GS1 Healthcare Reference Book 2012/2013

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Standards in action!

Welcome to the fourth edition of the GS1 Healthcare Reference Book (Edition 2012/2013).

This compendium of case studies contains detailed examples of the many success stories and promising projects that are advancing the implementation of GS1 Standards in the healthcare supply chain worldwide. They are intended to provide ideas and spur thinking about potential activities healthcare communities and organisations can undertake to further support the adoption and implementation of GS1 Standards.

We hope you find our reference book useful and we extend our appreciation to all the contributors that have made its development possible.

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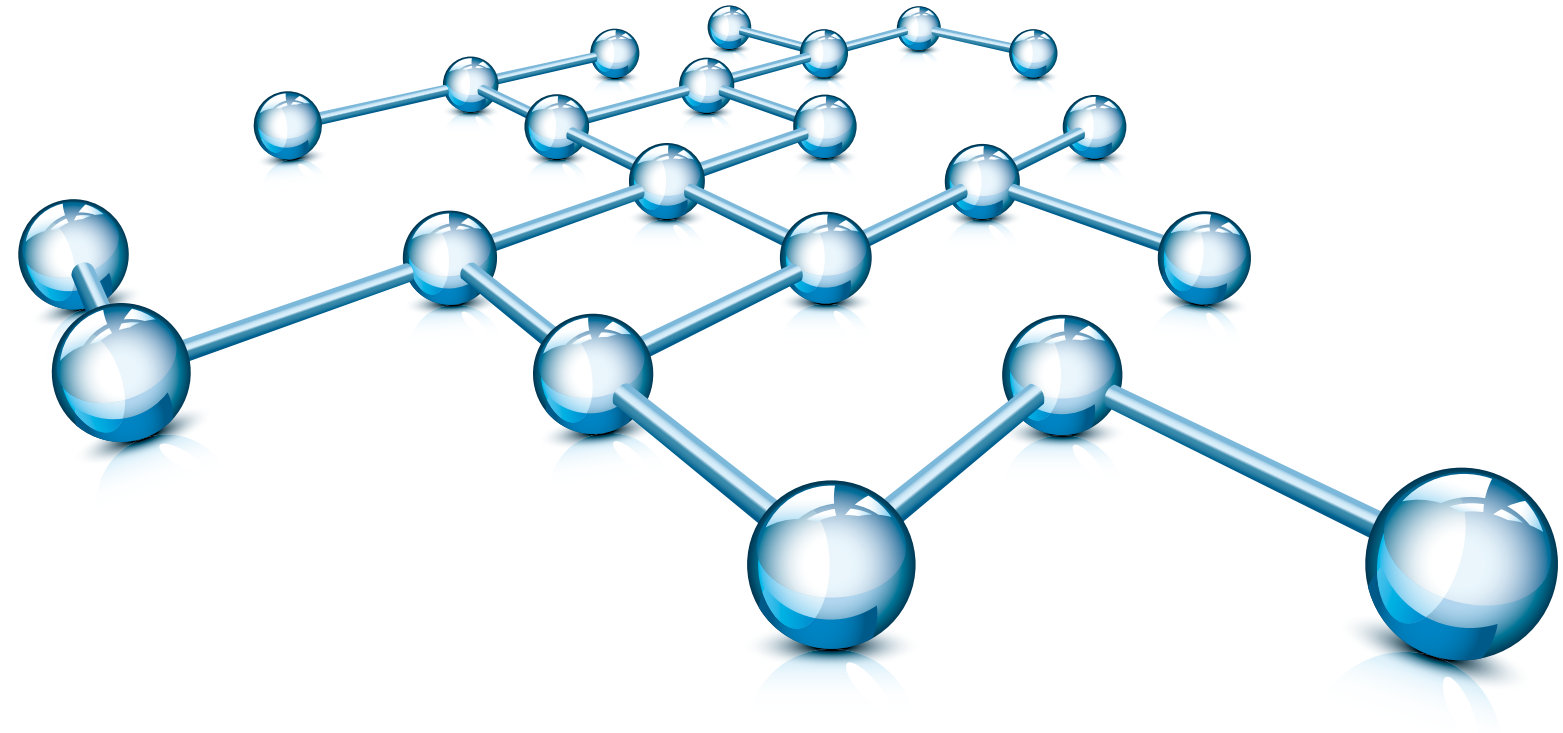


Connecting the dots to improve patient safety and supply chain efficiency

GS1 Standards in action – from production to the patient!

As GS1 Standards for healthcare were developed and became available over the last few years, healthcare communities worldwide embraced the standards and advanced their implementation. Standards will allow for streamlined supply chain processes and enable visibility – from production to the patient. In turn, they help improve patient safety and supply chain efficiency.

Enhancing patient safety through increased visibility

The safety of patients can be compromised in many ways, from medical errors, counterfeit or substandard medicines, to critical care products being unavailable. Increased supply chain visibility allows for the following issues to be addressed:

- Automatic identification by the caregiver of medicines and patients helps to reduce medication errors by ensuring that the right medicine is dispensed or administered to the right person, in the right dosage, at the right time. Automatic identification of medical devices also allows for the effective retrieval of the necessary information about those devices to ensure their proper use and avoid adverse events. But healthcare providers are struggling to implement such systems due to a lack of standardised barcodes on packages and devices.
- The serialisation of pharmaceutical products by their suppliers and the verification of these serial numbers by the dispensing pharmacist provide an additional layer of protection against the rising occurrence of potentially unsafe counterfeit drugs. Barcodes can be automatically read at different process points to record transactions such as physical transfers or changes of ownership, and the item's chain of custody can be documented. Considering the millions, or even billions of packages worldwide, efficiently managing this process obviously presents an enormous challenge for all stakeholders. Diverging country requirements can make this an even more daunting task, which makes standardisation and harmonisation vital to success.
- Increased stock visibility allows for automatic replenishment of stock, which will reduce the risk of stockouts of products needed for critical patient care.

Several case studies in this reference book illustrate how GS1 Standards help enhance patient safety.

The Taiwanese Food and Drug Administration (FDA) will require GS1 BarCodes on prescription drugs, which will allow hospitals to efficiently implement automatic identification systems to improve medication safety. The Changhua Christian Hospital is taking the lead in this endeavor in Taiwan (case study – see page 30). The Moinhos de Vento Hospital in Brazil has worked with three of its pharmaceutical suppliers to implement the GS1 DataMatrix and leverage those in the medication administration process (case study – see page 15).

Baxter, a leading, global pharmaceutical manufacturer, shows how GS1 Standards enable its serialisation programme, a crucial part of its product integrity strategy (case study – see page 13). In Colombia, a leading wholesaler, Dromayor, has worked closely with Pfizer to demonstrate how GS1 Standards can enable a traceability system to meet the government's requirements (case study – see page 19).

Improving supply chain efficiency through increased visibility

Healthcare costs have been rising for several years, and are still expected to grow faster than national income in most countries in the foreseeable future. Stemming this growth has become a major policy priority and healthcare suppliers and providers are looking for ways to control costs. Health information technology is expected to increase hospital efficiency.

- Leveraging Automatic Identification and Data Capture (AIDC) technologies will play a vital role to achieve this. For example, better visibility of inventory across nodes of the supply chain and transparency on inventory expiry dates will reduce inventory and obsolescence cost.
- Integrating data and using the same language across the supply chain will reduce transaction and processing costs. It will also reduce manual data capture, double checking, and relabeling, while increasing the accuracy of these processes.
- Effectively sharing master data of healthcare products between supply chain partners sets the foundation for an interoperable, electronic supply chain system and electronic procurement systems.

Several case studies in this reference book illustrate how GS1 Standards will enhance supply chain efficiency.

In the Netherlands, hospitals have quantified the expected benefits from several supply chain efficiency improvements: 100 Dutch hospitals will be able to save a total of between € 106 and € 168 million annually (case study – see page 26). The University Hospital of Graz (Austria) has implemented GS1 Standards and radio frequency identification (RFID) to improve its stock management of medical devices (case study – see page 11). The Medicon pharmacies in Germany implemented category management in their pharmacies to improve their customer service (case study – see page 23).

In the U.S., Becton, Dickinson and Company, Mercy and ROi demonstrated how the use of Global Trade Item Numbers (GTINs) and Global Location Numbers (GLNs) allowed them to achieve fully automated, accurate electronic processing of order transactions – known as the Perfect Order (case study – see page 33).

In Australia, major healthcare suppliers, such as Terumo Australia, Abbott Australia, ArjoHuntleigh and Cook Medical, are experiencing the benefits that the National Product Catalogue (NPC) brings to their supply chain and procurement processes. The NPC is an initiative of the National E-Health Transition Authority and leverages GS1 Standards (case study – see page 4). Siemens is also leveraging GS1 Standards, including the Global Data Synchronisation Network (GDSN), to efficiently manage data for thousands of products across multiple countries (case study – see page 40).

Speak ONE language

Global standards will become the ONE language of choice for supply chain management and electronic commerce in healthcare. GS1 Member Organisations worldwide continue to support the sector to help it benefit from the adoption and implementation of GS1 Standards in its supply chain.

Collaboration among stakeholders is fundamental to fully reap the benefits of standardising healthcare supply chain data. GS1 Global Office and GS1 Member Organisations have successfully brought various supply chain stakeholders together through a global user group and 30 local user groups. These groups are user-driven and provide a forum where the user community can come together to communicate and learn from each other's experiences.

For more information about GS1 Healthcare, both globally and locally, visit www.gs1.org/healthcare.

Australia

Healthcare suppliers benefiting from Global Data Synchronisation

ABSTRACT

The ability to store and share accurate, complete and up-to-date data on healthcare products between suppliers and healthcare delivery organisations is a critical, foundational component for Australia's transition to an electronic health system. The National E-Health Transition Authority (NEHTA) has worked with GS1 Australia to encourage suppliers of healthcare products to use the GS1 Global Data Synchronisation Network (GDSN) compliant National Product Catalogue (NPC) hosted on GS1net, to communicate product and price data to all government and private sector healthcare purchasers within Australia. Here, four healthcare suppliers share the benefits they are experiencing to date.

The NPC – Standardising healthcare product data

By **Mark Brommeyer,**
NEHTA

The National Product Catalogue (NPC) is a single repository of product, pricing and healthcare data for all healthcare industry product categories for the purpose of data synchronisation. These categories include pharmaceuticals and medical devices (such as orthopaedic prostheses, implantable devices, dental products, imaging equipment, etc.) and medical consumables. The objective of the NPC is to ensure better overall data integrity throughout the sector.

When suppliers use the NPC to share their product data, they can be confident that their trading partners will receive their information in Australia and, in the future, around the world. The NPC enables the secure sharing of item master information such as product identifiers and descriptions, units of measure, package contents, Therapeutic Goods Administration (TGA) risk classification, Pharmaceutical Benefits Scheme (PBS) and Prostheses Rebate Codes along with pricing and related healthcare information. The NPC uses Global Trade Item Numbers (GTINs) as the globally unique, primary product identifier for every NPC record. This provides unambiguous product identification and reduces the risk of product identification errors.

"The NPC provides suppliers with a single mechanism to communicate standardised and accurate product and price data electronically to Australian health departments and private hospital providers."

NEHTA anticipates that full implementation of the NPC will save the public healthcare sector up to $AU200 million per annum[1] by ensuring accurate, valid and up-to-date product data, and improved communications and supply chain operations.

Governments have recognised that inefficient data management in the healthcare supply chain leads to increased costs and impacts patient safety when necessary supplies are unavailable, or incorrectly identified and recorded at the point of care.

The NPC was introduced to provide the foundation for an interoperable electronic supply chain system that delivers quality and efficiency benefits for providers and consumers. It provides suppliers with a single mechanism to communicate standardised and accurate product and price data electronically to Australian health departments and private hospital providers.

NEHTA is working with representatives and stakeholders from all aspects of the supply chain. Reference groups, industry forums, seminars and site visits ensure the NPC benefits public and private healthcare providers as well as healthcare suppliers. Ongoing monitoring, review and feedback ensure these benefits remain current and dynamic to meet the needs of an evolving industry.

