

A study to analyze the placing behind the eHRSS security architecture of the principle of privacy protection

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Abstract

To guarantee that healthcare services in Hong Kong are of high quality and effective, human resources development is a key focus for the healthcare industry. However, the current eHR development in Hong Kong is mostly focused on healthcare providers in the public sector, such as the hospitals and clinics run by HA and DH (the city's health authorities). Most private hospitals and clinics are still utilising paper-based health records. Other healthcare providers may have their own eHR systems, but they are all disconnected.

It will be examined in this dissertation how the eHR system has developed in Hong Kong's public and private sectors, as well as the issues that healthcare providers and patients face.

The HKSAR government also offers support for the development of eHR in governance and financial issues. An eHR Office has been established under the Food and Health Bureau to help with coordination of the development of an eHR sharing system among healthcare providers. The eHR office will keep tabs on how the eHR development process is progressing. Because HA has a well-established

Medical records are handled electronically at public institutions on a regular basis using the well-known Clinical Management System (CMS). HKSAR counts on HA's expertise in eHR deployment as a critical resource.

Keywords: Efficient systems, life expectancy, population's rising

Introduction

eHRs are defined by the Food and Health Bureau (FHB) as a record in electronic format containing health-related data¹ of an individual (referred to hereafter as 'patient' for simplicity, though eHR is not limited to medical treatment for sickness) stored and retrieved by various healthcare providers, including doctors and other health professionals, for healthcare-related purposes. They defined an electronic health record in Health Informatics of Hospital Authority as containing all the information about a patient's episodes and visits, diagnoses, procedures, discharge summaries, allergies, and alerts, all medications, laboratory and radiology results, nursing and allied health information, documents, and letters, as well as clinical specialist data and radiological images. eHRs are defined by the Food and Health Bureau (FHB) as a record in electronic format containing health-related data¹ of an individual (referred to as 'patient' hereafter for simplicity, though eHR is not limited to medical treatment for illness) stored and retrieved by various healthcare providers, including doctors and other health professionals, for healthcare-related purposes. According to Health Informatics of Hospital Authority, an electronic health record includes everything from a patient's episodes and visits, to diagnoses, to procedures and discharge summaries, to allergies and alerts. It also contains information on all medications, laboratory and radiology results, nursing and allied health data and letters, and clinical specialist data and radiological images. eHRs are defined by the Food and Health Bureau (FHB) as a record in electronic format containing health-related data¹ of an individual (referred to as 'patient' hereafter for simplicity, though eHR is not limited to medical treatment for illness) stored and retrieved by various healthcare providers, including doctors and other health professionals, for healthcare-related purposes.

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Patients in Hong Kong are responsible for preserving their own health records and clinical data, which are generated and kept independently by various healthcare professionals in clinics or hospitals. There are no standard forms for the health records because they are kept in various locations. With the exception of the Hospital Authority, private healthcare providers continue to maintain paper-based health records and clinical data. Some healthcare providers have created patient/medical record systems to store or retrieve this data, but these records cannot be shared among other healthcare providers because of the many IT infrastructure platforms and data formats that have been chosen. The development of a system for exchanging eHealth records across the whole area and people is therefore critical.

However, there are still roadblocks in the way of eHR deployment. It's a certain that healthcare providers will be saddled with more costs to keep the system running. Additionally, healthcare providers must make an effort to adapt innovative clinical practises in the eHR. Patients' groups worry about the degree of data sharing and debate whether all healthcare professionals need to be aware of personal information such history of sexually transmitted diseases or mental health issues. The data formatting may not be recorded in the same standard when clinical data is exchanged across systems. Transitioning enormous amounts of current health records will be a challenge because more than half of private clinics are still utilising paper-based health records. The ease with which health care workers could copy patient health records in electronic format increased the risk of data leakage. There have been numerous incidents involving the leakage of patient health records in recent years, most of which involved electronic formats, such as the loss of USB thumb drives containing patient records. Security of health data and confidentiality crises among personal information will be key issues for patients. Although the Personal Data (Privacy) Ordinance (PDPO) lays out the requirements for safeguarding personal data privacy, there is no law in place specifically for eHR at this time.

