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THE FUTURE OF INVENTORY MANAGEMENT AND THE TECH THAT WILL DRIVE IT

INTRODUCTION

Following every major disaster, the imperative for industries involved is clear: Be better prepared for the next one. Savvy companies start getting ready for the next disaster while managing the current one, and healthcare should be no different. Forward-thinking organizations are already evaluating how to avoid catastrophic disruption in the future.

Pre-existing issues in healthcare worsened during the pandemic, such as the pressure to contain rising costs. An industry report from December 2019 found hospitals across the U.S. experienced significant declines in profitability with operating margins down by 21.3%, and supplies, labor, and drugs leading the expense categories (Kaufman Hall, 2019). An updated industry report revealed hospital operating margin declined 46.1% from January 2020 to January 2021 (Kaufman Hall, 2021).

Despite decreased revenue from delayed care, expenses continued to rise with non-labor costs going up 2.4% year over year (Kaufman Hall, 2021). The surge in demand for critical supplies and equipment certainly played a role. One study found by late March 2020, around a third of hospitals were almost out of face masks, and 13% were out of plastic face shields (Cohen, Rodgers, 2020).

"The pandemic has created an enhanced focus on the supply chain in healthcare," said Jason Rosemurgy, Senior Vice President of Sales & Marketing at Terso Solutions. "The lack of inventory visibility coupled with critical product shortages created an environment where supply chain functions received more focus across the entire healthcare industry." Shrewd healthcare leaders are recognizing the need for end-to-end transparency and investing in solutions to close these gaps.

GROWING ADOPTION OF INVENTORY MANAGEMENT SOLUTIONS IN HEALTHCARE

Healthcare supply chain has been slower to adopt technology, and that holds true in the inventory management space. "Today, for stakeholders in the supply chain - medical device manufacturers, distributors, and health care providers – inventory management is very manual," said Joe Pleshek, CEO of Terso Solutions. While industries like retail adopted supply chain best practices such as forecasting, data standardization, and tracking technology years ago, healthcare fell behind (Pohl, McGowan, 2013).

As healthcare organizations rush to catch up, they are learning there is not one technology that serves as a magic bullet. Instead, the complete solution includes IoT sensors, cloud-based software platforms, and analytics tools working together. "Sensors create data, but you have to make the data meaningful," Pleshek explained. "Software is playing a huge role in transforming data into insights enabling stakeholders to proactively manage the system and the supply chain. Going forward software platforms need to integrate with one another. Interoperability of information systems so there is one source of truth is really going to be important."

Integration is central to bringing together the end-to-end view of the healthcare supply chain. The real power of inventory management solutions is seeing beyond one actor in the supply chain to all actors. "When I think about the next several years, I do think that what will be table stakes is this interconnectedness across the value chain from the medical device maker all the way to the point of care in the hospital or the surgical center," explained Sandy Murti, Vice President Global Partner Development at Impinj. "The more this information continues to be

siloed, the less likely it is that people are getting the maximum value and benefit."

Interoperability is also important for this technology to scale within healthcare. However, to create interoperability, there needs to be concentrated efforts on standards. "There can't be thousands of point solutions providing benefit solely for individual hospitals and expect there to be complete industry-wide adoption," said Rosemurgy. "The sharing of data and infrastructure that allows systems to effectively talk to each other needs to come together to make that happen."

Having standardized, open systems that enable data exchange will enable healthcare to adopt true supply chain analytics. "When things are interconnected and automatic, you can put trust in real time visibility," said Peter Bloch, Business Development Manager - Healthcare at Avery Dennison Smartrac. "There will be a shift from past doubts of information, and more focus on the analytics. How we analyze and interpret and use information, versus just the sheer counting of things."

RAIN RFID LEADS TO INVENTORY MANAGEMENT SOLUTIONS OF THE FUTURE

The demand in healthcare for complete inventory management solutions is growing, and along with it the sensor technology considered best-in-class in other industries: RAIN RFID. "The most important ways in which RAIN RFID benefits the supply chain, and in particular the healthcare supply chain, is accurate and timely visibility into the level, the location, and the state of medical supplies so that hospitals and healthcare providers ultimately can deliver the best patient care," said Murti.

RAIN RFID is the preferred sensing technology in industries like retail and aviation because it can gather a significant amount of detail at the individual item level, and aggregate that data into a high level view. For health systems and device manufacturers managing geographically dispersed inventory, this is a major advantage. "From the hospital perspective, RAIN RFID provides real time visibility to high-dollar inventory from a single stocking location within one hospital all the way up to large hospital systems spanning multiple geographies," said David Lefkowitz, Senior Director of Market Strategy for Terso Solutions. "From the medical device company perspective, it enables real time visibility of all inventory across multiple locations, including one of the most difficult problems to solve...the mobile tracking of field inventory."

