Return on investment of standardised bar coding at Herz-Zentrum Bad Krozingen

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ABSTRACT

At the Herz-Zentrum Bad Krozingen, cost unit billing according to Diagnosis-Related Group (DRG) guidelines used to be time consuming and prone to error. The hospital has investigated the impact of the introduction of standardised bar coding: in addition to saving a significant 78% in documenting consumed materials, it has also shown that efficient, accurate DRG calculation is only possible when data is automatically entered by scanning the bar code. A cost-benefit analysis showed that the initial investment already paid for itself in the first year.

Background

The Herz-Zentrum in Bad Krozingen is a hospital specializing in the treatment of cardiovascular diseases. It has departments for cardiology, angiology and cardiovascular surgery. The Herz-Zentrum has a total of 256 beds.

The project was initiated in response to the time-consuming cost unit billing by Diagnosis-Related Groups (DRG calculation): When the project started in 2006, some 65% of medical requirements were entered to "cost units", namely patients, and the manual processes required much effort.

On the one hand, the hospital uses cost unit accounting as an instrument for efficiency controlling.

On the other hand, the cost unit accounting data is supplied to the Institut für das Entgeltsystem im Krankenhaus (InEK) GmbH for review, as required by law.

Table 2: Sample data supplied to InEK GmbH (sample data)

IK	Releasing location	In-hospital code	Cost centre group	Cost type group	Purchase price (€)
IK No		Inventory No	7	1	1,456.53
IK No		Inventory No	7	3	247.59
IK No		Inventory No	7	4a	29.07
IK No		Inventory No	7	5	1,926.00
IK No		Inventory No	7	6a	189.35
IK No		Inventory No	7	6b	7,157.42
IK No		Inventory No	7	7	253.92
IK No		Inventory No	7	8	239.18

Table 1: Excerpt from cost unit accounting per DRG case (sample data)

Booking date	KoA	Description	Quantity	BzGr	Amount (€)	Voucher number	Voucher date	BP	Booking text	Cost centre	Cost centre description
12.10.2007	660400	Medical and nursing consumables	2	st	30.09	10585	30.09.2007	9	Outgoing invoice	92232	Electrophysiology
12.10.2007	661003	Electro-cardiogram requirements	1	st	32.13	10585	30.09.2007	9	Outgoing invoice	92232	Electrophysiology
12.10.2007	661350	Intracardiac catheters	10	st	7,095.20	10585	30.09.2007	9	Outgoing invoice	92232	Electrophysiology
12.10.2007	661342	Stents, coated	2	st	1,926.00	4234	30.09.2007	9	Outgoing invoice	92019	Intracardiac catheters

Preparation for the Herz-Zentrum Bad Krozingen project

The project was approved by the hospital management in February 2005 and has been in production since September 2007. The relatively long project duration was necessary so that suppliers could have the opportunity to identify their products with GS1 barcodes in accordance with the requirements.

A prerequisite for using scanners is that a product's master data be available and incorporated in the inventory management system. The first task was therefore to enter the GS1 item numbers of the suppliers. The challenge for the hospital was less in making IT adjustments, since the materials management system it uses is GS1-compatible, than in universally identifying products with barcodes.

An initial classification and stocktaking of the relevant items in March 2005 showed that a large number of suppliers had not identified their products with barcodes. In those cases where suppliers had identified their articles with barcodes, the challenge was to analyse the various barcode systems and impose a single standard, namely GS1. Non-GS1 barcodes meant an extra step was needed to enter the batches and serial numbers that are necessary for sending invoices to consignment warehouses and to comply with statutory documentation requirements.

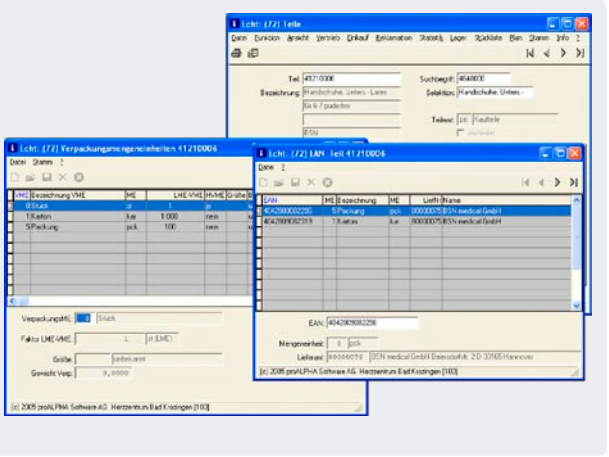
In order to conduct the project at all, the hospital decided on a stopgap solution: sufficient time would be dedicated to making IT adjustments so that this latter system could also be handled.

