



# BETTER PAT

by Samuel Greengard  
Photographs by Peter Ross



North Shore-Long Island  
Jewish Health System  
embraces new technologies  
to improve patient care and  
hospital administration.

# PATIENT CARE

**I**t's a few minutes past ten o'clock on a Tuesday morning and Carl Ilardi, M.D. is sitting in a small conference room evaluating a slide of a patient's biopsy for cancer. The chief of pathology for South Side Hospital in Bay Shore, New York, Ilardi uses a computer and manipulates the slide to view cross sections of the tissue. While he's studying the slide, he looks down at the bottom right-hand corner of the screen at two other doctors with whom he is consulting. "Take a look at the cell structure. At this point, it appears to be precancerous," he says.

This is no ordinary meeting, and this certainly isn't conventional medicine. Ilardi is using a state-of-the-art telepathology

maintaining costs, South Side Hospital is part of the North Shore-Long Island Jewish (North Shore-LIJ) Health System, which is blazing a trail into the future. Over the past two years, North Shore-LIJ—the third-largest not-for-profit health-care system in the United States—has turned to leading-edge networking technology to improve efficiency, reduce costs, and enhance patient care.

North Shore-LIJ has implemented technology solutions including a sophisticated enterprise portal that simplifies physician access to data, whether they are on-site or remote and accessing data via a virtual private network (VPN). Internet Protocol (IP) telephony, video on demand, and e-learning solutions boost efficiencies and streamline processes.

## "THE GOAL IS TO STEP OUTSIDE THE BOX AND BUILD SYSTEMS THAT MAXIMIZE THE ORGANIZATION'S POTENTIAL." —MICHAEL J. DOWLING, PRESIDENT AND CEO, NORTH SHORE-LIJ

system that carries data, voice, video, and high-quality digitized images across a high-speed secure network so he can view a microscope that is physically located more than 20 miles away. Another pathologist currently isn't available for consultation at that facility, but rather than make the patient wait a day or two for results, Ilardi can ask colleagues at other facilities to join him online to provide third or fourth opinions (if necessary), then provide instant feedback and diagnosis to the patient. "This is a huge step forward," says Ilardi. "The system allows pathologists to provide information faster and better than ever before."

At a time when hospitals and other health-care providers are under enormous pressure to offer high-quality care while

"What we've done will set the stage for the use of wireless devices at the bedside," says Patrick Carney, chief information officer for North Shore-LIJ. These technologies, plus the telepathology program and other online collaboration tools, demonstrate that North Shore-LIJ has its finger on the pulse of medicine.

In fact, Consumers' Checkbook, a nonprofit consumer-education organization, rated North Shore University Hospital in Manhasset, New York as the top U.S. hospital in its 2002 survey.

"Just as businesses in other industries are benefiting from the Internet and advanced networking capabilities, so too can medicine. Today's technology can improve the level of service for physicians, patients, employees, and others," says Michael J. Dowling, president and CEO of North Shore-LIJ. "The goal isn't technology for technology's sake, it's technology to save lives and improve the way people work."

### IN BRIEF

**GOALS** \\ In the spring of 2001, executives at North Shore-Long Island Jewish Health System (North Shore-LIJ), the third-largest not-for-profit health-care provider in the United States, recognized that the organization's 18 hospitals and dozens of clinics required a high-speed network and new applications to improve medicine, streamline business processes, and cut costs.

**STRATEGIES** \\ By introducing a variety of initiatives, including telemedicine, an enterprise portal, video on demand, IP telephony, and wireless data access, North Shore-LIJ seeks to provide state-of-the-art technology for physicians, employees, and patients. It spent more than \$5.5 million and eight months building an advanced fiber-optic network to support its current and future technology initiatives.

**RESULTS** \\ The health-care provider has improved service levels, reduced administrative tasks, improved paperwork accuracy, and cut costs. It now saves about \$400,000 annually on network and telecommunications expenses and expects savings to swell by 50 percent over the next couple of years. More importantly, it has strengthened its relationship with physicians, employees, patients, and the general community.

