6

A growing number of studies have shown that the aggressive deployment of telecommunications can control and even reduce the runaway costs of today's health care. Estimates suggest that as much as $2 billion a day – almost five percent of the nation's total daily expenditure for health care – can be cut simply by implementing a range of existing telecommunications-based information applications.

The delivery and processing of health-care information appears to be a major key to reducing administrative costs, expediting patient care, speeding claims processing, reducing duplication and waste, and perhaps most importantly increasing accessibility to quality health care.

And just in time. For while the actual buying power of the average American has increased about one percent since 1980, the cost of health care during that time has ballooned by more than 163 percent. Health care costs, in fact, are growing today at about 13 percent a year.

Yet the studies say telecommunications can stem this tide, and that the aggressive deployment of electronic data systems offers two major benefits:

❖ First, it can significantly reduce the cost of handling, storing and processing this mountain of information. According to the consulting firm of *Arthur D. Little*, almost 14 percent of the nation's total expenditure for health care is spent on managing this data – most of which is still *initiated, transferred and at least partially processed as paper.*

❖ Second, the easy availability of information appears to be a major factor in reducing the duplication of routine tests, radiological workups, and the perpetually repeated entry of basic patient medical histories.

Making Information Available

Today most modern hospitals have begun to address these challenges by making the rapid, easy transfer of information a reality. Using sophisticated high-speed backbone data networks, virtually all of the facilities, departments and offices on a hospital's campus can be joined together to give physicians, nurses and others immediate access to up-to-the-minute information stored anywhere in the facility.

In addition, many metropolitan, university and teaching hospitals are becoming part of regional networks joined by similar ultra-high-speed connections. These dedicated networks often include key medical and diagnostic laboratories, major radiological clinics, and a host of similar locations.

In effect, they bring together many facilities into total medical data systems for the rapid exchange of information, and the timely collaboration of individuals in many disciplines in many locations.

At *Massachusetts General Hospital*, for example, a dedicated data network – with data speeds as high as 45Mbps (megabits per second) – now brings together some five regional hospitals. This network carries a staggering array of applications, from remote video diagnostics to consultations among physicians simultaneously sharing radiological images, medical records and complete clinical and laboratory test results.

Extending a Backbone with ISDN

The one limitation of these systems, however, Is that they are typically closed – not by choice, but by the economics of extending expensive, dedicated high-speed digital connections to hundreds of smaller, often remote locations.

The answer again, of course, is ISDN. Dialed BRI connections can quickly and inexpensively extend these networks to distant locations, to smaller hospitals in rural areas, to nursing homes, hospices and special care facilities, and to doctors, nurses and others at their offices and even their homes.

Extending a backbone.
Dialed ISDN connections can open a backbone to thousands of locations where dedicated lines are too costly. Result: smaller facilities, rural clinics, even individual physicians at home can become part of the network. The network itself can also reach out to any resource, anywhere in the world.