At the same time, with the support of GS1 Germany, the hospital asked the suppliers that still did not have any barcodes and those that had not worked with GS1 to identify their products according to uniform GS1 standards. Suppliers' reactions were largely positive and in some cases products were even relabelled specifically for the hospital.

As a result, two facts became clear: First, that hospitals can get things moving and, second, that manufacturers have become more aware of the benefits of GS1 standards.

By summer 2006, the majority of products had GS1 barcodes and after consultation with the specialised departments, the project could start. After the scanners were purchased, a test run was conducted, and after a successful run, the actual project was implemented in two catheter laboratories.

Figure 1: GS1 master data in the hospital



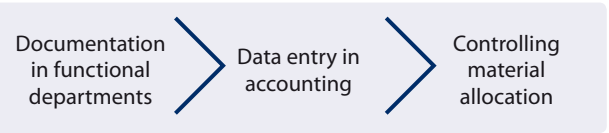
Before and after

Three basic process steps were identified before scanners were introduced:

- documentation in the functional departments
- entering materials in accounting
- controlling upstream allocation of special products to patients.

Because the manual system was so prone to errors, time was also spent on harmonising the entry of activities and materials.

Figure 2: Schematic process flow before scanners were introduced

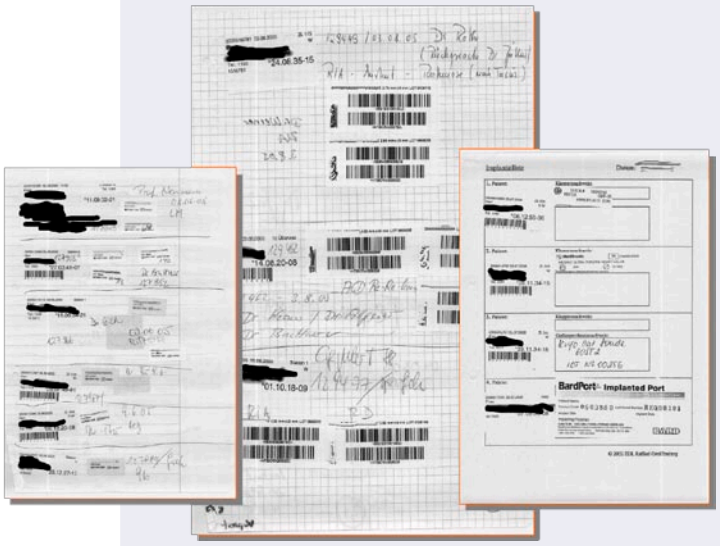


Consumed materials were not entered directly by the functional departments, but subsequently entered manually by the accounting department. In the functional department, labels were cut out from the consumed products or the patient labels often included by the manufacturer, were stuck on and passed on to the accounting department by internal post.

Also after scanner systems were introduced, the initial documentation on consumed materials remained the responsibility of the functional departments. However this is now done by scanning the GS1 barcodes on the consumed products. Materials are allocated directly to the patients through the IT system. Data entered in this way is thus available in fully electronic form for all further processes,

so that the accounting department is spared the time-consuming and error-prone entry of consumed articles and manual allocation to the patient when controlling.

Figure 3: Manual documentation of consumed articles in functional departments



There is no more need for patient stickers or cutting out labels. Instead, one simple and quick scanning procedure enters GS1 numbers, batches, serial numbers and in some cases expiry date, or any other relevant data for subsequent procedures.

For the functional departments in the hospital to document consumed articles, the use of bar codes resulted in work time savings of 78%.

Table 3: Before and after comparison: documentation in functional departments

	Average time spent per process	Number of processes p.a.	Total time spent p.a.
Before	00:03:10	1,260	66:30:00
After	00:00:42	1,260	14:42:00
Time saved	00:02:28		51:48:00

Before, the accounting department used to receive documentation or a brightly coloured bunch of cut-out labels, with a delay, via internal post from the functional departments.