### TECHNOLOGY AS A TOOL

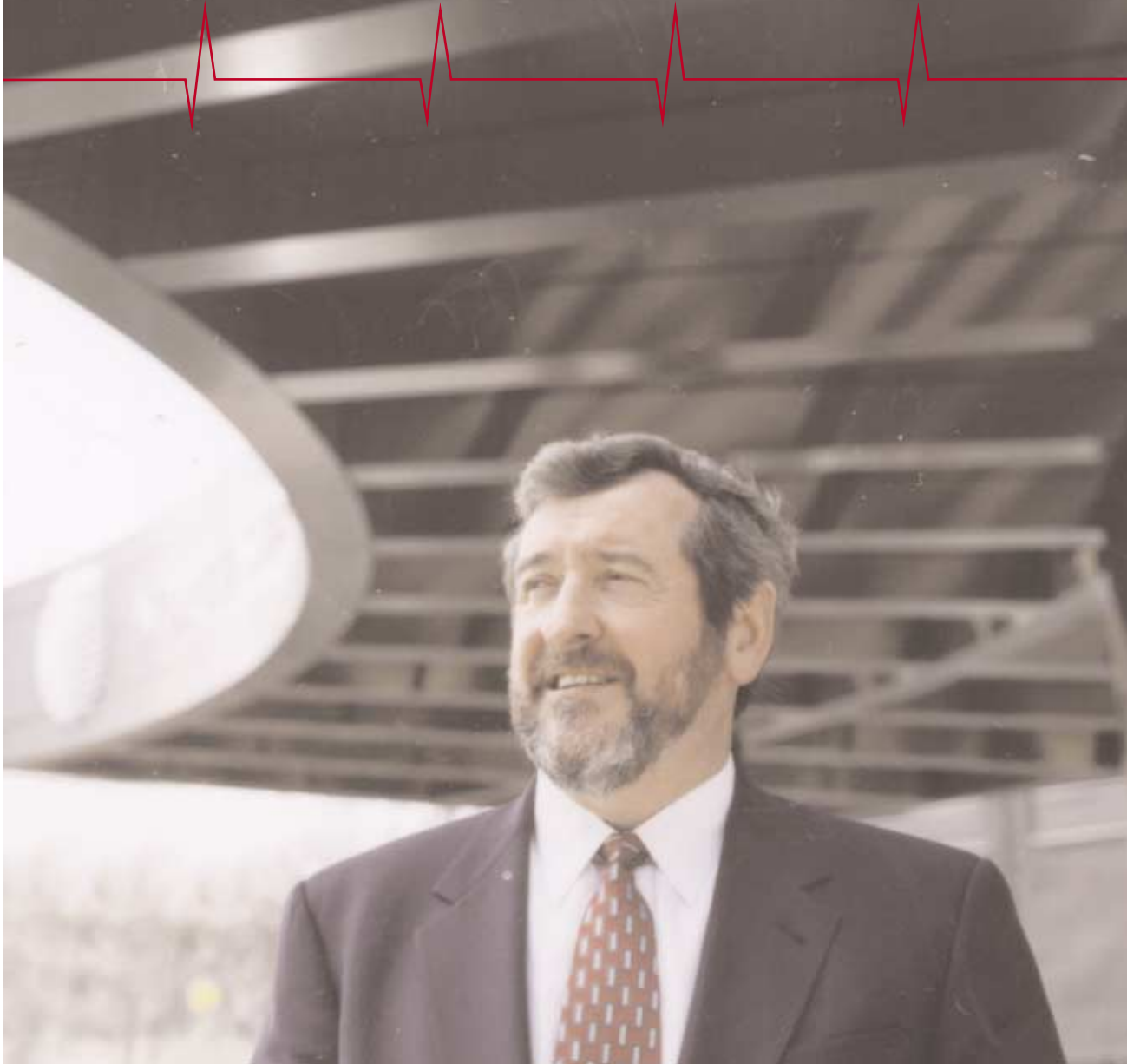
Technology has impacted medicine in remarkable ways throughout history. From French physician R.T.H. Laënnec's invention of the stethoscope in 1816 to Robert Jarvik's artificial-heart transplant in 1982, the drive to improve and prolong human life remains at the forefront of society. Yet, providing better medical care to the masses has proved a daunting and expensive challenge. The overall cost of providing care, combined with limited medical resources, has too often chipped away at the ideal of diagnosing problems quickly and treating patients effectively.

That issue has not gone unnoticed by Dowling, who aims to incorporate many of the efficiencies of Internet-business strategies into medicine.

"The goal is to step outside the box and build systems that maximize the organization's potential," says Dowling. "We want to eliminate many of the inefficiencies that exist today. We want to provide better health care at a lower cost and construct a solid foundation for the future."

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Carney adds, "We have moved from fax, phones, and paper into the information age. We have gained cost and performance advantages that will make us a better medical-care provider."

