MEDINFO 2007
HISA Ltd Australia
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Challenges to the Regional Comprehensive Electronic Health Record (rcEHR) - the Experiments in Koriyama

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Abstract

This paper reports on our efforts and the further challenges that we are having in our experiments in Koriyama. We have been developing electronic medical charts and health examination databases for medical and healthcare facilities, as well as eHealth cards and computer network systems on a regional basis. By integrating all of these functions, we have developed the Regional Comprehensive Electronic Health Record (rcEHR) in Koriyama. This paper explains the solutions to common problems generated in EHR development on a regional level, and upcoming challenges.

Keywords:

personal health database, eHealth card, medical record

Introduction

In Japan, the sharing of health checkup results and medication information on a regional basis began as the eHealth Card system around 1995. The Japanese government has experimented with numerous business models using the electronization of health insurance cards as its ultimate goal. However, there are just a few regions where the operations are still currently available. In regard to regional healthcare via computer networks, even though the government initially poured a sizable budget into the development of the system, an issue remains regarding its sustainability because of lack of personnel and economical reasons due to the elimination of the subsidy.

Without relying on the national budget, we have developed such systems as electronic medical charts, electronic health cards, regional medical computer networks, and a database of health checkup results. In these systems, operability, economical efficiency and interoperability have all been taken into consideration. The systems have been used for the past 20 years, and are well-established in many regions. This paper reports on the sustainable systems we have developed by integrating these operations in Koriyama in Fukushima Prefecture.

Methods

We are providing patients with their medical records and health data via electronic media used in digital cameras or cellular phones. We have named these systems My eChart and My eHealth Card respectively.

For medical and healthcare service providers, computer systems are needed to improve the efficiency of each operation at their facilities. Thus, we have developed electronic medical charts for medical facilities, an information system to record health checkup results and issue notifications for health examination clinics. Additionally, we have also developed a health checkup results database and an information system to support health guidance for the facilities. Moreover, from these systems, My eCharts and My eHealth Cards can be downloaded onto personal electronic media systems.

In regard to sharing health information between regionally-based medical and healthcare service providers, there are many restrictions in terms of time and amount of data when using patients' portable media systems. Since Internet communication is more convenient, we provide regional medical information sharing systems via highly encrypted networks.

In June 2006, we began using the electronic medical charts and My eCharts at Koriyama Medical and Nursing-care Hospital. Figure 1 shows an example of the medical imaging displayed on My eCharts. In September, we began using My eHealth Cards for workers that contain the data for physical examinations, physical fitness tests and nutritional assessments at the Health Promotion Foundation of Koriyama. We also began My eHealth Cards to provide elderly people with their general health checkup data at the Public Health Center in Koriyama. Figure 2 shows an example of the time-line graphs of the health checkup results in My eHealth cards. In April 2007, we started regional medical network to share patients' data.

Results

1. Operability

We applied the touch-screen system to our electronic medical charts. The terms, phrases and illustrations used by

each doctor are programmed into the system as a table beforehand, and this reference table will be displayed on the entry screen so that the doctor can enter data with the touch-screen. For My eCharts and My eHealth Cards, the patients will see the same screen that the doctors or health nurses do. These systems enable the patients to refer to their personal health information at home or at work without going through any special training on its operations.

2. Easiness to provide My eChart or My eHealth Card

By just clicking the data-providing button on the guidance screen for the patients, personal data will be downloaded automatically onto their My eChart or My eHealth Card. The access program, the execution environment such as DLL or OCX files, and the operation manual in the HTML format are also transferred all at once. This process takes only a few seconds and hardly affects day-to-day operations.

3. Security

The regional medical networks can be accessed only by the registered medical or healthcare specialists. An encrypted password is issued for each user as personal authentication in accessing the networks. SSL is used for communication to prevent interception. Since the data is encrypted and registered in the database in real time, it cannot be decoded through unauthenticated access (Figure 3).

4. Coexistence of applications among facilities

Coding schemes, examination methods and reference intervals, screen designs, and development environments often vary from facility to facility or from region to region. We are providing health data to the patients' media systems along with the programs and the execution environment. On the patients' media systems, we create folders for each facility, put their data, programs, tables and execution environment in them, and use each folder for one object. By using this method, even the systems developed by other manufacturers or vendors will be able to co-exist in a single patient's' media system.

