

## **How RFID Can Add Value in Healthcare and Pharmaceutical Tracking and Tracing**

*The coming decade is likely to deliver advanced RFID solutions designed to improve the safety, efficiency and visibility of pharmaceutical supply chain operations, as well as patient care processes in the healthcare sector.*

As radio-frequency identification (RFID) technology continues to improve, organizations are exploring new ways to apply the technology beyond Gen 2 Electronic Product Code (EPC) compliance. Armed with a better understanding of RFID's automatic identification and data capture capabilities, application developers, systems integrators, technology partners, and end-users are looking for new and innovative ways to expand its applications for even greater value.

Pundits anticipate continued RFID adoption and growth in item-level apparel tagging in retail and in baggage tagging in the airline industry. Two other sectors that offer significant opportunity for RFID market expansion over the next decade are the hospital management and pharmaceutical industries—both pharmaceutical manufacturing and retail pharmacies. Pilot testing is already under way in these areas, in applications ranging from patient identification wristbands and equipment/asset tracking to item-level tagging of prescription drugs, laboratory samples, patient files and more. If this trend continues, RFID promises to reduce drug counterfeiting and theft, increase patient safety, and bring greater visibility and efficiency to patient care.

This article provides examples of how RFID technology can ultimately transform the ways in which hospitals, pharmaceutical producers and retail pharmacies manage their businesses. Although changes incorporating RFID will likely occur incrementally—driven by current challenges and anticipated payback on investment—a total systems approach could have sustainable, long-term results.

### **RFID in Hospitals**

Early adopters of RFID technology in the manufacturing-to-retail supply chain sector have discovered how the technology can help bring order and increased automation to fast-paced distribution centers and retail supply chains. Similar benefits could be gained in busy, fast-paced hospitals where crisis management is a daily occurrence. Staff physicians, nurses, and technicians must be ready to respond instantly and efficiently to patient emergencies with the equipment, medications, and healthcare specialists required to address the situation.

RFID technology offers tremendous potential to address this need. Yet any operations management technology deployed would have to be seamless, automated, integrated and easy to use, so as not to add to the burden of the already demanding jobs of frontline healthcare professionals. In fact, not all hospitals have adopted bar coding technology for patient identification because of the inconvenience of carrying portable bar code scanners.

The complexity of running a large, busy hospital today can be compared with the evolution of air traffic control operations. In the early days of commercial aviation, relatively simple airport-to-pilot radio communications were sufficient to control the small number of flights aloft at any given time. With the volume of flight traffic today, however, that system would be impossible—and extremely dangerous.

That's why the industry developed and implemented a highly sophisticated air traffic control system with built-in overlap and redundancy to ensure passenger safety.

Similarly, in the hospital management industry, significant value could be gained through an RFID-enabled, networked system approach. Given the shortage of healthcare providers in many areas, as well as the escalating cost of hospital costs and health services, such a system could save time, save money and, most importantly, reduce patient care errors and save lives.

### **A Hospital RFID Network in Action**

In a hospital-based total system approach, RFID tagging would be done on virtually everything, including pharmaceuticals and supplies, medical devices, equipment and drug carts, patient wristbands and medical charts, and ID badges. Fixed readers would be placed strategically in all doorways and corridors, at nurses' stations, in storage cabinets, on Class II narcotics and other medication carts, and on wheelchairs and rolling equipment carts. Handheld, shelf, and task-specific readers would also be placed in key locations.

A sophisticated computer-aided management (CAM) software system would be needed to integrate and manage business process and operational data across the enterprise – similar to the way an enterprise resource planning (ERP) system manages data in manufacturing and business organizations. Such a system would enable hospitals to automate and streamline the day-to-day healthcare workflow activities, as well as significantly reduce the redundant recording, logging, and reporting that is required. For example:

- The use of Class II narcotics and other pharmaceuticals and supplies would be carefully monitored and tracked to reduce theft and shrinkage.
- Drug administration errors would be minimized by matching the right patient ID with the right drug and the right dosage with the patient's chart. In the event of a mismatch, an alert would sound. In addition, a log would be kept of who dispensed drugs, when, and to whom.
- In the same way, operating rooms would virtually eliminate patient ID mistakes, ensuring the right surgery is performed on the right patient.
- In emergency situations, the system would know the location of the nearest equipment cart and the physicians on call, saving precious time in starting the necessary procedures.

Also, if the CAM system were to incorporate real-time EDI (electronic data interchange) or the new EPCIS data exchange capabilities with major healthcare insurance providers, communications between hospitals and insurance companies could improve significantly. For example, diagnostic testing and clinical treatment pre-approvals could be streamlined so that medical professionals would not need to spend their valuable time justifying procedures to insurance company gatekeepers.

These are just a few examples of how an RFID-enabled intelligent automation software solution could provide value to hospitals in terms of improving patient safety, reducing labor and operating costs, and reducing liability, while improving workflow efficiency and productivity. Another benefit to automating the routine logging and reporting of healthcare information is that it decreases paperwork, improves accuracy and establishes a data trail that can be used on the business side of the enterprise.

### **Integrating Data Flow**

With an accurate record of hospital services rendered, diagnostic testing performed, equipment used, and daily medications dispensed, that captured information could also be imported and used for patient billing and insurance filing processes.

With detailed patient care data being imported in near real-time into the CAM software's accounting and financial applications, the hospital's billing cycles could be shortened significantly. Most importantly for the patient, fewer billing errors would occur. These mistakes routinely occur, even in the best of hospitals today. Electronic recordkeeping could eliminate these problems. In addition, hospitals could file claims more promptly with the patient's insurance provider, which could lead to faster payment and improved cash flow management.