North Shore-LIJ has succeeded. The telepathology system, which went live in April 2002, is being used for teaching in two of the organization's hospitals. Even if a facility lacks an on-staff pathologist, attending physicians can now obtain a diagnosis immediately, whereas before they would have had to wait 24 to 48 hours. For North Shore-LIJ, which includes several teaching institutions and manages a steady stream of medical residents and interns, the telepathology system also provides an opportunity to improve learning by allowing students and others to view diagnostic sessions firsthand via videoconferencing.

"In many instances, the system provides educational opportunities that wouldn't otherwise be possible," says Jon Cohen, M.D., chief medical officer at North Shore-LIJ. "We can view real-world situations and share data and video across multiple hospitals or clinics."

Yet, telepathology is only part of the story. The organization also implemented the eHealthStat system manufactured by Apollo Telemedicine. The system utilizes North Shore-LIJ's sophisticated network infrastructure, which includes high-speed fiber-optic connections and is built using Cisco AVVID (Architecture for Voice, Video and Integrated Data). In addition to the telepathology and telediagnostic applications, eHealthStat also provides sophisticated collaborative tools that allow several

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institutions to connect simultaneously for discussions, teaching, or other purposes. Participants will soon be able to view more types of medical information online, including high-resolution x-rays, digital photos, and video clips.

North Shore-LIJ has also developed a sophisticated enterprise portal, called North Shore-LIJ HealthPort, that offers a wealth of features and provides different information categories tailored to specific groups. Physicians can view lab results, pharmacology data, demographic information, radiology results, and general news and journal articles online. Nurses, therapists, and other allied health professionals can also tap into journal articles or patient data. Meanwhile, senior administrators, trustees, and employees can access employee directories and other relevant data online. In the coming months, the system will enable workers to manage their personal information by accessing the appropriate applications through the portal.


The portal is already changing the way people work. "For a physician, fast access to current clinical information is essential, and

HealthPort makes that access possible," says Lawrence Scherr, M.D., dean of North Shore-LIJ Health System in Great Neck, New York. He uses the portal regularly to compare biochemistry reports, x-ray reports, radiology data, and other lab information. "Although the phone is a time-tested method, it is cumbersome. HealthPort allows instantaneous data retrieval regardless of where you are. It is extremely valuable for doctors who have patients that use multiple institutions and need immediate access to all the data."

Eventually, patients and the outside community will be able to use the portal to access everything from educational videos to treatment regimens and medication schedules.

"The portal allows us to tie together a variety of systems and put important data right at people's fingertips," says Richard Jerothe, director of enterprise infrastructure at North Shore-LIJ.

Another aspect of the portal's appeal is that it offers secure anytime, anywhere access. "Physicians can check lab results and other information from their office or from home," says Carney. "Because many of them are on the go or work out of multiple



locations, it provides a level of convenience that wouldn't otherwise exist." HealthPort also has reduced the number of phone calls, as well as a good deal of the administrative load facing nurses and technicians, freeing them to spend more time on patient care. And because VPN access to the portal provides a high level of entitlement-based security and password protection, only those approved to access data can do so. (The facilities strictly adhere to Health Insurance Portability and Accountability Act privacy laws.)

#### TO THE NEXT LEVEL

Advancing the organization's strategic and business goals is critical, according to Carney, and North Shore-LIJ is moving ahead with other systems that save dollars and make sense. For example, it is now installing IP telephony, which will cut telecommunications costs between facilities and save on ongoing expenses. When the health-care provider installed the Cisco Systems IP telephony solution for the eHealthStat system, it took advantage of Cisco Call Manager's intelligent call-routing capabilities to automatically route calls. If a call is going to another North Shore-LIJ facility, it's sent over the data network at no cost. If it's traveling to an outside company, it's sent over the public-switched network. In the future, the hospitals would like to also add unified-messaging capabilities, says Carney.

North Shore-LIJ is also turning to video on demand to train employees and provide safety instruction. Using the technology, a group of employees can sit in a small conference room and view a film over the network whenever it is most convenient. The facilities do not need to keep track of tapes, and users all access the same central video source, so all the materials are up-to-date.

At the same time, the organization is embracing e-learning. Last January, North Shore-LIJ announced new learning initiatives designed to foster growth and lifelong learning among its 30,000 employees. Teaming with GE Medical Systems and Harvard University's School of Public Health, North Shore-LIJ launched the Center for Learning and Innovation, the largest corporate learning initiative in the health-care industry.

