White Paper

Radio Frequency Identification (RFID) / Real Time Location Systems (RTLS) in Healthcare

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1.0 WHY RFID/RTLS TRACKING IN HEALTHCARE?

In the United States, $2.2 trillion is spent on healthcare each year, with $1.2 trillion being identified as waste. The nation’s almost 6,000 hospitals have a combined budget of $690 billion. When accounting for waste at the hospital level, process inefficiencies are identified as the top offenders, where ineffective use of Healthcare Information Technology (HIT) is as high as $88 billion, as stated in a 2008 PriceWaterhouseCoopers Study. This is a significant sum, especially when considering reports by the American Hospital Association in 2010, that one third of hospitals are losing money on operations, and the remaining with positive revenue may only have margins of four percent. As the cost of healthcare rises and the reimbursement structures change, addressing this waste and inefficiency becomes a necessity. Radio Frequency Identification (RFID) and Real Time Location Systems (RTLS) are a set of Healthcare Information Technology (HIT) solutions that have been shown to successfully address these issues, affording cost containment and improved quality of care.

Typical HIT applications utilizing RFID and RTLS in healthcare include some of the following:

• Tracking medical equipment in real time, reducing search time, while also identifying sterility and maintenance needs. The data can also help management make rent vs. buy decisions based on known usage.
• Patient tracking to optimize the flow of patients, staff, doctors, and families.
• Access restrictions to prevent at-risk patients from leaving defined areas.
• Patient safety applications such as RFID in hand wash stations for infection control. Stick-on tags to help prevent wrong-site surgery, drug and blood delivery errors, and retained items during surgery.
• Patient wrist bands as wireless identifiers to pull up patient-specific chart information, including drug allergies.
• Supply chain management solutions to track consumables for proper billing, restock, recalls, and expirations.

Although many of these systems have been available for five years or more, adoption rates have been slow, as with other emerging technologies in healthcare. According to a May 2010 RAND Report, about seven percent of U.S. hospitals (non-military) have adopted some type of RFID technology, which is a relatively low number.

Significant barriers to adoption are:

1. Lack of available budget for the initial purchase
2. Questionable return on investment
3. Insufficient knowledge about RFID and RTLS solutions

Although adoption is currently low, these numbers are estimated to double yearly, which verifies a steady rising trend in usage, supported by practical cost-benefit considerations. Early adopters
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have successfully addressed these barriers, with reasonable return on investment and efficiency gains, simplification of process, and increased patient safety, among other benefits.

Notable examples of successful RTLS implementations include:

- Wayne Memorial Hospital of North Carolina tagged and tracked IV pumps. The hospital saved $300,000 by not purchasing additional pumps they didn’t need, reducing inventory by 20%. The project expanded to track beds, wheelchairs, and pulse oximeters, reducing search time from 28 to 1.5 hours a month. This also reduced instances of ‘hoarding’, as staff knew they could find equipment again if borrowed from their service.

- Brigham and Women’s Hospital of Boston became totally RTLS enabled two years ago. At Brigham they are currently tracking 8,000 pieces of equipment. They were able to realize a return on their investment within 15 months, saving an estimated $300,000 annually, with the added benefit of streamlined patient flow by tracking devices critical to care.

- University of Chicago Comer Children’s Hospital installed an RFID enabled supply cabinet for tracking high-value items used in procedure rooms. As the billing system is directly linked to the cabinets, the hospital increased charge capture by 30% for items typically unaccounted. This installation also solved difficulties in managing inventories across multiple facilities, achieving complete inventory visibility for resupply, notifications of expirations, and recall status.

- The U.S. military health system, the Defense Medical Logistics Standard Support System, over the last five years, has run pilot studies for medical supply chain tracking. The overwhelming positive results led to a 2007 mandate for major providers of military medical supplies to use RFID tagging.

As RFID/RTLS is mandated by the U.S. Military, commercial hospitals in the private sector are likely to follow. Other indicators of this trend may be the application of HIT technology to address 2011 healthcare reform objectives spelled out by the Meaningful Use criteria, such as implementing drug interaction, allergy checks, and other clinical decision support data. Meeting these objectives can result in financial reimbursements for the hospital, especially for Medicare and Medicaid cases.

2.0 CTC AS RFID/RTLS INTEGRATOR FOR HEALTHCARE

As adoption rates increase and trends lead toward potential RFID/RTLS use requirements in non-military healthcare, hospital managers are increasingly burdened with sorting out which solutions address their needs and budget. Additionally, the matters of reasonable investment return, staff training, installation, and technical support are of great concern. CTC is uniquely positioned as an RFID system integrator with the necessary technical and project management abilities to address those concerns of hospital decision makers who are inclined to implement
these HIT solutions. Every healthcare facility’s needs and resources are unique, and CTC has the comprehensive HIT skill sets to serve as a trusted partner, fully vested in helping hospitals implement new systems or make existing systems better.

