Improving patient safety and efficiency in the operating room: Potential savings of €170 million for Dutch hospitals

ABSTRACT

There is increasing government pressure to improve the quality of patient care and safety, and lower costs in the healthcare system. This article illustrates that employing the GS1 Global Traceability Standard for Healthcare contributes to achieving these objectives, with GS1 Netherlands initiating a project that focuses on adopting GS1 Standards for the traceability of medical devices (excluding capital goods) that are used in operating and treatment rooms.

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Introduction

Questions such as "Which patient was given which replacement heart valve?" and "Will the right material be available at the start of the operation?" are routinely asked. Unfortunately, they are not always simple to answer as a clear view of inventories and the devices used are required. Patient safety and logistics are therefore intertwined.

Alongside patient safety, there is increasing focus on efficiency within hospitals. Inventory levels and the high (hidden) costs involved in their management are attracting ever more attention. Logistics and administrative processes must be optimised in order to bring down costs and enable data to be exchanged simply and rapidly.

Advancing GS1

Before GS1 Standards can be adopted in hospitals, hospital management needs to appreciate their benefits. Members of the GS1 Netherlands Traceability Focus Group are confronted with the lack of awareness of GS1 Standards among their colleagues, and therefore focus their efforts on increasing awareness and demonstrating their value.

The immediate motivation for adopting GS1 Standards was the need to improve patient safety by guaranteeing 100% traceability of products used to treat patients. This measure will also enable hospitals to improve recall procedures. 100% traceability furthermore helps increase efficiency and reduces costs substantially. This desired scenario demands soundly organised logistics processes.

Scope

In the interests of clarity, the scope of the initiative was restricted to medical devices (excluding capital goods) that are used in operating and treatment rooms.

About the GS1 Netherlands Traceability Focus Group

The Traceability Focus Group, facilitated by GS1 Netherlands, brings together the different stakeholders in the Dutch healthcare sector, including representatives from medical device suppliers and hospitals. The Focus Group aims to be a community where stakeholders exchange their knowledge and experience with traceability projects, connect with traceability partners, and act as a community to help newcomers that want to start their own traceability projects.

The Focus Group has concentrated its efforts on collecting evidence on how traceability can contribute to a safer and more efficient supply chain. This resulted in the traceability business case, patient safety and efficiency in the operating theatre. Download the business case.

Commitment

The Dutch healthcare sector, which includes hospital organisations such as the Dutch Federation of University Medical Centres (NFU), the Dutch Hospitals Association (NVZ), the Dutch Association of Hospital Pharmacists (NVZA), pharmacists (KNMP and Z-Index) and other industry organisations (NefeMED and ZorgDAS), have declared GS1 Standards to be the definitive standard used in healthcare. They therefore intend to use GS1 Standards to improve patient safety and lower costs in the supply chain.

The sector's objective is to use GS1 BarCodes on all primary and secondary packaging in order to encode information like the Global Trade Item Number (GTIN), batch and/or serial numbers, and expiry dates, preferably using the GS1 DataMatrix.

> *"The immediate motivation for adopting GS1 Standards was the need to improve patient safety by guaranteeing 100% traceability of products used to treat patients."*

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Current practices

Current practices by the Dutch healthcare sector leave much room for improvement. For instance, the transparency and management of inventories in hospitals is far from optimal, the costs of an operation need to be estimated much more accurately and completely, and the automatic registration of products at the point of care has yet to be implemented. The lack of automatic registration leads to avoidable errors and a labour-intensive recall procedure.

Although the healthcare sector supports the use of barcodes, they are not used extensively in current practice. This situation is the result, of the fragmented nature of the Dutch healthcare sector and the issues associated with the need for up-front investment before any benefit can be gained by the sector, among other things.

As yet, only half of manufacturers barcode their products. Many hospitals have their own packing departments that apply codes, which is an extremely labour-intensive process. More than that, many hospitals and other providers perform the same process but in differing ways. The use of usually outdated manual systems in administering medicines and using medical devices is prone to error, inefficient, and anything, but economical.