Literature Review

Clinical Management System (CMS) was utilised by Hospital Authority to store and retrieve patient medical information internally starting in 1995. Hospital Authority spent \$1,420 million between 1995 and 2009 for CMS Phases I and II development. For clinical management in Hong Kong, CMS is largest eMR/ePR (integrated) system in clinical management. As far as hospital utilisation coverage, functionality, and complexity go, it's a cutting-edge and effective system. CMS has previously archived the medical information of over 8 million individuals, including over 800 million test results, 340 million prescriptions, and 34 million x-rays. HA clinical services in both hospitals and clinics are included. HA's IT network CMS offers a platform for authorised users to access patient data, making it a critical tool for HA to provide healthcare services around the clock, seven days a week. Over 3 million transactions are made in CMS every day by doctors, nurses, and other health care workers.

Cost and benefit analysis (CBA) is a decision-support technique that aims to make society's resources more efficiently and effectively allocated. Cataloguing the impacts in terms of benefits and costs, evaluating them in monetary terms (assigning weights), and calculating the net advantages of the plan in comparison to what is currently in place are all part of this process. This chapter will look at the overall costs and benefits to society. CBA serves as a policy evaluation tool that measures the worth of all policy outcomes to the entire population. It will examine the trade-offs between costs and benefits from the perspective of various

stakeholders. The policy's worth is measured by its net social benefits. (NSB) = Social Benefits - Social Costs Net (C)

NSB is equal to B minus C.

Any type of government involvement, such as policies, programmes, initiatives, laws, and demonstration, might benefit from a cost-benefit analysis. The following analysis is focused on Hong Kong's adoption of electronic health records.

The privacy and security of patient data is a hot topic in eHR development.

The IT industry has put in a lot of work to protect the privacy and confidentiality of user data through technical means. While PDPO governs privacy issues for personal data, no regulation specifically addresses eHR. Because of the fast advancements in medical technology and information technology, legislation regarding eHR is being considered. The privacy standards must be explicitly defined for the eHR sharing process. It can protect healthcare professionals and patients from each other's claims.

The eHR legislative process will also establish criminal consequences for maliciously gaining unauthorised access to the eHR Sharing System. However, if healthcare professionals make unintentional mistakes when entering data into the eHR system, it is not recommended that criminal responsibilities be placed on them. Building trust between healthcare providers and their patients is essential in the healthcare industry.

Research Gap

When it comes to eHR development, privacy is always a major concern. The consultation document on eHR contained a lengthy section devoted to eHR privacy. Privacy is the ability to decide who gets access to one's data and under what conditions they can use it. Protecting data's confidentiality ensures that it's being used and accessed in accordance with the intended purposes. Data preservation and physical protection are both part of security.

Data privacy protection becomes extremely essential when health information is shared among healthcare providers to make delivery of healthcare services more efficient. It might have an impact on the trust and support of the individual whose records are being shared and the person who is accessing those information.

The electronic structure of the health record makes it easier to share data since it is more efficient. Data may be transferred through the internet or stored on a variety of portable storage devices, including a USB thumb drive, a portable hard drive, and a smartphone. However, it also raises the possibility of these private health records being leaked. The patient health record might be exposed, accessed, or even edited by an unauthorised person if adequate security measures are not in place. It would be difficult to track down the person(s) responsible for these illegal activities. Furthermore, an assault on the IT system might disrupt regular operations in the delivery of healthcare services. Consequently, in order to ensure data privacy, secrecy, and security, the government and associated organisations have taken specific precautions.

Before using the electronic health record to make decisions, be aware of the limits of the Cost-Benefit Analysis. It is possible to categorise the restrictions into two groups depending on the situation. Due to these restrictions, the net benefits may no longer be acceptable for making public policy decisions.

CBA in its purest form need monetization in order to accurately measure all consequences. It's necessary to quantify all expenses and advantages in monetary terms before calculating the net benefit. However, it is impossible to directly monetize all of the impacts of policy. The costs and benefits of many effects are

difficult to quantify because they are intangible. For example, it's difficult to put a financial value on human emotions and pain.