2.1 Using Process Analysis to Identify Inefficiencies
At the earliest stage, CTC can help a hospital identify key inefficiencies in their operations, including equipment allocation, patient and staff flow, asset management, supply chain visibility, patient safety, and billing gaps among others. This is accomplished by using analytic methods that CTC has developed for use in healthcare settings. Our patient flow model simulates flow through a hospital based on the combination of patient volumes as well as the staffing and equipment resources available. CTC has a full complement of technical staff and management committed to the solution of these varied and complex strategic, operational, and managerial issues.

2.2 Defining Metrics to Hone in on Organizational Effectiveness
A following step is to define the metrics that measure effectiveness of organizational performance. Patient satisfaction, costs and revenues, process efficiency, and resource utilization are key measures that we use, but we also recognize that each organization has unique challenges that feed into these categories. CTC understands those challenges and will work with staff and management to understand each unique situation.

2.3 Evaluating Potential Custom Solutions
With the metrics defined and appropriately weighted, CTC can lead a hospital in evaluating potential RFID and RTLS solutions that could address these issues. A unique aspect of CTC analysis is the ability to theoretically model a solution and determine effectiveness, where time and cost savings are quantified for informed decision making. Because CTC has no manufacturer allegiances, it is possible to evaluate potential solutions as a neutral party. CTC is results-motivated, not profit-motivated. The outputs of the data analysis can be combined to realize a customized return on investment (ROI). This goes above and beyond the generalized speculations provided by other vendors, affording a much more accurate time calculation for return, based on actual conditions of a specific hospital’s business process.

2.4 Technical Planning for Long-term Success
Moving beyond the simulations and on to planning for installation, it is critical to consider key technical issues that have the potential to plague an otherwise promising RFID/RTLS implementation. Such concerns to be evaluated include analysis of the frequency spectrum within the hospital and the probability of electromagnetic interference with critical equipment. CTC has the expertise and technical resources to accurately perform electromagnetic investigations to verify emissions and susceptibility. These experts can optimize placement of antennas and tag components to ensure the best coverage possible and eliminate dead spots or false reads for optimal tracking. Depending on the hardware components, an installation may stretch the bandwidth available on a hospital network, or may require a protocol update. CTC has staff on hand to perform such investigations and upgrades of IT infrastructure.
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2.5 Making Software Customization Seamless and Painless
Partnering with CTC as an Integrator can make this a painless process, as CTC has experience integrating legacy software systems with contemporary RFID and RTLS systems, all while maintaining the existing business flow. Varying degrees of software customization are needed; some solutions are essentially standalone, others require integration with electronic records, databases, billing, supply chain software, and intraweb-user interfaces. CTC can integrate software for one or a host of solutions, coming together seamlessly to provide the intended enterprise-wide efficiency gains.

2.6 Training to Ensure Staff Comfort and Capability
In order to realize the benefits of HIT solutions, staff and users must be trained appropriately for its use. Often, technology changes require changes in process work flow, and it is imperative that users are comfortable with a new way of doing things. CTC can train hospital staff through web-based education services or traditional print methods and on-site presentations to ensure that employees understand any new technology and accompanying changes in work flow. CTC has been developing highly effective training programs for more than 20 years.

2.7 Optimizing Systems; Reducing Costs
As with any new installation, CTC’s techniques and services are effective for optimizing an existing system when the desired efficiencies and returns are not being realized. Maybe the system requires more nodes, an upgraded network, better staff training, or perhaps the system itself is the wrong solution. CTC’s process analysis and technical capabilities afford a useful skill set when attempting to uncover these issues. Once the proper metrics are identified to gauge performance, the health of the system can be continually monitored. CTC can also investigate data management for errors, inefficiencies, and security, all while confirming interoperability with the existing enterprise software. System optimization effectiveness stems from extensive experience in Department of Defense applications.

3.0 SUMMARY
CTC is well suited to serve as a trusted partner to healthcare facilities for RFID and RTLS system integration. For any hospital, allocating funds for investigative analysis and HIT solutions is a difficult subject as margins are narrow and budgets tight. However, this is exactly the case that CTC can address by modeling a solution, defining a hospital-specific ROI, uncovering lost revenue, and removing unnecessary costs. As with hardware ROI, the service pays for itself with a short turnaround. A flexible business relationship allows a hospital to work with CTC on a low risk basis with payments that are tiered in relation to efficiency gains and found revenue realized. As government mandates are issued which can be addressed by RFID and RTLS solutions, CTC can work with hospitals as their system integrator, to meet requirements and obtain their associated credits and refunds. With a breadth and depth of system integration background, CTC skills are relevant at all stages of a hospital’s HIT implementation.
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4.0 SOURCES