In addition to the NPC, NEHTA has also developed an electronic procurement solution (eProcurement), which is designed to streamline the electronic purchasing process. This solution uses GS1 XML as the messaging format.

1 Deloitte, 2004. *Recommendations for National IM & ICT Enablers in the Health Sector Supply Chain report*

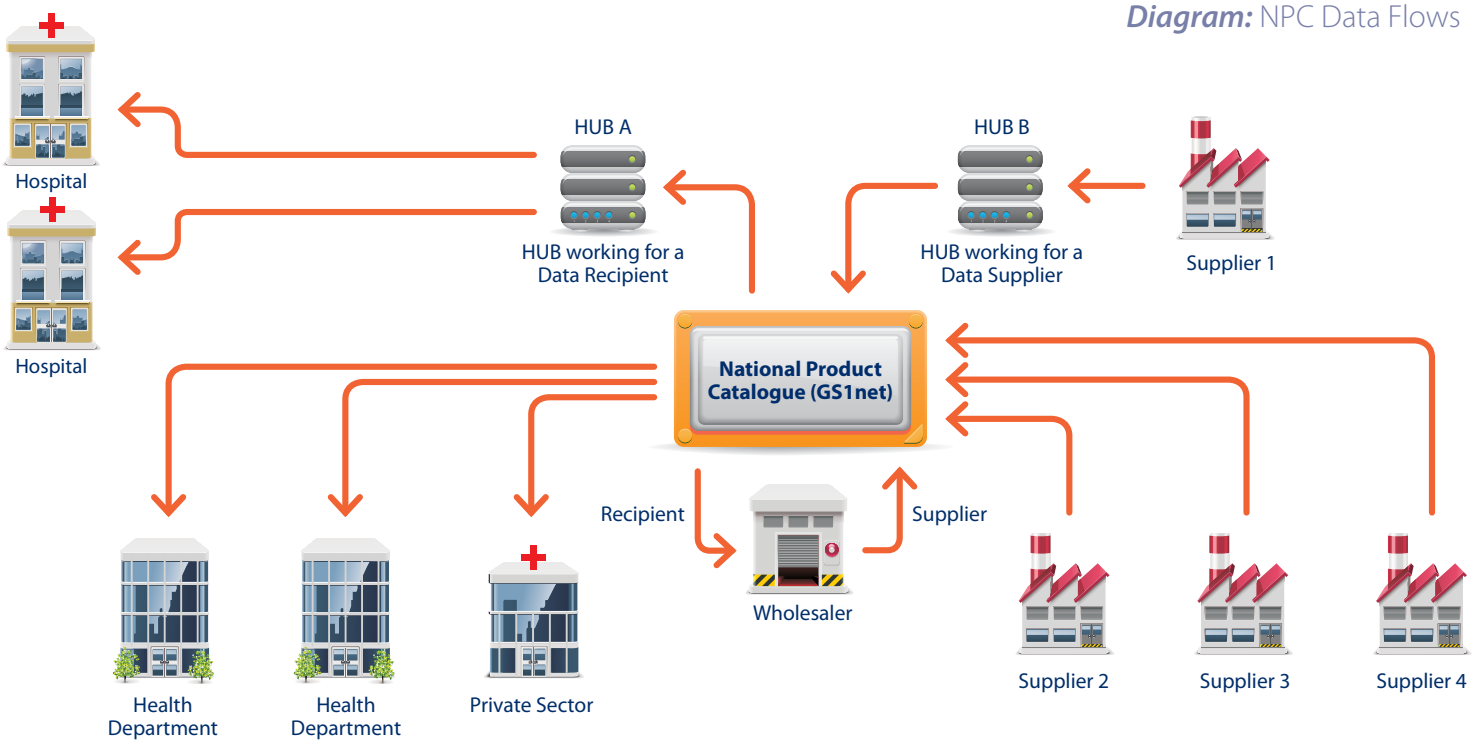
Key advantages of the NPC and Data Sychronisation

- Current, accurate, standardised product information
- Foundation for national standardised method of electronic procurement
- Secure pricing information available only to nominated trading partners
- Ensures reliable continuity of supply with minimum inventory investment
- Removes inefficient and error-prone paper based processes, and automates the efficient distribution of product information
- Reduces order errors and the supply costs associated with invoice reconciliations, credit claims, returns and refused deliveries

NPC in practice

As at July 2012 more than 380 healthcare organisations are participating with the NPC. Major healthcare supply companies, such as Terumo Australia, Abbott Australia, ArjoHuntleigh and Cook Medical, are experiencing the benefits the NPC brings to their supply chain and procurement processes in Australia.

Diagram: NPC Data Flows



Terumo Australia: Gaining efficiencies

By **Yvonne Bell,**
Terumo Australia

Terumo Australia develops, manufactures and distributes an extensive range of products for use in Cardiovascular and Cardiothoracic surgery, Interventional procedures, Transfusion/ Laboratory and Pathology medicine for Blood Collection and Monitoring, Vascular grafts, in addition to Hospital products such as syringe and hypodermic needle products for hospital and physician office use. The Tokyo-based company operates locally through sales branches around the globe, including Terumo Australia based in New South Wales.

The company embarked on the NPC project as part of a requirement by customers to have a standard set of data they could use in their procurement systems.

The choice for Terumo to publish data on the National Product Catalogue provided an opportunity to prepare and clean this information once and then share the data between their customers to gain efficiencies.

Implementation of the National Product Catalogue was defined as part of a larger overall B2B project. Terumo Australia recognised the value that this would bring to the organisation by standardising product data, as an initial step to future implementation of the NEHTA eProcurement Solution.

Terumo has published 1,690 items to date, with the data made available to 17 of its trading partners, over 50% of who actively use it. The process took under eight months initially and the company continues to add new ranges as they are introduced into the market.

"It is now much easier to communicate product and price data to trading partners, as we only have one set of data instead of five."

To plan and implement the NPC project, Terumo established a small project team, with representatives from its internal IT, marketing, logistics and business support teams. Input was also garnered from its customer service team.

As a result Terumo has significantly reduced catalogue maintenance time for both internal and external customers. It is now much easier to communicate product and price data to trading partners, as there is only one set of data instead of five different sets.

Customer service and sales representatives rely on this data source for the product information they need to do their jobs.

The organisation forsees additional benefits when the eProcurement solution is implemented, as the standardisation of product data is critical to the success of any future electronic trading process.

Terumo Australia's NPC implementation plan:

1. Identification
Of the key points required for the project:
- Are there any new processes to be implemented?
- Where do we keep all of our current data?
- How often does the price change?
- How often does the product data change?
- What format is the current data in?
- Gap analysis – what's missing?
  - → Where will we house the complete data set internally?
  - → How often do we need to upload data?
  - → Who needs to be involved in this process?

2. Investigation
- Analyse current processes
- What resources do we need
- Who needs to be involved
- Other items identified in the Gap analysis

3. Preparing the data
- Cleansing process
- Review process
- Maintenance policy
- Analyse current processes

4. Implementation
- Upload to GS1 NPC
- Ongoing maintenance

Abbott Australia: Streamlining data catalogues

By **Dianne Prince**,
Abbott Australia

For Abbott Australia, the NPC is an essential ingredient in the company's future eProcurement activities.

Abbott is a global healthcare company with products spanning from nutritional products and laboratory diagnostics through medical devices and pharmaceutical therapies.

Locally, it offers a range of healthcare options spanning different disciplines and therapeutic areas, including pharmaceutical, nutrition, diabetes care, diagnostics, optical and vascular products.

Abbott Australia chose to publish data on the NPC because it was recognised that this would be the foundation for all business to business transactions in the future. The company could see that there would be multiple benefits for its customers as well as within the business.

Abbott Australia has currently published around 4,000 GTINs from across its different divisions, beginning the project in April 2007 and publishing its data two months later on 30 June 2007.

"The NPC is an essential ingredient in the company's future eProcurement activities"

At the start of the project, Abbott anticipated that the automation of accurate item and pricing data exchange with its trading partners would result in significant savings, flowing from a reduction in handling the same information in different formats for multiple trading partners.

Accordingly, the implementation plan was viewed as a whole-of-company project.

Abbott Australia took the approach that everyone who touched item and pricing data should be involved in some way or other, as this opportunity would provide everyone with greater insights into trading partner requirements.

The company invested in the support of a GS1 consultant to help understand the item and pricing data requirements, and to guide it through the implementation. In addition, a cross-functional team of 12-15 employees worked on gathering and validating data.

The project team included people from IT, supply, pricing, regulatory affairs, logistics and customer service functions across its pharmaceutical, nutrition, diagnostics and diabetes care businesses.

In response to feedback from trading partners, data was initially loaded from across all Abbott divisions, including data from acquired companies, to a single catalogue. This resulted in using a number of different ways of uploading data – in itself an excellent learning experience. In 2012, the data will be separated into a number of different divisional catalogues.

Some of the early benefits Abbott has seen include a revised local data maintenance process, which can be shared with its global office as it begins preparing to load data to the GDSN. Other benefits have included reduced time to prepare tender submissions, since all involved can refer to a single source of data, and the company no longer needs to provide the same information to different trading partners in multiple formats; it can now direct them to the NPC.

All of the jurisdictions are starting to use Abbott Australia data as well as a major distributor of Abbott products. The process of granting access to a number of other trading partners is underway. Is it now easier to communicate product and price data to trading partners since being on the NPC? Absolutely – it's much easier!

ArjoHuntleigh: Leading the way globally

By **Karen O'Donnell**, ArjoHuntleigh

In late 2009 ArjoHuntleigh, a global designer and manufacturer of products and services that help healthcare facilities care for people with reduced mobility, received a tender whereby it was mandatory to be NPC compliant.

This was all the reason needed to start their NPC implementation.

The NPC was always a concept ArjoHuntleigh knew about; the organisation had membership with GS1 Australia and allocated GTINs to products, but needed this push to take the next step and publish all product data on the NPC.

ArjoHuntleigh worked closely with GS1 Australia to implement the NPC.

The first step was three days of one-on-one intensive training with a GS1 trainer. This was exactly what was needed to kick-start ArjoHuntleigh's implementation. The training was completely tailored to the organisation's needs; based on a sample of live data which was worked with, and mapped out exactly how to implement the project.

Following the training, it took ArjoHuntleigh just three months to cleanse, upload and publish its data in time for the tender. Now, two years later, the company has the majority of its capital and consumable healthcare products in the NPC.

With GS1 Australia's support, ArjoHuntleigh completed the NPC project successfully in such a short period; and so accurately that nothing has changed since the project started.

It was important to the company to get it right first time. If the wrong data was published and had to be changed later, it is not only wasting valuable time and resources, but it also gives the wrong impression to the marketplace.

With an increased demand for NPC registered products specified in government and private sector tenders, this project continues to ensure ArjoHuntleigh can submit compliant responses in a timely and efficient way.

At least 90 percent of the data requested by tenders is generally already on the NPC, with the remaining 10 percent being specific supplementary information. The NPC makes it easy to reference the data and provide fundamentals and pricing.

Maintenance of accurate product data is a critical part of the NPC. Recognising this, ArjoHuntleigh has allocated a cross-functional team responsible for each data area, such as contract pricing and product specifics.

"Another significant benefit is having all the data logically and securely stored within the NPC, assisting staff in accessing the information required in the preparation of contracts, and allowing us to provide a more efficient service to our customers."

Aside from tenders, another significant benefit is having all the data logically and securely stored within the NPC assisting staff in accessing the information required in the preparation of contracts, and allowing provision of a more efficient service to customers.

This drives efficiencies internally. Staff members, across all functional areas are getting trained in the use of the system and how to access the information required for their business needs.