Finally, North Shore-LIJ is migrating toward wireless technology, which will likely revolutionize the health-care industry in the years ahead, according to Carney. Putting handheld computers and PDAs in the hands of doctors and other clinicians will ultimately improve access to records, charts, and notes, while opening the door to prescriber order-entry (POE) systems that provide physicians with immediate access to drug and dosage information and other data, whether in an office or by the patient's bedside. "Studies show that bedside medicine will reduce errors, improve productivity, and allow more informed decision making," says Carney.

Wireless technology will also allow North Shore-LIJ to streamline many processes that currently impede operations at a typical hospital. For example, patients checking out typically receive a hefty package of documents. In many cases, it can take a day or more to prepare everything. However, applications are available that allow a nurse to check off the appropriate boxes at

## Taking the Pulse

Although doctors are adopting technology and increasing their use of the Internet, face-to-face contact remains important, according to a recent study by market-research and consulting firms Deloitte Research and Fulcrum Analytics. The research firms questioned 1,200 practicing U.S. physicians and published their findings in the January 2002 study, "Taking the Pulse v 2.0: Physicians and Emerging Information Technologies."

Some of the key findings include the following:

- 23% of all physicians interact with their patients by e-mail, up 4% over the last year.
- 79% of those who do not interact via e-mail choose not to because they prefer "face-to-face" communication with patients.
- The leading drivers for adopting Internet technology include reallocating staff (43%), saving time (42%), seeing more patients in a week (37%), and cutting expenses (37%).
- Most doctors who responded to the survey were not prescribing medications electronically, but 30% expressed interest in electronic prescriptions, given that a system is designed, developed, and managed properly.
- 30% of all physicians report that they currently own a PDA.
- 84% of physicians using a PDA maintain their personal schedules and 68% manage their professional scheduling through the device; 59% of these same doctors use the device to access drug databases.



the patient's bedside, send the data to a central server, and then send the check-out documents to a laser printer or to the patient's e-mail account. Not only would such a system cut hospital costs, it would reduce patient errors and could, in some cases, allow patients to go home sooner.

For now, Jerothe says that North Shore-LIJ is working to solve various practical issues and security challenges. In the meantime, it is introducing wireless local-area network (LAN) technology at its Manhasset and LIJ facilities. Physicians can now roam throughout a facility with wireless IP phones, and soon, through wireless data connectivity, they will have access to the enterprise portal via PDAs, handheld PCs, and carts with notebook PCs.

Although obstacles remain, wireless technology "represents a remarkable step in the evolution of medicine," says Jerothe.

### A TRADITION OF INNOVATION

The original North Shore Hospital opened its doors to its first patient in 1953. Through the 1950s, the 163-bed community hospital catered to the health-care needs of the Manhasset community. During the 1960s, the hospital added new wings and built affiliations with Cornell University and New York University. It eventually became a 731-bed facility with a familial atmosphere and deep roots in the community. Many of its employees have stayed with North Shore for decades.

Beginning in the 1990s, North Shore merged with, acquired, or developed affiliations with more than ten other health-care institutions in the metropolitan New York area, transforming it into a health-care powerhouse. Today, North Shore-LIJ has more than 5,600 hospital and long-term beds, 3 regional trauma centers, and more than 130 ambulatory care sites. It staffs more than 6,000 doctors and 7,000 registered nurses and handles 200,000 hospital admissions each year. Six of its 18 facilities are affiliated with universities.

North Shore-LIJ has always stood at the forefront of medical innovation. In 1984, it became only the third hospital in the United States to install an MRI machine, now widely available at hospitals and clinics. It is currently one of only a few medical centers with a PET scanner, a device that provides digital cross-sectional images of the brain, allowing doctors to understand

how the brain is functioning while a patient is comfortable, conscious, and alert. In addition, North Shore-LIJ recently became one of the first U.S. health-care providers to perform robotic heart surgery. The robotic device, now in clinical trials, allows surgeons to perform operations remotely, whether they're elsewhere in the facility or at another facility.

"Technology has long played an important role in medicine, and we have strived to remain on the leading edge of innovation," says Carney. The provider's current initiative to build a high-speed converged voice and data network is no exception. "It is the foundation for the future. If we build it correctly, we'll be prepared for all the medical advances that will likely occur in the years to come," he says.

From the beginning, the redesigned network was about business rather than bytes. "A physician doesn't care about bandwidth and data packets. Physicians don't care about the speed of the network for the network's sake but want reliable applications that improve their ability to practice medicine," says Jerothe. Therefore, the organization focused on design and integration from the start and continued to do so through the entire network infrastructure. As Carney and others analyzed and constructed the network over an eight-month period beginning in early 2001, they focused on achieving performance gains through e-business tools that could streamline processes.

