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A Comprehensive Health Information System to Support Health Promotion and Disease Prevention in Japan

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Abstract

The Japanese Ministry of Health, Labour, and Welfare intends to reform the health promotion and disease prevention system in 2008. We are developing a comprehensive health information system that will support health examination, health education, and outcome assessment in compliance with the newly-proposed national guidelines. The system adopts a state-of-the art secure communication protocol - TCP2, which will enable information sharing based on personal identification and hardware- and software-independent security.

Keywords:

health information system, internet, health examination, health education, outcome assessment, Japan

Introduction

In order to promote the prevention of cardiovascular diseases, the Japanese Ministry of Health, Labour, and Welfare intends to reform the health promotion and disease prevention system in 2008. Under the new system, medical insurance organizations will be responsible for providing annual health examination and health education for every insured person aged 40 years and implementing outcome assessment. They fervently hope for a comprehensive health information system because they will have to deal with health information that is collected from various sources (Figure 1).

In 2006, we established a university-industry collaboration project with the aim of developing a comprehensive health information system to support health promotion and disease prevention in Japan (J-CHIS).

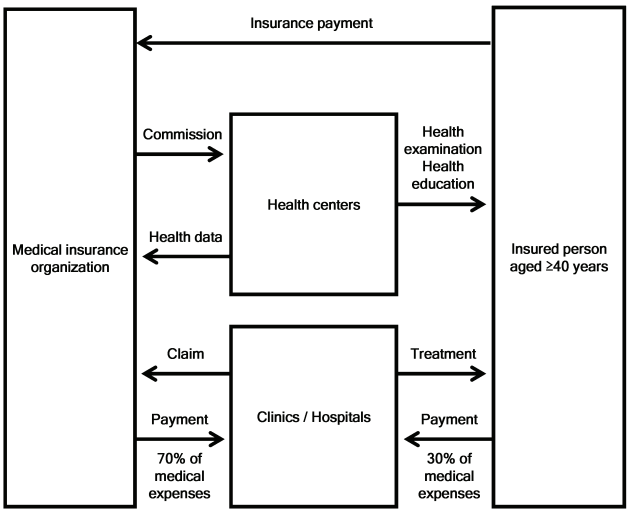

Figure 1 - Overview of the public health system in Japan

Methods

The J-CHIS is designed to support health examination, health education, and outcome assessment in compliance with the newly-proposed national guidelines (available for download at http://www.mhlw.go.jp/bunya/kenkou/seikatsu/index.html).

Results and discussion

The J-CHIS consists of three components - health data, health education resources, and medical insurance data (Figure 2). Health data shown in Table 1 are collected from health centers where the insured people receive health examination and health education. Notice that each medical insurance organization will commission more than one health center to provide health examination and health education for the insured people, and health examination and health education for each insured person will possibly be conducted at different health centers. Health education resources include information about health promotion and

disease prevention and instruction materials that are useful for health education at health centers or at home. Medical insurance data are collected from clinics and hospitals where insured people receive medical treatment, as part of the procedures for payment of medical expenses.

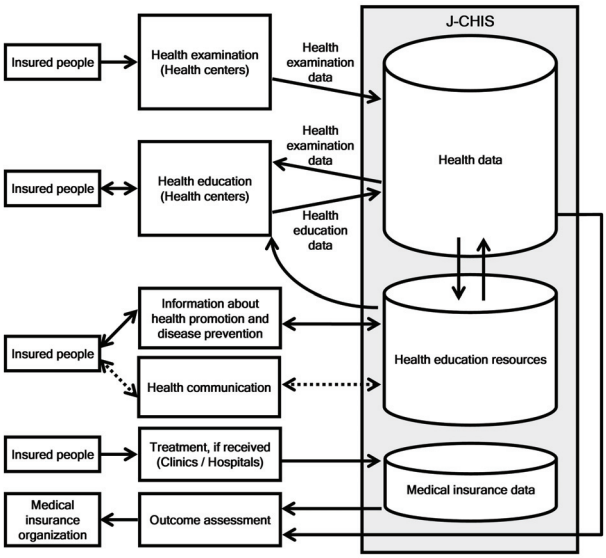

Figure 2 - Overview of the J-CHIS

Table 1 - Health data

Health examination
Height, Weight, BMI, Waist circumference, Blood pressure, Blood glucose, HbA1c, LDL, HDL, Triglyceride, AST, ALT, GT, Urinalysis, Smoking habit, Medication
Health education
Participation in health education sessions, Goal setting

The users will access each component through the Internet. Communication on the Internet is timely and easily accessible, but data on the Internet is vulnerable. The J-CHIS requires vigorous security measures to preserve strict privacy. Moreover, the components of health data and health education resources will be accessed by various people from various places using various computer hardware; insured people will check their own health data and seek information about health promotion and disease prevention; health center staff will input and check their clients' health data and use instruction materials for health education at health centers. It is difficult to prepare specific software that is usable under such wide variety of circumstances. In order to deal with these problems, the J-CHIS adopts a state-of-the-art secure communication protocol - TCP2 (developed by T.T.T. kabushikikaisya, Tokyo, Japan; available for download at http://www.tttnet.ne.jp/tcp2.html). TCP2 performs encryption, certification, key switch, and firewall on the fourth (transport) layer of the Open System Interconnection (OSI) reference model (Figure 3). The use of TCP2 makes it possible 1) to identify the person who accesses the system, 2) to establish secure communication independent of hardware and software, and 3) to build strict privacy and security measures into the system. Information sharing based on personal identification and hardware- and software-independent security will be realized in the J-CHIS.

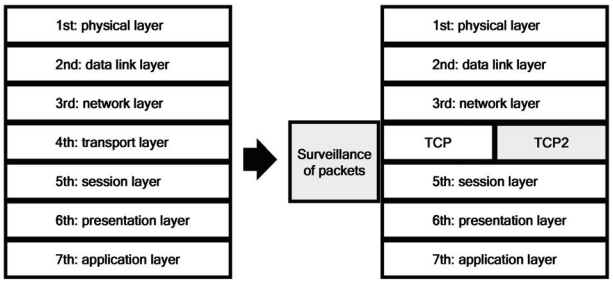

Figure 3 - TCP2

Conclusion

The J-CHIS will support health examination, health education, and outcome assessment in compliance with the newly-proposed national guidelines. It will contribute to promoting the Japanese health promotion and disease prevention system by information sharing based on personal identification and hardware- and software-independent security.

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