

Achieving Operational Excellence With Pre-Tagged RFID Products

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Tracking Medications With RFID Technology

The use of radio frequency identification (RFID) is gaining momentum as an effective, real-time method for tracking medications in health systems and is often used to manage code trays/boxes, kits, and anesthesia trays in hospital emergency departments and operating rooms (ORs).¹ Equipped with a system of tag readers, this wireless technology identifies and captures unique information about tagged medications, which is then transferred to a central database for tracking, analysis, and reporting.¹ RFID is “a reliable medication inventory management solution in the hospital setting,”¹ and with pharmacy being one of its early adopters,² this article highlights the experience of pharmacy experts in the implementation and use of this important technology at their institutions.

Practical Applications

Vanbotra Huang, PharmD, MBA, the Director of Pharmacy Services at Eisenhower Health in Rancho Mirage, California, uses an RFID-enabled kit and tray system. “We started about 5 years ago, as we are always looking for innovative technology that can improve patient safety as well as productivity and efficiency,” he said. “Before that we had a manual process. We handled a lot of different medications and a lot of trays and kits. It was time-consuming. It was also tedious and error-prone. RFID technology provided safety benefits and workload efficiencies, so it was an easy decision.”

Steve Wenger, RPh, the inpatient Pharmacy Tech Manager at Rady Children's Hospital in San Diego, California, also uses an RFID-enabled kit and tray system, and after a suspected diversion event, implemented an RFID-enabled anesthesia workstation (carts) that stores medications in locked drawers with secured access. “We needed a better way to manage controlled substances in the OR. We can now capture information on when tagged medications are removed, by whom, and

match those drugs to specific patients,” he said. “We can track medication usage, dispensing, returns, and waste events automatically in real time, and we can optimize our inventory levels with extreme accuracy.”

The Burden of Manual Tagging

RFID-enabled systems require pharmacies to manually associate (encode) drug information to RFID tags, then physically place those tags on the correct medications.¹ At Rady Children's Hospital, a typical day begins by filling all the trays and assessing which medications need to be tagged and encoded according to a daily calendar. “If we run out of tagged medications while refilling the trays, we need to stop, tag, and encode additional products, which involves technicians entering all the appropriate product information into the computer, linking it to the tag, and placing the correct RFID tag on the correct product,” Mr Wenger said. “The pharmacist must then ensure all the tagged medications are encoded correctly, and this check must be completed before the products are approved and placed into inventory for use in the trays,” he said. “We purchase 20 boxes of RFID tags per month, and each box contains 500 tags. So, we're tagging and encoding about 10,000 medications per month. It's 2 to 3 hours of daily work for our technicians, with additional pharmacist time to check the tagged medications.”

Lori Redeaux, a level 2 Pharmacy Technician at Rady Children's Hospital, knows firsthand how this process affects pharmacy staff and the issues that may arise.

“It's so labor-intensive, and there's always a chance for human error in the workflow,” she said. “After we've tagged products, we leave them for the pharmacist to approve. If these products are inadvertently placed on the inventory shelf before the pharmacist pushes the 'Approve' button, medication won't be seen as approved when we fill the trays. We then need to shift through vials—sometimes hundreds of them—to separate approved from non-approved tagged products before we can use them.”

Benefits of Pre-Tagged RFID Medications

Increased Safety and Quality Assurance

Today's manual encoding process increases the likelihood of certain errors, such as linking inaccurate information to the RFID tag or placing a tag on the wrong product.³ Placing a tag on a small vial or ampule without covering up key product information (eg, drug name, dosage, lot number, expiration date) is its own challenge, while poor adhesive quality means tags may not stay in place and alter the integrity of the product.¹ Using pre-tagged RFID medications may help circumvent these pitfalls.⁴ Some medications, such as Diprivan (propofol, Fresenius Kabi), are available pre-tagged,⁵ eliminating the need to tag and encode products manually while improving safety, efficiency, and performance (Figure 1).⁴ Diprivan +RFID has all pertinent data embedded within the tag on the medication label, including the National Drug Code, expiration date, lot, and serial number.⁵ In addition, its RFID tag functionality and the product's encoded data are validated throughout Fresenius Kabi's automated Current Good Manufacturing Practice process to ensure tag readability and data accuracy.⁴

SAFETY

- ✓ **Manufacturer-prepared**
Manufacturer-prepared medication under strict FDA guidelines and CGMP processes
- ✓ **Embedded tag and data**
Embedded data may help reduce the risk for error from manual tagging and data entry
- ✓ **Quality assurance**
Tag functionality and encoded data are validated throughout the automated CGMP manufacturing process (ensuring tag robustness and data accuracy)

EFFICIENCY

- ✓ **Pre-tagged**
Products arrive pre-tagged, eliminating tedious manual tagging and associating product information
- ✓ **Ready-to-read**
Custom designed tags are ready-to-read, loaded with essential drug information: NDC, expiration date, lot, and unique serial number
- ✓ **Time savings**
Saves time for pharmacy personnel, freeing up specialized resources to focus more on value-added tasks

PERFORMANCE

- ✓ **Clear identification**
Labels will include RFID identifiers to indicate which products are pre-tagged
- ✓ **Authentication**
Locked serialization at the unit of use allows for the identification of genuine Fresenius Kabi products

Figure 1. RFID eliminates tedious manual tagging and data entry and may help improve patient safety by reducing medical errors. Fresenius Kabi +RFID medicines feature a high-performance RFID tag embedded in the label with the data hospitals need to immediately identify, locate, and manage their inventory.

CGMP, Current Good Manufacturing Practice; **NDC**, National Drug Code; **RFID**, radio frequency identification. Based on reference 4.

