

Bedside scanning and patient safety

GS1 barcodes on medical devices reduces stock and enhances patient safety

The procurement and management of medical devices in the Region of Southern Denmark were once manual tasks with the inherent risks of errors leading to stock outs or obsolete products. The region has now implemented a digital inventory management system, using existing barcodes on the products. The system automatically registers Global Trade Item Numbers, lot number and expiry dates, providing an overview of products in stock, the order in which products must be used and automatic write-downs and reordering of products from manufacturers. In addition to automating the product management process, the system assures doctors that the products required for each day's surgeries are in stock, thus reducing the risk of postponing surgical procedures while enhancing patient safety.

By Sine Carlsson



Inventory management in surgical wards

Denmark is divided into five regions, each with its own political management. The Region of Southern Denmark is the third largest region with a population of approximately 1.2 million and a net annual operating budget of DKK 22.7 billion. The healthcare system, including its operation of hospitals, represents the greatest challenge for the region.

Medical devices are used at the region's hospitals for patient diagnostics and therapy in many processes, which makes it extremely important to manage and control the devices correctly.

For years, the region's surgical wards in particular have wanted to digitise inventory management. The goal is to improve the overview of products in stock, prevent products from becoming obsolete, reduce the volume of stock and generate traceability throughout the workflow. One benefit is that surgeries will no longer need to be cancelled due to unavailable products.

Manual processes introduce risk for patients

Previously, the daily assessment of products needed for the day's surgery took place manually, which was time consuming and involved the risk of overlooking or choosing the wrong medical device.

Surgical wards stock hundreds of products. The challenge is that these products are expensive and the wards need to have the right quantity of the right products.

For example, when a patient is undergoing hip replacement surgery, the surgical team expects "size X" to be the correct size, but after commencing the surgery, the team may find that "size Y" is required and is out of stock. In this situation, other hospitals must be immediately contacted to locate the required size. Although this is often successful, it either involves significant delays or requires the dimensions of the available prosthesis to be slightly modified for the best compromise. This unnecessarily prolonged the surgical procedure—and thus the

period of general anaesthesia—and prompted postponements in other scheduled surgeries.

All prostheses come with an expiry date, which means that it is not enough to have the implant in stock. The date guaranteeing sterility of the product must not be exceeded for reasons of patient safety.

Previously, a logistics employee collected all prostheses with 12 months' remaining service life. The lot number and expiry date were photocopied and filed in a folder to create a manual methodology of which prostheses to use first. This was especially difficult to manage for products placed at several locations. Furthermore, during a surgical procedure, there was no time to check other operating theatres to see if they had a corresponding implant with an older expiry date that should be used first. Unfortunately, this resulted in products passing their expiration dates—a situation that can now be handled differently and seamlessly with GS1 standards.

To ensure the validity of expiry dates, it is particularly important for manufacturers to know the exact lot number used so that they can record the specific use in their own systems.

This information was previously communicated manually by sending a copy of the lot number by email or fax to the supplier. Alternatively, they received no information at all, which meant the manufacturer had to visit the ward and manually audit each product. Now with the digitised order exchange and agreements, the region has become a stronger business partner.



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75% on average.



Scanning barcodes for a safer process

A project group, including clinicians, was tasked to develop a system that would replace the time-consuming manual functions and free up resources for patient care. The project group chose a warehouse management system that used mobile scanners and existing packaging barcodes on medical devices to create transparency across inventory management processes.

Now, when a product is registered for stock, the GS1 barcode provides all the needed information for successfully automating the processes.

All products are labelled with a barcode today with more than 85 percent being a GS1 barcode that is encoded with the product's unique identification number—the Global Trade Item Number® (GTIN®). The remaining products are labelled with proprietary barcodes.

For an optimally functioning system, it is important that there is only one unique barcode on each product in order to facilitate swift and efficient identification. In addition, it is important for the barcode to include relevant information such as the batch/lot number and expiry date to enable automatic data capture.

The lessons learned during the project show that medical devices with multiple barcodes, insufficient information in barcodes, and poor quality barcodes create problems for users in their daily processes by making the system more difficult to use. Proprietary barcodes increase the system's complexity since more formats must be accommodated.

