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Nowadays, smart-card-based applications have become a common part of the daily life, successfully improving the quality of services available to the public with applications such as nationwide ID card programmes, automatic fare collection systems, e-Health card programmes and social security card services. In Hong Kong, the first 2 applications have been effectively deployed since 2003 and 1997, respectively, in the form of the Hong Kong Smart ID card and the Octopus card. Nonetheless, neither an e-Health system nor an e-Health card has yet to see full scale implementation in Hong Kong.

Implementing An e-Health 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 e-Health Record Office (eHR Office) was established in 2009 to plan, develop, implement and manage the population-wide e-Health 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 4 major functions of public key infrastructure – confidentiality (encryption/decryption), data integrity, authentication and non-repudiation. It enables users of an unsecured 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, eg. a doctor card and a patient card.

Pilot e-Health Schemes Using The 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.

Leveraging Healthcare With Smart Cards



Healthcare Vouchers

The Elderly Health Care Voucher Pilot Scheme was launched in 2009 to financially subsidise the elderly's use of private primary healthcare service, and in effect, promote the concept of shared responsibility for patients' healthcare between public and private sectors. Every elderly person aged 70 and above is given five HK\$50 (US\$6.41) vouchers per year. The scheme adopts the "money-follows-patient" concept, in which the elderly can use the vouchers in private healthcare clinics that are most accessible and convenient to them.

To implement and operate this, a web-based e-Health 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 was launched, the healthcare service providers needed to register to become an enrolled healthcare provider. Likewise, the elderly 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 were introduced into this system, benefitting both the enrolled healthcare service providers and eligible voucher recipients. By inserting the Smart ID card into the e-Health smart card reader which is connected to a PC, the online e-Health system can collect and verify the information stored in the Smart ID card without obstacle. On 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 e-Health 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.

Vaccination Schemes

Two other pilot e-Health programmes started for 2011/2012 – the Elderly Vaccination Subsidy Scheme and the 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 subsidise the seasonal influenza vaccination obtained from enrolled private healthcare service providers. All Hong Kong residents aged 65 and above can receive a HK\$130 (US\$16.67) subsidy per dose of seasonal influenza vaccination (1 dose/year is recommended) and HK\$190 (US\$24.36) 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 (US\$10.26) subsidy per dose of seasonal influenza vaccination (2 doses/year is recommended).

Similar to the Healthcare Voucher, Smart IDs and smart card readers are adopted in this e-Health system. These devices facilitate the registration process of eligible elderly and children. Also, they help to 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 2 mentioned pilot e-Health 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 e-Health card to all 7 million citizens, using the current Smart ID in the e-Health 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 co-operation 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 e-Health 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 e-Health system that can be extended to all the remaining healthcare services in Hong Kong. ■