Improved Efficiency

In an era of burnout and staffing challenges,⁶ manually tagging products consumes valuable resources.¹ Use of pre-tagged products can reduce time spent on labor-intensive tasks.¹ “The redundant nature of manual tagging primarily impacts the technicians,” Mr Huang said. “With less time spent on these repetitive tasks, use of pre-tagged products can potentially increase job satisfaction.” Ms Redeaux agrees, saying she appreciates the time Diprivan +RFID saves technicians as these products come into the pharmacy ready to use in the tray restocking process. Ready-to-read pre-tagged RFID medications are loaded with essential drug information,⁵ freeing up pharmacy personnel to focus more on value-added tasks.

Cost Savings

Currently, RFID tags must be obtained by an approved supplier,¹ and most vendors charge a price per tag.¹ Pre-tagged products can lessen costs by reducing the labor associated with manual tagging and encoding while eliminating the need to purchase separate tags.¹ Avoiding the errors associated with manual tagging and encoding can also curtail expenses.^{3,7} “There are real advantages to using a pre-tagged RFID product like Diprivan,” Mr Wenger said. “The safety benefits and reduced labor requirements yield substantial cost savings to our institution.”

Better Drug Inventory and Recall Management

A 2022 American Society of Health-System Pharmacists (ASHP) survey of 232 pharmacists found that inventory management is a top reason for wanting to implement RFID in the medication-use process.¹ RFID technology allows for automatic ordering in real time when par levels are low (Figure 2).^{1,5} Additionally, pre-tagged products can be removed more

quickly in the event of a recall, with real-time identification of impacted lot numbers and product locations across the health system.^{1,5} The ASHP survey showed that substantial proportions of respondents who had implemented RFID technology reported improved inventory tracking (82%), increased availability of data to optimize kit or tray contents (73%), decreases in the number of expired medications (72%), and greater ease in managing drugs during shortages (46%) and recalls (64%).¹ “Prior to the use of RFID, we had no idea of knowing exactly where the products were in the health system,” Mr Huang said. “They could be on the shelf, in a kit, or at a clinic site, and we would have to send people across the organization to find them. The process has been substantially streamlined with RFID products. We know exactly where the impacted products are and can immediately locate and remove them from the inventory.”

Call to Action for Today and the Future

A 2024 ASHP Foundation report, [RFID Technology in Medication-Use Systems: Considerations and Recommendations to Advance Implementation](https://www.ashpfoundation.org/-/media/REF/pdf-folder/5_ASHPFoundation-RFID-Report_Web.pdf), discusses the findings of a Strategic Advisory Group (SAG)—consisting mostly of pharmacists with expertise in operations, quality improvement, and medication safety.²

In addition to assessing barriers to adoption, the SAG voted on 38 of the 76 recommendations that had 90% or greater participant agreement as being important to enhance the safety and efficiency of medication-use systems.² Their high priority recommendations included actionable guidance to²:

- advocate for the standardization of RFID tags used in the medication distribution process so they can be read across any vendor’s scanning technology;
- work with vendors and partners to optimize the interoperability of multiple systems (eg, electronic

health records, barcode medication administration, automated dispensing cabinets);

- work with vendors to design ways for RFID to seamlessly capture administration and billing in the electronic health record; and
- assess the role of RFID in assisting organizations with becoming compliant with the Drug Supply Chain Security Act.²

Participants also identified controlled substance inventory management as an area where RFID use could provide added visibility, efficiency, and safety for patients and staff.² The SAG endorses the packaging and purchasing of medication doses in pre-tagged units of use, and believes that health systems with pharmacy staffing shortages should minimize manual tagging.² According to SAG participants, RFID in conjunction with the benefits of pre-tagged medications offers “a future where technology-enabled medication-use systems allow the health care team to focus on patients and not on operations, materials, and medications with increased efficiency, visibility, safety, and quality.”²

Conclusion

According to the pharmacy professionals featured in this article and a research group associated with the ASHP Foundation, health care institutions are in need of more pre-tagged products.² Pre-tagged RFID products, such as Diprivan +RFID,⁵ reduce the need for manual tagging, tag placement, and associating drug information.^{1,3,4} It is a ready-to-read, reliable, and efficient product that can be used immediately.⁵ “Pre-tagged products can potentially improve safety, lower costs, and increase job satisfaction among pharmacy professionals,” Mr Huang said.

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Simplify your medication inventory process
RFID-embedded smart-labeled products arrive ready-to-read, which saves time and supports a safe, more efficient medication inventory process.

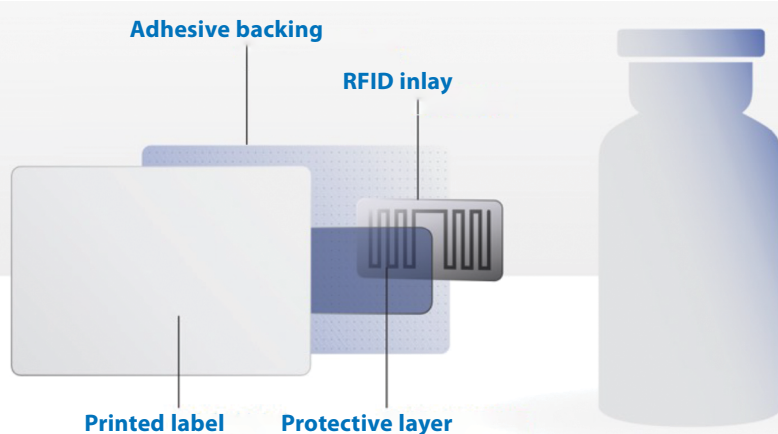


Figure 2. RFID enables real-time inventory management.

RFID, radio frequency identification.
Based on references 1 and 5.