BUILDING A SMARTER HOSPITAL:

WHY HOSPITALS ARE RAPIDLY ADOPTING RFID-ENABLED MEDICAL CABINETS

SMART HOSPITALS ARE REDUCING WASTE IN HEALTHCARE

Pressures on the global healthcare system are more profound than ever. Mandates are enforcing stricter budgets even though demand is increasing, driving healthcare facilities to seek out any source of potential improvement that will reduce costs, save time, and improve patient safety. One potential source of improvement is the adoption of new technologies, especially in automation and traceability, such as barcode scanners, machine vision, and radio frequency identification (RFID).

RFID has established itself as a key player in achieving this task by enabling hospitals to wirelessly track both items and people. From surgical instrument to blood samples, RFID is being used to create a network of smart devices throughout these "Smart Hospitals". RFID-enabled technologies allow for consumable tracking, patient and staff identification[i], medication tracking for error prevention and anti-counterfeiting[ii], and asset/device tracking[iii]. These solutions ultimately improve patient care, optimize workflow, reduce operating costs, avoid error, and reduce costly thefts. For Original Equipment Manufacturers (OEMs), being able to offer customers "smart products" is crucial to success, and in some cases it even lends to the protection of consumable revenue streams.

RFID-ENABLED SMART MEDICAL CABINETS

RFID-enabled medical cabinets, known as "Smart Cabinets", are an integral part of a smart hospital's ecosystem. They are becoming popular among healthcare facilities because they optimize workflow, increase patient safety, and reduce cost. They accomplish this through various means, such as inventory and consignment stock management, tracking high value medical devices, and secure access to pharmaceuticals. They allow hospital personnel to dispense medications quickly, safely, and accurately. In addition, what was once a manual, tedious task, is now automated: every item removed or added to the medical cabinet is recorded automatically, saving time, and eliminating human error.

“Smart” Medical Cabinets

With America facing an opioid epidemic, “drug diversion” has become a huge issue in medical facilities. To clarify: Drug diversion involves the transfer of any legally prescribed controlled substance from the individual for whom it was prescribed to another person for any illicit use[iv]. Smart medical cabinets can prevent the theft of narcotics by healthcare workers. RFID allows for real time inventory of the cabinet making sure that the operator only takes the amount for which they are authorized.

Where are smart medical cabinets being adopted?

Smart medical cabinets are being adopted in any department where efficient inventory management and consumable tracking is critical. This includes:

- Cath-labs
- Operating rooms and ICUs
- Emergency departments
- Interventional radiology labs
- Pharmacies and Clinics
- Patient floors

How does a smart cabinet work?

