

# Improving Community Care



COMMUNITY HOSPITALS  
EMBRACE ADVANCED NETWORK APPLICATIONS  
TO ENHANCE PATIENT CARE  
AND OPERATIONAL EFFICIENCY.

By Vicki Powers



DR. DONALD L. MAPLES  
DIGITALLY ENTERS PATIENT  
INFORMATION AT A  
CITIZENS MEMORIAL  
HEALTHCARE FACILITY.  
A NETWORK-BASED  
APPLICATION STREAM-  
LINES PROCESSES AND  
REDUCES COSTS.

**A**T FIRST GLANCE, Citizens Memorial Healthcare looks like a typical rural hospital. Located in Bolivar, Missouri, Citizens Memorial employs approximately 1,500 people and has a charter to serve its community. It also has very real budget limitations and a need to make the most of its limited resources to improve patient care, manage rising costs, and operate efficiently.

Look more closely, however, and you'll see that Citizens Memorial is anything but typical. Thanks to its forward-looking approach to technology, Citizens Memorial is inspiring other small and medium-sized healthcare organizations to adopt advanced clinical applications to address their business challenges and improve patient care.

Before it began upgrading its technology in 2002, Citizens Memorial had an antiquated combination of disparate information systems. Today, with a standards-based Internet Protocol (IP) medical-grade network as a foundation, it supports electronic health records (EHR) to operate in a 100% paperless environment. Mobile caregivers and support staff gain access to patient information where and when they need it, thanks to the accompanying wireless local-area network (LAN) the hospital established.

In 2005, Citizens Memorial became the first rural hospital to earn the Nicholas E. Davies Award of Excellence, presented by the

Photographs by Greg Kiger

Healthcare Information and Management Systems Society (HIMSS) for advanced clinical applications in hospitals and clinics.

## BALANCING COSTS AND BENEFITS

Community hospitals and clinics increasingly rely on networked healthcare technologies to improve patient care, increase productivity, reduce medical errors, and remain competitive. But research shows that smaller providers have been slower to adopt advanced clinical applications, almost completely because of their expense, according to Dave Garets, president and CEO at HIMSS Analytics, a provider of healthcare information and analysis.

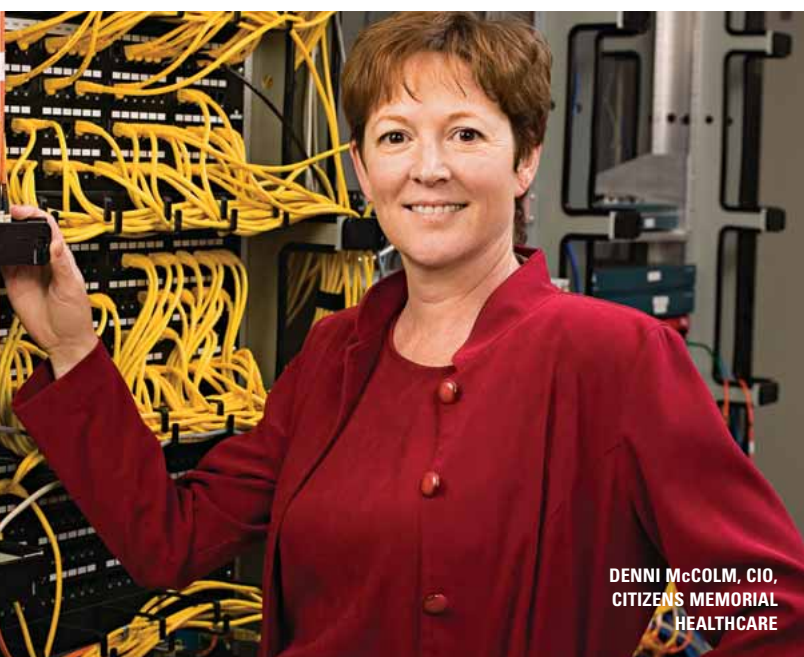
But even smaller hospitals with more limited budgets are realizing that investing in network-based technologies can enhance care and staff productivity while helping to reduce operating costs. “Rural hospitals have to balance costs with the benefits [the technology will] return,” Garets says. “Having a good clinical foundation of IT to support advanced care is becoming a necessity.”