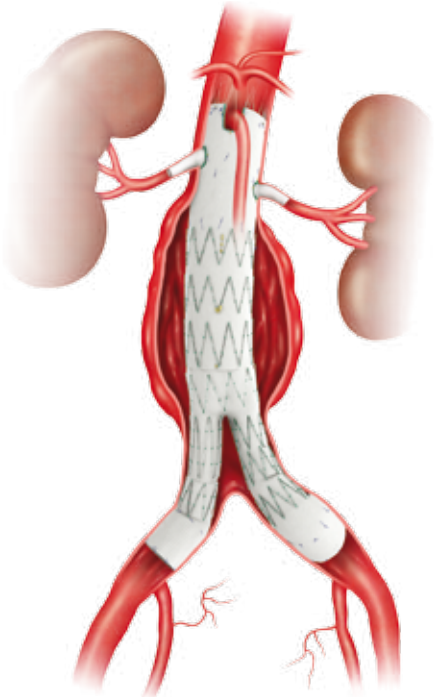
ArjoHuntleigh is now planning to use the principles of the NPC and GS1 Standards in other areas of the business, including stock control and logistics. The NPC has enabled easy demonstration of the business benefits of streamlining our processes. Australia has set an example for the company globally, and it is looking to Australia for guidance on streamlining data management and procurement processes.

COOK MEDICAL: NPC essential for tenders and broad data transparency

By **Robert Webb,**
Cook Medical

Cook Medical is a global company developing and manufacturing products for endovascular therapy, critical care medicine, general surgery, diagnostic and interventional procedures, bioengineered tissue replacement and regeneration, gastroenterology and endoscopy procedures, urology, and obstetrics and gynaecology, and non-traditional innovative medical solutions.

NPC compliance is now a condition of most public tenders for major customers. The prospect of customers having enhanced access to products via a national product catalogue is very positive. Cook Medical has published approximately 6,000 items to the NPC, the overall process taking around eight months. As at April 2012, approximately 11 customers can access the data through NPC – these are currently limited to the largest group customers, such as the Australian State Health jurisdictions. Cook Medical anticipates it will trade electronically (EDI) with over 400 hospitals (GLNs) by year end.



The IT team took a thorough approach to find out what was needed to become NPC compliant, attending GS1 seminars and training seminars and working closely with NEHTA, who then put Cook Medical on to third-party integrators to assist with the implementation.

Externally, the company is now able to maximise its opportunity with product tenders, and internally, the team has learned more about the organisation's own global systems and has a central location for all relevant product data.

Becoming NPC compliant has helped Cook Medical in its steps towards full EDI and the organisation now trades electronically (EDI transactions) with Healthscope and ACT Health. Cook Medical is now ready to expand its EDI functionality and is now ready for expansion to other healthcare providers. Choosing the right middleware companies that work with the given timeframe, show patience and understand the complexity of working with various ERP solutions was crucial to Cook Medical's NPC go-live project

The organisation anticipates even more business benefits when more customers start using the NEHTA eProcurement Solution (GS1 XML). In the meantime, the time taken up in providing information to certain trading partners has already been reduced and staff re-deployed to other value adding tasks internally.

"We anticipate increased business benefits as more customers start using the NEHTA eProcurement Solution"

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ABOUT THE AUTHORS

Mark Brommeyer leads the Supply Chain Reform Program at NEHTA, incorporating the National Product Catalogue (NPC), the eProcurement solution and purchasing reform. Having spent 28 years in the health sector, with significant experience in e-health strategy and change management, Mark is passionate about supply chain reform. The last 20 years have involved managing change and the integration of information and communication technologies to support, connect and provide healthcare across distance and time barriers.

Yvonne Bell has worked within the healthcare industry for more than 25 years, during which she has held a variety of roles. Yvonne joined Terumo nine years ago and her role of National Business Support Manager covers core areas in Contract and Tender Management, Business Analysis and both internal and external customer support. In her current role, Yvonne had responsibility for the implementation of the National Product Catalogue in 2007 and is now actively involved in ongoing Terumo projects for the implementation of E Business.

Dianne Prince has worked for Abbott Australia for 16 years, initially as Training Manager for Operations and Quality Assurance and, for the past 12 years, as Customer Supply Chain Manager. This role requires a strong focus on anticipating external customer requirements to ensure Abbott's business processes are continually adaptive to changes within the healthcare environment. In addition to actively participating in industry working groups, Dianne works with Abbott colleagues locally and globally on the implementation of GS1 standards.

Karen O'Donnell, ArjoHunteigh, has worked in the healthcare industry for 15 years specialising in the supply, service and rental of a wide variety medical devices ranging from class 1 hoists and bed platforms in a community setting through to class 2b Ultrasonic Diagnostic equipment intended for the acute care sector. Although her role within the Quality, Regulatory and Environment Department of ArjoHunteigh is predominantly focussed on ensuring the quality and regulatory requirements of the Australian and New Zealand operations are met, Karen also provides support to the greater Asia Pacific region.

As Director of Healthcare Business Solutions at Cook Medical, **Robert Webb** is responsible for driving innovation in healthcare supply chain in the Asia Pacific region. Working with distribution channel members, governments, group purchasing organisations and hospital supply executives, he and his team seek to identify and create new ways to streamline and enhance the supply chain process. Rob has extensive experience in the medical sales and marketing industry and joined Cook Medical eight years ago.

For more information about these case studies, contact Tania Snioch at: tsnioch@gs1au.org.

Austria

Efficiently managing inventory of medical devices using RFID

ABSTRACT

To save time and resources during the annual stocktaking of medical devices, the Center for Medical Research at the University Hospital of Graz (Austria) implemented GS1 Standards and invested in Radio Frequency Identification (RFID) equipment. A SmartID™ Framework was implemented at the hospital, developed in collaboration between the University of Applied Science Joanneum (Department for Healthcare Engineering), GS1 Austria and RFIDInnovations GmbH. Leveraging GS1 Standards and Electronic Product Code (EPC)/RFID technology, the hospital reduced the time needed for annual stocktaking by more than 96%.

By **Dr. Stefan Sabutsch,**
University of Applied Sciences Joanneum, Graz (Austria)

The pain of managing inventory in hospitals

In many hospitals, managing inventory is not a very popular task as it is a cumbersome, resource intensive process of stocktaking every year to physically verify the location, quantity and condition of items. Hospital staff needs to inspect all stock items, counting everything, clearing out, re-arranging, correcting and clearing final errors, writing off stock, or starting all over with warehouse entries. Stocktaking results in a lot of work for the hospital, so it is obvious that optimising this process can save a lot of time and money.

In collaboration with GS1 Austria, three important areas for improvement were identified: unambiguous identification of items that can effectively be read, controlled processes, and processing data.

"Leveraging GS1 Standards and RFID/EPC technology allowed the hospital to reduce the time and effort needed for annual stocktaking by more than 96%."

Various GS1 Standards can optimise these processes, including: GS1 Identification Keys, such as the Global Trade Item Number (GTIN) and the Global Individual Asset Identifier (GIAI); GS1 BarCodes, such as the GS1 DataBar, GS1-128 and GS1 DataMatrix; and GS1 Electronic Product Code/Radio Frequency Identification (EPC/RFID), such as Ultra High Frequency (UHF) EPC Gen2.

Each technology offers advantages to the company, and the GS1 Standards provide security and harmonisation for investments in inventory management systems and during the configuration of the interfaces.

SmartInventory Project at the University Hospital of Graz

In the Center for Medical Research at the University Hospital of Graz (Austria), all medical devices are registered in the in-house facility management system and further assigned to specified rooms. Whether those devices are actually located in the right room is also checked during the annual stocktaking. It often turned out that loaned devices were physically moved to another room, but this was not captured in the in-house facility management system. The stocktaking and the subsequent re-allocation required a lot of time and resources.

This motivated the hospital to implement GS1 Standards and invest in RFID equipment. Over 100 rooms were marked with Global Location Numbers (GLN) and over 1,500 medical devices were marked with a Global Individual Asset Identifier (GIAI). A SmartID™ Framework was implemented at the hospital, developed in collaboration between the University of Applied Science Joanneum (Department for Healthcare Engineering), GS1 Austria and RFIDInnovations GmbH.

Leveraging GS1 Standards and EPC/RFID technology allowed the hospital to reduce the time needed for annual stocktaking to two days instead of 14 and only required one employee instead of four. The solution reduced the time and effort needed by more than 96%. This means the inventory process is done 28 times faster than before. This tremendous reduction makes it now possible to carry out a monthly inventory and inspection of stocks.

Overcoming technology challenges

One of the challenges was to find an appropriate transponder that would fulfill the requirements of a clinical environment. The transponder needed to be suitable to function on metal surfaces, typical for medical devices, and able to be affixed upon the most different and partially abrasive surfaces of other types of devices. The adjusted Ironside of Confidex (Finland) with an adhesive foil of 3M was selected.

Austria: Efficiently managing inventory of medical devices using RFID

LKH - University Hospital Graz

A very compact and handy Personal Digital Assistant (PDA) with an attachable UHF reader was chosen as an RFID handheld. Due to the SmartID™ Framework used, the application could be configured for a variety of other mobile terminals, such as ATiD, NordicID and many more, without the need for programming.

The new process

The apparent medical device identification number from the system is directly coded in a GIAI and stored in the transponder.

At the beginning of the inventory process, the current allocation of the devices is transmitted from the facility management system onto the mobile RFID UHF readers. While scanning the UHF door plate, the user automatically receives the current set list, which is shown on the display, and enabling the user to register all devices that are stored in that specific location. If the device is in the wrong location, a warning is sent out and a decision can be made on site as to whether the current room-allocation should be updated. The corrected data can be re-transmitted into the system in order to get an accurate database.

Furthermore, by choosing the new type of chip's user profile, G2XM with 512 bit, warning data and ownership information can be saved directly on the device. In doing so, information about the owner of the device, date of the last maintenance operation, maintenance interval or activity status can be retrieved even without direct access to the facility management system.

The use of UHF technology/hardware and the SmartID™ Framework resulted in a cost-efficient and yet extensive and

Personal Digital Assistant (PDA) with an attachable UHF reader

University of Applied Sciences Joanneum in Graz

user-friendly solution for inventory and maintenance activities within a short period of time. The project clearly demonstrated the advantages of using global and technology-independent GS1 Standards in the field of RFID.

For more information about this case study, contact Barbara Dorner at: dorner@gs1.at

ABOUT THE AUTHOR

Dr. Stefan Sabutsch is Senior IT-architect and standards expert for ELGA GmbH in Austria. After obtaining a PhD degree Biology at Graz University, he worked for AGFA Healthcare in the area of diagnostic systems, laboratory information systems, pathology and cardiology. He is also a technical expert at the University Hospital Graz in Austria and lectures "Health Care Engineering" and "eHealth" at the University of Applied Sciences Joanneum in Graz. His research fields covered communication in medicine and related standards, as well as identification systems. Since 2007, Dr. Sabutsch has been Chair of Health Level Seven Austria.

Co-Authors: **Michael Mally**, RFIDInnovations and **Alexander Peterlik**, GS1 Austria

Belgium

Baxter endorses GS1 Standards as a building block of brand integrity programme

ABSTRACT

Baxter International Inc. has endorsed and been a strong supporter of industry-wide, global adoption of the GS1 Standards for healthcare. Baxter believes that industry-wide adoption of these standards will improve patient safety and will drive increased efficiency and integrity within the healthcare system.

By **Philippe Majois,**
Baxter

Counterfeit and/or altered medical products pose growing risks to patient safety worldwide. Maintaining product integrity is complex and multifaceted, encompassing an array of supply chain, product design and packaging, and risk management strategies.

"Baxter believes that industry-wide adoption of these standards will improve patient safety and will drive increased efficiency and integrity within the healthcare system."

Baxter believes that adoption of GS1 Standards for healthcare and serialisation of certain products will facilitate greater use of track-and-trace strategies and technologies that can help ensure that products are moved correctly and efficiently throughout the supply chain. Ultimately, adoption of these standards can help enable healthcare professionals to verify they are administering the right product to the right patient at the right time.

