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Smart Card Technology and Healthcare Information: A Dynamic Duo

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Key Points:

- * What is a healthcare smart card?
- * How can it be used?
- * Why will it be beneficial?

It is a muggy summer day, and you need to be airlifted out of China's Yellow Mountains after a head injury sustained in a hiking accident. In such a situation, as a United States citizen, you are very vulnerable because you are not able to provide a narrative of your medical history to healthcare providers in China. Additionally, no one at home may communicate your medical history to Chinese emergency care providers. This is a prime example of when it could be life saving to have your health history stored on a convenient "health smart card" (HSC) that could be read by Chinese healthcare providers using a multilingual smart card reader.¹ The guides accompanying you on the backpacking trip would simply use your HSC, thumbprint identification (ID), and authorized hardware and software to access your critical healthcare information. If you were a Chinese citizen, chances are that in your backpack you would have an HSC that contained your demographic data, personal medical contacts, insurance providers, medical-surgical history, current medications, and known allergies. China has initiated a National ID Smart Card, and many of its 1.5 billion citizens have these cards.² Countries that have enacted similar programs include Austria, Germany, Macao, and Taiwan. Why is the US so behind in adopting this well-known technology?

DESCRIPTION OF THE HEALTH SMART CARD

What are HSCs and the technology that supports their use? In simple terms, an HSC looks like a plastic credit card, but it has an embedded memory chip. The HSC enables secure access to patient information such as demographic data, comprehensive medical records, laboratory test results, current medications, drug and food allergies, health insurance coverage, and

registration information for healthcare providers. The HSC may also store information about the principal healthcare provider, the patient's health system activity, enrollment in medical research trials, and information about the patient's legal and business relationships with an insurance agency.³ Furthermore, the HSC has the capability of opening distributed online repositories containing pertinent patient information.³

The cards have varying degrees of memory storage and are protected by a personal photograph, ID pin number, or a biometric feature, such as a fingerprint. The communication takes place when the HSC comes physically into "contact" with a reader (hardware) or a "contactless" interface that is supported by a computing system. A contact card contains a metal strip that physically comes into contact with an authorized reader, whereas a contactless card transmits and receives data via radio frequency technology as close as a couple of millimeters or inches away from the receiving system. There are also "combi" cards offered by vendors, and these cards provide the functionality of both methods of communication.⁴

Siemens⁵ manufactures the "Patient Health Card," and the company advertises the HSC as reliable and guarantees privacy and security of an individual's data. Most recently, there was discussion of how the advancement of "chip" technology is paving the way for the use of mobile phones as a wireless connection to the HSC, hence eliminating the use of a "reader" and therefore decreasing the expense and providing a greater ease of use.³ Today's HSC technology has tackled the storage capacity dilemma of the past by storing less data on the card and providing "storage pointers" on the card that allow for ready access to online information.²

Historically speaking, HSCs have been very popular in Europe and were showcased in France by Robert Moreno in 1974. In 1990, as a result of a campaign by health insurance companies in France, 250,000 "Carte Santes" (health cards) were issued. By 1992, there were 1000 readers in medical practices throughout France.⁶ It is forecasted that by 2008, there will be 220 million of these units in Europe.⁴ Worldwide, many applications are associated with smart card technology, such as secure identity, financial payment, transportation, telecommunication, and healthcare applications (eg, health insurance ID cards, physician ID cards, and portable medical records).⁷

BENEFITS OF THE HEALTH SMART CARD

The HSC benefits both patients and the healthcare industry.³ According to Abrahamsen,⁸ the HSC is becoming a more accepted application in the US and acts as a patient's electronic healthcare "passport." The HSC can interact with any Java-enabled computer system.⁸

Patients may readily access their complete medical record at their own convenience and, with appropriate consent, healthcare providers may access vital information necessary for treatment.

