

The Telehomecare/Telehealth System in Japan

a report by

Dr Masatsugu Tsuji

Dean and Professor of Economics, Osaka School of International Public Policy (OSIPP), Osaka University



Dr Masatsugu Tsuji is Dean and Professor of Economics for the Osaka School of International Public Policy (OSIPP) at Osaka University. Major areas of speciality include economic theory, Japanese economy and economics of information. Current research is focused particularly on economics of telemedicine. In addition to having engaged in advanced studies in the US, Dr Tsuji has much international experience through participation in international conferences and field research abroad. He was awarded the "Telecommunications Social Science Award" by the Foundation for Promotion of Telecommunications for co-authorship of *The Economics of Telecommunications* (in Japanese) in May 1994 and received the "Award for excellence of paper" from the World Tele-port Association in May 1996 and also by the Japan Society of Information and Communication Research in June 1998. Dr Tsuji's publications include *Privatization, Deregulation and Economic Efficiency, Private Initiatives in Infrastructure: Priorities, Incentives and Performance* and *The IT revolution and Developing Countries: Late-Comer Advantage?* Dr Tsuji received a BA in Economics from Kyoto University, an MA in Economics from Osaka University and a PhD in Economics from Stanford University, US.

Currently, Japan is leading the world in the field of Japanese telemedicine, especially telehomecare, in terms of the number of systems implemented by local governments and the manufacturing devices related to telehomecare. Based on field research on those systems, the characteristics and issues of the Japanese telehomecare system are presented as follows.

Definition of Telehomecare

Telehomecare implies the use of electronic signals to transmit medical information on patients from remote areas. This is a realtime and two-way interactive transmission of information of large capacity including images and data. Telehomecare differs from telemedicine in the sense that people who transmit and receive medical information are not medical doctors but the patients themselves and their families, nurses, care-givers, home-helpers and medical technical experts, etc. Consequently, under the current level of technology, telehomecare cannot provide advanced medical treatment and services, and the focus is on primary care and mental care, such as the diagnosis of the patient at home through examining the images on personal computer (PC) or television screens and through observing health data transmitted by the system.

The telehomecare system in effect today in Japan can be categorised broadly into three groups in terms of aim, nature of medical information, equipment and type of network as follows:

- telehomecare;
- telehealth; and
- community health and welfare management type.

Telehomecare System

This system aims at providing telehomecare, for example, to bedridden patients and patients stricken with terminal diseases who require medical care. The characteristics of this system are the realtime and two-way interactive transmission of motion pictures via videoconference systems or videophones. This system is classified into three subcategories according to network type:

- community access television (CATV) broadcast;
- CATV local area network (LAN); and
- integrated services digital network (ISDN).

The CATV network is utilised by CATV broadcast and CATV LAN that can transmit high-definition motion pictures of 30 cells per second using a colour digital camera with 360,000 elements. Two working examples of CATV broadcast in operation are the systems of Goshiki Town in Hyogo Prefecture and Kamaishi City in Iwate Prefecture. For CATV LAN, there is the care-at-home support system called 'Anshin-netto' in Minami-Shinano Village in Nagano Prefecture, which is the only working example of the LAN type.

The ISDN type of telehomecare utilises ISDN 64Kb/s as its network and image information is transmitted by the videophone system. As for quality of image on a videophone screen, the motion picture is 10 to 25 cells per second and is inferior to that of the CATV type. On the other hand, in the case of ISDN, correspondence such as exchange of messages among patients can be accomplished easily, and families of the patients exchange information through ISDN. This type of system is in operation in 20 regions such as Bekkai Town in Hokkaido, Mogami Town in Yamagata Prefecture and Mitoyo Region in Kagawa Prefecture.

Telehealth-type System

The telehealth-type and regional health and welfare management-type systems differ from the previous telehomecare type in that neither use image information. The aim of the health system is not to treat patients' illnesses but to observe the health condition of elderly residents or patients regularly, for example, after they have been released from hospital.

The system consists of the following devices. First, at the patient's home, a camera, PC and remote monitoring (also called remote sensor) are installed to measure temperature, blood pressure, pulse, heartbeat, electrocardiogram and amount of blood oxygen as part of patient observation. The medical information obtained through these instruments is

then transmitted to medical institutions such as local health centres via the telecoms network, which includes public telephone lines, leased circuits, ISDN and the CATV network.

Several household electrical appliance manufacturers such as Panasonic, NEC, Fujitsu, Sanyo and Hitachi, etc., are producing and selling remote monitoring, and the current price is US\$2,000 to US\$3,000 per set. This system is a simple device but, when it is used continuously, the condition of the illness such as a chronic disease is shown in graphs that are then used for diagnosis and consultation.

The system is also effective for encouraging patients to take more interest in their health condition. Some of the terminals are equipped with a simple voice function and the doctor can examine the condition of the patient's health by talking with the patient. Local governments operating a care-at-home-type system, as mentioned previously, use this system jointly. There are 76 local governments across Japan that operate the telehealth system, including Kiwa Town in Mie Prefecture, Tadami Town and Nishi-Aizu Town in Fukushima Prefecture and Manmoku Village in Gunma Prefecture. The total number of devices amounts to more than 8,100 as of August 2000, which is the largest in the world.