Advanced clinical solutions available today include:

- Mobile nurse-call communications that enable nurses to use wireless IP phones to communicate directly with patients from any location in the facility

**“The new technology enables us to be more efficient.”**

**—Denni McColm, Citizens Memorial Healthcare**



DENNI McCOLM, CIO,  
CITIZENS MEMORIAL  
HEALTHCARE



## IN BRIEF

**GOALS:** With rising costs, inefficiencies, and labor shortages, challenges continue to abound for physicians, clinics, and hospitals.

**STRATEGIES:** Networking technology provides the best platform upon which to deploy advanced clinical applications to improve patient care, reduce medical errors, and increase productivity.

**RESULTS:** These solutions provide near real-time access to information through wireless networking, nurse call, and location-based services. Organizations that deploy advanced applications can improve patient care, streamline operations, and contain costs.

- Active radio-frequency identification (RFID)–based services for tracking equipment and other assets
- Imaging and patient-monitoring applications

All of these technologies enable caregivers to increase productivity and responsiveness through a variety of medical-grade network wireless solutions. (Read “The Cisco Clinical Connection Suite” on page 47 to learn more.)

## TRANSFORMING PROCESSES

At Citizens Memorial, a lengthy assessment and strategic planning process provided the impetus for change. The hospital system wanted caregivers to have access to information whenever and wherever they needed it. Related facilities were providing services—such as lab tests—but the hospital didn’t have access to the same information.

“The new technology was definitely to solve a business issue,” Citizens Memorial CIO Denni McColm says. “In the board’s and administration’s minds, it’s connected to a strategic outcome—providing seamless care.”

Today, an IP backbone from Cisco Systems and 50 servers support a wired and wireless network that connects 33 buildings that include a hospital, five long-term care facilities, 16 physician clinics, and home-care services. Citizens Memorial selected the Meditech Client/Server platform to maintain flexibility and ease the transition for employees familiar with Microsoft Windows products. It also added clinical and administrative applications from Meditech and a practice-management solution from LSS Data Systems.

An external consultant helped Citizens Memorial with software selection, and experts were heavily involved in the process early on, enabling the hospital’s IT group (11 employees on the infrastructure side) to take over once the installation was complete. During 2002 and 2003, Citizens Memorial deployed financial, billing, nursing, and core clinical applications. In 2004, the hospital finished scanning all paper-based documents into the system, achieving its goal of becoming a paperless facility.

By 2005, Citizens Memorial had implemented real-time nursing documentation and online medication-administration

applications, and in the emergency department, a patient-tracking application that greatly improves communication and workflow.

McColm cites three critical success factors:

- One-on-one physician training
- Physician participation for suggestions and feedback
- Adequate allocation of resources

Although some physicians initially resisted the technology changes, McColm recalls, two physician advocates proved effective in leading one-on-one conversations with them.

The project's cost—\$3.4 million for software and \$1.58 million for hardware—initially seemed expensive because Citizens Memorial had never made significant investments in technology solutions. But as the business benefits continue to add up, the value is clear. For example:

- The hospital now processes 70% of claims without human touch.
- Net patient revenues increased 23%.
- Medical-records filming costs, which ranged from \$48,000 to \$60,000 each year, have been eliminated.
- At the physician clinics, the average time it takes to receive payment dropped from more than 80 days to fewer than 50.

“The investment is significant, and it put a lot of pressure on us to succeed,” McColm says. “Overall, the new technology enables us to be more efficient and to handle the growth we’ve sustained more effectively.”

Most important is the direct benefit to patients. Care



**CITIZENS MEMORIAL SAVES \$48,000 TO \$60,000 ANNUALLY BY ELIMINATING MEDICAL-RECORD FILMING COSTS ALONE.**

providers now have effective access to information when they need it, resulting in enhanced care, according to McColm. “It makes a big difference when physicians have that information in front of them,” she says. “We all recognize it’s all about [improving] patient care. This is our part to make it happen.”

### MONITORING PATIENTS EFFECTIVELY

Another pioneering solution is in progress at Central DuPage Hospital, a healthcare system near Chicago, which recently invested in an enabling technology complementing

#### FROM CISCO

### THE CISCO CLINICAL CONNECTION SUITE

Networked healthcare technologies are just as appropriate for medium-sized community hospitals and clinics as for their enterprise counterparts.

The Cisco Clinical Connection Suite provides network-based clinical solutions that enable caregivers to efficiently locate, direct, and escalate health information. Developed in conjunction with technology partners, the solution's four components are: nurse call, patient-monitoring, location-based services, and collaborative care.

