In Israel, a national program does not exist; however, EHR implementations are widespread in both the public and private sectors. A survey was conducted within Israel to evaluate the status of electronic medical record (EMR) systems in all major general

hospitals in terms of the applications used and the patterns of use. Of the 26 general hospitals, 21 (91.3%) use EMR systems.

STANDARDS AND INTEROPERABILITY

All countries suffer from the same issues of lack of healthcare IT standards and barriers to inter-system communication.

France, Sweden and the Netherlands are trying to standardize EHRs within their respective countries. Germany, the Netherlands and France are attempting to do this by using a variation of the Health Leven Seven (HL7) standard so that interoperability can also occur between countries.

Strategic national leadership leads to better plans for interoperability, yet even with these national attempts barriers are difficult to surmount. Germany, for example, has a distributed strategy model but their hospitals compete against each other for patients and services. This does not lend itself to an organized integrated solution.

South Africa is in the process of selecting an EHR vendor utilizing an RFI process. With the selection of a mainstream vendor there would be considerable interoperability and utilization of industry standards such as HL7, DICOM, etc.

Israel has at least 27 different types of systems in use in Israeli hospitals, and generally more than one type is used in any given hospital. Physicians work with EMR systems in over 98% of the departments. Also, the EMR systems are used for clinical admission and discharge in over 90% of the departments and for medical daily follow-up in about 45% of them.

Hospitals in Japan started to utilize computerized practitioner order entry (CPOE) systems from the early 1980s and now CPOE is widely used in hospitals. The installation of EHR systems, including medical imaging reference functions is increasing within hospitals and clinics, but the data between hospitals is still not easily shared .

The current EHR project for England, the National Care Record Service Program, began implementation via a nationwide procurement process that resulted in one National Application Service Provider (NASP) and five Local Service Providers (LSPs). The EHR information model is based on HL7 v3 RIM, updated and queried through HL7 v3 messaging.

Canada has created a national framework to guide the development of an interoperable EHR across its jurisdictions, with each one determining its own implementation strategy**.** Like Germany, Canada has national agreement to use a distributed model approach with health data coming from different operational applications in a given jurisdiction. This data is then replicated into the Electronic Health Record Solutions (EHRS) via the Electronic Health Record Infrastructure (EHRi). Thu, the EHR is composed of many

Electronic Health Record Solutions and is a peer-to-peer network of message-based interoperable EHRSs deployed across Canada.

To maintain its focus on interoperability and standardization, Canada's Infoway uses the *EHRS Blueprint* with its coordination of standards, including nomenclature and messaging standards. The *EHRS Blueprint* is a flexible business and technical design framework that allows solutions, components and best practices developed in one jurisdiction to be reused in another. It ensures that all EHR solutions can seamlessly and securely exchange patient health information. Infoway has also created a Canada-wide standards coordination function to support and sustain health information standards. Nine specific pan-Canadian Standards Groups contribute, review, validate and harmonize standards in support of the nine Infoway Programs (Registries, Infostructure, Laboratory Information Systems, Diagnostic Imaging Systems and PACS, Drug Information Systems, Interoperable EHR Systems, Telehealth, Public Heath Surveillance, and Innovation and Adoption).

In Australia, NEHTA's mission is to set the standard, specification and infrastructure requirements for secure, interoperable electronic health information systems. The Australian, State and Territory governments will then adopt these standards into their own eHealth systems. A national interoperability framework (IF) has been developed for eHealth systems and within this framework, EHR design principles are being established for shared use by authorized clinicians and consumers. The IF is seen as a way of aligning various enterprise and solution architecture activities. Nomenclature and messaging standards are being reviewed, validated and developed if necessary to fit the Australian context. National directories are also being created to accurately identify medicines, medical products, devices and consumables. Lastly, NEHTA is using a centralized approach to unique identification with unique personal and provider identifiers being planned at the national level. This common national approach will set the necessary foundations for the widespread and rapid adoption of eHealth across the national health sector.

COMMUNICATION

Perhaps the greatest barrier to creating interoperable standards in healthcare IT is the gap in communication that exists between and within countries. Whether coordinated and funded by the national government or "boot-strapped" by local agencies, a failure to communicate activities within a country can lead to implementation failures. Some countries have focused their efforts on thorough and continual communications to guide EHR implementation   For example, the Canadian effort emphasizes communication with stakeholders and inter-jurisdictional collaboration enhanced by knowledge sharing. To this end Infoway created the *e-Health Knowledge Way* – a gateway to English and French language resources for all topics related to the implementation of the EHR, including the pan-Canadian forums and toolkits for implementation with most of the information available worldwide.

HIMSS, as the worlds' leading organization in healthcare information technology, can be instrumental in linking communication and promoting EHR efforts within and between the countries of the world.

U.S. EFFORTS

When compared to some countries the U.S. seems to fall behind in many distinct and important categories of EHR implementation. The U.K., Australia, New Zealand, and Canada already have <u>Standards</u> (agreed upon and mandated by national or private entities), <u>Funding</u> (national or a mix of private and public funds), and good <u>Communication</u> between vendors and systems (in telecommunications, for example, which allows for interoperable systems).

The U.S., on the other hand, is still working towards developing standards. This is complicated by the fact that there are so many vendors to choose from when compared to other nations. This tends to widen the gap in interoperability.

Although the federal government has introduced some legislation to support the implementation of EHRs, unlike most other countries it has not mandated its use nor provided adequate funding sources for nationwide implementations.

Communications between vendor systems in the U.S. is both complex and not standardized, even in the face of "standard" messages and indexing such as HL7 and SNOMED. They still require interfaces between disparate systems and data repositories before they can be useful to the larger provider, payor and consumer communities.

At a minimum, in order for the U.S. to successfully deploy a national, interoperable EHR system, we first need to set standards, find adequate funding, and establish good communications with consistent messages. We need to learn from the rest of the global community and not make the same mistakes some have made while capitalizing on their successes. This will take a concerted and collaborative effort by both the public and private sectors to implement a national system. This cannot be done in a vacuum. Effective healthcare IT should be no different from technology in the banking industry. Information about health is no more sensitive than information about personal finances yet we can go to any ATM across the globe and obtain information from our home bank. The world has communicated and created standards for interoperability in the banking industry. We should do no less in healthcare.