Information had to be manually entered and allotted to the individual patients which, depending on how many there were, took several days per monthly report.

After implementing the automated process in the functional departments, the accounting department was spared the entire entry procedure when it comes to controlling and allocating special products to patients in the catheter laboratories in question. Both tasks could be eliminated.

Table 4: Before and after comparison: data entry in the accounting department

	Average time spent per process	Number of processes p.a.	Total time spent p.a.
Before	00:01:25	1,260	29:45:00
After	00:00:00	1,260	00:00:00
Time saved	00:01:25		29:45:00

Table 5: Before and after comparison: Materials allocation in the control system

	Average time spent per process	Number of processes p.a.	Total time spent p.a.
Before	00:07:48	2	15:36:00
After	00:00:00	2	00:00:00
Time saved	00:07:48		15:36:00

The entire process flow was not only inefficient but also associated with a high error rate, since labels could go missing or product packaging could be forgotten and not passed on as anticipated. There was also the risk that materials could be allocated to and documented for the wrong patient.

As a result of this automated process, a basis has been created for forwarding accurate data to InEK for payment of hospital services.

Payment by InEK GmbH for hospital services is therefore also incorporated in the overall analysis:

Table 6: Payment based on DRG calculation

	Number of cases p.a.	Total revenue p.a. (€2.03 per case)
Before	0	€0.00
After	942	€1,912.26
Revenues		€1,912.26

An analysis of the documentation process as a whole gives the following result:

Table 7: Time saved in the Herz-Zentrum Bad Krozingen

Process	Time saved p.a.
Documentation in the functional departments	51:48:00
Entry by the accounting department	29:45:00
Controlling the allocation of materials	15:36:00
Total	96:39:00

Greater transparency, safety and quality

In addition to the cost savings, there are also qualitative benefits of scanner systems and uniform standards, such as greater data transparency, safety and quality.

Since the continuous entry of consumed material provides up-do-date figures of the articles in stock, the entire ordering process can be automated. When stock falls below a predefined amount, an order is automatically triggered. This does away with stock planning, leading to yet another enormous saving of time. If required, the purchasing department can also monitor stocks in real time.

The Herz-Zentrum Bad Krozingen has established that stocktaking takes only around 1.5 hours instead of the previous six to seven hours. The available data is reliable and the hardware can be used flexibly for a wide range of processes.

The data scanned in by the functional departments is available to other departments for downstream process steps. Transparency is increased since every area works with the same information. Additionally, it is now possible to simplify medical documentation, since the scanned product data, including batch numbers, can be transferred into medical documentation. This not only reduces the time spent on entering data but also avoids potential sources of error that can result from data that is classified or entered incorrectly.

With the transparency that is created, products can also be traced within the organisation, since consumption and movement of goods can be documented automatically. In the event of recalls, the products in question can be located and returned quickly and systematically. Not only does the use of automatic data entry systems make sense for products where documentation is mandatory, but in the long term all medical goods are likely to factor in such considerations for the sake of increased efficiency and patient safety.

In the hospital, the project encountered extremely positive reactions, resulting in the gradual inclusion of other operational areas. With the support of management and staff in the various departments, it will not be long before the hospital sees this project become part of daily practice.

Since parallel processes lead to unnecessary expenditure of time and the benefits speak for themselves, the hospital's message to its suppliers is unmistakable: products need to be identified with GS1 barcodes across all packaging sizes, enabling universal use from production to patient.

AUTHOR

Holger Klein is Head of Inventory Management and Logistics at Herz-Zentrum Bad Krozingen in Germany, a health service centre specialised in cardiology, heart surgery, vascular surgery and angiology. Having finished his apprenticeship in international business successfully, Mr. Klein studied business management at VWA (business college) in Freiburg. Afterwards he started his career at Herz-Zentrum Bad Krozingen within the procurement- and materials-management-department. Mr. Klein has extensive experience within the healthcare sector and has been leading various standardisation projects. He was responsible for optimising logistic processes in Bad Krozingen, including the roll-out of a scanner-based ERP system.