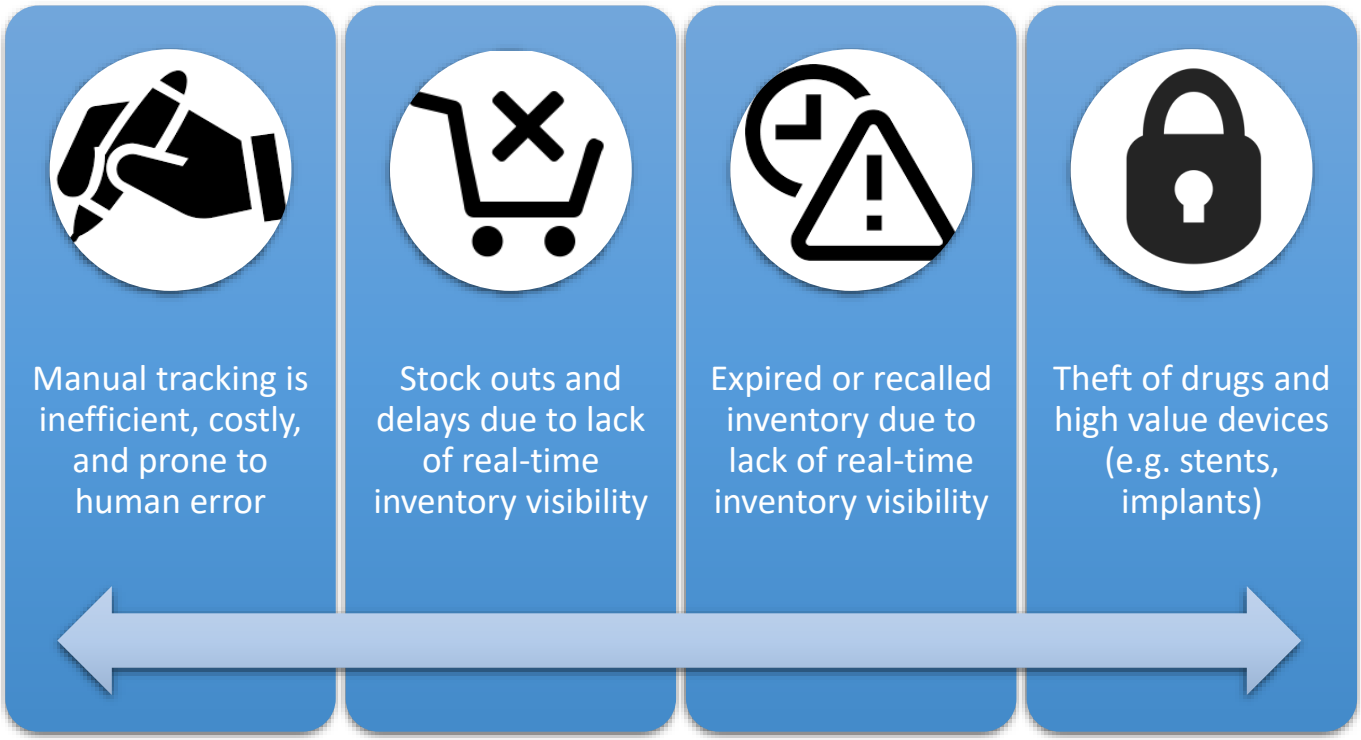
1. Each cabinet is equipped with a reader that records each transaction (i.e., what was removed and who removed it). RFID-enabled cabinets can employ standard EPC Gen 2 Ultra High Frequency (UHF) passive RFID tags and readers, but cabinets can also utilize HF.
2. Each item in the cabinet is labeled with a small RFID tag that contains basic information about the item. In some hospitals, items arrive pre-tagged.
3. All relevant personnel carry an RFID-enabled access card to gain access to the cabinet. This could be their existing badges (which is usually HF) or a separate access card specific to the cabinet only (which could utilize HF or UHF).
4. Often, an external reader is needed to check items in or out of the cabinet as a double verification of items entered or removed.

When integrated with the Hospital’s information system, real-time data can be sent directly to vendors, distributors, and manufacturers giving the entire supply chain an accurate view of inventory levels and usage. This allows supplies to be automatically re-ordered when inventory is running low.

“Smart” Medical Cabinets

PAIN POINTS

Expired or recalled medications, empty shelves, misplaced product, and missing inventory are significant problems in any medical facility. The inability to track and manage individual items can lead to inefficiencies and inadequate patient care. Facilities and vendors need real-time data into the location and current state of inventory at the item-level. This is where RFID-enabled technologies provide the largest value. Here are a few of the main pain points smart medical cabinets aim to alleviate:



WHY HOSPITALS ARE ADOPTING SMART CABINETS

RFID-enabled medical cabinets can provide immediate ROI with a minimal investment of time and IT resources. Below are a few of the main benefits that can be achieved through RFID-enabled smart cabinets:

