Health Information

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Computers against disease

In order to improve the efficiency of the collection, compilation and dissemination of information on 35 communicable diseases in China’s Sichuan Province, a computerized network has been established. In 1987 a microcomputer link was set up between the Provincial Health and Anti-epidemic Centre at Chengdu and the Health Information Centre in Beijing, and in 1990 a microcomputer network was established between Chengdu and the 21 prefectures in the province. Substantial progress in disease control is already apparent as a consequence of these developments.

China’s Sichuan Province has a population of over 107 million and is divided administratively into 21 prefectures, 213 counties and 7068 townships. Measures on health and communicable diseases are conducted by the health and anti-epidemic system: there are 236 health and anti-epidemic centres in the province, and more than 7000 anti-epidemic groups in health clinics or township hospitals. Almost 14 000 health personnel work in units above county level.

The Provincial Health and Anti-epidemic Centre, set up in 1953 with a staff of approximately 500, is mainly responsible for surveillance, supervision, training, law enforcement in health matters, and scientific research. Its terms of reference include environmental hygiene, the monitoring of water quality, food hygiene, health education, epidemiological research, disease control, immunization, disinfection, control of insect vectors, staff training, the implementation of health regulations, and the enforcement of standards. Similar duties are performed by the prefectural and county centres.

In China there are 35 notifiable communicable diseases, cases of which must be reported daily by clinics and hospitals to the local county or municipal health and anti-epidemic centres, and monthly to the prefectural and provincial centres. These diseases remain a significant problem: in 1990 over 503 900 cases were reported in Sichuan. The main responsibility for controlling infectious diseases lies with the local health and anti-epidemic centres.

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From manual to electronic

Each report submitted has to indicate the patient’s name, sex, age, race, address, occupation, and school or work unit; the kind of exposure; any history of attacks; the dates when the disease appeared and hospital was first attended; and the dates of diagnosis, cure, death or other developments. If there is an outbreak of infectious disease the county centre reports immediately to a high-level centre by telephone or telegram. The data from all counties are analysed, and a report is sent to the prefectural and municipal centres, the provincial centre and the Ministry of Public Health.

The manual collection, storage, compilation, management, processing and dissemination of data on the 35 communicable diseases proved too slow, and the preparation of summarized information was very difficult. The indirect flow of information, together with delays in its processing, severely diminished its usefulness when it finally reached the Ministry of Public Health. In many instances, information arrived too late to be of service in the implementation of strategies and measures. An efficient computerized information network was clearly needed to support work on the prevention and control of communicable diseases, and during the last two years the Provincial Health and Anti-epidemic Centre of Sichuan has begun to employ microcomputers with numerous software applications.

A two-week training course on computer skills was held for suitably qualified people, who were required to have a satisfactory command of English. The main focus was on practical operations with microcomputers.

A user-friendly system

So that the system can be adopted in various settings, well-known commercial software and widely compatible hardware are employed. It is also intended to be user-friendly, easily understood, and operable by health personnel who lack extensive computing experience.

The system uses an IBM PC/XT computer and the compatible T&W 286 machine (MS-DOS 3.0; 640 KB (1MB) RAM), a floppy disk drive, a hard disk drive, and a modem. A telephone permits the quick sending of information to and receiving it from municipal, prefectural, provincial and national public health agencies.

Funding and training

The cost of microcomputer equipment was shared equally by the Provincial Health Bureau and local government. The enthusiasm and initiative of the local authorities were thereby stimulated.

The software is written in Foxplus, chosen because it is powerful, well known and widely available. Its capabilities should easily meet the anticipated needs of the Sichuan database. For larger databases, other, more suitable software could be employed, such as SPSS, SAS and HG.
Information is communicated using the modem and telephone. The transmission rate between the provincial centre and local centres is 1200 bps; that between the provincial centre and the Health Information Centre in Beijing is 2400 bps.

The capabilities of the system include the entry of information about patients, the location of patients’ records, and the monthly preparation of summary reports.

The benefits of the computer network system are outlined below.

- Funds can be obtained more quickly than formerly when urgently required. During the summer and autumn of 1991, over 100 counties had exceptionally serious floods, and there were outbreaks of infectious intestinal diseases. Daily reports were required in Beijing, and this was achieved thanks to the microcomputer network, making possible the prompt transfer of funds.

- Medical teams and medicine can be sent expeditiously to disaster areas. Thus, after receiving information on epidemics, the Provincial Health Bureau made decisions immediately and a large number of medical workers were quickly available to treat the sick and organize precautionary measures.

- Time and manpower can be saved: by using the microcomputer network, processed data reach the Ministry in Beijing 15–20 days earlier than formerly.

- The reliability and analysis of data can be improved. With manual methods, mistakes often occurred during the collection and compilation of data. Computerization permits the detection of errors.

- Feedback on infectious diseases can be accelerated, allowing prompt action by the authorities at all levels.

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The computerized system provides increased speed and accuracy at all stages from data entry to the reporting of results. When data are entered the operator is alerted to values that are invalid or unlikely. In addition it is possible to locate, retrieve and review cases more readily than with manual techniques.

The system is user-friendly and has a self-explanatory menu. The data input displays are modelled on standard Ministry of Health reporting forms. The capabilities of the system include the entry of information about patients, the location of patients’ records, and the monthly preparation of summary reports. The latter facility could lead to an increase in the proportion of reported cases of notifiable infectious diseases. Ultimately, the system will allow the electronic transfer of information between health agencies.

The computer network has already enabled great strides to be taken in the fight against notifiable diseases. Other developing countries may wish to examine the experiences gained with a view to taking similar action.