BACKBONE NETWORK   SMALLER or REMOTE LOCATIONS
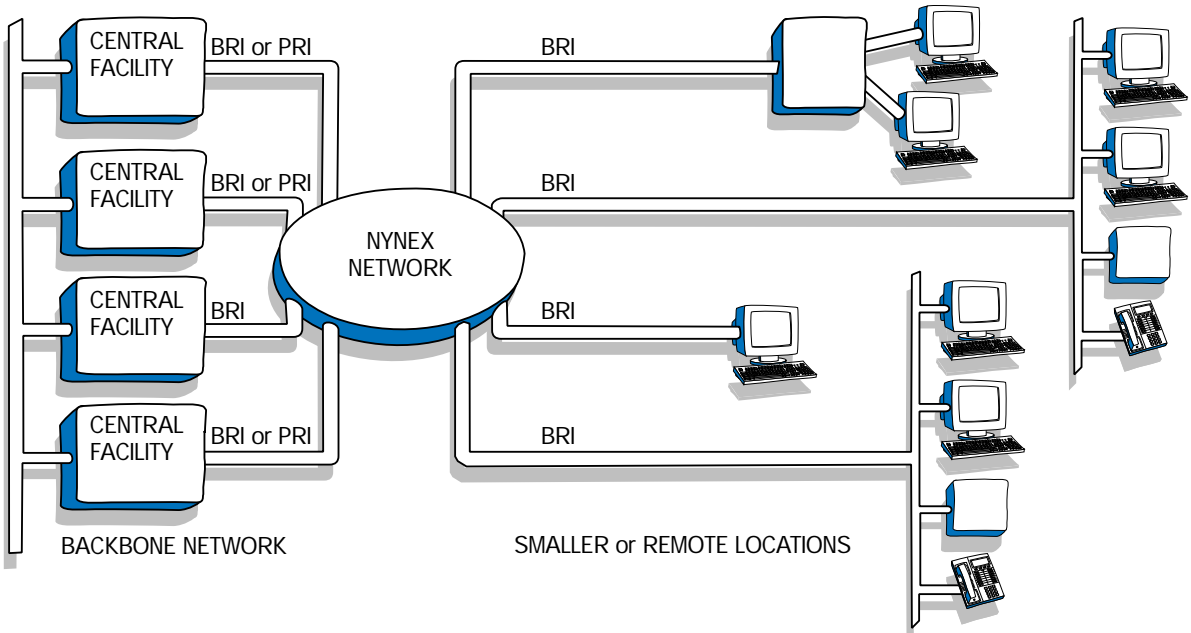
One of the nation's best examples of extending a backbone is at *St. Vincent's Hospital* in Birmingham, AL, a member of the Daughters of Charity National Health System.

According to Russell Wilson, the entire hospital campus is linked by a single, high-speed data network. Fiber-optic connections link every department on the campus for access to host computers, medical records and patient information, for reports from medical and radiological laboratories, for operating room and other schedules, for pharmacological data, accounting and billing data, as well as e-mail and other administrative information.
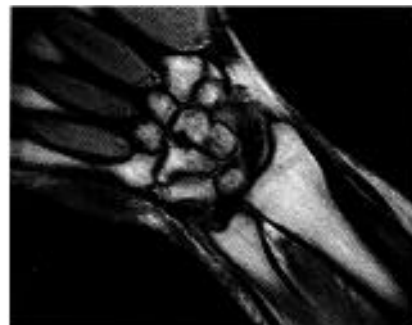
"Our medical record department today is totally paperless," said Wilson. Which means that doctors, nurses and other health care practitioners have immediate access to each patient's complete records, no matter where the patient is, and no matter where the information is needed.

The role of ISDN in this environment is obvious: to *extend* this central backbone to off-campus locations that are part of the hospital's care system. These include radiology and medical laboratories throughout Birmingham, clinics and offices of doctors associated with the hospital, doctors' homes for weekend and evening access, and even insurance companies and others who need patient billing information.

Equipment used includes a Gandalf concentrator at the hospital linked to Gandalf routers at remote LANs and individual desktop computers. Speeds through bonded B channels in a single ISDN BRI average about 600Kbps, according to Wilson.

"Users at remote sites really cannot see a difference," he said. "Dialed connections are set up in less than three seconds, and transmission and response times are so fast that users feel like they are actually on the LAN."

Transmitting radiological images. *All types of medical images are now being sent and retrieved through the digital channels of ISDN. Faster ISDN speeds mean that even diagnostic-quality images can now be transmitted.*