With all of the requirements for handling medical items, ensuring compliance is a major concern. RAIN RFID provides situational awareness that makes safe handling of these items much easier. "Certain types of healthcare supplies where expiration dates matter or refrigeration is needed, can be so expensive that hospitals want to purchase only the optimum quantities necessary," Murti explained. "Having visibility into where your supplies are, how many of a given supply you have - or a medical device, or an implant - can really help reduce the cost of care."

There are many aspects of RAIN RFID that set it apart from other technologies of inventory management solutions. One important feature is the distance from which a RAIN RFID reader can obtain information from a tag. "Read-ranges of RAIN RFID can reach 30 feet and farther making a great tool for capturing data from afar," explained Bloch. "In addition, the speed of data transfer enables reading of hundreds of items seemingly at once without needing line of sight." This is a major advantage over other technologies that require greater compliance by the operator to accurately record items. "Scanning a barcode or physically recording something in a logbook can be forgotten or skipped in the moment due to time constraints," adds Rosemurgy. "If these steps don't happen properly, inventory counts are inaccurate, charge capture is lost, and rework time is created with additional backend reconciliation processes."

RAPIDLY SCALING RAIN RFID ADOPTION IN HEALTHCARE

Healthcare gets to benefit from the retail industry's investment in RAIN RFID. "The retail market adoption of RAIN technology is probably one of the biggest factors driving the adoption in healthcare," stated Rosemurgy. "Healthcare can easily leverage this foundational work that has been in place for years." Because of retail investment, manufacturers have been able to evolve the technology to accommodate healthcare use cases. "The reliability of RAIN RFID tags has greatly increased in the last 10 years to provide six sigma performance," explained Bloch. "Manufacturing processes have also changed to make RAIN RFID more sustainable, recyclable, and have less environmental impact."

Another major benefit retail is gifting to healthcare is economies of scale. Previous studies of RFID use in healthcare named expense as a barrier (Haddara and Staaby, 2018, and Paaske et al 2017). Thanks to retail, prices are greatly reduced. "The cost of this technology has come down dramatically over the last 10 years," said Pleshek.

"There are 15 billion tags being implemented and in use within the retail supply chain annually. These volumes are driving the cost of RAIN RFID tags to less than 15 cents a tag."

Retail not only drove down cost, it also proved the return on investment for accurately tracking every item. "You have to have that real time visibility because it shrinks the padding in the supply chain," explained Bloch. "I think the future holds tagging and digital identities for even lower-level items so that you can start to manage those in a way that decreases the costs, decreases waste, and increases sustainability."

Another major driver of RAIN RFID adoption in healthcare is the interconnection of the healthcare supply chain. "The vendor, the medical device manufacturer, the pharmaceutical company – this technology is going to bring them together and enable them to collaborate," Murti explained. "The thing that will drive innovation is more cooperation and collaboration across those groups so that more companies get the value of using this technology across the value chain."

Looking ahead to the next five years, it is very likely there will soon be a new actor in the healthcare supply chain driving adoption: the consumer. "Consumers are increasingly empowered with more information," said Murti. "I wonder if consumers asking and expecting more information about implants, about drugs, about devices that are being used to care for them, will require hospitals and drug makers and device manufacturers to consider the need to provide better information for the consumer.' RAIN RFID technology can absolutely play a role here."

As RAIN RFID expands to fit many types of objects, healthcare consumers will be presented with networks of connected items. "Consumers will start to be more involved and expand feedback, data points, and interactions with items," described Bloch. "I think it will become more ubiquitous and allow communication between things and people in a way that we have a hard time conceptualizing."

THE VISION OF A FULLY-CONNECTED FUTURE

To get to the point where consumers can play an active role in the healthcare supply chain, organizations must first implement end-to-end inventory management solutions. Led by RAIN RFID, these technologies enable healthcare to not only catch up to other industries, but to leapfrog into the future.

This vision is becoming reality today as healthcare providers including acute care hospitals, ambulatory surgery centers, and medical device manufacturers are rapidly implementing RAIN RFID technologies. With nearly 1,000 healthcare facilities implementing automated inventory management solutions from Terso, the company sees initial point projects expanding into enterprise-wide solutions. "A hospital may start with RFID enabled cabinets and freezers to manage extremely valuable tissue and biologic products but then, after recognizing process and cost efficiencies, rapidly expand the implementation to all surgical supplies and instrumentation kits," described Pleshek. "Real time visibility catches on quickly when you have spent years manually tracking these items."

Pleshek certainly sees a fully-connected future where inventory is proactively affiliated with scheduled patient procedures, instrumentation, equipment, physical locations, and hospital staff: "If I'm entering a hospital this morning for a procedure, it would be good to know when I entered the hospital or the facility, know the inventory is ready for my knee replacement at 10:00 a.m., and the room is going to be scheduled, or is ready and available. That really comes down to sensing technologies and software working together to create a real time healthcare system."

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