

RFID keeps lab's supplies on hand, just in time

Kevin B. O'Reilly

June 2015—Sharon Cox, MT(ASCP)SM, has a passion for the correct count.

Charged with managing the laboratory supply inventory as core lab supervisor at Saint Francis Health System in Tulsa, Okla., she knows the right tally matters. Get it wrong and the lab can wind up with too little of what is needed. That can mean big overnight shipping charges when things run out unexpectedly. To avoid that outcome, the lab may order more supply than necessary, which leads to a different kind of problem.

"All those reagents you have sitting in the refrigerator—that's just wasted money sitting there that could be better used by the health system," Cox said last month during a talk at the Executive War College in New Orleans.



Cox

"Now we run a lot leaner ship," Cox said, explaining the impact of the lab's implementation of an inventory management system powered by radio-frequency identification. "We used to have two of everything, and we had \$1.2 million worth of supplies in stock. That's now down to \$700,000."

This sort of just-in-time supply management is enabled by getting the correct count, of course, but doing so is easier said than done. As with any other process in the laboratory, the more manual it is the more prone it is to error. Before adopting Abbott's RFID system in November 2013, the Saint Francis laboratory, which performs 8.8 million tests annually, employed labeling and supply-chain software made by the German company SAP to manage its inventory.

After a review aided by Abbott, Cox and her colleagues discovered a 27 percent inventory error rate that added \$68,000 in expenses annually due to expired stocks, urgent orders, and items out of stock. Those mistakes came about because products had to be labeled by hand. It is easy enough to slap the wrong label on a product. What shows up in the tracking system as C-peptide reagent could actually be C-peptide calibrator because someone goofed.

Manual data entry was another source of mistakes, Cox said.

"If you're off by one digit, then it could be the wrong product that's being decremented. There are all sorts of areas with that touch system where you're making mistakes with labeling or how you're consuming your product."

Abbott, by contrast, ships all of its supplies with the RFID tag already affixed to the product, reducing costly and error-prone hands-on time at Saint Francis. The companion software automatically enters any changes as read by handheld RFID readers or strategically placed RFID-scanning portals.

As an Abbott shop, Cox tells CAP TODAY, about 70 percent of Saint Francis' laboratory supplies come from the company. For the more than two dozen other vendors it works with, the lab uses a printer that can spit out 100 RFID tags in two seconds. In all, the lab tracks more than 2,500 RFID-tagged items. Cox said she is pushing the other vendors to adopt RFID to save her lab the time and expense of applying the RFID tags.

"As we're negotiating with vendors now, part of our demands are going to be: 'We have this RFID system, and you

have to accommodate this system or, frankly, we can find another vendor to work with us,” she said at the War College.

One shortcoming of barcoding is that it requires a line of sight between the handheld barcode reader and the barcode tag for counting purposes. That makes reconciling discrepant inventory levels a time-consuming process.

“We used to do a wall-to-wall inventory once a year,” Cox said. “It took two of us 20 hours to go through the entire core lab and count every widget in there. That’s every part in your lab, every reagent and consumable.”

Now, using the Abbott Inventory Manager system, that everything-and-the-kitchen-sink count takes just 15 minutes and is done once a week. The handheld RFID reader needs to be only in the same general area as the tags to do its counting. Geoff Zawolkow, former CEO of RFID Network, an RFID product-testing website, explains the impact.



Zawolkow

“The barcoding stuff was a big improvement over having to visually figure out what you had. Now you can just use a barcode reader. But if you think about it, you have to basically touch each item or have a line of sight with each item and manually read each one individually,” Zawolkow tells CAP TODAY. “With RFID, you can bring the handheld reader within range of the area where the supplies are being stored and quickly read all of them. If you had a refrigerator with a bunch of reagents in it, you can read those in a matter of seconds, compared to a number of minutes or maybe even an hour to do so.”

Cox said RFID works at room temperature, the cold temperatures found in lab refrigerators, and in freezers.

“A refrigerator turns out to be the best conduit for that technology,” she said. “It’s a big metal box, so when you shove the RFID beam in the fridge, those beams actually bounce up the walls. So I get 100 percent read rates with refrigerators jam-packed with reagent boxes.”

The switch to RFID has saved Saint Francis more than 1,200 labor hours a year in hands-on inventory time, valued at nearly \$40,000, Cox said. Reducing the amount of inventory, enabled by automated tracking of supplies, slashed nearly \$300,000 in costs right off the bat. The lab also slashed nearly \$27,000 in overnight shipping costs. Using RFID, Saint Francis decreased its inventory error rate from that 27 percent mentioned earlier to about one percent.

Three ways to manage lab inventory			
Processing method	Manual	Semiautomated	Automated
Line of sight required?	Yes	Yes	No
Time to locate inventory	High Hunt and find	High Hunt and find	Low Real-time, automatic location
Risk of errors and noncompliance	High Manual introduction of error	Medium Requires manual handling; audit trail	Low Fully automated audit trail
Labor requirement	High Very labor intensive	Medium Hunt and find with rule-based informatics	Low Automated find with rule-based informatics

Adapted from: May 6, 2015 Executive War College talk by Sharon Cox: "RFID in the Clinical Laboratory: How We Transformed Inventory Management, Cut Costs, and Improved Productivity."