Recently, administrators at St Thomas hospital in Nashville, TN, implemented an HSC program in the hospital's Women of Heart Program. Officials report that the cost of encryption and readers was balanced by time saved in registering patients and by the potential to improve patient care and reduce medical expenditures.⁸ Each card costs the hospital \$5.00; however, there is no charge to the patient.⁹ The HSC decreased erroneous record information transmission and increased patient safety. There are many reasons why HSC applications in the US healthcare industry are very attractive and timely. Over the past 3 years, the federal government ¹⁰ has encouraged the healthcare industry to provide each American with an electronic health record by 2014 in an attempt to reduce costs and avoid medical errors. An accompanying HSC would improve even more the communication of healthcare information. In 1996, the US Congress passed the Health Insurance Portability and Accountability Act (HIPAA). Although this act is also concerned with the portability of information, the first efforts were directed at maintaining the privacy and security of patients' medical information. Not only do HSCs support the patient privacy and security requirements stipulated by HIPAA, but also they act as a secure method for accessing medical records. They can also sustain new methods that reduce administrative costs, help eliminate healthcare fraud, supply secure access to emergency medical data, and assure observance of government recommendations and mandates.⁶

A not-for-profit organization whose sole purpose is to develop an understanding and explain the use of smart card technology is the Smart Card Alliance. Members of this organization stay connected to industry leaders through educational programs, marketing research, and open forums.³ The Smart Card Alliance ¹¹ reports that HSC technology has a unique ability to make information access easier for healthcare providers while at the same time enforcing the security policies required of healthcare organizations under HIPAA. The US standards associated with the storage and portability of sensitive and confidential health information on a chip embedded in a plastic card meet the Health Level Seven (HL7) and the continuity-of-care records (CCR) standards.¹¹ The HL7 is an organization that develops standards to "... enable different healthcare applications to exchange key clinical and administrative data."^{2(p6)} The CCR standards support the portability of healthcare information to foster continuity of care, reduce medical errors, and strengthen the role of patients in managing their health.^{11(p7)}

Information stored on an HSC will help prevent medical errors because of prompt and easy access to patients' current medications, allergies, and complete medical records online or off-

line. Card replacement and auditing to prevent fraud are straightforward because of the centralization of data management,³ and the use of reams of paper may be eliminated because patient data are stored electronically. Prescriptions for medications may be stored electronically on the HSC, therefore eliminating paper transactions and decreasing errors associated with paper scripts.³ In addition, healthcare organizations will save time in registering patients and obtaining past information, which can reduce costs.

One can easily see the healthcare benefits of having an HSC reader in emergency care vehicles because vital information needs to be processed immediately. Imagine if healthcare data could be accessed wirelessly? healthcare professionals would be able to access pertinent patient information seamlessly when given authorization by the patient. One idea is that such permission may be provided on a driver's license, very similar to the current organ donor permission sticker on individual driver's licenses.

TO "HAVE" OR TO "HAVE NOT"

The implementation of HSC technology in healthcare settings across the US has been discussed for many years. However, its adoption in the US has been slow and with some trepidation due to key issues, such as privacy, interoperability, and security of patients' healthcare data. A nationwide survey of the documentation of patient data was conducted in 2001. The results supported the implementation of HSC technology to streamline documentation and enhance reporting requirements while also improving finances for the provider, payer, and retailers. It is possible that this technology could lower administrative costs by providing smoother retrieval of information and improving reporting requirements. Some healthcare institutions in the US are incorporating the use of HSCs into patient care. For example, Mt Sinai Hospital in New York City has started a program that allows patients to store medical information, health insurance contact details, and even electrocardiogram results on a secure and private smart card.¹²

In conclusion, HSCs are being used by millions of people around the globe. The United States needs to conduct more research on the use of smart card technology for storing citizen's ID and protected data, obtaining medical and payment information, and using biometric authentication. Perhaps one day US citizens will be able to access their healthcare records from the convenience of their home personal computer or the connection provided in the physician's office. Are we ready for the marriage of smart card technology and healthcare information as a standard dynamic duo? Anxiety about healthcare while away from home or in a foreign country can be reduced through HSCs. Let there be an HSC in each US citizen's pocket because quick access to pertinent patient information saves lives.

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