As Chinese medicine progresses, so does the combination of Chinese and Western medicine in healthcare. The eHR sharing system will incorporate Chinese Medicine health records as well. CMIS and CMS are not linked, despite the fact that 20 public hospitals offer Chinese Medicine services. Also, at this point, Chinese Medicine is not supported by the eHR. Outpatient clinics and 56 in-patient beds will be built as part of the renovation of Kwong Wah Hospital. It will be a watershed moment in the growth of Chinese medicine in Hong Kong. The use of Chinese Medicine is expected to become an integral element of hospital core services in the future.

In contrast, the medical records of patients who received Western medicine as well as those who received Chinese medicine were kept separate and handled separately. Even in public hospitals, there is no direct combination of Chinese Medicine and Western Medicine at this time.

In the future, eHR will include Chinese Medicine records to assure the accuracy of patient data and the quality of healthcare services. Prior to that, it will look at the viability of standardising common data in the eHR for Chinese medicine.

Research Objective & Methodology

In this pilot initiative, eHRs were shared in a single direction. A patient's permission is required before the private healthcare providers and institutions participating in HA can access the medical records of their approved patients. Patients' discharge summaries, diagnoses, procedure codes, test findings, radiology data, prescription orders, allergy information, and future appointments can all be found in these records by private healthcare providers.

PPI-ePR has more than 170,000 patients as of September 2011. Furthermore, the PPI-ePR has enlisted 2,470 private healthcare practitioners, 13 private hospitals, and 58 private or non-governmental organisations (NGOs) that provide healthcare-related services, including 348 of their residential care homes and centers.

For Kong, the Food and Health Bureau is in charge of the programme. In Hong Kong, it is supported by the eHR Office within FHB, whose primary responsibility was to lead and monitor the coherence growth of the two-way eHR Sharing system between public and private sectors in the healthcare business.

The ultimate objective of eHR sharing is to link the public and private healthcare sectors. It gives healthcare providers a place to upload and download patient health records.

The private sector, on the other hand, should have the freedom to select its own IT systems. As a result, not all healthcare service providers use the same IT system when it comes to eHR data exchange. Instead, it will establish a set of common standards and interfaces for eHR sharing to make it easier for the public and private sectors to share information.

The eHR programme is built on a foundation of voluntary patient engagement. The eHR sharing system will only reveal and share the health data of those patients who have given their informed consent; only healthcare professionals who have participated and complied with the regulations can upload and access the data to and from the eHR sharing system.

The Chinese Medicine Ordinance was expected to be passed in July 1999. It established a legal framework for regulating Chinese medicine in Hong Kong. The Hospital Authority has taken on the task of establishing one Chinese Medicine Center for Training and Research (CMCTR) in each of Hong Kong's 18 districts by following the Government's lead. The CMCTRs follow a tripartite approach in which they work with non-

governmental organisations (NGOs) as well as local institutions. In this paradigm, non-governmental organisations (NGOs) and universities provide evidence-based Chinese medicine services and create research and training. In addition, the government offers subsidies to CMCTR operators who work for non-profit organisations (NGOs) via HA. HA38 has taken on the job of governance in order to ensure appropriate governance.

Despite the lack of a Chinese Medicine department in public hospitals, three pilot models of Chinese and Western medicine shared care services for pain management, stroke rehabilitation, nervous system diseases, palliative care, cancer treatment, diabetes mellitus treatment, gynaecology, are being implemented.

In order to assist clinical and service management, HA created the Chinese Medicine Information System (CMIS). It has been used at the Chinese Medicine Training and Research Center in California (CMCTRs). CMIS is meant to assist the administration of patients, clinical practise, pharmacy management and a platform for data analysis, planning and research in Chinese Medicine linked to clinical elements. In order to promote Chinese medicine and Western medicine, build a territory-wide eHR and allow the interchange of data between the two fields of healthcare now there is no connection between CMS and CMIS.