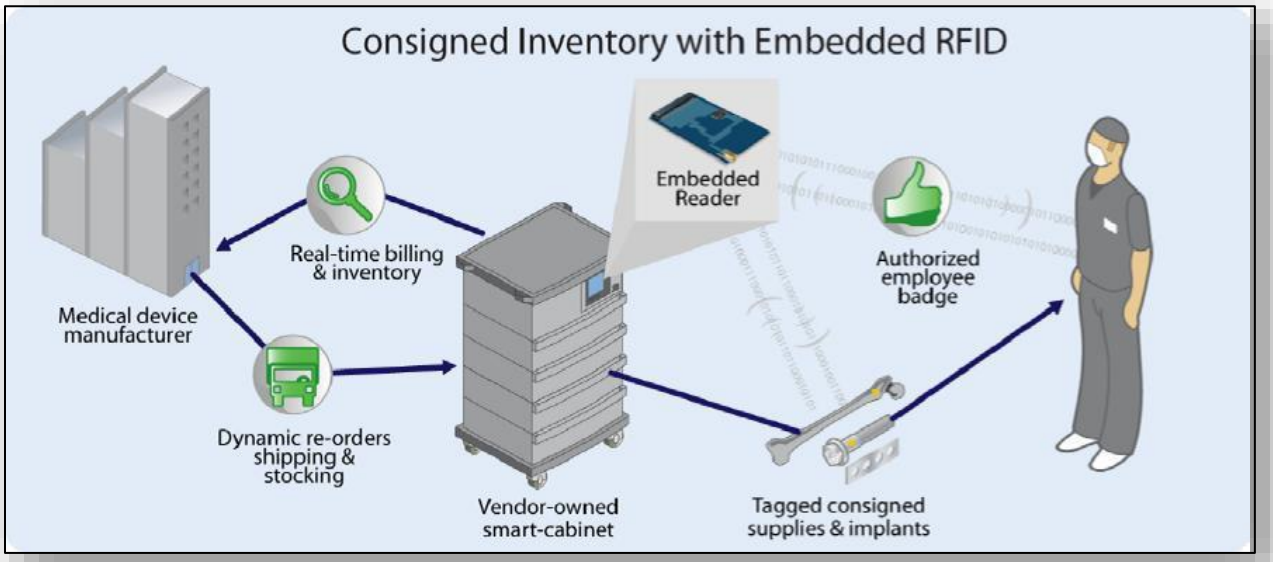
“Smart” Medical Cabinets

Improved Patient Safety	• Eliminate the dangers associated with expired or recalled products
Undisrupted Workflow	• No more manual counting or data entry: Automatic data collection and product ordering without disruption to natural workflow, saving time and eliminating human error
Optimized Inventory Management	• Real-time usage analytics allows visibilty to thousands of items • Right-size inventory eliminates over- and under-ordering, eliminating stock-outs and associated overnight shipping costs
Security & Theft Prevention	• Drug- and device-level tracking, monitoring, and control • Secure access to cabinets prevents theft
Continual Improvement	• Gain new insights into improving performance • Better predict certain trends, like demand

EXAMPLE OF SMART MEDICAL CABINET IN USE

Inventory management is best exemplified through consigned inventory in a smart-cabinet. Take, for instance, an orthopedic implant manufacturer who has arranged to sell their implants on consignment at a hospital. Because they only get paid when the product is used and reported, they experience a significant lag between usage and revenue and high carrying costs. Compound this with lost revenue due to misplaced/stolen product and high stocking costs associated with manual inventory checking, and it is no surprise that most large distributors and manufacturers are looking for a way to obtain automated, real-time inventory and order placement.

Such a company would obtain a customized, secure cabinet embedded with an RFID reader responsible for storing and cataloging the implants. In addition to tracking what implants were used, the reader would also verify and record the identity of any individual accessing the unit. When connected to the manufacturer’s order and fulfillment system, the hospital is assured they will have the right product at the right time, while the manufacturer can bill immediately upon product retrieval. This scenario also works for Hospitals who own their own inventory, such as surgical supplies and other consumables.