Regional Health and Welfare Management-type System

The regional community health and welfare management-type system is not only aimed at providing information on the patients' health condition, but also at providing complete information regarding health/medical care/welfare services by setting up a database of such residents' information. Via this database, information is shared among the local government departments that provide each service. In an ageing society, it is highly desirable for all kinds of information related to the elderly to be centralised, and all medical institutions, administrative bodies and volunteer groups in the community can share this information in order to ensure the adequate provision of services.

However, not many local governments are putting this system to practical use. Two examples are Kawai Village in Iwate Prefecture and Kakogawa City in Hyogo Prefecture. In the case of the Yuitori Network System of Kawai Village, the public health centre, welfare centre for the aged, Kokuho Clinic, special nursing home for the aged, supporting centre for care at home, day service centre and village office are linked together by fibre-optics and LAN. In the database, information on medical care/welfare is

VIDEOCONFERENCING FOR LESS!



- * Conduct face-to-face meetings with your business associates, clients, family and friends without the hassles of traveling
- * New generation of affordable plug-n-play systems **at 60-80% OFF MSRP**
- * TV-quality video and audio systems from top manufacturers - Polycom, PictureTel, Tandberg, Vtel, Sony, Philips and more
- * Prices start **at \$975**

**Visit us at www.vc4less.com
Call toll free (800)400-1059**

vc4less

**172 Garibaldi Ave. Lodi, NJ 07644 USA
Phone (973)458-9745 Fax: (973)458-9874**

entered and shared by all those involved in telehomecare such as doctors, physiotherapists, public health nurses, dieticians, lifestyle instructors and other village staff.

In Kakogawa City, more than 160 local medical institutions are linked by the 'Local Health and Medical Care Information System' – an ISDN 64Kb/s network – and the medical information that has been entered by doctors is shared by those who are engaged in local medical activities. In this way, the system aims to prevent redundant medical examination and medication and strives for a more efficient method of providing medical care to the community.

Effectiveness of a Telehealth System

A field survey was conducted on users of a telehealth system in Nanmoku Village, Kamashi City and Katsura Village and the following results regarding the effects of telehealth systems were obtained:

- stabilisation of the condition of diseases;
- rising health consciousness;
- decreasing anxiety towards health; and
- decreasing medical expenditures.

Health data sent to the medical institution is simple but basic. By examining the medical data each day, medical staff are able to recognise changes in health condition and give advice to the users. By reading their data records, users begin to want to improve that data. Thus, they pay more attention to their own health. Users can communicate with medical staff via the system and, as they realise they are connected to medical staff 24 hours a day, this decreases any anxiety.

According to replies to questionnaires, about 20% of the users claim their medical expenditures declined after their use of the telehealth system. This was a rather surprising result so this hypothesis should be proved by other methods of research.

Regarding assessment by users in the survey in three regions, more than 90% of users recognise that the system is helpful and want to continue to use it. More than two-thirds of users are satisfied with the function of the device and replied 'nothing to improve'. Most users are elderly yet stated that the devices are easy to learn how to operate. To summarise, it can be concluded that the three systems surveyed are supported by users.

Comparison of the Telehealth Systems

As mentioned previously, Japanese household electrical appliance manufacturers such as Panasonic, NEC, Fujitsu and Sanyo, etc., are selling remote monitoring and more than 8,100 have been used. The largest share is occupied by 'Urara', which was invented and is

manufactured by Nasa Corporation. Urara is adopted in Kamishi City. It is designated for simple functions and is therefore cheap. Other monitoring terminals are manufactured by well-established companies: Sanyo is selling 'Medicom,' while NEC sells 'Sukoyaka Mate'. These have multifunctions and, since PC is a platform, functions such as transmitting image and voice data are attached easily. On the other hand, they tend to be expensive. Currently, local governments seem to pay attention to Urara's price. With the development of Internet technology, however, telephony or even videophone systems will become available soon. At that time, the telehealth system will expand to incorporate these functions.

Supplementary Program to Increase Usage of the System

The important issue regarding the Japanese telehealth system is that the usage rate is quite low in some local governments. Most local governments provide the device without any cost to the elderly in the region and they do not charge any fee. This means that there is less incentive to measure the health data. Kamaishi City, on the other hand, charges about US\$25 per family but its usage rate is quite high. Twenty-six per cent of the users record the data every day, and 29.1% at least once a week. The reasons for the high usage rate are:

- the system is operated by a medical hospital; and
- the users' association.

Most of the systems of local governments are operated by public nurses and not by medical doctors. The participation of medical doctors adds to the confidence of the users. The association provides meetings and conferences on health regularly and this helps to promote health consciousness. In order to increase the usage rate, these kinds of schemes are required.

Another Role of the Japanese Telehealth System

Except Panasonic, which started the telehealth business in the US summer in 2001, Japanese manufacturers are quite reluctant to export, even though it has strong international competitiveness. Another role of a Japanese telehealth system is found in the collaboration with developing countries. It is reasonably priced, simple to function, easy to operate and only requires a telecoms infrastructure to provide service. Installing the system in villages in those countries might help to promote health and welfare of the residents. ■

Additional Information

The complete version of this article, including graphics, can be found in the Reference Library on the CD-ROM accompanying this business briefing.