The results Saint Francis' laboratory is achieving in using RFID to manage inventory echo those accomplished in the retailing and apparel industries, says RFID veteran Zawolkow. (He is now CEO of Lab Sensor Solutions, which offers a Bluetooth-driven solution that aims to ensure the quality of health care specimens while in transit through real-time temperature and location monitoring.)

"It was the kind of thing I'd been hearing about from general retail," says Zawolkow, who attended Cox's War College talk. "There was a similar savings that they were achieving because they were basically able to keep their inventories lower and still be able to fill the need for the items. And also everything was a lot more accurate and they didn't lose things as much, and they were able to keep track of when things came in and when things left, and when things were used and when, in the retail case, things were put on shelves and moved from shelves.

"What it [RFID] allows you to do is do inventory much more frequently and, in some cases, completely automate inventory," he adds, noting that RFID error rates are generally "very low." The two substances that can impede accurate scans are metal and liquid.

Cox and her colleagues at Saint Francis ran into trouble with these very materials.

"Lots of blood gas vendors use foil to ship their cartridges, and RFID energy is absorbed into that. It can't detect the tag on a big foil wrapper," Cox says. "And RFID energy is absorbed by liquid, so it doesn't work well on a huge container of liquid."

Some liquid supplies such as wash buffer solution are shipped in large Cubitainers. For those items, the laboratory uses barcoding to track inventory.

Together, these kinds of supplies account for about three percent of the laboratory's total inventory, Cox says. She and her colleagues did come up with a clever workaround for those foil-wrapped containers. They attach the RFID tag to a 3 x 5 inch index card and then stick the card to the wrapper. "Simply adding that air gap between the foil wrapper and the RFID tag" does the trick, Cox says.

The RFID switch also has led to changes in how inventory is stored, she said.

"Now, we have to be a little more careful in how we orient stuff in the refrigerator. We have learned how to position things so that we get advantageous read rates," Cox said. "For example, reagents, when they come in, are in square, cardboard boxes. If you have two RFID tags that touch each other, they won't be able to be read. So you can't just sling it into the refrigerator. We stack it so all the RFID tags face to the right."

The Saint Francis laboratory has four handheld RFID readers and two stationary portal readers, one on the receiving dock and one in the lab. They have two readers in the ceiling that track the movement of items. As a beta site for the Abbott Inventory Manager, the laboratory received a price break on the system, Cox said. The lab's two-year agreement with Abbott expires in October 2015, and the plan is to keep the system.

Greg Ahlberg, Abbott's vice president of diagnostics in the U.S., provided this statement in response to CAP TODAY questions about pricing.

"Every solution is customized based on each lab's inventory management processes, and therefore the price of the system is dependent on the individual solution's design. Sites choosing to adopt Abbott's Inventory Manager solution and algorithms," he said, "have seen significant benefits through reductions in time spent managing inventory as well as lowering inventory levels, thereby decreasing inventory carrying cost. One site adopting Abbott's solution saw a return on investment in less than one year."

In response to a separate question about whether Abbott's RFID system would work well for a non-Abbott shop, Ahlberg said: "While Abbott does not need to be the primary vendor supplier, there are additional potential efficiencies when choosing Abbott products as we pre-tag our products."

He added that potential benefits for laboratories using the Abbott Inventory Manager include better use of staff, lower send-out costs, reduced overnight shipping expenses, less product waste, and smaller inventory holding costs.

The company, which began offering the system in the U.S. last year, said it is keeping confidential the number of laboratories that have installed the Abbott Inventory Manager. In February, Siemens launched a similar product, called Syngo Lab Inventory Manager. A Siemens spokesperson said she was unable to provide information regarding pricing or the number of installations.

One laboratory leader who attended Cox's War College talk said he wants to know more about costs.



**Dr.
Sossaman**

"I thought the presentation was fantastic, but I do wish there had been some discussion on pricing. That is probably the deciding factor in doing something different for us," Gregory Sossaman, MD, tells CAP TODAY. He is system chair of pathology and laboratory medicine at Ochsner Health System in New Orleans.

"Unfortunately, all of our practices now are entirely manual, and although I could really see some advantages to the system that Saint Francis uses, I'm still not entirely sure how I would justify the cost of implementing their solution."

For her part, Cox says any laboratory big enough to have implemented an automated track system "will have

enough volume to pay for this.”

“We were able to figure out in this lab that we were able to save hard dollars very quickly by using this system,” she adds. Amid an 18-month transition to the Epic health information system during which the C-suite put a hold on any big purchases, executives gave the OK for the lab’s switch to RFID.

“Our administration saw the value of it,” Cox says.

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