Baxter launched a formal, global product integrity programme in 2007 to safeguard the company's products from the threat of counterfeiting or adulteration. As part of this program, the company conducted a series of risk assessments, examining economic incentives, supply chain and product complexity and other factors. Based on those assessments, Baxter prioritised certain product lines and geographies for piloting and implementing various product integrity measures. The highest priority products and markets were earmarked for initial implementation of serialisation using GS1 Standards, which also comply with California Board of Pharmacy ePedigree requirements.

One Baxter facility in Belgium where biologic-derived therapies are produced has been bar coding and mass serialising for the last two years. The experience there has helped guide other Baxter product integrity efforts and points to the complexity involved in implementation.

A number of factors can influence the complexity of implementation, including the product itself, how it is manufactured, packaged and stored, and where it is manufactured and shipped. Implementation of GS1 and serialisation is not simply a matter of placing a bar code on a product. The implementation process involves a number of steps and requires the manufacturing capability to generate and print two dimensional dot matrices and the technology behind it to store, process and track data. The steps involved include: Upgrading packing lines to bar code (without serialisation) the unit of dose packaging level.

1. Upgrading packing lines to bar code and serialise the lowest sealable unit and the above packaging levels
2. Using GS1's Global Trade Item Number for product identification
3. Using GS1 DataMatrix bar codes for unit of dose and unit of sales packaging levels
4. Using a GS1-128 bar code on shipping case level

Baxter

About Baxter

Baxter develops, manufactures and markets products that save and sustain the lives of people with hemophilia, immune disorders, infectious diseases, kidney disease, trauma, and other chronic and acute medical conditions. As a global, diversified healthcare company, Baxter applies a unique combination of expertise in medical devices, pharmaceuticals and biotechnology to create products that advance patient care worldwide. Baxter's diverse product portfolio is manufactured in 27 countries and sold in more than 100 countries globally, and ranges in complexity from basic intravenous solutions to highly-specialised biologic derived therapies.

Baxter in Belgium – Production site in Lessines

5. Using a SSCC-18 bar code on pallet level
6. Including batch number and expiration date for all products, as well as potency for certain products
7. Continue to meet shifting or differing local bar code regulatory requirements, such as as having the National Drug Code (NDC) in a linear bar code in the US.

With this implemented, products can be scanned by warehouses, logistic partners, customers, nurses and patients for specific home care treatments at all levels of packaging.

Also adding complexity is the need to educate internal contributors/collaborators (for example Information Technology, Manufacturing, Supply Chain and Quality professionals across the organisation) and external stakeholders on GS1 Standards and the implications for systems, equipment and processes, including on such elements as:

- Working with GS1 on creation and allocation of GTIN to products
- Selection of system and equipment vendors
- Defining validation approach and demonstrating reliability of process
- Understanding the impact on labeling and packaging, particularly for Regulatory requirements or design
- Understanding the numerous operational impacts
- Understanding interactions between the enterprise level software and the plant equipment.

First and foremost for implementation, manufacturing capabilities need to be upgraded to incorporate printing and verification systems that are able to print bar codes and qualify them. This can require significant investment depending of number of packing lines, type of products, and packaging materials. Multiple sets of standards and requirements would drive unnecessary or redundant investment, extend timelines for implementation and create confusion and increased risk

for manufacturers, healthcare providers and patients. The continued adoption of GS1 Standards by additional countries will facilitate quicker adoption of a single global standard and spur the many supply chain and patient benefits envisioned with the creation of the GS1 Standard.

Preventing and overcoming the many threats to product integrity that exist today and will arise in the future requires a comprehensive approach that incorporates many elements. Industry-wide, global adoption of GS1 Standards and product serialisation is an important building block in those efforts. Baxter looks forward to expanding its implementation of those standards, furthering its product integrity efforts and driving greater security and efficiency in the delivery of our products to healthcare providers and patients around the world.

ABOUT THE AUTHOR

Philippe Majois is Packaging Technology Development Manager for Baxter's BioScience business. He has been with Baxter since 1998 and started as Packing Operation Manager. Since 2002, he has managed packaging design and technology development for biologic products within the company's BioScience business.

Brazil

Implementing GS1 DataMatrix at Moinhos de Vento Hospital: Ensuring drug traceability and patient safety

ABSTRACT

The Moinhos de Vento Hospital in Brazil implemented GS1 DataMatrix barcodes on medicines in 2011. The hospital aimed to enhance patient safety and reduce costs by more efficiently managing inventory and enabling traceability. Return on investment is expected within fifteen months, and could even be faster if more pharmaceutical suppliers print the GS1 DataMatrix on their unit dose packaging.

By **Joana Heydrich,**
Moinhos de Vento Hospital
(Brazil)

Quest for quality

HMV, the Moinhos de Vento Hospital, has been on a quest for quality in patient care since it was founded in 1927. The hospital manages the "Programa Excelência na Prática" (Excellence in Healthcare Programme), which involves ANAHP, Brazil's National Association of Private Hospitals, and the Institute for Healthcare Improvement (IHI) in the United States.

This continuous effort was recognised by the Brazilian Ministry of Health, electing the hospital as one of the most excellent hospitals in Brazil. HMV has also been certified four times by the Joint Commission International (JCI), a renowned organisation evaluating and accrediting hospitals worldwide.

Leveraging GS1 DataMatrix at HMV

The Brazilian Federal Law 11,903 instituted in January 2009 requires establishing a national system to control the supply of medicines. Any medicine manufactured, dispensed and sold in the country has to be tracked. ANVISA, the National Agency for Sanitary Surveillance in Brazil, will coordinate and adopt an identification system to be implemented gradually in the country. Pharmaceutical suppliers will have to comply with this system.

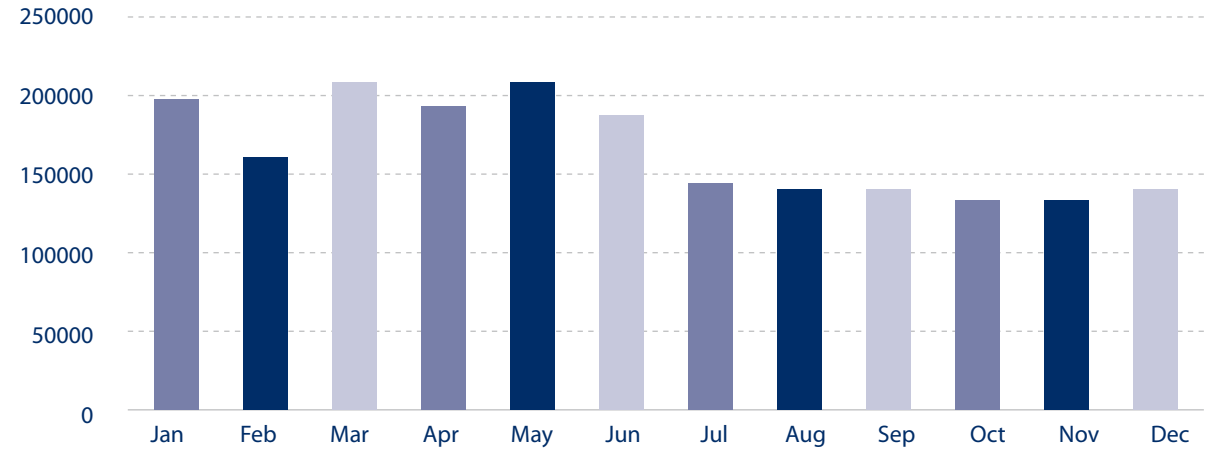
GS1 Brazil and ANAHP jointly promote the use of barcodes and identification standards in the healthcare supply chain, from production to the patient. A joint seminar in September 2010 brought suppliers and hospitals together to discuss the implementation and their benefits.

The conclusions from that seminar helped HMV to develop the hospital strategy to implement GS1 DataMatrix barcodes on medicines. This strategy was presented to the hospital's board and subsequently approved.

"The main goals of the project are to enhance patient safety and ensure inventory control."

The main goals of the project are to enhance patient safety and ensure inventory control. This can be achieved by ensuring the traceability of medicines inside the hospital, in particular the ability to track and trace medicines from receiving to dispensing, and report on the process in detail. Technology, in particular barcoding, needs to be implemented to enable this. The hospital would like to work with its suppliers to have GS1 DataMatrix barcodes printed on the packaging, avoiding unnecessary rework by the hospital and increasing the traceability in the whole chain.

Figure 1: **Internal labelling of medicines at HMV in 2011**



The main benefits for HMV to implement this traceability system and leveraging GS1 DataMatrix include:

- ensuring traceability of medicines from receiving to dispensing;
- reducing operating costs by eliminating internal labelling as suppliers leverage a global standard;
- saving time during receiving and internal identification;
- reducing waste by monitoring expiry dates of medicines;
- optimising human resources by eliminating internal identification and focusing on core activities;
- performing registry safety;
- reducing errors by automating the process and eliminating human errors; and
- reducing waste by eliminating internal labelling.

Internal identification and labelling of medicines

Every medicine that is distributed and dispensed in the hospital receives an internal label with information about the product, its batch number and expiry date, in addition to the barcode printed on the label. This label serves as an entry in the computer system used in the hospital to ensure the traceability of that medicine.

The labelling process is sometimes manual, sometimes automated, but always carried out by pharmaceutical professionals with full-time supervision of the responsible pharmacist. This process is one of the most important steps in the medicine supply chain in the hospital – not only for financial control, as it guarantees the correct charge of the medicine in the patient account – but also for process safety.

This labelling process not only brings on unnecessary work, but also increases cost and the risk of errors in the medicine supply chain. In June 2011, four suppliers (Eurofarma, B. Braun Brasil, Isofarma Industrial Farmacêutica Ltda and Baxter Brasil) started supplying their products printed with GS1 DataMatrix. As shown in Figure 1, the monthly average of manual, internal labelling decreased almost 28%, averaging 137,043 units per month as of June 2011 instead of 189,476 units prior.

This has saved a lot of work for the hospital and is a much safer process for the patient. The product information comes directly from the supplier and remains unchanged throughout the process.

The project allowed the hospital to save approximately R$1,250 (€~500) per month in supplies (labels, ink, etc.) and R$4,900 (~€1,900) per month in labour costs in the second half of 2011.

	Monthly average labelling	Average monthly cost - supplies	Average monthly cost – labour
Before	189,476 medicines	R$ 4,500	R$ 7,000
After	137,043 medicines	R$ 3,270	R$ 2,100

Investing in equipment and people

To be able to read two-dimensional (2D) barcodes in the hospital, it was necessary to replace all the previously used scanners and data collectors. HMV invested R$72,765 (~€21,000) in scanners and data collectors. Forty-two fixed data readers were replaced in all locations where medicines are dispensed, and three handheld data scanners were replaced in the central warehouse and pharmacy for increased mobility.

Description	Quantity	Location	Unit Value R$	Total Value R$
Fixed Data Scanner	42	All	896	37,623
Handheld Data Scanner	3	Central Warehouse and Obstetric Care Unit	766	2,298
Data Collectors	11	Central Warehouse and Pharmacy	2,730	**30,030**
Batteries	11	Central Warehouse and Pharmacy	255	2,805
Total	67	-		72,765

Examples of data scanners

The computer system used at HMV was already prepared to understand the data scanned from GS1 DataMatrix barcodes. For this phase, it was only necessary to do tests before the implementation to ensure system reliability. Using standardised solutions is a great advantage in these kinds of projects.

Training of hospital staff was essential for the project in order to be successful. In total, 118 co-workers have been trained in eighteen different satellite stocks in the hospital, from the Central Warehouse, to Oncology, to ICU, and so on. The responsible pharmacist conducted training in their area.

To make sure all hospital staff was and remained engaged in the project, HMV's marketing department helped to promote the use and benefits of the GS1 DataMatrix for drug traceability. A marketing campaign – "Datamatrix – Segurança para todos (Security for everyone) – was set up, including a poster used throughout the hospital and e-cards sent via email to hospital staff.

From planning to reality in less than eight months

The project was successfully concluded and according to plan. Eight months after the project's kick-off, the GS1 DataMatrix started to capture information for medicines from Eurofarma and B.Braun.

"Training of hospital staff was essential for the project in order to be successful."

