

The hospital group, having already deployed active RFID to monitor the whereabouts of movable assets, will use the technology to keep tabs on its patients.

By Beth Bacheldor

Sept. 14, 2007—After two years of testing active RFID technology for use in tracking assets at several of its hospitals, [HCA North Florida Division](#) is expanding its RFID-based real-time location system (RTLS). The organization, consisting of nine hospitals in northern Florida and eight in southern Georgia, now wants to test the technology, combined with 2-D bar-coding, to track patients. Its goal is to improve patient care, patient safety, hospital operations and workflow.

HCA North Florida is part of [Hospital Corporation of America](#) (HCA), one of the country's largest providers of health-care services. Nashville-based HCA is composed of 173 locally managed hospitals and 108 outpatient centers in 20 U.S. states, as well as England and Switzerland. Founded in 1968, HCA was among the nation's first hospital companies; it currently employs about 180,000 people and reported revenues of \$25.56 billion in 2006.

The North Florida division is employing 433 MHz active RFID tags and readers, made by RTLS provider [Agility Healthcare Solutions](#), to track the locations of numerous assets, including infusion pumps, wheelchairs, beds and thermometers. "We are tracking anything that moves," says In Mun, the organization's VP of research and technology. The RFID hardware uses a proprietary air-interface protocol and is already in place at several of the organization's hospitals, though Mun declines to identify the sites involved at this time.

Since deploying the RTLS, Mun says, HCA North Florida has cut the time required to locate equipment and improved the overall management of leasing contracts, equipment maintenance and warranties. "In hospitals like ours, engineers can spend more than 30 or 40 percent of their time simply looking for equipment," he explains, adding that without RFID, items are typically identified only through bar codes, which require line-of-sight reads to determine an asset's specific information, such as maintenance schedules. "And when you have hundreds of items, like we do, trying to find them all can basically be an impossible task."

The asset-tracking RTLS has enabled Mun and his colleagues to better understand RFID technology, and to determine what works best for the organization's facilities. For example, the division tested Wi-Fi-enabled RFID systems but discovered the technology wasn't the best choice. "A [Wi-Fi-based RTLS] is designed to manage a few items per access point—20 to maybe 50 items," Mun says. "But if you go into a medical service area, there might be a hundred or more items there, so that area becomes a black hole."

The Wi-Fi systems Mun and his colleagues tested employed active tags requiring relatively large batteries (about the size of a credit card), making the tags too bulky to fit on thermometers and other small items. HCA North Florida also tested passive RFID, but Mun says the technology did not provide

reads as reliable as those achieved with active RFID.

HCA North Florida is now gearing up to expand the RTLS to track patients as well. It plans to fasten the 433 MHz tags, encoded with 16-digit unique ID numbers, to patient wristbands. The tags are reusable and will be sterilized before each use. The organization will also test patient wristbands bearing 2-D bar codes, so each patient will be given two wristbands: one RFID-enabled, the other 2-D bar-coded. A 2-D bar code—a two-dimensional method for representing information encoded in a checkerboard-like pattern—can be used to store thousands of digits or ASCII characters, unlike a linear (one-dimensional) bar code, which is composed of vertical lines used to store only a small number of ASCII characters or digits.

To protect a patient's privacy, the RFID-enabled wristband will transmit only a unique ID number, associated with detailed patient information in a back-end system. The system will provide employees with location information for each patient, accessible via hospital computers. The organization will install a network of fixed interrogators throughout the hospitals, which will receive the tag transmissions and communicate that data to a server. The server will then interpret the transmissions to determine the tag's location.

To identify a patient and access that person's medical records, a doctor or nurse will use a handheld computer equipped with a 2-D bar-code scanner to read the bar-coded wristband. The scanner decodes the 2-D bar code, which is formatted as a portable data file (PDF), and renders the bar code to human-readable text. Displayed on the handheld, the text will consist of basic information such as the patient's name, treatment and other data the hospital deems pertinent. "If you look at conventional wristbands," Mun says, "there is a one-dimensional bar code and the patient name. With 2-D, we can store a couple hundred characters on the wristband—that is not a problem." The 2-D bar-code system, however, does not provide location data.

HCA North Florida is interested in using both technologies simultaneously, Mun explains, because such a combination provides a more comprehensive patient tracking and identification solution. Not only is patient privacy protected (since no patient information is broadcast), the organization will still be able to identify patients during treatment in the event of a power failure—a necessity for hospitals in states susceptible to hurricanes. If HCA North Florida were to rely solely on active RFID, which can be used to both identify and locate patients, the organization would run the risk of losing the ability to identify and track patients in the event of a power failure. The RTLS network and other computer equipment would likely shut down in such an scenario.

"We will eventually end up using both, because they do compliment each other. They cover different areas," Mun notes. "With active RFID, we will know exactly where a patient is, which is critical in some instances, such as in the ER. The 2-D bar-code has a different side. It lets us easily get the kind of information we need when treating a patient. Even in a disaster, if we lose electrical power, the only devices you can rely on are those that are battery-operated. The handheld that has battery backup, we'll still be able to get that information."

HCA North Florida Expands Its RTLS to Track Patients

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