The practical implementation of the system took place directly on the ward amidst the hustle-and-bustle of staff and patients. Yet even with a successful system in place, ensuring the internalisation and ownership of the new process was a priority for long-term success. For this reason, a key element of the project is identifying who supports the process and understands the resources required as well as any procedural changes.

It is also important to select a few key people with the right skills to take responsibility for day-to-day operations and ownership of the system. The resources used in a successful implementation can quickly go to waste if the system is not maintained and fed with the correct data.

One way to create this ownership is for these people to take an active part in the implementation, and thus help implement the improvements while also becoming familiar with the system.

After having now completed six implementations at four orthopaedic surgery wards and two x-ray wards, the lessons learned include:

- It is necessary to analyse the needs, environment and prerequisites in order to facilitate implementation.
- The finance department and decentralised procurement department must be involved as they will provide support in the future.
- The fewer number of key personnel, the greater the chances of success when everyday procedures are operational.
- The greater the support of management, the greater the commitment.
- Normal operations must be able to function during project implementation, e.g., ordering products, receiving goods, handling orders already ordered before the implementation.

A ward must be ready for the change in order to instil commitment. This means that the timing of the implementation must be considered carefully.

The next step is a major process during which all products must be reviewed and decisions made in terms of number, location, consignment, and more. It is often necessary to involve the manufacturers and inform them about the coming changes and to discuss the possibility of reducing the consigned quantities.

Once the actual implementation starts, it is a question of registering all barcodes in the system so that it recognises the products, and then scanning the products until the registration of the entire stock has been completed.

Optimising stock levels for patient safety

Today, as product barcodes are scanned, the new inventory management system automatically captures batch/lot numbers and expiry dates.

It is now possible to get an overview within seconds of real-time inventory status. The region also receives a warning three months before reaching the expiry date of each individual product. If a manufacturer recalls a batch, the products can be quickly located in the system and on the shelves.

When a product is used, the barcode is scanned again and the stock level of that exact product is immediately adjusted with an order generated for the manufacturer. The batch/lot number is automatically captured from the barcode and transferred via the system, which includes the information in the electronic order.

Time previously spent on ordering and ensuring correct order submission has been reduced by 75 percent on average; the order also includes all relevant information for manufacturers. With the new system, the right products are in stock, which enhances patient safety. It also strengthens the region's cooperation with manufacturers since they can request easily accessible information such as an up-to-date list of lot numbers stocked by the ward.

The majority of products in surgical wards are consigned, meaning that products are owned by manufacturers and not invoiced until used. Therefore, manufacturers are only interested in stocking small quantities at an individual hospital; yet, for the region, a limited amount of products held in stock could exacerbate the system's vulnerability for out-of-stock situations.

The new inventory management system has helped reduce the number of products since it now records products held in stock and their locations. As a result, the ward can rest assured, knowing that the stock, and ultimately patient safety, is under control. If the possibility of error is reduced, fewer surgical procedures will be subject to delays and related nuisances.

Efforts are currently underway to integrate the system with medical records so that information already registered is automatically transferred to patient medical records.



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A scalable system built on GS1 standards

By using product barcodes with information about expiry date and batch/lot numbers, work flows within wards have become more reliable and efficient. The time spent on ordering and controlling products has been greatly reduced and the stock is under control. The use of global GS1 standards contributes to a stronger project and ultimately, a safer environment.

The approach is not limited to orthopaedic surgery wards and can be implemented with expected positive results in other wards and departments in need of product management and control.

About the Author



Sine Carlsson is currently E-commerce Coordinator in the Southern Region of Denmark, and has been engaged in the Region for eight years. She has been a part of the project team, developing, implementing and maintaining the warehouse management system used to control and order products for the hospitals to support efficient and secure stock flow. As E-commerce Coordinator, Sine has daily contact with the hospitals in the Region.

About the Region of Southern Denmark

Denmark is divided into five regions, each with its own political management. The Region of Southern Denmark is the third largest region with a population of approximately 1.2 million and a net annual operating budget of DKK 22.7 billion. The healthcare system, including the operation of hospitals, represents the greatest challenge for the region.

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