On the hospital's supply chain side, the integrated, RFID-enabled CAM system could help better manage inventories, purchasing, and other internal processes – much as ERP systems do in manufacturing and distribution supply chains. As hospitals begin to explore the potential for RFID, they will find the possibilities to be virtually limitless. And perhaps one day, our health information management systems will be as automated, networked and efficient as our air traffic control system.

### **RFID in the Pharmaceutical Supply-Chain**

For drug manufacturers and distributors, one of today's biggest challenges is to counteract global drug counterfeiting by ensuring the integrity and authentication of products across the entire supply chain. Many states are considering e-Pedigree regulations mandating lifecycle tracking and chain of custody for all prescription drugs. Florida has already enacted pedigree laws, and California's electronic pedigree takes effect in January 2009. For this kind of application, RFID tags can provide an ideal vehicle for rapidly encoding and reading unique identification tags.

Drug counterfeiting negatively affects both the consumer and the manufacturer. For consumers, the biggest issue, of course, is safety. Counterfeit drugs could be ineffective in treating the patient's condition, and they could threaten patient health. For drug manufacturers, having counterfeit drugs in circulation that bear their brand name and logo could wreak severe, long-term damage on the company's reputation and even lead to litigation.

Given these risks, it is easy to see why drug authentication has grown into such a huge issue worldwide. Current estimates put the cost of drug counterfeiting at more than \$40 billion, according to the World Health Organization. And the United States ranks sixth in the world for counterfeit drug discoveries and seizures, as stated by a 2005 Situational Report by the Pharmaceutical Security Institute (PSI).

In addition to combating counterfeit drugs, RFID tags can enable drug manufacturers and distributors to respond quickly and effectively to contamination threats and drug recalls by tracking and tracing the specific products involved, whether in the supply chain pipeline or stocked on retailer shelves.

### **RFID in the Retail Pharmacy**

Retail pharmacies face multiple challenges, whether they are branches of major drugstores, supermarket or discount chains, or smaller independent operators. Large chain pharmacies often experience the same type of unpredictable environment as other retail departments. Staff pharmacists are subjected to seasonal surges, long work hours, a shortage of help, and frequent turnover of support personnel. Yet a pharmacist on duty has greater and more serious responsibilities than the average department manager. For example, pharmacists need to:

- Ensure that prescription drugs are dispensed properly to ensure patient safety.
- Counsel customers on the proper use and storage of their prescriptions.
- Communicate with doctors and other healthcare providers to renew prescriptions and discuss drug protocols and potential drug interactions.
- See that insurance forms are properly completed, signed, and filed.

- Manage inventories efficiently to avoid out-of-stocks.
- Constantly monitor sell-by and expiration dates to ensure that out-of-date drugs are not dispensed.
- Manage timely return of near-expiring drugs to ensure maximum manufacturer rebates.
- Take full responsibility for the security of Class II narcotics and other controlled substances to prevent theft or fraudulent dispensing.
- Properly supervise the pharmacy technicians assigned to restocking and other routine duties.

Clearly, this is a daunting list of responsibilities. So, how can retail pharmacies deploy RFID technology to improve their operational safety and efficiency, and enable pharmacists to spend more time on patient care and using the professional skills they trained for? As many industries have learned, automation is the answer.

### **Automate, Streamline, and Simplify**

Imagine if a specialized, all-points RFID solution could be designed specifically for use in retail pharmacies. The system would include RFID tagging of virtually everything in this enclosed and protected area, including:

- The locked Class 2 narcotics cabinet and each individual container therein.
- The storage cabinet containing expensive, climate-controlled biologics, and each of their individual containers.
- All the pharmacy storage shelves, as well as the drug containers and medical devices stored there.
- Labels on confidential patient drug records and insurance documents.
- Personnel badges for every pharmacist, pharmacy technician, and anyone else having regular access to the area.

In addition to ubiquitous RFID tagging, there would need to be strategically placed fixed RFID readers and handheld scanners. All hardware would then tie into a computer database and the system's "brains" and automation capabilities would be provided by a flexible and powerful suite of data integration and management software applications.

The benefits of such a system could be substantial. The most immediate value delivered would be the security and control of regulated substances and costly biologics. Every time these cabinets were accessed, the system would log the identity of the person dispensing, as well as the time and amount dispensed. At the point-of-sale, the patient information would be recorded and entered into the files. This end-to-end tracking would reduce the risk of human error, theft and fraud.

Similar benefits would be gained for other stocked pharmaceuticals, devices, and supplies. In addition, the system would make real-time inventory counts and replenishment reminders automatic. As a result, out-of-stocks and waste would be minimized. Drug expiration dates would be monitored so returns could be made on a timely basis. Insurance forms and other compliance paperwork and reports would be automated. And larger pharmacies would find it easier to make collaborative, remote vendor-managed inventory (VMI) arrangements with their primary suppliers, thereby increasing supply chain efficiency.

### **RFID: The Next Decade**

In the coming decade and beyond, economics and practicality will no doubt dictate the path of RFID deployment in the healthcare and pharmaceutical industries. As with all technology advancements, organizations will evaluate, test, and deploy solutions designed to address their major business concerns.

Once they realize measurable improvements and payback, they will look for additional ways to apply RFID to achieve value. This is what is happening now across the manufacturing and retail industries.

For now it is enough to anticipate that the automatic identification, data capture and asset tracking capabilities of RFID in the hospital and pharmaceutical sectors will at least make a start in enabling new levels of patient safety, greater supply chain security and integrity, improved operational efficiency, and high quality of service levels. Stay tuned.

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