The project was done through a truly multidisciplinary approach, engaging and integrating multiple hospital departments, including procurement, information technology, marketing, corporate education, and decentralised storages. Without this multidisciplinary approach, there is no doubt that the project would not have achieved so much in such a short period of time.

Nº	Activities	Sep/10	Oct/10	Nov/10	Dec/10	Jan/11	Feb/11	Mar/11	Apr/11	May/11
1	Participation in the ANAHP/GS1 Event									
2	A study of equipment needs									
3	Project work-up at HMV									
4	Project presentation to the board									
5	Supply quotation									
6	Analysis and approval of the equipment									
7	Equipment purchase and receipt									
8	Equipment installation									
9	Adjustments in the internal system - software (Screen for the Supplier and Product Register)									
10	Team training in the inventory									
11	Full functioning of the Project									

Conclusion – "Segurança para todos"

Return on investment in new equipment will be achieved by HMV in less than fifteen months. With only four suppliers, HMV could reduce 30% of its internal labelling efforts. More pharmaceutical suppliers participating in the GS1 DataMatrix project will enable the hospital to realise more savings.

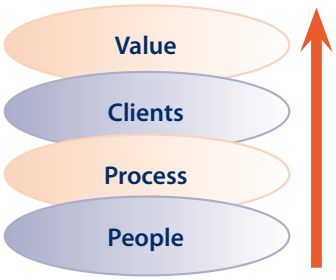
Enhancing patient safety was the most important goal of HMV. Although difficult to measure, the automation of the dispensing process through the usage of the GS1 DataMatrix reduces the risk of medication errors by eliminating the human intervention to capture product identification and information.

"Return on investment in new equipment will be achieved by HMV in less than fifteen months."

HVM was one of the winners of the 14th edition of Brazil's automation prize, "*Simplifying business and lives*" (November 2011).

When it comes to their tasks, better trained and motivated staff members perform better, catching the attention of the clients and forming loyalty to the HVM brand – generating a positive spiral and better results for everyone.

For more information about this case study, contact Roberto Matsubayashi at:
rmatsu@gs1brasil.org.br.



Positive spiral of the Balanced Score Card. Source: Adapted Model - Kaplan and Norton.

About the Moinhos de Vento Hospital

HMV is a 376-bed hospital in Brazil and was founded in 1927 as Hospital Alemão (German Hospital). The hospital campus has four modern buildings that are fully integrated, with a hospital, two clinics and an Institute for Research and Education. HMV is renowned for its quality in patient care and is the only hospital in South Brazil to be accredited by the Joint Commission International. HMV provides comprehensive assistance, which includes personalised and integral assistance by a multidisciplinary team, searching for not only the physical wellbeing, but also the spiritual and psyche wellbeing.

ABOUT THE AUTHOR

Joana Heydrich, Responsible Pharmacist at the Moinhos de Vento Hospital in Brazil, joined the hospital in 2008 as Technical Pharmacist in charge of the materials processes and medicine. She leads the team at the Central Warehouse and is responsible for the performance of the whole process of receiving, registering and distributing all supplies. She is also a member of the Standardisation Committee of Hospital Medical Device (Comitê de Padronização de Materiais Médicos Hospitalares) and the HMV Medicine Committee (Comitê de Medicamentos do HMV). She managed the HMV's GS1 DataMatrix project.

Ms. Heydrich holds a post graduate degree in Pharmaceutical Sciences from the Universidade Federal do Rio Grande do Sul. Currently, she is pursuing her MBA in Health Management (Gestão da Saúde) at Fundação Getulio Vargas in a partnership with HMV.

Colombia

Deployment of a traceability system by a pharmaceutical wholesaler leveraging GS1 Standards

ABSTRACT

The Colombian government will require that all healthcare supply chain stakeholders can track and trace pharmaceutical products throughout the supply chain. Dromayor, a Colombian pharmaceutical wholesaler, and Pfizer, a global pharmaceutical manufacturer, have successfully concluded a pilot project demonstrating how GS1 Standards can enable a traceability system to meet the government's requirements.

By **Jorge Enrique Gonzalez,** Dromayor

Background

Currently, the process to track pharmaceutical products in Colombia is completely manual. Items are shipped with a Global Trade Item Number (GTIN)-13, a GS1 Standard, encoded in a barcode. Additional information on the manufacturing date, batch and serial numbers are printed on the package, often in small font size. Once the product is shipped to other nodes in the supply chain, it is the only information available to validate its authenticity and retrieve the additional information. There is no database to validate the information. This makes inspection and traceability very difficult, or even impossible.

A few years ago, Colombia passed a law to requiring drug traceability throughout the supply chain. Article 34 of Law 1122 of 2007 mandated INVIMA, the National Institute of Food and Drug Monitoring, to regulate such a traceability system:

"It is the duty of INVIMA to […] to guarantee the correct identification of pharmaceutical products at any stage of the supply chain, from production to final consumption, in order to avoid counterfeiting, adulteration and smuggling. Local authorities need to require that both manufacturers and distributors comply with such requirements for all drugs marketed in their jurisdiction".

Since this law, supply chain stakeholders, including suppliers, wholesalers, drug stores and healthcare providers, have succeeded in reaching consensus on how to implement this traceability system – from which technology to use, to a coding system and information tools.

Advancing solutions to meet government requirements

Several stakeholders, in conjunction with the Health and Social Security Working Group from GS1 Colombia, have been working on initiatives to meet government requirements regarding the identification of products, processes, automatic data capture, and the use of electronic commerce to generate traceability processes based on these parameters:

"Guarantee the correct identification of pharmaceutical products at any stage of the supply chain, from production to final consumption."

A traceability system through a standard identification and communication system involves:

- unique identification for any medication throughout the different companies and entities involved in their production, distribution, marketing, supply, administration and consumption;
- a means to represent this identification that ensures security and data integrity, authenticity of products, and the possibility to have agile processes through automatic data capture;
- an online information system to register every time an event occurs regarding products and supplies: what was sent, received or sold, dispensed or administered, in what quantities, where the event occurred, what was the player responsible for, and the related transport information;
- the appropriate technology to capture the event information automatically making it available online and with the required quality when it goes to bulk operations; and
- the development of applications that enable consumers to access legal information about the product they are getting, and other applications (e.g., accessing allergenic information through mobile phones.

The Dromayor-Pfizer pilot project

In October 2011, Pfizer and Dromayor, a Columbian pharmaceutical wholesaler, started to work together to set up a pilot project to validate the impact of a traceability system based on GS1 Standards, including: the Global Trade Item Number (GTIN), GS1 DataMatrix, and GS1 Global Data Synchronisation Network (GDSN).

An internal traceability framework needed to be set up for Dromayor and its main suppliers and customers, as well as its own pharmacies. Dromayor uses CABASnet, GS1 Colombia's GDSN-certified data pool, to synchronise product data, and integrated its enterprise resource planning (ERP) system with GS1 Colombia's traceability system, Traceability System Online, to manage serial numbers.

The pilot involved Pfizer's distribution center for consumer products, Dromayor's distribution center, and a Dromayor pharmacy in Bogotá. It focused on nine over-the-counter pharmaceutical products with high rotation.

"GS1 Standards enable online traceability systems that can be used to manage and verify serial numbers."

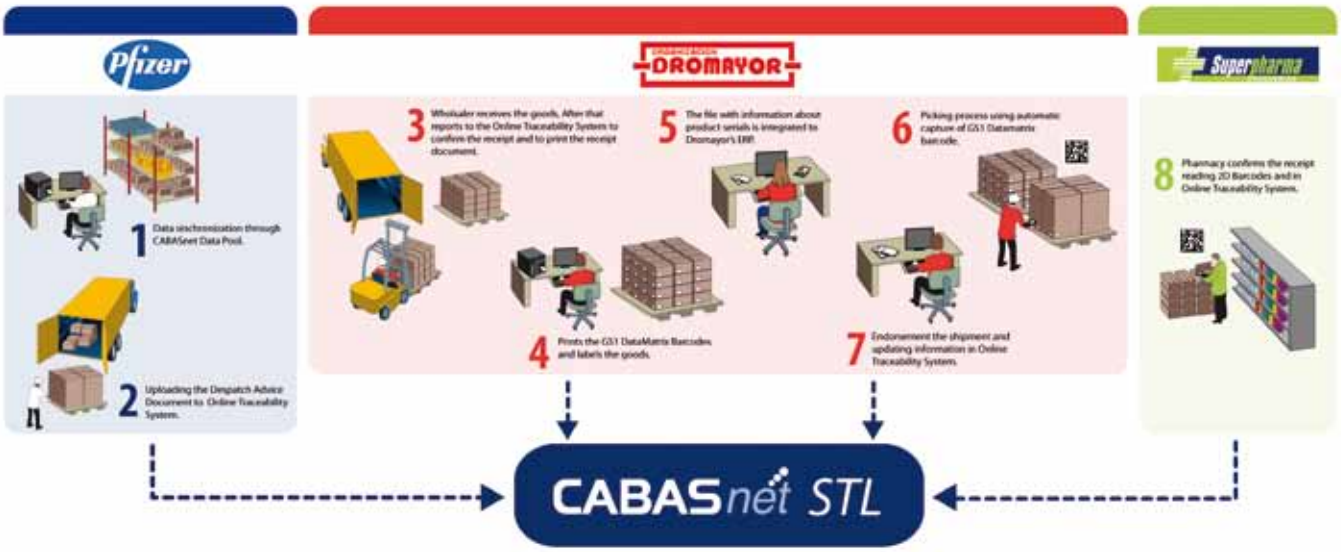
During the pilot, those nine products were marked with a GS1 DataMatrix including the GTIN, lot number, expiration date and serial number at Dromayor's distribution center (see Image 1).

Product information was synchronised between supply chain partners through CABASnet.

When shipping the products to Dromayor, Pfizer uploaded the Dispatch Advice Document to the CABASnet Online Traceability System.

When Dromayor received the shipments, the labels with the DataMatrix barcodes and the right information were printed and put on the package. Manual labeling took nine seconds on average per item and cost US$0.05 per label. Dromayor reported back to the CABASnet Online Traceability System to confirm receipt and to print the receipt document. The serial number for each package is linked to the GTIN, lot number and other product data in its ERP system and the CABASnet Online Traceability System. During the picking process, the GS1 Datamatrix barcode was automatically read and the CABASnet Online Traceability System updated.

Figure 1: Pilot process



Finally, the drug store also scanned the GS1 DataMatrix barcode and confirmed receipt to the CABASnet Online Traceability System.

The CABASnet Online Traceability System provides visibility throughout the whole process. This is of particular importance for the technical receipt document, which is a regulatory requirement (see Figure 2).

This report shows information about order numbers, invoice and shipment dates, including products shipped, their lot numbers and expiration dates (see Figure 3).