Teleradiology

A major component of today's medical diagnostics is the growing radiological capability to look carefully and deeply within the human body. The images produced include Computerized Tomography (CT or CAT) scans, Ultrasound, Nuclear Medicine, Magnetic Resonance Imaging (MRI), and of course the traditional X-ray. All except X-rays, in fact, originate as digital files viewed on
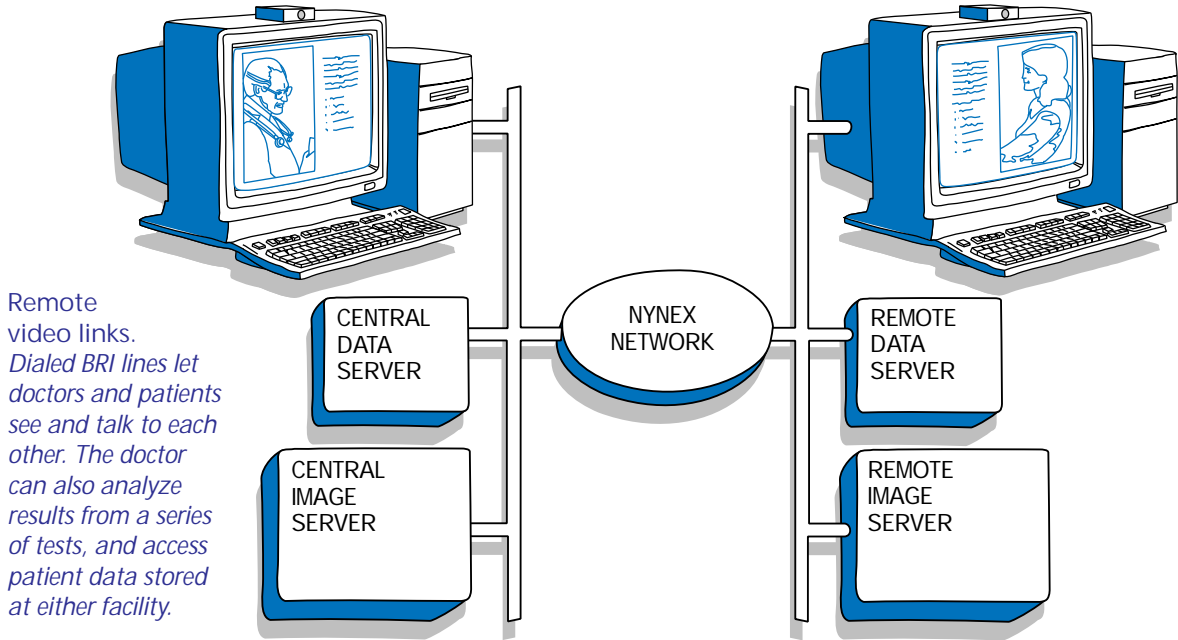
Remote video links. *Dialed BRI lines let doctors and patients see and talk to each other. The doctor can also analyze results from a series of tests, and access patient data stored at either facility.*

CENTRAL DATA SERVER

CENTRAL IMAGE SERVER

NYNEX NETWORK

REMOTE DATA SERVER

REMOTE IMAGE SERVER

ultra-high-resolution computer screens. In addition, many X-rays, although they begin as photographic film, are being scanned into digital files for storage or transportability.

The ability to transmit these files – to specialized radiologists for analysis and diagnosis, to remote experts for consultation, to surgeons preparing for an operation, to expert technicians for image enhancement, and more – not only saves time and travel, but dramatically expands the circle of expertise available to the care of any patient. Unfortunately, the enormous size of these digital images (as much as 10-20 megabits and more each) has traditionally limited their availability to those directly linked to the higher speeds of a backbone network.

Yet ISDN has begun to answer specific needs, and to save time when time is critical. With the increased speeds of ISDN, even diagnostic-quality images are now transmitted beyond a hospital complex for emergency diagnosis, remote consultation, or timely review and comparison.

At *Richland Memorial Hospital* in Richland, SC, for example, radiologists affiliated with the hospital receive good quality radio-logical images at their homes through ISDN BRI connections. Instead of rushing to the hospital in pre-dawn hours to look at an accident victim's x-ray or CT scan, key images are transmitted to a high-resolution monitor at a radiologist's home, where he or she can prepare an initial diagnosis while still in robe and

slippers. The system uses Macintosh-based ICON video-capture boards and software with Gandalf routers. The images are good enough to let doctors consult with emergency room physicians, and decide whether a trip to the hospital is, in fact, necessary.

Patient Information and Medical Records

ISDN also lets virtually any physician or qualified health-care practitioner at any location access a patient's medical history stored at virtually any medical facility, doctor's office or laboratory. The result is better data for physicians, faster and better diagnoses, less duplication of specialized testing, and more efficient patient health care.