Desired situation

Patient safety considerations make an automated recall procedure and 100% confidence in the registration of product-patient relationships desirable. It is also vital for inventories to be correct and transparent. It would then be possible to avoid obsolete stock and cancel fewer operations because of out-of-stock products, bring down inventory levels and make optimum use of consignment goods, amongst other things. Further gains in efficiency will be achieved by automating administrative processes. A simpler, faster ordering, delivery and billing process brings down the number of errors and clarifies the costs.

GS1 Global Traceability Standard for Healthcare

The GS1 Global Traceability Standard for Healthcare (GTSH) provides a means to achieve this desired situation. GTSH can be employed when suppliers and hospitals both have effective IT infrastructures to track and trace products throughout the supply chain.

GTSH ensures that each product is correctly recognised, and every movement – from one location to another – is recorded. To achieve this, suppliers need to create barcodes that capture the GTIN, expiry date and any batch or serial number. Hospitals can then scan the barcode and store product data in its system. Locations can also be identified using the Global Location Number (GLN) in order to pinpoint the location of a product. Linking this information using an enterprise resource planning (ERP) system, which automates business processes using an integrated software application to support business processes across an organisation, means that it will be clear at all times which product can be found at which location.
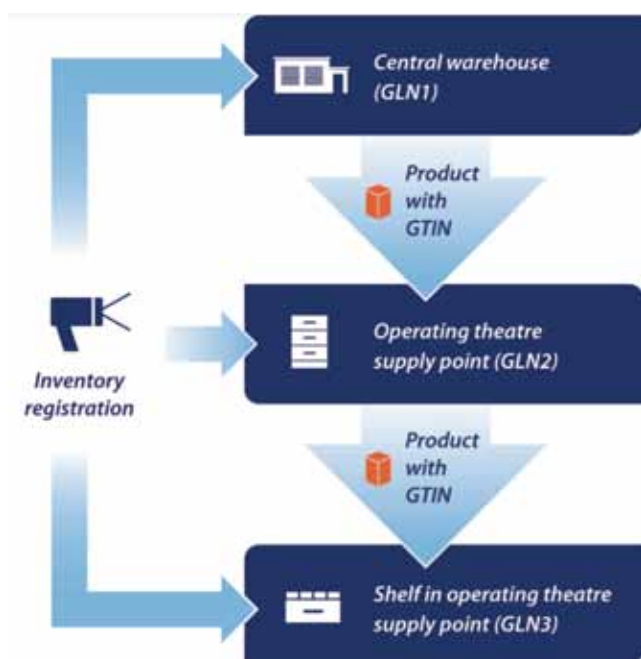

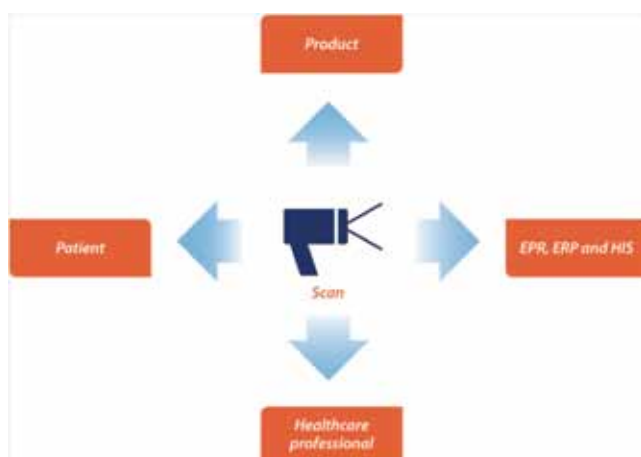Figure 1. How products are recorded at various locations.

Figure 2. How product data is linked to a patient and the member of staff who is responsible for administering or implanting it.

The data can also be linked to a specific patient, such as through a barcode on a wrist band, and to a member of the hospital staff through a barcode on their staff ID badge. These measures mean that it will always be clear which product has been used to treat which patient, and which member of staff was responsible for administering or implanting it.