Mobile patient-monitoring delivers medical device alerts to wired and wireless Cisco Unified IP phones. Cisco networks serve as the platform for Emergin's Integration Suite, which delivers messages from patients' nurse-call buttons as well as bedside and telemetry patient-

monitoring systems to a variety of caregiver devices. This improves workflow efficiency and staff response time, and increases patient satisfaction.

“So many applications in healthcare signal something happened, creating an environment that is often noisy and chaotic,” says Moe Kirk, director of business development at Emergin. “This solution delivers important information directly to clinicians so they can begin to understand what is happening and where they are needed.”

The system delivers patient requests directly to a wireless IP phone, for example, eliminating the need for constant overhead paging, and creating a more restful recovery environment.

Location-based services use wireless LAN-based RFID communications to pin-

point the whereabouts of equipment, people, or devices. PanGo Networks provides an asset-tracking software application that uses a map-based system to show the location of assets, minimizing the time it takes to locate equipment.

Collaborative care allows off-site specialists and colleagues to communicate remotely with patients and colleagues within healthcare facilities using on-demand conferencing, which enables faster diagnosis and response time through team communication.

The Cisco Clinical Connection Suite helps healthcare providers access information when and where they need it. Healthcare facilities find it offers increased productivity and workflow, better patient care, and heightened competitive advantage.—V.P.



the patient-monitoring system for its 38-bed cardiology unit. The application sends critical patient data to attending nurses' wireless IP phones so they can learn what is happening with their patient en route to the bedside. Cisco collaborated with Philips Medical Systems, a patient-monitoring solution provider, and technology integration company Emergin, to utilize the hospital's existing Cisco Medical-Grade Network infrastructure.

Central DuPage served as a test site for the patient-monitoring system. The hospital replaced nurses' cell phones with wireless IP phones because cell phones couldn't be integrated into a central call-management program. Telemetry information—the electrocardiogram data that illustrates how a patient's heart is functioning—is now output as digitized data on the network. Because the system automatically delivers alerts to mobile clinicians within 3 seconds (compared with 15 to 20 seconds previously), nurses can respond more proactively, before situations escalate.

"The technology incorporated into this wireless IP phone enables nurses to receive real-time alerts reliably," says Dr. David Cooke, MD, medical director for quality and safety at Central DuPage. "The capability means our nurses can make an assessment more quickly than ever before and determine the best intervention."

**"Our nurses can make an assessment more quickly than ever before and determine the best intervention."**

**—Dr. David Cooke, Central DuPage Hospital**

The patient-monitoring system not only improves patient care, but also reduces the cost of data and voice communications. The hospital estimates that the IP telephone system will save \$1.68 million over five years.

### **INCREASING OPERATIONAL EFFICIENCY**

With 9,000 pieces of equipment to track, employees in the biomedical engineering department at Rockford Memorial Hospital, a 396-bed facility in Rockford, Illinois, spent hours each day trying to locate specific equipment for routine preventive maintenance. The lost productivity went beyond the engineering department, however.

Gary Bayston, the hospital's biomedical engineering manager, conducted research and interviewed staff members to learn the full effects of the situation. His conclusions revealed many challenges:

- Missing or unavailable equipment led to excess equipment leases and purchases.
- Patient care was delayed when equipment wasn't ready for use.
- Workers spent excessive time searching for equipment.
- Management inefficiency affected personnel, bed, and systems capacity.

Overall, Rockford Memorial realized that tracking the equipment was costing the hospital \$1.5 million per year in lost productivity alone, based on the amount of time that staff members in the nursing, biomedical engineering, and support services departments spent looking for equipment.

The biomedical engineering group might spend seven hours to find a piece of equipment and just one hour to perform the required maintenance. Likewise, Bayston estimates that care providers spent 25% to 30% of their time looking for equipment and often purchased extra equipment just to ensure they had what they needed when they needed it.

Rockford Memorial began researching ways to more efficiently track its equipment. In late 2005, it selected PanGo

Networks' Locator wireless asset-tracking solution, which uses the hospital's existing Cisco wireless LAN. A standards-based, out-of-the-box asset-tracking application, PanGo Locator starts at \$75,000, according to Colleen Crafton, PanGo's director of business development.