At *Baystate Health Systems* in Springfield, MA, for example, access to the high-speed backbone has now been opened to physician's offices through ISDN connections. According to Michael Weisse, senior systems programmer at the facility, doctors can dial into a patient-care information database for complete patient histories and medical records, for pharmaco-logical data and synopses of laboratory test results. They can also access the laboratory system database to study detailed results from a range of labs associated with the hospital.

"ISDN also gives them quick and easy access to e-mail, bulletins, schedules and more," notes Weisse.

Remote Video Consultations

Video links between doctors and their patients has just begun to be tested in hospitals nationwide. Yet early practitioners have been amazed at the thoroughness and accuracy these remote consul-tations have brought to patient care, and point to the enormous potential for extending these links to rural clinics, nursing homes, hospices and literally scores of similarly remote locations.

The *New England Medical Center*, a 450-bed hospital complex in Boston, for example, is beginning to develop video conferencing capabilities that will reach out to long-term health facilities, such as nursing homes, hospices and the like. According to John Patterson, the hospital's director for advanced planning, many nursing-home patients who travel to a hospital are not admitted, but are returned to their facilities for treatment. By installing an ISDN video link, he noted in an interview, patients can have immediate access to quality healthcare without the time and cost of hospital visits.

Remote telemetry. *Temperature, blood pressure and pulse readings, as well as electro-cardiograms and a broad range of other diagnostic tests, can be quickly and accurately transmitted through ISDN connections.*
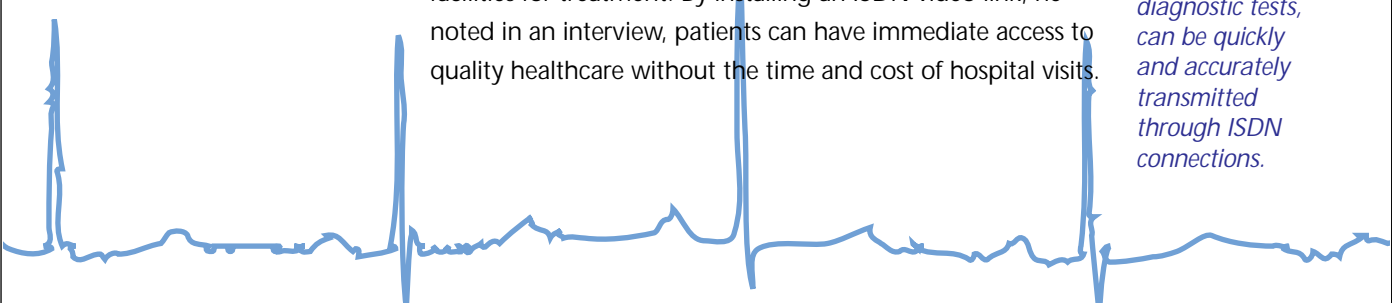
At the *Medical College of Georgia* in Augusta, a similar program is already in place. Doctors use BRI video links to extend modern medicine to rural areas throughout the state. These video consultations put the diagnostic expertise of a doctor on one end of the connection, and the patient with a caring health-care professional on the other.

The doctor can see and talk with the patient, employ a wide range of instrumentation – from blood pressure readings and electrocardiograms to results from a series of medical devices – and examine the patient as thoroughly as if they were in the same office.

Tests indicate that electronic claims processing can save as much as $50-60 billion a year.

Electronic Claims Processing

The insurance industry processes more than 200 billion claims for medical care each year – more than 90 percent still submitted on paper. Yet a number of Blue Cross and Blue Shield offices nation-wide have shown that medical claims received in electronic form are not only significantly less expensive to handle, but can be processed much more quickly and accurately.

Typical results from their controlled tests indicate that electronic claims processing could in fact save as much as 30 cents a claim – or a *potential savings of some $50-60 billion a year.*

"ISDN is the first step towards better, more accurate, faster health care" says Len De Paolo, vice president of marketing at *Communications Planning & Services.* "ISDN is also the first step towards saving enormous amounts of money in the process. Many of the systems are already in place: what we need now is the will to make it happen."