For more information on embedded RFID in medical devices, see JADAK’s RFID whitepaper titled “Embedded RFID for Medical Device”: https://www.jadaktech.com/resources/white-papers/

CONCLUSION

Reducing waste and eliminating inefficiencies in healthcare systems is a global challenge. RFID-enabled medical cabinets have proven to be a major source of improvement by reducing manual labor and human error involved in manual tacking and monitoring of supplies; reduction of misplaced and stolen items; efficient use of time-sensitive pharmaceuticals that may expire; and elimination of potentially dangerous recalled drugs. Although smart cabinets can be used in a variety of industries, they are particularly valuable in the healthcare system due to the unique challenges associated with this industry, such as[v]:

- High value medical devices and products
- Highly unpredictable product consumption due to patient variability
- Difficult inventory tracking due to urgency of medical procedures

- Product expiration and tracking issues caused by a lack of accountability for products managed under a consignment process[vi]

There are many different ways in which RFID can be used to improve processes and increase efficiencies. Smart cabinets are just one component of the “smart hospital” ecosystem.

A TRUSTED RFID PARTNER

Medical device engineers looking to embed RFID technologies into their equipment can benefit by partnering with companies that have deep RFID engineering expertise. Many suppliers can offer a wide variety of RFID products to choose from but unlike most data collection manufacturers, JADAK has one of the broadest RFID product portfolios in the industry, backed by engineers with the resources and technical expertise to help OEMs implement solutions to meet their specific needs and requirements.

JADAK's deep knowledge of RFID, particularly in the medical industry, makes them uniquely positioned to solve many different types of challenges. By embedding RFID technology into new and existing products, OEMs can now gain the product differentiation and competitive advantage that RFID-enabled features and functions impart, while at the same time protecting revenue streams and brand integrity.

In addition to medical cabinets, JADAK RFID solutions are engineered for applications such as medical equipment tracking, sterilization tracking, access control, patient monitoring, sample tracking, and more. To learn more about JADAK’s full line of HF/UHF RFID products and services, contact them at 315-701-0678 or info@jadaktech.com

ABOUT JADAK:

JADAK, a business unit of Novanta, is a market leader in machine vision, RFID, barcode, printing, and color and light measurement products and services for original equipment manufacturers. The company designs and manufactures embedded detection and analysis solutions that help customers solve unique inspection, tracking, scanning and documenting challenges. The company is ISO 9001 and ISO 13485 registered.

Novanta is a trusted technology partner to OEMs in the medical and advanced industrial technology markets, with deep proprietary expertise in photonics, vision and precision motion technologies.

ThingMagic is JADAK’s RFID line of products and services.

www.jadaktech.com

FOOTNOTES:

[i] RFID tracking of patients, staff and equipment to enhance hospital response to mass casualty events AMIA Annu Symp Proc (2005), pp. 261-265

[ii] K. Ohashi, S. Ota, L. Ohno-Machado, H. Tanaka. Smart medical environment at the point of care: auto-tracking clinical interventions at the bedside using RFID technology. Comput Biol Med, 40 (6) (2010), pp. 545-554

[iii] Sangwan RS, Qiu RG, Jessen D. Using RFID tags for tracking patients, charts and medical equipment within an integrated health delivery network. Proc IEEE Networking, Sensing and Control; 2005. p. 1070–4.

[iv] Berge KH, Dillon KR, Sikkink KM, Taylor TK, Lanier WL (2012). "Diversion of drugs within health care facilities, a multiple-victim crime: patterns of diversion, scope, consequences, detection, and prevention". Mayo Clin. Proc. 87 (7): 674–82. doi:10.1016/j.mayocp.2012.03.013. PMC 3538481 Freely accessible. PMID 22766087.

[v] gal Bendavid, Harold Boeck, “Using RFID to Improve Hospital Supply Chain Management for High Value and Consignment Items”. Procedia Computer Science (Volume 5, 2011) Pages 849-856. ISSN 1877-0509. https://doi.org/10.1016/j.procs.2011.07.117.

[vi] Lewis .O, Balaji S., Rai A. RFID-Enabled Capabilities and Their Impact on Healthcare Process Performance, Proceedings of the 17th European Conference on Information Systems, ICIS 2010 (2010).