

## HOW DOES SMART CARD TECHNOLOGY LEVERAGE WITH THE eHEALTH SYSTEM IN HONG KONG?

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Nowadays, smart card-based applications have become a common part of daily life, successfully improving the quality of services available to the public with applications such as, nationwide identity (ID) card programs, automatic fare collection systems, electronic health (eHealth) card programs and social security card services. In Hong Kong, the first two applications have been effectively deployed since 2003 and 1997, respectively, in the form of the Hong Kong Smart ID card and Octopus card. Nonetheless, neither an eHealth system nor eHealth card has seen full scale implementations in Hong Kong yet.

### APPROACH OF IMPLEMENTING AN eHEALTH SYSTEM IN HONG KONG

Given the prevailing trend at that time, the government addressed the need for and importance of developing a territory-wide and patient-oriented electronic health record through public-private partnership in the Hong Kong Policy Address 2007. As a result, an eHealth Record Office (eHR Office) was established in 2009 to plan, develop, implement and manage the population-wide eHealth record (eHR) sharing system. The eHR sharing system is an IT infrastructure and platform for healthcare providers in public and private sectors to share the eHR of their patients with other healthcare providers for healthcare-related purposes. Since the medical records are personal and confidential, a well-established security infrastructure is essential.

In accomplishing this, applying smart card technologies proves to be a wise choice. It can achieve the four major functions of public key infrastructure – confidentiality (encryption/ decryption), data integrity, authentication and non-repudiation. It enables users of an unsecure public network, such as the Internet, to securely and privately exchange data through the use of a public and a private cryptographic key pair that is obtained and shared through a trusted authority. Additionally, it enables a convenient way of setting different access rights and identities by issuing different smart cards, e.g. doctor card and patient card.

### PILOT eHEALTH SCHEMES USING HONG KONG SMART ID CARD

While the eHR sharing system is not fully developed, some pilot schemes are being implemented using the Smart ID card in the meantime – (1) Healthcare Voucher and (2) Vaccination schemes.

#### (1) Healthcare Vouchers

The Elderly Health Care Voucher Pilot Scheme was launched in 2009 to financially subsidize the elders' use of private primary healthcare service, and in effect, promote the concept of shared responsibility for patients' healthcare between public and private sectors. Each elder aged 70 or above is given five HK\$50 vouchers per year. The scheme adopts the "money-follows-patient" concept, in which elders can use the vouchers in private healthcare clinics that are most accessible and convenient to them.

To implement and operate this, a web-based eHealth system is built so that there is no need to issue or carry any paper voucher. Instead, the vouchers, in electronic copy, are issued and used directly within the system. When this scheme launched, the healthcare service providers needed to register to become an enrolled healthcare provider. Likewise, the elders needed to register a personal healthcare voucher account so as to use the vouchers. Owing to the complicated nature and operational inefficiency of the whole registration process, including filling out the paper application form and inputting the data manually, some enrolled healthcare service providers gave up on using this system.

In order to simplify all operations in the registration process, Smart ID cards are introduced into this system, benefitting both the enrolled healthcare service providers and eligible voucher recipients. By inserting the elders' Smart ID card into the eHealth smart card reader, which is connected to a PC, the online eHealth system can collect and verify the information stored in the Smart ID card without obstacle. On the one hand, the enrolled healthcare service providers can



correctly check the number of valid vouchers of their patients and then claim the corresponding amount from the government. On the other hand, the eligible users of the vouchers can create their personal account, authenticate themselves to access the account, check the voucher balance, and claim the vouchers through the eHealth system by simply presenting their Smart ID card. This change does not only ensure the accuracy and fluidity of the whole operating process, but also brings convenience to the elders who may suffer from illiteracy and/or losing their ability to retain information.

#### (2) Vaccination Schemes

Two other pilot eHealth programs started for 2011/2012 – Elderly Vaccination Subsidy Scheme and Childhood Influenza Vaccination Subsidy Scheme. In Hong Kong, influenza is a common infectious disease that typically records the most cases among elders and children from January to March and from July to August. As proven by medical evidence, getting vaccinated can protect one from being infected by influenza and can limit its spread within the community. Therefore, the government has chosen to subsidize the seasonal influenza vaccination obtained from enrolled private healthcare service providers. All Hong Kong residents aged 65 or above can receive a HK\$130 subsidy per dose of seasonal influenza vaccination (1 dose/year is recommended) and HK\$190 per dose of pneumococcal vaccination (1 dose/year is recommended); while all Hong Kong children aged between 6 months to less than 6 years old can receive a HK\$80 subsidy per dose of seasonal influenza vaccination (2 doses/year is recommended).

Similar to the Healthcare Voucher scheme mentioned above, Smart ID's and smart card readers are adopted in this

eHealth system. These devices facilitate the registration process of the eligible elders and children. Also, they help save administrative costs associated with the subsidy reimbursement for the enrolled healthcare service providers. What is more important is that they provide a way to store and maintain accurate vaccination information for each individual, preventing the possibility of overdosing on vaccination, which is harmful to health.

### CONCLUSION

The two above pilot eHealth schemes are at a preliminary stage. For the Hong Kong government, which aims to develop a population-oriented eHR sharing system, smart cards are definitely an essential element. It can take advantage of the fact that the infrastructure of Smart ID in Hong Kong is so mature. Instead of issuing a separate eHealth card to all 7 million citizens, using the current Smart ID in the eHealth system will be a very wise option.

However, the current healthcare situation in Hong Kong is complex. There are 40 public hospitals, 13 private hospitals, 4,500 public doctors and 5,000 private doctors. Records from different institutions are in different formats and most are still paper-based. Moreover, there is no cooperation within and between the public and private sectors. Thus, there is difficulty in building such an eHR sharing system.

Even so, a smart card-based eHealth network can offer different benefits that override the difficulty of transforming Hong Kong's healthcare system. From the administrative point of view, it will cut costs, eliminate fraud, reduce paperwork and streamline operations. From the healthcare point of view, it can provide information that will allow health institutions to decide the most suitable treatment to patients based on the assessment of well-stored medical records, as well as facilitate communication and information sharing—all of these while ensuring security for all parties. In conclusion, for the sake of the public, it is necessary for the government to implement a complete eHealth system that can be extended to all the remaining healthcare services in Hong Kong.

#### Reference Links:

- Hong Kong Policy Address 2007 – 2008 - <http://www.policyaddress.gov.hk/07-08/eng/policy.html>
- eHealth Record Office - <http://www.ehealth.gov.hk>
- eHealth System - <https://apps.hcv.gov.hk/en/>
- Centre for Health Protection - <http://www.chp.gov.hk>
- Health Care Voucher - <http://www.hcv.gov.hk>
- Department of Health - <http://www.dh.gov.hk/>
- Hospital authority - <http://www.ha.org.hk/>

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