Costs and benefits

Hospitals and suppliers alike must be willing to invest in the hardware, software and personnel required to achieve the desired situation. As a result, there are a variety of benefits and savings that will be achieved in return of the investment.

The 'hard' measurement points in this business case are concerned mainly with efficiency. The 'soft' measurement points are concerned with patient safety.

Benefits on patient safety include:

· **Operations proceed as planned**. There is a clear view of inventories, so that staff can be certain that the products needed are in stock.
· **Improved recall procedure.** Products are registered as they move throughout the supply chain, making them simple to locate using hospital systems regardless of whether the product still resides with the supplier, at a hospital supply point, or already administered or implanted in a patient.
· **Better information when replacing an implant.** When implants have to be replaced(e.g. at the end of operating life), the implant used to treat which patient needs to be identified. The 100% secure product-patient registration means the patient and the applicable product is simple to locate in the hospital's system.
· **Fewer errors with automatic product-patient registration by means of barcode scanning.** Manual actions are no longer needed, which reduces the number of errors. Research into the effect of barcoding on the administration of medicines shows an approximately 40% drop in the number of errors in product-patient registration. No comparable study is yet available for medical devices, but it is assumed that the reduction in error rate will be similar (study by Poon et al., N Engl J Med 2010;362:1698-707)

Benefits in efficiency have been quantified based on experience and findings of the UMC Nijmegen, UMC Utrecht, Ziekenhuisgroep Twente and the St. Antonius Hospital, and through a comparison of the annual reports of various other hospitals, including university medical centres and several small and large general hospitals.

"Hospitals are able to save a total of between € 106 and € 168 million annually."

The registration of traceable products at all relevant points in the logistics chain facilitates complete transparency of inventories. It is then possible to:

- reduce inventory levels by approximately 20%;
- bring down obsolete stock by approximately 80%;
- save time and money through automatic reordering*;
- save time and money through the use of electronic packing lists (despatch advice)*;
- save time and money through electronic billing*;
- accelerate recall procedures by hours or even days, with hospital staff no longer needing to physically search through paper files and supply points due to automated systems; and
- make the most effective use of consignment goods.

*Further research is required to quantify the savings.

The hospitals mentioned above estimate that the rate of obsolete stock in Dutch hospitals is 5-8%. They also report that obsolete stock could be reduced by approximately 80% through the automatic registration of expiry dates.

As work proceeds faster and more efficiently, and inventories are controlled with greater confidence, substantial cost savings are realised. Hospitals are able to save a total of between € 106 and € 168 million annually.

Conclusion

Increased patient safety and huge potential savings are reasons enough to start implementing traceability now. The implementation will require commitment on all levels, including removing a number of obstacles. The obstacles include the absence of logistics support in some hospitals, poor integration of different IT systems within a hospital, and a lack of familiarity with GS1 Netherlands and GS1 Standards.

For more information about this case study, please contact Esther Peelen at: Esther.Peelen@gs1.nl.

Costs in euros	Year 1	Year 2	Year 3
Total revenues	€ 106 million	€ 106 million	€ 106 million
Nonrecurring costs*			
Hardware and software procurement	€ 12.3 million	-	-
Personnel costs	€ 5 million	-	-
Total nonrecurring costs	€ 17.3 million	-	-
Structural costs*			
Hardware depreciation	€ 450,000	€ 450,000	€ 450,000
Software licences	€ 750,000	€ 750,000	€ 750,000
Connection to data pool	€ 200,000	€ 200,000	€ 200,000
GS1 Netherlands membership	€ 450,000	€ 450,000	€ 450,000
Personnel costs	€ 20 million	€ 15 million	€ 10 million
Total structural costs	**€ 21.9 million**	**€ 16.9 million**	**€ 11.9 million**
ROI hospitals	+ € 66.8 million	+ € 155.9 million	+ € 250 million

Figure 3. Return on investment (ROI) model for hospitals.

*100 hospitals were used to estimate costs.

ABOUT THE AUTHOR

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chain. In 2010, Mr. Pereboom received his International Master in Business Administration. His thesis covered inventory management in the University Medical Center of Utrecht's operating room.

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