The public and private sectors need to make a significant effort to promote the use of a territory-wide eHR sharing system, it is claimed. Few people use PPI-ePR; just around 170,000 people out of 7 million people have signed up for PPI-ePR, making it a low participation rate.

The government should take the lead on eHR development efforts. It's possible that it won't be used by all healthcare professionals right away. The government, on the other hand, may market the eHR sharing system to private healthcare providers. As long as the setup price for the eHR accessing platform is reasonable to private healthcare providers, a subsidy is not required.

The government, on the other side, may make advantage of the eHR sharing mechanism in PPP projects. The healthcare sector is driven by the market, and private healthcare providers will benefit from the eHR by linking their services to the eHR system, and for example, earnings from vaccine subsidies and healthcare vouchers. Patients may choose their healthcare providers more freely with eHR, and their health records can be accessible by any approved healthcare provider as long as that provider has joined the eHR network.

It is necessary to lay out all of the options for analysis, including the status quo, for the analyst to determine which project strategy will be most beneficial to the society (the existing situation). It would have a huge number of alternative projects, therefore it would typically concentrate on a small number of them for study. Typically, it will look at one alternative to the current quo in the real world.

To determining who has standing, the costs and advantages of each party must be considered. As a result, all of the main stakeholders who will be impacted by the project must be listed.

Include the costs and benefits associated with various alternatives in a comprehensive impact assessment. In addition, it must establish the measuring indicators for the various impacts in order to guarantee that the measurements are uniform. In any case, because part of the influence can't be quantified with measuring markers,

Impacts are difficult to measure since they are subjective. It may also be dependent on the availability of data in that location for study.

Because the project will last for a long period, it's important to forecast and analyse the long-term effects in quantitative terms. Again, the study is reliant on the availability of data. It will be difficult to anticipate the long-term consequences.

To put a monetary value to all of an impact's effects is known as monetization. It's used in cost-benefit analysis to figure out which initiatives are worth more in the long run. Some values, on the other hand, are intangible, such as life and moral values. Some effects can't be valued at this time. After then, a different type of analysis will be employed, such as a cost-effectiveness analysis or a multi-goal analysis.

Discount rate methods are commonly used in future benefits and costs to aggregate expenses and benefits across time in a project with a long duration of time. Discounting occurs as a result of people's preferences for the project having been eaten over time, along with the accompanying effects.

People are more likely to spend money today than they will be in the future. Disregarding it, is critical in the CBA process.

Data Analysis & Findings

The protection of personal healthcare data is governed by the Personal Data (Privacy) Ordinance (Cap. 486) (PDPO) and the common law of duty of confidence in Hong Kong. The ordinance set out the minimum standard on protecting one's data for every institution to follow. All of the healthcare providers, both public and private sectors, they should comply with the principles given in the PDPO. The Data Protection Principles – Schedule 1 under Personal Data (Privacy) Ordinance³², it stated out six principles to protect all forms of personal data including patient records, and the development of eHR is also following this principles.

One of the most important eHR development objectives is to standardise data formats so that correct and efficient electronic data can be exchanged. Today, the health record system must connect with a variety of systems to keep running smoothly, including clinical information systems (CIS), pharmacies, and others.

System, x-ray system, laboratory system, and financial system are all examples of interconnected systems. Data standardisation makes it possible for many systems to communicate with one another, obtaining, transmitting, and analysing data in a standardised manner. Since of this, healthcare services are more efficient because data can be reused, which means fewer duplicate tests. It also has the potential to minimise the number of errors due to misunderstandings and to free up resources needed in data transcription and redundancy. eHR office has worked in three major ways to computerise medical data.

Healthcare professionals may lack expertise on how to handle patient records while yet maintaining patient privacy. Data processing in medical records includes various phases such as system design and development; data management and data utilisation are also typically included in this process. Healthcare professionals, such as physicians, nurses, allied health professionals, information technology (IT) personnel, and administrative staff, put forth a lot of effort to make these things happen. These employees will be educated so that they are properly versed in how to manage patient data.

