

Denmark


Improving inventory management and patient safety with simple scans

Challenge

The North Denmark Region has three hospitals with approximately 1,800 beds and more than 8,700 employees. The hospitals' surgery departments used non-standardised manual processes for the replenishment of goods, making them time-consuming with increased risk for human error. There was also an insufficient way to track and trace implants and their patients. Finally, the hospitals needed a better understanding of the total cost for surgeries.

Approach

North Denmark Region's IT department developed an automated process for replenishment that allows staff to scan GS1 barcodes on products used in surgery, directly from the operation theatre. The system was then expanded to include traceability capabilities for implants to patients, named the Implant Trace Module (ITM). Since the traceability system is scalable, it has been implemented in all Surgery departments.



€134,000
saved each year by the
Cardiac Laboratory
department



Out of stock situations have
been eliminated



12 minutes saved on
each surgery



Increased staff productivity
and improved patient safety

One of five regions in Denmark, the North Denmark Region is the smallest with 578,839 citizens. Yet, the region provides health services for Greenland which makes it, from a geographical perspective, the largest area to serve. The North Denmark Region has three main areas of responsibility:

- Healthcare, including public hospitals
- Regional development
- Social services and special education

The region's public hospitals make up 95% of all hospital services. To make these services possible, the hospitals needed highly efficient inventory management of medical devices and implants. In particular, the region's surgical wards wanted to digitalise their inventory management by using GS1 barcodes for streamlined processes.

Inefficient and risk-prone manual processes

Prior to using barcodes, inventory management processes were manual. After surgeries, a nurse had to key in the medical devices and implants to be reordered via a computer—making it a time-

consuming and vulnerable process. Sometimes, multiple nurses reordered products and, at other times, products were not reordered at all. The process was also risk-prone; at times, the wrong devices were reordered. All this impacted the efficiency, accuracy and trustworthiness of the hospitals' inventory management system. It also meant that they had higher inventory levels than needed of very expensive devices and implants.

Together with the IT department, the Cardiology Laboratory and Orthopedic department planned a digital replenishment project, using GS1 Global Trade Item Numbers (GTINs) encoded in GS1 DataMatrix barcodes on packages of medical devices and implants.

In the beginning, the project was straightforward and required about 200 hours of development from the IT experts. When the new process was introduced, replenishment was performed directly from the operation theatre by scanning the GS1 barcodes available on packages. When used products reached a specific threshold defined by doctors and nurses, the products were reordered automatically.

As a result, nurses and doctors increasingly trusted the inventory management process.

Receiving and handling products became much more efficient, because these processes were accomplished without paper. It was also easier to replace products in the stock rooms, because staff knew where products were taken from.

Eventually, threshold levels declined and stock levels decreased, due to increased visibility and more efficient processes.

All this has led to improved financial benefits. The Cardiology Laboratory participating in the pilot saved approximately €134,000 annually (1 million Danish Kroner) resulting from improved inventory management and processes.

Better inventory managed meant better planning with no out-of-stock situations. In turn, this prevented the cancellation of surgeries due to the lack of necessary products, a huge benefit for staff as well as patients. Because of the simpler processes, it also became easier to train back up staff for holidays and when staff were ill.

Region's Board approves full roll out

The pilot was considered a huge success for all involved with a high return based on a low investment in time. Because the system used GS1 standards, it was quite scalable. As a result, the Region's Board decided to focus on improving other important processes.

At that time, data for the traceability of implants to patients was generated, but in

a manual and time-consuming way. In case of a recall, data was not easy to work with, and required a significant number of hours of searching by the staff to find those patients impacted by the recall.

Therefore, the next phase of the project focused on creating a regional implant registry, where traceability information between patient and implants is stored.

Traceability data was generated by scanning GS1 barcodes on implant packages, capturing necessary information such as the implant's Global Trade Item Number® (GTIN®), batch/lot number and serial number. In the registry, user-friendly functions make it possible to match implants to patients in a matter of seconds, increasing patient safety and saving the staff valuable time.

In the new processes, more complete and accurate data is generated by scanning barcodes as part of the new processes. The fiscal department has started using the data as an input to better estimate the total cost of surgeries performed.

Based on a better overview of what products were used in surgeries, the department is able to better estimate the resources required to run a department. Furthermore, with access to accurate and complete data, the department can better negotiate with the national bodies that pay the regions for what they perform and the associated costs. The information is also used in tenders for greater precision on what



was actually purchased on a specific contract for a specific period.

Because of the numerous benefits the pilot project, the Board of the region decided that the new GS1 standards-based processes should be implemented in all Surgery departments at the hospitals.

