

# Fibre-optic links eliminate distances separating specialists, patients

John Lyttle

## In brief

NEW TYPES OF TELEMEDICINE LINKS are being tested in Ottawa and the definition they provide is so good that cardiologists can treat patients several hundred kilometres away. Dr. Wilbert Keon says this technology should not be seen as an expensive frill but as a needed advance that will make health care more efficient.

## En bref

UN NOUVEAU GENRE DE CONNEXION DE TÉLÉMÉDECINE est à l'essai à Ottawa et le degré de définition d'image qu'il permet est tel qu'un cardiologue peut traiter un patient situé à des centaines de kilomètres. Le Dr Wilbert Keon affirme qu'il ne faut pas voir cette technologie comme un luxe coûteux mais plutôt comme un progrès essentiel pour améliorer l'efficacité des soins de santé.

**T**he University of Ottawa Heart Institute is now using fibre-optic lines that allow it to conduct the fastest telemedicine in the world. Roy Marsh, the institute's project manager for telehealth, says a fibre-optic project linking the institute with physicians in Pembroke, Ont., was launched in earnest last November, delivering or receiving data at a rate of up to 45 megabits a second — roughly 1500 times the speed of a typical computer modem. Other slower systems are also being tested, since few specialties require that much telemedicine power.

The transmission system, which is to support videoconferencing, medical imaging, voice and data calls, and Internet connections, was developed with support from the Ontario government and communication industry giants such as Bell Northern and Nortel. Cardiologists at the institute are now testing the benefits of using the systems to conduct consultations involving patients far removed from Ottawa. For instance, the Heart Institute now holds a weekly "cyberclinic" during which its doctors examine patients from the Pembroke General Hospital.

Institute director general Wilbert Keon, a cardiac surgeon who also sits in the Canadian Senate, says this type of high-tech advance needs further funding, even as Canadians from coast to coast witness cuts in other areas of health care spending. The Heart Institute's telemedicine project, which has a budget of more than \$6 million for 1997 and 1998, received a \$2-million grant from the province in March 1997, and this was matched by industry funding.

Even as the telemedicine grant was being approved, the Ontario Health Service Restructuring Commission was seeking ways to chop \$126 million from hospital budgets in the Ottawa area, and last year it ordered the closure or transformation of 3 Ottawa hospitals. But isn't it a contradiction to close hospitals while at the same time spending money on a frill like telemedicine?

Not at all, says Keon, who argues that many hospitals have been closed simply because they are obsolete. On the other hand, telemedicine R & D is "a necessity — it's as essential as the telephone was when it came into play. One of the major problems in medicine is the resistance to progress. What we need is more, not less, research and development because the payoff is enormous."

Keon says it is ridiculous that Canada, which has an annual health care bill of around \$75 billion, allocates so little money to health care R & D, and he remains "amazed that there is so much resistance to progress."



## Features

## Chroniques

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He thinks the Heart Institute is ideally placed to conduct research because of its telemedicine connections with other hospitals. The initial fibre-optic connection was with Pembroke, a small Ottawa Valley community about 200 km west of the capital. Links with Almonte, 50 km southwest of the capital, and the Chapleau Cree First Nations Reserve near Timmins were expected to be completed this spring. Keon says the institute wants to test 3 systems: fibre-optic cables, telephone lines and satellite links.

Shu-Tim Cheung, manager of information technology at the institute, says cardiac medicine is the ideal testing ground for such equipment because it requires a range of bandwidths, from an electrocardiogram that requires only 1 megabit per second (mbps) to an angiogram that requires 20 mbps.

“The ultimate goal we would like to pursue is to monitor a patient in intensive care [using telemedicine],” he says. This could ensure that a patient has quick treatment without having to be transferred from a remote part of the province — a transfer that not only would be costly but could also put the patient’s health at risk. “We just don’t have enough specialists in every city,” says Cheung.

Barry Rezsansoff, from Nortel’s Industrial Applications Planning Department, says fibre-optic technology involves more than bells and whistles: it means doctors can practise in telemedicine’s fast lane. With the asynchronous transfer mode (ATM), video and audio information travels down the fibre-optic highway at 45 mbps, about 15 times faster than an integrated services digital network (ISDN), which depends on phone lines. Some projects involving ISDN are taking place in Eastern Canada and Northern Ontario (see *CMAJ* 1997;156:1009-13).

“ISDN is cheaper but its quality is not so good,” Rezsansoff explains. The difference in quality translates into different limits in patient consultation. He says ATM provides more realistic rapport during doctor-patient consultations and allows more detailed information to flow from the remote site to the specialist.

The physician has the option of seeing several screens, including one showing the patient as he appears in the examining room and another with complete information about the patient’s angiogram. Rezsansoff says an ISDN platform would not be adequate for this type of evaluation. These networks can also cause delays in the video and audio signals, so the patient will see the doctor’s mouth move and then hear the message a split second later. This may appear to be a cosmetic problem, but it can be disconcerting during an otherwise productive consultation.

Dr. Ross Male, a resident at the Heart Institute, is excited about using the technology to reach patients several hundred kilometres away. “We can actually have a fairly


realistic conversation from a remote site,” he says. Both the doctor and patient can control the camera, adjusting perspectives and zooming in and out as they discuss the patient’s condition. At the same time, the doctor can be listening to the patient’s heartbeat and viewing a screen containing information about an electrocardiogram or angiogram.

Not only would a slower system be inconvenient, says Male, but an undependable source of data may lead to undependable diagnoses or treatments. “You’d be seeing it in a different way than you’ve been trained to see it, and that can lead to problems. The goal is to make things as clear as if you were right there.”

Dr. Richard Davies, a cardiologist at the institute, agrees that the new technology is a must for consultations. “Patients really like to feel that they’re talking to a doctor. The definition is so good that you don’t really have to have the patient in front of you.”


But do such advances put jobs at risk? Davies says technology isn’t a threat to specialists and subspecialists in remote towns and small cities. In fact, he expects it might have the opposite effect and such areas will be more likely to attract subspecialists because these physicians would now be able to consult easily with their peers.?

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