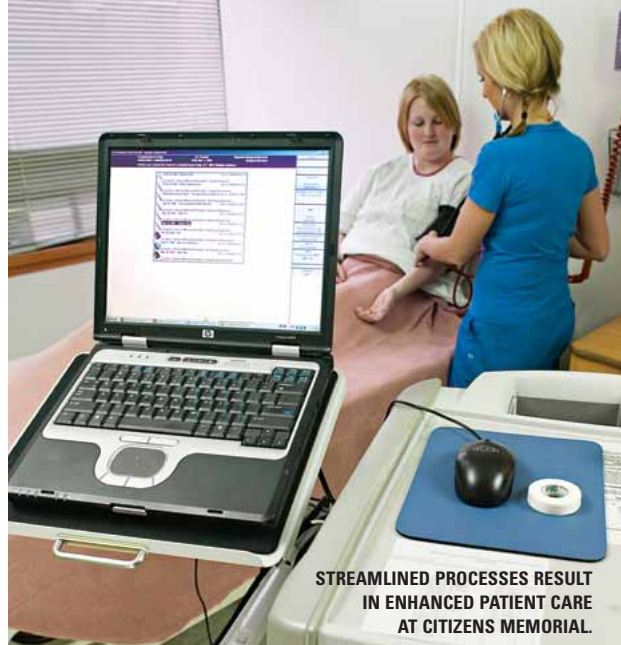
PanGo's solution uses RFID tags on equipment to communicate information over the wireless network, letting staff know the exact location of any piece of equipment at any time. Rockford Memorial first conducted a pilot program by tagging 50 assets with active RFID tags. Today, it tracks 600 assets using RFID and plans for an additional 1,000 per year for several years. Rockford is considering tags for everything from food-service carts to biomedical equipment—possibly even people such as staff, Alzheimer's patients, and infants.

The solution offers a monitoring application to search, query, and set up alerts. Monitors at the nurses' stations help staff see exactly where equipment is when they need it. The biomedical engineering staff has trimmed hours from the time it takes to find equipment.


As in other industries, RFID is emerging as a way to improve operational efficiency and manage costs, but the healthcare field has its specific needs. The majority of healthcare systems use *active RFID* rather than *passive RFID* by a ratio of 3:1, because it solves a more compelling business problem, according to Gregg Malkary, founder and managing director of the Spyglass Consulting Group.

"Active RFID tags contain a built-in responder, which is ideal for location-based services such as tracking mobile assets and patients," says Malkary.

In a study completed in August 2005, Spyglass found



that 23% of 100 healthcare organizations of various sizes surveyed were investing in RFID, a figure that Malkary expects to more than double in the ensuing 18 months.

For Rockford Memorial, RFID's benefits are clear. "The savings from productivity improvements alone will more than justify the system cost," Bayston says. "The reduction in equipment rentals and lost assets just makes the payback that much better." 

TEXAS-BASED WRITER VICKI POWERS, WHO FOCUSES ON TECHNOLOGY ISSUES IN INDUSTRIES SUCH AS HEALTHCARE, RETAIL, AND GOVERNMENT, HAS WRITTEN FOR *BUSINESS 2.0*, *CMO*, AND *ENTREPRENEUR*.

#### NEXT STEPS

Learn more about the Cisco Clinical Connection Suite at [cisco.com/go/iq-ccs](http://cisco.com/go/iq-ccs).

Go to [cisco.com/go/iq-healthcare](http://cisco.com/go/iq-healthcare) for healthcare solutions from Cisco.

## REDUCING MEDICAL ERRORS

**H** EALTHCARE ORGANIZATIONS that invest in IT and deploy advanced clinical applications should realize considerable cost savings over the next five years as a result of fewer medical errors, according to Dave Garets, president and CEO at HIMSS Analytics, a provider of healthcare information and analysis. Hospitals are not reimbursed for these kinds of investments, so it's even more critical for them to work accurately, safely, and efficiently.

"The average cost when you have a medication error is around \$4,400," Garets says. "When you make a mistake, people get sicker or have a violent reaction and have to stay in the hospital longer. IT will be one of the most effective tools for reducing the cost of healthcare."

IT has a unique chance to help healthcare organizations provide improved patient care while slowing the rate of cost increases, according to Garets. As a result, investing in IT is higher on most healthcare organizations' priority lists now than it was five years ago. "IT still competes with medical devices, and still competes with a new building or services for cancer treatment," he says. "It's that kind of trade-off that the executives have to address."

Citizens Memorial Healthcare in Bolivar, Missouri, has experienced significant benefits from its technology transformation, including reduced medical errors. CIO Denni McColm says that once a day on average, a physician in the Citizens Memorial system gets an alert that a drug-drug or drug-allergy interaction may occur and changes an order to prevent it. "If even one-tenth or one-hundredth of them would have been an adverse drug event, we're talking some big dollars," McColm says.—V.P.