

**As the hospital tests the system's ability to track patients, staff and assets, it also plans to check for any potential electromagnetic interference that may disrupt medical equipment.**

By Beth Bacheldor

July 21, 2008—[Utah Valley Regional Medical Center](#) in Provo, Utah, is gearing up to test a dual RFID-infrared real-time location system (RTLS) to track patient flow and hospital equipment. A fundamental part of the test will involve checking for electromagnetic interference (EMI) from the RFID system that could disrupt the operation of medical equipment.

The pilot will help the 395-bed hospital—part of the [Intermountain Healthcare](#) system—determine how well the technology works for tracking patient flow, as well as for monitoring how long patients wait before being seen by a nurse or doctor. "We hope to see patient wait times decrease because of this," says Larson Holyoak, director of clinical engineering at Utah Valley Regional Medical Center.



*The Utah Valley Regional Medical Center is preparing to test a dual RFID-infrared real-time location system to track patient flow and hospital equipment.*

The RTLS will also be tested for managing and quickly locating infusion pumps, ventilators, wheelchairs

and other equipment in the ER department. "Also, the doctors and nurses can wear the badges," Holyoak says, "so we can find them much more quickly." If all goes well, Intermountain Healthcare may opt to roll out the RFID-infrared technology across the company's 100 clinics and 41 hospitals throughout Utah and Idaho. The pilot, slated to get underway in November, is expected to last for three months.

Utah Valley Regional Medical Center will test a system utilizing active tags that emit both infrared and RF (433 MHz) signals. Patients entering the ER will be provided with infrared-RF tags (worn on either a lanyard or wristband) to monitor and track their movements and care progression for the duration of their visit. Nurses and doctors will wear ID badges containing the tags, and a variety of hospital equipment will be tagged as well.

Each badge or tag transmits a unique ID number correlated with the patient, personnel or equipment information in a back-end system. According to Holyoak, the hospital will deploy sensors (readers) in hallways and waiting rooms, and the sensors will use a proprietary air-interface protocol to communicate with the tags' RFID component. The tag's infrared component, meanwhile, emits an IR signal to sensors that will be placed in the approximately 40 patient rooms in the hospital's ER department.

When a sensor receives a tag's signal, it forwards that tag's unique ID number and its own location to a computer system that hospital employees can access from their desktops to locate people or equipment. Holyoak says he is not at liberty to reveal the company providing the RTLS. He and his team intend to check for EMI on each piece of equipment Utah Valley Regional Medical Center has in its ER department—a process the hospital performs every time it brings a new wireless device on-site.

Results were recently released from two studies specifically examining the effects of EMI from RFID systems on medical devices. One, conducted by researchers at [Indiana University Purdue University Indianapolis](#) (IUPUI) and RFID consulting and systems integration firm [BlueBean](#), studied passive 868 MHz ultrahigh-frequency (UHF) RFID tags and readers but did not detect any incidents of EMI (see [New RFID Study Finds No Interference With Medical Devices](#)).

The other, conducted by researchers at the [University of Amsterdam's Academic Medical Center](#) in the Netherlands, examined both passive 868 MHz and active 125 kHz RFID systems. That study found several incidents of EMI by RFID (see [Researchers Warn RFID May Disrupt Medical Equipment](#)).

EMI from wireless systems is not a new phenomenon, Holyoak says, noting, "We are all aware of this problem and are very conscientious about it." Still, he says he takes issue with media reports that he believes hyped the findings from the Dutch study. "The stories made it sound like there is a big panic, and that hospitals have this new thing to be worried about. It wasn't the study or its findings—we are aware of EMI—it was the reaction of the media."

Utah Valley Regional Medical Center has established policies based on testing conducted by Holyoak

that found cell phone use caused electromagnetic interference that could affect medical devices. The hospital discourages visitors and patients from using cell phones in patient rooms, encouraging them to operate the phones only in hallways or waiting areas. Furthermore, doctors and nurses have been educated to be sure, if they must use a cell phone in a patient room, that they keep the phone at least 3 feet away from any medical equipment.



Larson Holyoak

Medical equipment manufacturers, Holyoak says, continue to improve their products to protect them from EMI. "Manufacturers are doing more with shielding [of EMI] so we are seeing less effects," he states.

As Utah Valley Regional Medical Center rolls out its pilot of the infrared-RFID RTLS, Holyoak's team plans to place the tags/badges by the equipment at various distances—from right next to a device to several feet away—and to observe whether there is any interference or disruption to that equipment. Holyoak expects that the 3-foot rule—keeping tags at least 3 feet away from any medical equipment—will suffice in preventing any disruptions. He also believes that rule should be easily applied, primarily because RFID emissions will occur only in waiting areas and hallways, and not in patient rooms, where the system's infrared component will be used instead.

In addition to testing for EMI, Holyoak says, the hospital staff will be educated regarding how to utilize the RTLS, and on the need to keep tags a safe distance from medical equipment. "If we do find something happening from EMI," he states, "we will have to take a closer look. For starters, we'll have to ask if the equipment affected is a piece of equipment that would cause serious problems if there was a disruption, such as a ventilator or defibrillator. We would have to do more extensive testing. And we might have to develop ways to work around the problem."

Even so, Holyoak says he considers RFID's benefits to be much greater than the risks. "As long as we test everything and educate our staff," he notes, "I can really see how this is going to far more beneficial. There is always potential for problems, but we are very conscientious. If we had any doubts about this, we wouldn't be bringing this in. Patient safety is our number-one concern."