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FEATURE

A monthly features service on scientific, technical, and educational subjects pertinent to development.

Words: 900 approx.

TELEMEDICINE, THE NEXT BEST THING TO BEING THERE

by ROWAN SHIRKIE

The child was sick with chickenpox, pneumonia, and high fever. The nurse at the remote health outpost was worried and wanted to know if the child should be taken by airplane to a regional hospital, 200 rugged travelling miles away, but could not get through radio interference to reach the hospital. Then she turned to the new recently installed equipment, that would make the necessary communication link via a satellite orbiting 22 300 miles above the earth.

Contact: A brief consultation with a physician at the hospital showed that there was nothing to be gained in subjecting the child to a discomforting plane trip, and confirmed that the treatment being given by the nurse was correct and sufficient.

The incident took place in a remote area of northern Canada, during a telemedicine experiment. Telemedicine - literally, medicine over distance - is the use of telecommunications channels such as radio, television, telephone, and satellite to deliver health care. A few years from now, the scene might be acted out in any of a number of developing countries that share the same sort of problems as Canada in delivering health services to a population scattered over a large area.

With the launch of Russia's Sputnik in 1957, satellites ushered in a new age for communications, largely eliminating barriers of distance and geography. Some experts now believe that satellites can have the same sort of impact on medicine, at least in the areas of primary care and medical education.

As the technology advanced in the 21 years since that first launch, it has been possible to move from complex, expensive ground receiving stations to sturdy, readily portable terminals as small as one metre in diameter. Satellites such as Hermes (or CTS for Communications Technology Satellite), a joint Canada-USA venture launched in early 1976, are 10 to 20 times more

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powerful than any previous space communications device. Thus, without involving complex equipment that requires technical experts to operate, reliable communications can be provided at the village level.

Besides telemedicine applications, this new generation of satellites can bring a variety of social services within reach. Experiments with educational television (notably India's recent Satellite Instructional Technology Experiment), interactive broadcasting, and transmission of newspaper facsimiles point the way communications may develop.

Telemedicine is perhaps one of the most immediately beneficial applications of communications satellites. The ability to provide health care over distance, regardless of terrain or remoteness from centralized facilities, can help correct the lopsided distribution of medical resources in developing countries, now largely concentrated in urban centres and away from the majority of the population in need. As the story that began this article illustrates, telemedicine can support rural health care workers such as nurses and auxiliaries, providing access to physicians or diagnostic facilities.

Often, medical communications in rural areas are limited to persons passing through by vehicle (or by foot or animal in very remote and inaccessible areas). The level of care in these areas is limited to what the local health worker can provide on his/her own, often with poor equipment and inadequate supplies, and little or no advice from supervisory trained medical personnel. At the same time, the local health worker has few possibilities for continuing education or advancement in the job. Vital statistics go unreported, further confusing the understanding of the health levels of populations. And in an emergency or epidemic situation, many will suffer because of the delay in communicating the information or treatment needed to take action.

The educational applications of a telemedicine system could be exploited to allow a practitioner to remain in the field while continuing his training, whether it be updating his knowledge of professional procedures or new drugs, conducting a crosscountry seminar on particular medical problems, or holding "university of the air" sessions for health workers.

Two-way radios for emergency medical communications are becoming more common in developing countries, but technological, economic, and administrative difficulties continue to restrict their widespread use. The two-way radio becomes more versatile and valuable when there are enough relaying

or broad-casting stations to form a network. Satellites provide an instant network as they do not depend on the ground structure of land lines or microwave towers to reach from cities to rural areas. The World Health Organization, as part of its appropriate technology for health program, has assigned an important priority to the need for communications for the health sector. It specifically suggests two-way radio and satellite communications as alternatives that developing countries might follow.

The economics seem right, especially in relation to the expense of expanding (or establishing) land-based communications systems. The benefits are particularly great when service must be provided to a population scattered over a large area, isolated by geography or distance. Indonesia, with its people spread throughout some 3 000 islands within several million square kilometres of the Pacific Ocean, has its own domestic satellite. Algeria, Brazil, and Malaysia operate their domestic satellite systems through INTELSAT (the International Telecommunications Satellite Consortium) whose network includes 91 countries. Chile, Nigeria, the Philippines, and Zaire are planning domestic telecommunications systems using satellites.

Health care via satellite may never become as commonplace practice as the use of a stethoscope, nor as comforting as the "laying on of hands" by a human health worker. But in the search for ways to provide improved health services to the most people at the least cost in rural and remote areas in developing and developed countries, telemedicine may play an increasingly important role in future.

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