More than 70% of Hong Kong residents' outpatient consultations are provided by private medical practitioners and clinics. However, the majority of them work alone, with no collaboration with other healthcare practitioners. I'm quite sure they're still keeping patient records on paper and storing them in metal filing cabinets. Pilot PPI-ePR and eMR produced by HA and DH are still incompatible with two-way sharing for those who use them. Some private medical laboratories and radiological service centres in the private healthcare sector have set up an IT system, but these standalone systems are only set up for in-house operations, with the tailored software for the IT system, the private healthcare IT system cannot communicate with the PPI-ePR or eMR developed by HA and DH 20.

The percentage of people in the private health sector who use electronic health records is low. According to the results of a poll performed by the Hong Kong Medical Association, computer use in private health care is becoming increasingly popular.

Over 85% of them use computers in the workplace. However, the computers are mostly used for letter writing, internet access, and indexing patient demographic data. Only 49% of them use computers to create medication labels, and only 43% use computers to maintain patient clinical data. For appointment scheduling, medicine dispensing, billing, accounting, and inventory tracking purposes, the 14 contemporary private hospitals rely mostly on computers. Their medical records are still on paper. The fact that some of them store clinical records electronically doesn't mean that they can be shared with other healthcare providers or commercial or governmental organisations because of their proprietary nature.

Hong Kong's Department of Health oversees and maintains the city's public health system. It has a massive collection of community health records, the most of which are on paper in the form of immunisation records. DH has made significant strides in recent years.

Developed a single electronic information system to keep track of these documents. It also has eHR sharing features, making it possible to share this information with both public and private healthcare professionals via an electronic platform. The centralised electronic information system integrated a number of preexisting systems, including the Maternal and Child Health Centre (MCHC) information system with immunisation records, the Social Hygiene Service Information System, and the Clinical Genetics Service Information System with Family Clinics.

Efficiency is the only aim in cost and benefit analysis. General public members as well as elected officials and economic experts may focus on goals other than efficiency, such as social values.

Only public hospitals run by the Hospital Authority now employ electronic health records; private hospitals and clinics use their own systems to manage patient information electronically. In fact, paper-based health records are still used in certain private clinics as well. As things stand now, patients' medical records cannot be fully linked across public and private healthcare providers.

The second option is to develop a comprehensive electronic health record, the eHR office's objective was that "health records accompany patients," the implementation must follow the concepts of "patient under-care" and "need-to-know bases"⁴³. Patients can seek advice at any of Hong Kong's well-known public or private hospitals and clinics. Health care professionals might access and update patient health data depending on diagnosis needs such as medical history, allergy information, X-ray films etc. with the agreement of patients supplied by their healthcare providers.

Conclusion

Under the Food and Health Bureau, a steering committee for E-Health Record Sharing has been established to help advance eHR in Hong Kong. A territory-wide information system suitable with sharing patient records throughout Hong Kong's healthcare system may be developed by bringing together various players from both the private and public healthcare sectors to exchange their knowledge and establish consensus.

The eHealth Record Office (eHR Office) was established to coordinate, lead, and execute eHR sharing in the public and private sectors. Legal, policy, data privacy, and security are all areas that the eHR Office is responsible for. Human Resources Office (eHR).

The Health Branch of FHB is within the civil service system, and it is supported by the HA's IT services and the Food and Health Branch (FHB) (HAITS). If the eHR office is a component of FHB, it may provide policy guidance and coordination for the eHR programme with other departments. HAITS, on the other hand, may contribute their knowledge and experience in the creation of clinical IT systems, which is necessary for the establishment of an eHR sharing infrastructure between the public and private sectors.

DH also established an eHR team for eHR development, which is coordinated by the eHR Office. Aside from that, FHB's advisory body, the Steering Committee and eHR's working groups²⁷ continue. There is an outline of the governance structure in the Advisory and Coordination Structure for Electronic Health Records (OHR).

The project's alternatives must be defined, as noted in the literature review. Status quo and complete electronic health record implementation in Hong Kong were the two options considered in this research.

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