The road to success has been paved with plenty of challenges. For one thing, swapping out numerous systems wasn't without risk, particularly in a 24x7 environment. In most cases, IT staff replaced old LANs with new ones, tested everything, and then switched over to the new network. For another, North Shore-LIJ had to deal with significant change-management issues.

"In some instances," says Carney, "technology is now touching people who haven't had much exposure to it in the past." That forced the hospital to examine its workflow and business processes and realign them to fit the technology. It also meant providing training to familiarize workers with the new technology.

Leading-edge technology is helping North Shore-LIJ maintain a competitive edge. Carney says that informal surveys indicate that physicians are attracted to the health-care provider as a result of its innovative practices and because it continually strives to

### FROM CISCO

In early 2001, North Shore-Long Island Jewish Health System's Chief Information Officer Patrick Carney and other executives sat down to map out a next-generation network. They knew it had to be flexible, scalable, and cost-efficient in order to support the array of present and future applications.

"Without a solid foundation, you can find yourself coping with limited options and spending more money over the long run," says Carney.

North Shore-LIJ enlisted the help of systems integrator Perot Systems to assist in the network design. By March, executives had

assembled the strategic plan. After conducting an extensive technology audit and assessing its existing infrastructure, Carney and his staff decided on the Cisco AVVID (Architecture for Voice, Video and Integrated Data) network to provide the architecture and foundation.

With the project-management expertise of NEC, the North Shore-LIJ installed a wide-area Gigabit Ethernet network at its larger facilities and linked smaller ones via T-1 lines. It also built in redundancies to ensure resiliency so that multiple paths exist to its data centers and network-storage devices, minimizing the potential for downtime should

one part of the network experience a problem.

Late in 2001, North Shore-LIJ switched on the new network. As of April 2002, Richard Jerothe, director of enterprise infrastructure at North Shore-LIJ, estimates that the \$5.5 million network was already 75 percent to 80 percent operational. Now, many tools, including IP telephony, videoconferencing, collaborative medicine, and telemedicine are quietly taking root. "Once people familiarize themselves with the new tools and technology, they realize how much value they can bring to medicine," says North Shore-LIJ Chief Medical Officer Jon Cohen.—s.g.



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**NORTH SHORE-LIJ BOASTS MORE THAN 6,000 DOCTORS, 7,000 REGISTERED NURSES, AND 200,000 HOSPITAL ADMISSIONS EACH YEAR.**



introduce more efficient technology and tools. “Increasingly, medical professionals are looking to affiliate themselves with forward-thinking institutions,” says Carney. “They want the tools so they can do their job faster and better.”

The foray into new technology is paying off in other ways too. Ultimately, North Shore-LIJ will save about \$400,000 annually on telecommunications and network expenses—a figure that should rise as much as 50 percent a year as use of IP telephony increases. In addition, a sophisticated PeopleSoft enterprise-resource planning (ERP) system planned for integration in 2003 should result in \$20 million-plus savings over the next seven years due to increased efficiencies. Faster reimbursements have also improved cash flow, and an application called PatientKeeper has increased accuracy on insurance forms, reducing the number of rejected claims.

The way that Dowling sees it, the massive project is not merely about cost savings and return on investment. It’s a way to stay at the forefront of medicine. “By providing high-quality medical care and reinforcing the public image that we’re an outstanding health-care provider, we’re more likely to become the preferred choice among the public, and we’re far more likely to flourish,” he says.

In fact, Dowling steadfastly believes that North Shore-LIJ can continue to be at the forefront of twenty-first century medicine. “We are intent on building the best systems in the country and maintaining our position as a premier health-care provider,” he says. “While health care today is a business, it’s also about people, about caring, about compassion. Today’s technology is an essential enabler that helps us achieve our goals.” 

SAMUEL GREENGARD WRITES ABOUT BUSINESS AND TECHNOLOGY. HE IS A REGULAR CONTRIBUTOR TO IQ MAGAZINE.



**NEXT STEPS**

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The IQ Web site includes an industry overview for health care at [cisco.com/go/iq/healthcare](http://cisco.com/go/iq/healthcare). The Internet Business Solutions Group also has a page at [cisco.com/go/healthcare](http://cisco.com/go/healthcare).

The Pew Internet & American Life has a report on the Online Health Care Revolution at [www.pewinternet.org](http://www.pewinternet.org).

Get more information about the Healthcare Insurance Portability and Accountability Act at [cisco.com/go/hipaa-info](http://cisco.com/go/hipaa-info).