Discussion and conclusion

The interoperations are considered to be the key element, and the standardization of communication protocols and coding schemes is in progress. Moreover, it is not easy to integrate information systems that have been developed and operated by each facility and organization. But, especially with the rapid increase of medical accidents and expenses, EHR is in such a high demand as measures against them that there is no time to wait for standardizations.We are aiming to create interoperations by implementing applications as objects although this is still on a regional basis. The sustainability of the systems is not proportional to the amount of money invested. Sustainable systems are the ones that have gradually been developed and have had functions added to them based on the needs and practical uses in the region. The foundation to support the sustainability of EHR systems can be seen in the prerequisite of the systems. It is believed that the interoperation of the EHR systems will lead to medical safety and the reduction of medical costs through the reduction of duplicate checkups, the prevention of dangerous drug interactions, support for doctors' treatment policies, effective healthcare guidance, and self health care. Having experienced further challenges in Koriyama, we are planning to assess these outcomes quantitatively and clarify the overall effects including extension of healthy lifetime.

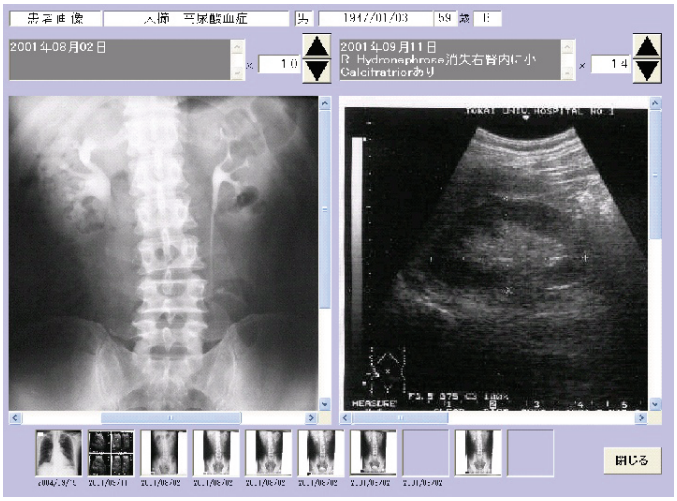

Figure 1- An example display of My eChart medical imaging

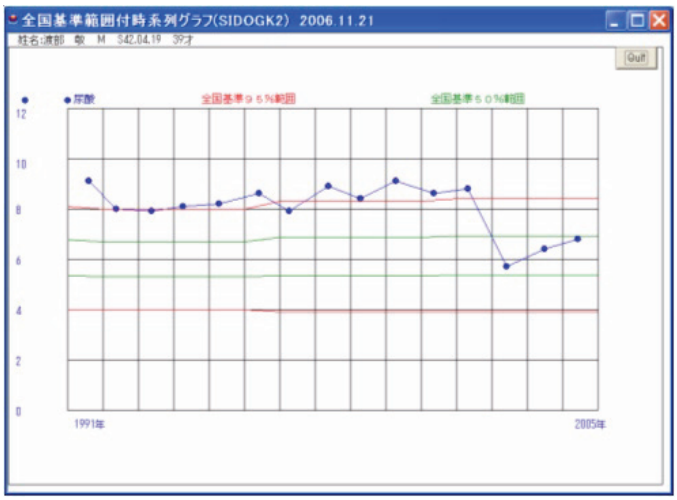

Figure 2 - An example of My eHealth Card time-line graphs

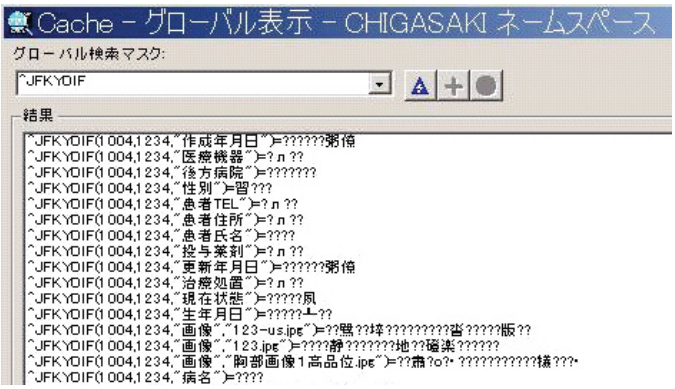

Figure 3 - The database encrypted in real time