

type. Since early 1976, the bureau has been receiving financial support beyond that provided by members' subscriptions through an arrangement between the provinces and the Federal Government.

By the end of 1975, the bureau had published three issues of *Health Computer Applications in Canada*, giving health professionals across the country a picture of what computer applications are being developed and used, and cataloguing more than 900 applications. Let me describe a few of the 490 applications described in detail in the catalogue.

At Toronto's Hospital for Sick Children, Dr. Michael Albisser has developed an artificial endocrine pancreas of great benefit to diabetic patients. By giving insulin according to a computer-projected level of blood sugar, it effectively restores to the diabetic patient the pattern of a healthy pancreas. Knowledge gained from this research will be used in the on-going development of an implantable artificial endocrine pancreas.

Other medical applications

At the University of British Columbia, Dr. M.P. Beddoes has developed a talking typewriter, called Spellex 1, to help the blind in typing and reading.

As the blind person types, the system's computer, linked to remote terminals by telephone lines, spells out each word letter by letter. A reading machine is now being developed to scan a line of print and output the letters in spelled speech. Experiments indicate the blind can read at 80 words a minute with this machine, after a short period of getting used to the voice.

Another project described in the catalogue is the formidably named technique of computerized transaxial tomography (CTT) which helps doctors detect brain hemorrhages and assess the condition of patients with head injuries.

Using equipment originally developed in the United States, Dr. M.J. Molot at the Hamilton General Hospital and computer engineer C.J. Thompson at the Montreal Neurological Institute, among others in Canada, have worked to perfect this technique. A narrow beam of X-rays scans the head in a circular fashion, making a series of horizontal cuts. In the course of each cut, 28,000 separate readings are registered by gamma sensitive detectors

instead of the photographic film used in conventional X-rays. The readings, processed by a mini-computer, may be displayed in digital or video form. The result is a picture 100 times more detailed than that provided by a standard X-ray examination.

Health data banks

One of the most important roles of computer communications in the health care system is linking individual records and incorporating them into data banks. The availability of fully-linked health data would enable health professionals to obtain the critical and sometimes life-saving information needed for emergency treatment. It would also avoid the great waste of time now spent duplicating identification data, and assist in making full health histories transportable when people move or change doctors.

Technology is already available which can provide — for under \$10, in credit-card size — a personal, portable health file, containing microfilms of health history which can easily be read at any level of health care.

With the health care system in 1975 probably costing somewhere between \$400 and \$500 for the average Canadian, it would seem economical to provide a personal, portable health history to every citizen.

Private concerns

The proliferation of computerized health data raises concerns about the control over this type of information. Two dangers are commonly stressed: possible interference with the long-standing confidential relationship between patient and health professional; and potential invasion of privacy, because of the increase in the number of people who might have access to personal health information.

If the health professional-patient relationship in itself is sound and firmly based on trust, it need not be endangered because the doctor or public health nurse uses a computer facility instead of a filing cabinet to store information about patients. It is a simple matter for health professionals to use whatever means are necessary, from programming techniques to security devices, in order to prevent unauthorized access. No record, whether computerized or not, is safe in badly

guarded storage. But at present, far more people suffer from lack of information about their health problems and their treatment (for example, drug reactions) than from improper disclosures of confidential information. With a personal, portable health history, individuals would be aware what information about their health was known to others in the health system, and would be able to exert greater control over it.

Who watches the watcher?

A more complex problem is posed by government data centres which, in support of national health insurance, collect data about the health of the individuals. Who will watch the watcher? In this respect, the professionalism of directors and key employees of a growing number of computer centres will play a vital role. As soon as they can achieve an independent professional status under legally binding terms of reference and can function as honest brokers, the privacy-confidentiality issue will be defused.

Building on the relationship of trust between society and health professionals, they will ensure that computer-stored medical information to be transmitted to governments and researchers is accessed only with the knowledge and consent of the patients.

Political problems

What should federal and provincial governments try to accomplish in relation to the computer in health care? In Canada, the Federal Government may legislate broadly in matters of health care, but the provincial governments have the final word in matters of application of policy. At present, there is no unified approach to such problems as the duplication of effort and costs, due to similarity of projects; the priority to be given to certain applications; the social impact of project implementation on patients and health care personnel; and the responsibility — fiscal and administrative as well as scientific — for project implementation.

The future of health care computer applications in Canada depends largely upon how quickly the federal and provincial governments begin solving these problems, many of which are politically oriented.