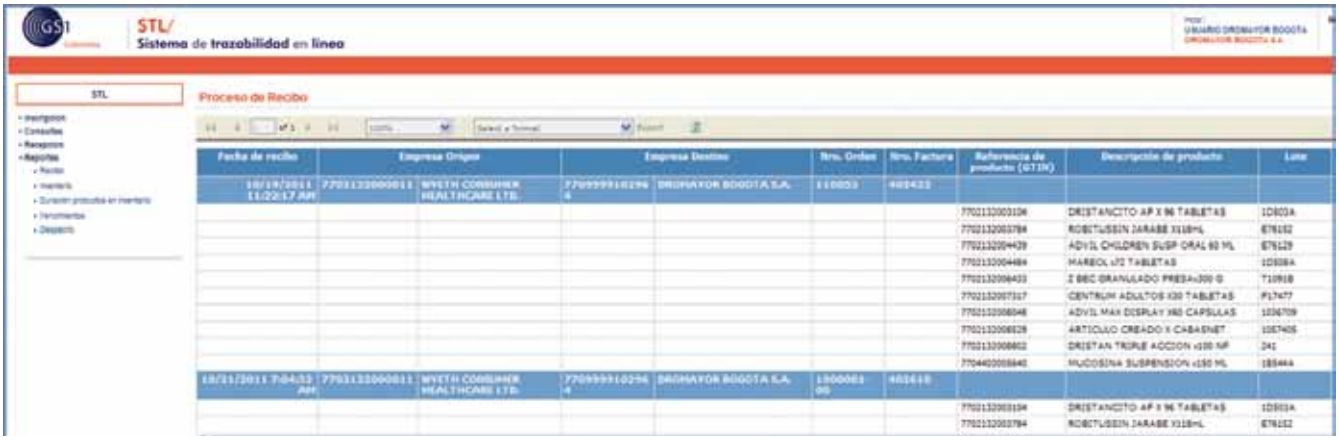
Figure 2

ACTA DE RECEPCION TÉCNICA DE MEDICAMENTOS Y DISPOSITIVOS MÉDICOS

NUMERO DE LA FACTURA REMISORIA:	402433	
NUMERO DEL DESPACHO REMISORIA:		
NUMERO DEL PEDIDO REMISORIA:	110053	
FECHA DE RECEPCIÓN:	19/10/2011	
FECHA DE DESPACHO:	19/10/2011	
NOMBRE DEL PROVEEDOR - DIRECCIÓN	WYETH CONSUMER HEALTHCARE LTD.	CR 7 71 21 TO B P 14
NOMBRE DEL CLIENTE - DIRECCIÓN	CEDI DROMAYOR BOGOTA	

ITEM	CODIGO	NOMBRE	F.FARMACEUTICA	CONCENTRACION	PRESENTACION	UNIDADES	LOTE	REG. INVIMA	F. VENCIMIENTO	LABORATORIO	OBSERVA
1	7702132003784	ROBITUSSIN JARABE X118mL	ROBITUSSIN		6 Numero de artículos	72	E76152	INVIMA2009M-012891R1		Wyeth Comsumer Healthcare LTD.	
2	7702132004439	ADVIL CHILDREN SUSP ORAL 60 ML	ADVIL CHIL		6 Numero de artículos	36	E76129	INVIMA2008M-011320R1		Wyeth Comsumer Healthcare LTD.	
3	7702132004484	MAREOL x72 TABLETAS	MAREOL		1 Numero de artículos	48	1D508A	INVIMA 2001M-0000142		Wyeth Comsumer Healthcare LTD.	
4	7704403005640	Mucosina suspension				48	1B544A				
5	7702132006433	Z-bec granulado fresa x 300 g			300 Gramos	72	T1091B	INVIMA2001M-0000661		Boehringer ingelheim s.a. bogota	
6	7702132008048	ADVIL MAX DISPLAY X60 CAPSULAS	ADVIL MAX		1 Numero de artículos	144	1036709	INVIMA 2004M-0003510		Wyeth Comsumer Healthcare LTD.	

Figure 3



Conclusion

Serialisation helps to verify authenticity of pharmaceutical products. GS1 Standards enable online traceability systems that can be used to manage and verify serial numbers, so that implementing serialisation does not require major developments for a wholesaler's ERP. This online system allows to effectively manage technical receipt documents required in Colombia and provides easy access to historical records through a cloud computing system. Basic infrastructure is required to achieve traceability, including Internet access and 2D barcode scanners.

Ideally, serial numbers are encoded in the barcode by the pharmaceutical supplier at the point of production using global, industry-wide standards. This reduces the risk of errors later in the supply chain and allows for efficient receiving and shipping processes. If the wholesaler has to label the package afterwards with the serial numbers, this adds cost and risk. Furthermore, the wholesaler needs to have an area in the warehouse where they can label the packages.

ABOUT THE AUTHOR

Jorge Enrique Gonzalez is National Director of IT and Logistics at Dromayor, one of the largest Colombian pharmaceutical wholesalers. Mr. Gonzalez is cofounder and official speaker of the Foundation "I believe in Colombia" for more than 11 years with more than 500 conferences in several cities of Colombia, Venezuela and United States. He is a systems engineer, specialising in artificial intelligence and logistics. He was trained in strategic management and management skills at University Politecnico Gran Colombiano and at the University of Pennsylvania in the US.

Germany

How category management improved customer service in the pharmacy

ABSTRACT

The implementation of category management in three Medicon pharmacies allowed for a significant improvement in customer service and resulted in increased sales despite a declining market. Redesigning the way products were presented in the pharmacies helped to attract new customers and improve customer satisfaction and loyalty.

By **Verena Schielein,**
MEDICON BRL GmbH

Improving customer service in pharmacies

Customer service is vital for the retail pharmacy. The Medicon Pharmacy Group (Medicon) is committed to its motto: 'Gerne für Sie da' (Happy to serve you). This also means that customers need to quickly find what they are looking for in the pharmacy. Re-organising products in product groups – or categories – helps to improve orientation of customers in the pharmacy. The focus is then on what the patient or customer is looking for, with products that a buyer considers related displayed together. The objective is to better meet customer requirements, which in turn aims to improve customer loyalty and satisfaction, increasing sales in the process.

To achieve this, Medicon pharmacies began introducing the category management approach in three of its pharmacies in January 2010. The Klosterfrau Healthcare Group (Klosterfrau), a pharmaceutical supplier, and GS1 Germany supported the implementation, under the auspices of the Federal Ministry of Commerce and Technology as part of PROZEUS, a German eBusiness initiative providing clear information on eBusiness standards to help small and medium-sized companies acquire eBusiness competence.

Klosterfrau recommended the specific categories to implement based on a systematic analysis of market and scan data, as well as considering the specific characteristics and strategic

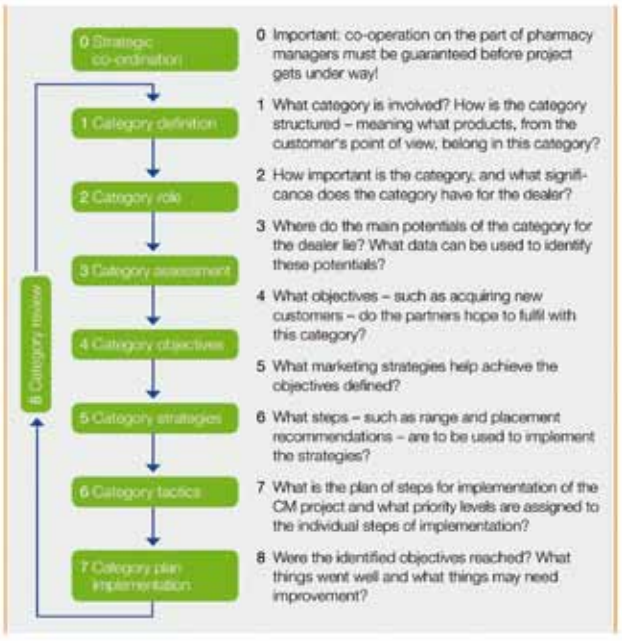
orientation of the Medicon pharmacies. A customer-focused approach to category management is a significant instrument to define the sales strategy. Harmonising the product portfolio with local needs is critical. By introducing category management into the business planning process, the customer-focused design of the product portfolio can be linked to the strategic positioning within the pharmacy. The result is increased customer satisfaction, also allowing for differentiation of the pharmacy in comparison to other pharmacies in the area.

The support of GS1 Germany enabled Medicon to leverage its expertise in business process optimisation in various industries and sectors. Specifically, GS1 Germany supported the implementation of GS1 Standards and enabled Electronic Data Interchange (EDI) between Medicon and Klosterfrau, which helps to streamline the exchange of information between suppliers and pharmacies. Data, such as the sales data report, can now be transmitted electronically between the supply chain partners using specified messaging standards (eCom message SLSRPT - Sales data report message - United Nations Directories for Electronic Data Interchange), minimising human intervention and thus reducing errors and simplifying the flow of information.

Category management in eight steps

The backbone of the project was a detailed analysis of the current situation in the pharmacies. It was important to take time for this despite a pharmacy's busy day-to-day operations. Taking a step back to evaluate ways of improving long-term customer satisfaction is important. Nevertheless, in less than six months, the pharmacies were redesigned to meet the requirements of category management. The category plan was defined and implemented in eight steps, from getting management buy-in, to category plan implementation and review, as defined by Efficient

The 8-step process for category management:



Medicon pharmacy: Over-the-counter products grouped by category

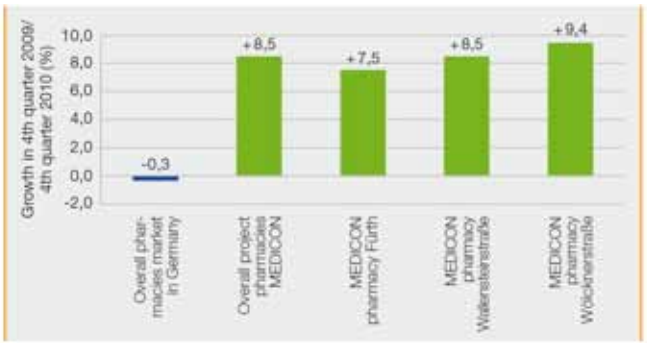
Consumer Response (ECR), a GS1 initiative to optimise the business processes between suppliers and retailers focusing on the consumer.

Lessons learned

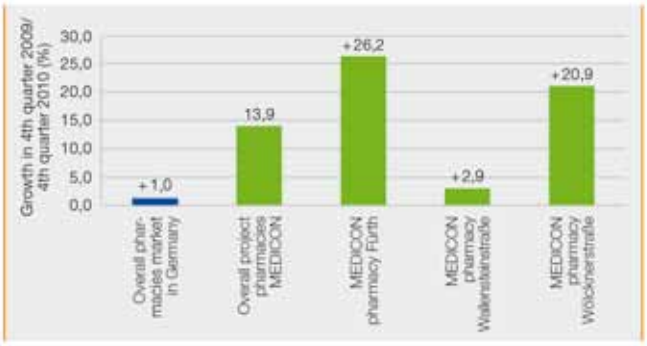
The first objective was to improve customer service in Medicon pharmacies. Customer feedback upon implementation was extremely positive. Where individual products were once grouped by supplier, they are now grouped into categories. For example, if customers are looking for something for their feet or legs, they will find all of related products from any supplier on the same shelf or in the same area. The customer will not only find what he or she needs much faster, but it also positions different products in the same category. For another example, a customer looking for compression stockings may also benefit from Medicon's offering of individually tailored compression stockings. Or they can find all natural healthcare products in one area.

Retailer and producer approach to defining a category role:

Step	Content	Responsibility
1	**Presentation of prior category roles** • What roles does the retailer work with? • What role has the category in question played thus far? • How was the role derived?	Retailer
2	**Clarification of the approach to the category role during the process** • From the producer's or retailer's point of view, is there any reason to question the prior category role? • If yes: implement steps 3 through 5	Producer/ Retailer
3	**Developing an assessment model** • Decisions on which data can, and which data should, factor into the quantitative analysis • Clarification of weighting of data • Clarification of questions for the qualitative assessment	Producer/ Retailer
4	**Performing the assessment** • Quantitative and qualitative execution of the assessment (with retailer's assistance) • Evaluation of analyses and derivation of a recommendation	Producer
5	**Determination of category role**	Retailer



Sales, over-the-counter placement: overall market trend downwards – project pharmacies experienced growth



Sales, display placement: overall market near 0% - project pharmacies experienced above-average growth

The efforts and investments have certainly paid off. Medicon pharmacies sales where category management was implemented increased 8.5% despite a declining market – German pharmacies' sales decreased 0.3% in the fourth quarter of 2010. Those Medicon pharmacies also attracted more customers, increasing by 12.6%. One pharmacy increased its number of customer loyalty card holders by 18.5%, and another by 71.9%.

Based on the results in these three pharmacies, Medicon decided to implement category management in their other ten pharmacies.

For more information about this case study, contact Bettina Bartz at: bartz@gs1-germany.de.

The German law requires certain pharmaceutical products to be displayed behind the counter and can only provided by the pharmacist

ABOUT THE AUTHOR

Verena Schielein is Managing Director of MEDICON BRL GmbH, a service provider in the areas of marketing, purchasing, controlling, accounting, and IT for pharmacies. Prior to holding this position, she set up the marketing and controlling department at MEDICON Apotheke oHG, which she headed for several years.