Step-by-step roll out

Given the task, the clear decision from executives in the organisation to automate hospital processes enabled by GS1 standards was an important tool for the small team.

The project was approved for implementation in 26 departments in North Denmark Region's hospitals. It was decided to implement in phases—three departments at a time, completing implementation before starting a new one.

This approach provided the team with an opportunity to learn from each implementation, and bring these experiences and lessons learned to the next phase. At the same time, the team was able to ensure that each department realised the planned benefits within a certain timeframe.

The project's implementations were based on a step-by-step plan, to include:

1. Introduction by the Purchasing department, explaining the challenges with the existing replenishment and traceability processes for implants. The GS1 standards-based solution was explained with the Implant Traceability Module (ITM).
2. Technical introduction on the new inventory management process with the ITM and updated internal processes.
3. Roll-out plan development with the local team responsible for the department, including timelines, sourcing scanners, and recruiting champions and super users.
4. Education and training of the staff, including the training of super users who would help others (e.g. help them understand which barcodes to scan on packs, if multiple barcodes were on the pack).
5. Conducting the implementation, starting with getting an exact baseline inventory level.
6. Project evaluation and support of users until they were comfortable with the new system and processes.

It was important that training was very close to start of implementation. That helped the trained staff to remember the important messages in the training when they started to use the system. The surgery department has discovered it is now saving time with each surgery. The implementation staff once used 10-15 minutes to perform the replenishment process manually.



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Concept for National Implant Registry

For improved patient safety, it was decided in 2015 that Denmark should have a national implant registry where traceability information for each patient would be stored for all surgeries, with a few exemptions.

The project in North Denmark Region was an inspiration for this National Implant Registry concept. Before all other hospitals (public or private), the region participated in a pilot for one year that delivered traceability data to the implant registry as a proof of concept. Since July 2018, legislation has required that all hospitals deliver traceability data about implants used in all surgeries to the registry.

As a result, the importance of barcodes on packages has increased. As part of the system implementation in all region's departments, tenders now mandate that suppliers of implants must apply barcodes based on global standards, such as GS1. This step was necessary to ensure that the barcodes needed are available for users.

Next steps

Many benefits have been achieved and more are still to come, including increased patient safety and the productivity of users.

An obvious benefit is that most implants have expiration dates encoded in their GS1 barcodes. This information can be used for better inventory

management, helping staff work with the first in, first out (FIFO) concept and to reduce waste by keeping expired implants to a minimum. The ITM solution also contains data to provide a better overview of when back-order situations occur and find the needed products elsewhere to prevent the cancellation of surgeries. This can be achieved by giving departments access to information about levels of available products in other departments, making it more efficient to find needed stock internally.

A challenge today is that it is not always easy for the user to decide if an implant should be registered in the National Implant Registry, or if it is exempt. The classification standard, UNSPSC (United Nations Standard Products and Services Code), is used in different processes today, and this step could be an additional one in the future, using the classification standard to define if the product needs to be registered or not. This will require a continuous focus on high quality data by manufacturers, because their work will be used for compliance with legislative traceability requirements.

Greenland plans to soon use all IT systems for purchasing and warehouse management that the North Denmark Region uses. Implementing the ITM solution for surgical departments in Greenland is an important step.

Conclusion

Starting the journey from manual to automated processes, using technology and standards such as barcodes and GS1 standards, has been a great choice for North Denmark Region. Improved stock management, replenishment and traceability for implants has been achieved in ways that would not be possible without the use of GS1 standards and technology.

The benefits are much greater than the cost of implementation, when it comes to both economic and human resources, and increased patient safety.

An important learning has been that is essential to secure both local and top level management commitment when conducting projects that have a huge impact on how staff work in hospitals.

North Denmark has started a journey, and the journey will not end soon. The hospitals will continue to use technology and GS1 standards to achieve more and more benefits.

About the author



In 2002, Camilla Schnell Steen received a law degree from the University of Aalborg. After 11 years in the telecommunications industry working with LEAN manufacturing, she started at North Denmark Region as a Purchasing Controller, responsible for LEAN and e-commerce projects.

Camilla Schnell Steen,
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About the organisation



North Denmark Region

The healthcare sector is the main responsibility for North Denmark Region. Over 90% of its budget is allocated for healthcare services. The hospitals in Northern Denmark represent practically all medical specialties, and offer most types of treatments. In particular, Aalborg University Hospital is of great importance to the high standard the regional hospitals possess.

North Denmark Region includes:

- 3 hospitals on 11 sites
- 1,753 beds plus an additional 50 beds in the patient hotel
- Approx. 8,700 employees working in the hospitals
- Budget of almost 7.2B DKK
- Pre-hospital force with approximately 50 ambulance alert units

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