Netherlands

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.

By **Tom Pereboom,**
Amstelland Hospital

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

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.

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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.

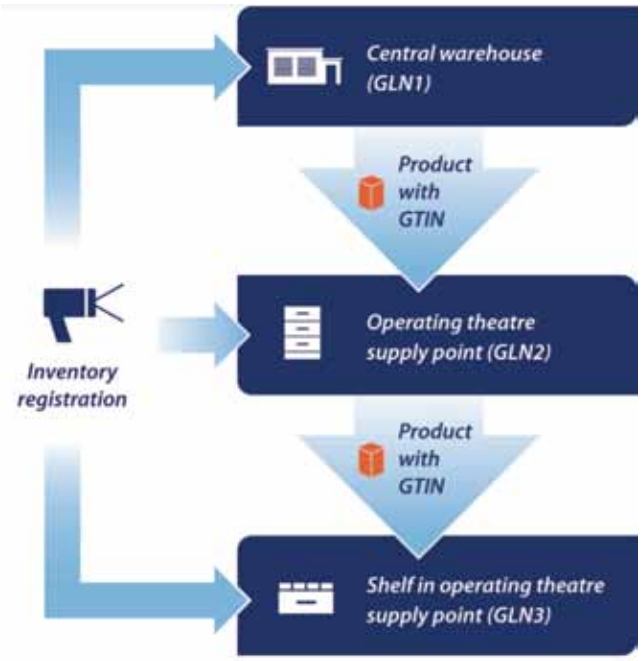


Figure 1. How products are recorded at various locations.

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

Tom Pereboom is the head of the Central Sterilisation Department and Operating Room Logistics at Amstelland Hospital in the Netherlands and has a financial background in healthcare organisations. Mr. Pereboom has chaired the GS1 Netherlands Traceability Focus Group for the last two years. Since 2007, he has worked with operating room departments as a financial advisor, which resulted in increasing his interest in the operating room supply 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.

Co-author: **Esther Peelen**, Project Manager Traceability and eCom, Healthcare, GS1 Netherlands

Taiwan

TFDA, CCH and GS1 Taiwan advancing GS1 BarCodes to improve patient safety

ABSTRACT

To prevent medication errors, the Taiwan Food and Drug Administration (TFDA) is developing a regulation that will require printing barcodes on prescription drugs, which will promote the use of automatic identification and data capture to improve patient safety. The Changhua Christian Hospital is deploying and piloting the use of such barcodes in its medication procedures. The TFDA encourages the use of standardised barcodes on pharmaceutical products and plans to mandate the use of GS1 Standards by pharmaceutical manufacturers and hospitals. Barcodes should include the lot number and expiry date, and should allow for the tracking and tracing of a medication prescription, as well as its dispensing and administration.

By **Liang-Chin Wang,** Taiwan Food and Drug Administration

and **Su-Yu Chien,** Changhua Christian Hospital

Medication safety in hospitals

Medication errors are the single most preventable incident that impacts patient safety in hospitals. The Institute of Medicine (IOM) Report 'To Err Is Human - Building a Safer Health System'[1] underlined the importance to reduce medication errors in the U.S. by presenting estimates of the incidence and cost of such errors, as well as evidence on the efficacy of various prevention strategies.

To better understand the situation in Taiwan, the Department of Health introduced the Taiwan Patient-safety Reporting (TPR) system in 2003. Reporting by hospitals is voluntary and anonymous. Last year, over 3,900 hospitals reported about 189,000 incidents in the system.

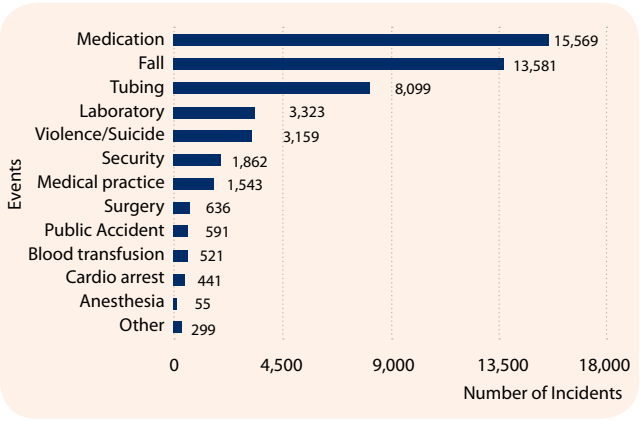


Figure 1. 2010 TPR system Report – Number of incidents by type of event[2]

The 2010 Annual Report of the TPR indicated that medication errors are the most common type of incidents that impact patient safety in hospitals.

Improve patient safety and increase efficiency

Unit dose barcodes provide additional safeguard during the dispensing and administration of medication to ensure the 'five rights' — right patient, right medication, right dose, right time, and right route of administration. Numerous hospitals worldwide have proven this is an effective way to prevent medication errors, both for the dispensing pharmacist and the nurse administering the drugs. The nurse scans the barcodes on the patient's wristband and the package of the drug to make sure the right patient gets the right medication.

Increased visibility on product availability also allows for improvement on inventory management, including easy retrieval of products in the pharmacy or another location on the hospital campus, and management of expired or recalled drugs.

In addition, increased supply chain visibility helps pharmaceutical suppliers efficiently manage inventory and distribution.

1 "To Err is Human: Building A Safer Health System" November 1, 1999, Institute of Medicine, http://www.iom.edu/Reports/1999/To-Err-is-Human-Building-A-Safer-Health-System.aspx
2 http://www.tpr.org.tw/english.htm

Introducing barcodes in the medication process

To improve patient safety, the TFDA seeks to reduce medication errors through the use of barcodes in the medication procedures. Today, only a few hospitals in Taiwan use such a barcode system. The limited availability of barcodes on the packages of prescription drugs and the lack of standardised barcodes are considered the greatest barriers to adopting a barcode system in the medication process.

To this end, the TFDA is planning to mandate the use of standardised barcodes on prescription drugs. The regulation will require pharmaceutical suppliers to put GS1 BarCodes on their packages, with the aim of enabling hospitals to efficiently implement a barcode system in their medication procedures. Furthermore, the TFDA commissioned the Changhua Christian Hospital and GS1 Taiwan to develop a programme to implement barcode systems in hospitals.

The inaugurating meeting of the Taiwan Healthcare Automation Association

In June 2011, a user group was set up by the Taiwan Society of Health-System Pharmacists (TSHP) and GS1 Taiwan. The user group –Taiwan Healthcare Automation Association– consists of representatives from major hospitals, including CCH, National Taiwan University Hospital, Taiwan Veterans General Hospital, and Chang-Gung Memorial Hospital, as well as other stakeholders. GS1 Healthcare Taiwan's objective is to advance the implementation of GS1 Standards to enable automatic identification systems in hospitals.

One of the most significant challenges when implementing barcode systems in hospitals is the necessity to invest in an infrastructure for an electronic medication administration system, and the cost of maintaining and upgrading the system. This issue may be addressed by government subsidies.

The challenge for pharmaceutical suppliers lies in solving technical issues, such as ensuring barcode printing quality on a blister pack and the difficulty that comes with printing a barcode on a unit dose package. The user group is looking into these issues, with GS1 Taiwan providing technical support throughout the implementation process. The user group is also looking into recommendations to increase health insurance payments to cover the additional cost of barcoding.

Prescription drugs

The primary and secondary package stages of prescription drugs are required to apply one of the GS1 Data Carriers to encode Global Trade Item Number (GTIN). Multi-packs and cases stages are required to have GTIN, expiry date, and lot / batch numbers or serial number with GS1-128.

Packaging hierarchy		GS1 Identification Key	Additional Data	Data Carrier
Primary package		GTIN - AI(01)	• Lot/Batch Number* - AI(10) • Expiry Date* - AI(17)	GS1 Data Carriers (Lot/ batch Number and Expiry Date are Optional)
Secondary package		GTIN -AI(01)	• Lot/Batch Number* - AI(10) • Expiry Date* - AI(17)	GS1 Data Carriers (Lot/ batch Number and Expiry Date are Optional)
Multi-packs		GTIN -AI(01)	• Lot/Batch Number - AI(10) • Expiry Date - AI(17)	GS1-128
Cases		GTIN - AI(01)	• Lot/Batch Number - AI(10) • Expiry Date - AI(17)	GS1-128

Figure 2: Taiwan Healthcare Automation Association recommendation to the TFDA for prescription drugs

* Instead of encoding the lot/batch number and expiry date into data carriers on the primary and secondary packages of prescription drugs, pharmaceutical manufacturers just need to print these two elements in a human-readable way on the packages.

Packaging hierarchy		GS1 Identification Key	Additional Data	Data Carrier
Primary package		GTIN - AI(01)	• Lot/Batch Number - AI(10) • Expiry Date - AI(17) • Serial Number* - AI(21)	GS1 Data Carriers
Secondary package		GTIN -AI(01)	• Lot/Batch Number - AI(10) • Expiry Date - AI(17)	GS1 Data Carriers
Multi-packs		GTIN -AI(01)	• Lot/Batch Number - AI(10) • Expiry Date - AI(17)	GS1-128
Cases		GTIN - AI(01)	• Lot/Batch Number - AI(10) • Expiry Date - AI(17)	GS1-128

Figure 3: Taiwan Healthcare Automation Association recommendation to the TFDA for controlled drugs, blood products and vaccines.

*: The data carriers on all levels of the package of controlled drugs, blood products and vaccines must include serial numbers.

Controlled drugs, blood products and vaccines

Controlled drugs, blood products and vaccines are required to utilise GS1-128 and other GS1 Data Carriers to encode the necessary product and production identification, including the GTIN, expiry date, and batch/lot numbers on every level of packaging. Furthermore, the data carriers on all levels of packaging of controlled drugs, blood products and vaccines must include serial numbers.

Conclusion

The TFDA's regulation on medication safety will require the implementation of GS1 BarCodes on prescription drug packaging. Most pharmaceutical suppliers, domestic and international, have already implemented GS1 Standards on certain packaging levels to manage their supply chain. This will help them to comply with the upcoming requirements.

Moreover, Taiwan Healthcare Automation Association's guidelines will guide stakeholders to follow global standards of medication barcoding at various packaging levels.

About the Taiwan Food and Drug Administration (TFDA)

The TFDA's mission is to ensure food and drug safety and to lead the nation into a new era of food and drug management. The TFDA was established by the Department of Health in 2010. It consolidated four governmental bodies, including the Bureau of Food Safety, the Bureau of Pharmaceutical Affairs, the Bureau of Food and Drug Analysis and the Bureau of Controlled Drugs. This organisational reform was needed to streamline the process from policy planning to execution, and to increase administration efficiency.

About the Changhua Christian Hospital (CCH)

CCH was established in 1896. It has grown under the selfless contributions of overseas missionaries and has continued growing to the present day. CCH consists of ten branch hospitals, totaling 3,232 beds and 6,358 employees.

ABOUT THE AUTHOR

Liang-Chin Wang works at the Taiwanese Department of Health as a TFDA Officer for over 20 years and has gained experiences in GS1 Standards and barcodes.

Su-Yu Chien is director of the pharmacy department at CCH. She is also a professor at the School of Pharmacy of the Kaohsiung Medical University. As investigator of the Joint Commission on Hospital Accreditation, Department of Health, Taiwan, she has been involved in many governmental projects. She is a member of the Quality of Pharmacy Service Promotion Committee, Department of Health, Taiwan and of the Drug Pricing Committee, Bureau of National Health Insurance, Taiwan.

Co-author: **Shawn Chen**, currently works for GS1 Taiwan as Project Manager of Professional Service Department.

USA

Achieving 'Perfect Order' and beyond

ABSTRACT

Trading partners use GS1 Standards in every transactional step – from manufacturing plant to patient bedside – contributing to patient safety and supply chain optimisation with fully automated order processes and transactions. BD and ROi launched their collaborative effort in early 2011 to implement GS1 Standards and achieve 'Perfect Order.'

By **Dennis Black,** BD

and **Alex Zimmerman,** ROi

Collaborative effort of BD and ROi

Through a collaborative effort launched in early 2011 and continuing through today, BD (Becton, Dickinson and Company), Mercy and its supply chain company, ROi, implemented GS1 Standards at each step from manufacturing to patient bedside, realising significant benefits, including those associated with patient safety and an optimised supply chain. This end-to-end global data standard integration represents the first known instance in the United States that a healthcare provider and manufacturer used the Global Location Number (GLN) and Global Trade Item Number (GTIN) in both supply chain and clinical processes, achieving fully-automated, accurate electronic processing of order transactions, also known as 'Perfect Order.'

The organisations implemented their project in two phases:

Phase 1: Establish the technology infrastructure and processes to enable true system-to-system transactional processing, eliminating 100% of all human interaction throughout the entire procurement and replenishment process across the entire spectrum, from the manufacturing plant to the patient, to achieve 'Perfect Order' and beyond.

Phase 2: Implement GS1 Standards to make the process even more efficient and sustainable. The use of GS1 Standards allows for easier scalability of future 'Perfect Order' initiatives and for improved recognition of product usage at the patient level through the use of package barcodes and supported scanning technology.

The implementation of GS1 Standards was integrated into an overall 'Perfect Order' engagement that leveraged both organisations' supply chain capabilities. The achievement of 'Perfect Order' and effective use of GS1 Standards are part of a comprehensive supply chain strategy.

State of the healthcare industry

The U.S. healthcare supply chain is functioning in a sub-optimal state. Healthcare providers, distributors and manufacturers struggle with a large error rate related to the procurement process of medical devices. Inefficiencies or errors in the procurement process extend all the way to the patient, manifesting in ordering errors, not having enough product on hand to treat the patient, clinicians receiving the incorrect product, expired inventory and other scenarios.

Perfect Order

A standard prevalent in many industries including retail, **Perfect Order** is defined by Strategic Marketplace Initiative (SMI) as "a purchase order processed electronically (from order to payment) without human intervention, delivered to the correct location, on time, undamaged, at the right price, with the desired quantity, on the first attempt." This process ensures effective use of available resources by eliminating errors and maximising the use of technology.

www.smisupplychain.com

The industry has been challenged by disparate proprietary data for medical devices and location information. Data translations and manual processes cause a multitude of errors and create an insidious obstacle to achieving the desired future state of efficiency or implementing specific clinical systems and programs. The lack of common supply chain performance metrics creates further obstacles. Common shared metrics provide benchmarks which illuminate both good and bad supply chain performance. Something as basic as the true cost per transaction is largely a mystery to many manufacturers and healthcare providers.

"GS1 data standards enable healthcare trading partners to speak the same language when it comes to product or location information, saving valuable time and resources, as well as reducing costs and enhancing patient safety."

'Perfect Order' metrics

BD and ROi began their initiative by reviewing past transactions between the two organisations. By using an objective set of 'Perfect Order' metrics to calculate transactional errors retrospectively, and then conducting extensive root cause analyses, the organisations gained insight into how to reduce errors going forward. After extensive collaboration and a significant number of process changes, the two organisations are now achieving many of the desired 'Perfect Order' outcomes, including:

- **30% reduction in days payable outstanding**
- **73% reduction in discrepancies, including a complete elimination of vendor part number and unit of measure (UOM) discrepancies by supplanting part number and UOMs with GTINs on purchase orders**
- improved sourcing of products by use of a single scan of a barcode to determine the right product and product UOM to reorder
- less calls to customer service
- fewer stock outs due to the inherent simplicity offered to nursing staff for scanning barcodes at the bedside
- better charge compliance resulting from scanning as a surrogate to traditional practices.

End-to-end integration: GS1 Standards go where the product goes

The GTIN unambiguously identifies products and is helpful in communicating product data throughout the supply chain and through to the clinical setting and beyond; while the GLN is used as a consistent standard to identify delivery locations and to replace custom account numbers.

GTIN

BD and ROi are transacting by using the GTIN as the primary product identifier on purchase orders, invoices and other electronic data interchange (EDI) transactions. The organisations are also able to follow the actual product through the supply chain by scanning the package barcode containing the GTIN that BD prints on product labels through ROi's distribution management system at the point of receipt. The native package barcode that BD prints containing the GTIN is again scanned during product consumption, and then interfaced to the electronic health record (EHR) for documentation and patient billing purposes. The GTIN is being successfully transmitted through all the steps of the supply chain as well as through to the clinical care setting.

GTIN/GLN usage in BD's supply chain

BD enumerates products with catalog numbers and GTINs, and captures the codes in applicable systems before the company releases the products to market. GTINs are created for each packaging level (i.e., Each, Shelf Pack, Case, etc.). Catalogue numbers are directly associated with the GTINs in a configuration that allows healthcare providers and distributors to interpret packaging hierarchies.

BD creates and manages many forms of product data that are ultimately associated with GTINs and catalogue numbers, including unit of measure, shelf life, dimensions, allergens, etc. BD defines and records data requirements early in the product life cycle, and updates and maintains relevant product data the entire time a product is marketed.

As part of the 'Perfect Order' effort, BD shared an initial set of product data with ROi via the GS1 Global Data Synchronisation Network (GDSN).

BD has enumerated its medical devices sold in the U.S. with GTINs and prints the GTIN in a GS1-128 barcode at the shippable packaging level. BD scans the GTINs at multiple points in its internal supply chain, and stores the information in BD systems.

"True collaboration and use of an agreed upon set of common Perfect Order metrics provide the healthcare industry a real opportunity to improve operational effectiveness and eliminate costs from the supply chain."

Steve Gundersen
Vice President, Corporate National Accounts, BD

BD uses additional GS1 Standards, such as the Serial Shipping Container Code (SSCC), to identify a single shipping unit, and is beginning to use the Global Shipment Identification Number (GSIN), to identify groupings of shipping units to track shipments from BD Distribution Centers to customers. This shipment data is stored in BD's enterprise resource planning (ERP) system and made available on shipping documentation.

BD Distribution Centers use the SSCC, GTINs and production data when receiving products from manufacturing plants to verify receipt and track inventory. Having this information at the moment it is needed speeds up supply chain processes and helps ensure overall process accuracy. GTINs, specific quantity data and production data are captured and associated with a pallet license plate barcode, a type of SSCC. That information is stored in internal systems and is used for each material movement through the use of the scanning system. The data can be shared with distributors and healthcare providers in EDI transactions, such as order acknowledgements (855), automated shipping notices (856) and invoices (810).

GTIN/GLN usage in Mercy's and ROi's supply chain

Through its the collaboration with BD, ROi is now implementing GTINs as the global standard product identifier for BD products rather than creating custom labels. The GTINs are entered into Mercy's item master, and are being used to track and order products. Because the GTIN is pre-loaded into the provider's item master, the process of validating receipt of product delivery is made much simpler and orders in general are more accurate.

ROi now consistently uses GTINs when ordering, picking and shipping BD products. In addition, both organisations use production data assessed via the manufacturer assigned barcodes to rotate inventory and for quality control processes. Finally, ROi's Distribution Center and Mercy facilities have active GLNs, obtained through the GLN Registry for Healthcare®. ROi is working with vendor partners to share its GLN information to replace custom account numbers.

GTINs stored in Mercy's systems are the primary reference numbers for transacting, and serve as a common identifier, enabling the tracing of supplies from the point of replenishment to the point of use. Upon shipment, ROi sends an Advance Ship Notice (ASN) to the Mercy department receiving the shipment.

"In addition to improving the efficiency of the healthcare supply chain, data standards play a significant role in ensuring patient safety through improved product recall management. With data standards in place, hospitals can rely upon the uniqueness of the packaged barcode and use it to drive critical processes."

Gene Kirtser,
President/CEO, ROi

GTINs are used to order and track medical devices for use in labs, pharmacies, storage locations and in patient care areas. GTINs can also be scanned to help search for products in Mercy's materials management information system. A Receiving and Delivery software programme is used to scan-out products to various departments throughout the facility.

Caregivers scan patient wrist bands to identify the patient and the location where care is taking place. Caregivers also scan GTINs on consumed products, capturing critical information to drive:

- product consumption
- real-time usage
- real-time inventory control
- patient charging

As surgeries are performed, products used during the procedure are tracked and documented in the patient's EHR. GTIN data can then be tracked from end-to-end, all the way from the point of order to the near exact time the product was applied to a specific patient. Transactions entered in the patient EHR flow through to patient billing. In time, recall notifications for specific GTINs could trigger automatic reports alerting administrators of affected patients.

GLN

Healthcare providers need to manage and store a multitude of customer numbers assigned by their suppliers. For example, ROi has 124,000 manufacturer assigned numbers for Mercy facilities stored in its systems today. Thirty GLNs can cover the majority of ROi transactional locations. Throughout the BD/Mercy/ROi collaboration, GLNs were utilised to unambiguously identify locations and further reduce transactional errors. ROi and BD continue to transact with the GLN today, and are each working with other partners to implement GLN going forward.

BD is migrating to use GLNs from a system that is currently based on proprietary customer numbers. Since each distributor and GPO maintains unique proprietary numbering systems for each location, manufacturers must utilise resources to continually manage the different numbers representing the same customer locations. Because proprietary enterprise resource planning (ERP)-generated customer numbers are necessary in the current environment, GLNs must be correlated to these ERP numbers. BD is only using GLNs that have been validated by the location owner and are maintained in the GS1 US GLN Registry for Healthcare. BD has assigned itself GLNs to define the company as a global entity, a U.S. organisation and specific transactional locations for EDI usage.

Because ROi already distributes to Mercy locations and has an enumeration process in place, GLN numbering was a fairly simple process and mirrored recommendations from industry best practices. ROi decided to use one primary Ship-to GLN per location. Data reconciliation began with BD reviewing Mercy's GLN locations. The primary focus was on the ROi Distribution Center and 23 Mercy hospitals.

GTINs and GLNs in EDI transactions

ROi and BD implemented both GLNs and GTINs into EDI transactions. For this initiative, the EDI transaction between BD and ROi was the last step in the implementation, occurring after all the steps involved with GLN enumeration and GTIN reconciliation and synchronisation.

Conclusion

GLNs and GTINs can be implemented now to help improve the healthcare supply chain. Clearly identify and agree to goals in advance. To prevent "scope creep" and distractions, identify and prioritise project phases. Trading partners need to ensure that technology providers can support the agreed upon goals and established work plan.

BD and Mercy/ROi were able to use and leverage GS1 Standards throughout the supply chain and beyond, realising many benefits, including:

- achievement of 'Perfect Order'
- more accurate purchase orders, invoicing and payment processes
- clean data on delivery locations and account information
- real-time product usage and consumption
- better product and lot number tracking
- improved infrastructure and data accuracy for future patient care initiatives and the recall process
- stronger business relationships with critical healthcare partners.

About BD

BD is a leading global medical technology company that develops, manufactures and sells medical devices, instrument systems and reagents. The Company is dedicated to improving people's health throughout the world. BD is focused on improving drug delivery, enhancing the quality and speed of diagnosing infectious diseases and cancers, and advancing research, discovery and production of new drugs and vaccines. BD's capabilities are instrumental in combating many of the world's most pressing diseases. Founded in 1897 and headquartered in Franklin Lakes, New Jersey, BD employs approximately 29,000 associates in more than 50 countries throughout the world. The Company serves healthcare institutions, life science researchers, clinical laboratories, the pharmaceutical industry and the general public. For more information, please visit www.bd.com.

About ROi

ROi (Resource Optimization & Innovation) is a recognised leader in the healthcare supply chain management industry. Founded by Mercy in 2002, ROi provides a single source, fully integrated supply chain solution, including group contracting, clinical and operational consulting, pharmaceutical repackaging, custom procedure tray manufacturing, print operations, purchasing and master item file management, and distribution and transportation management. For more information,
visit www.roiscs.com

About Mercy

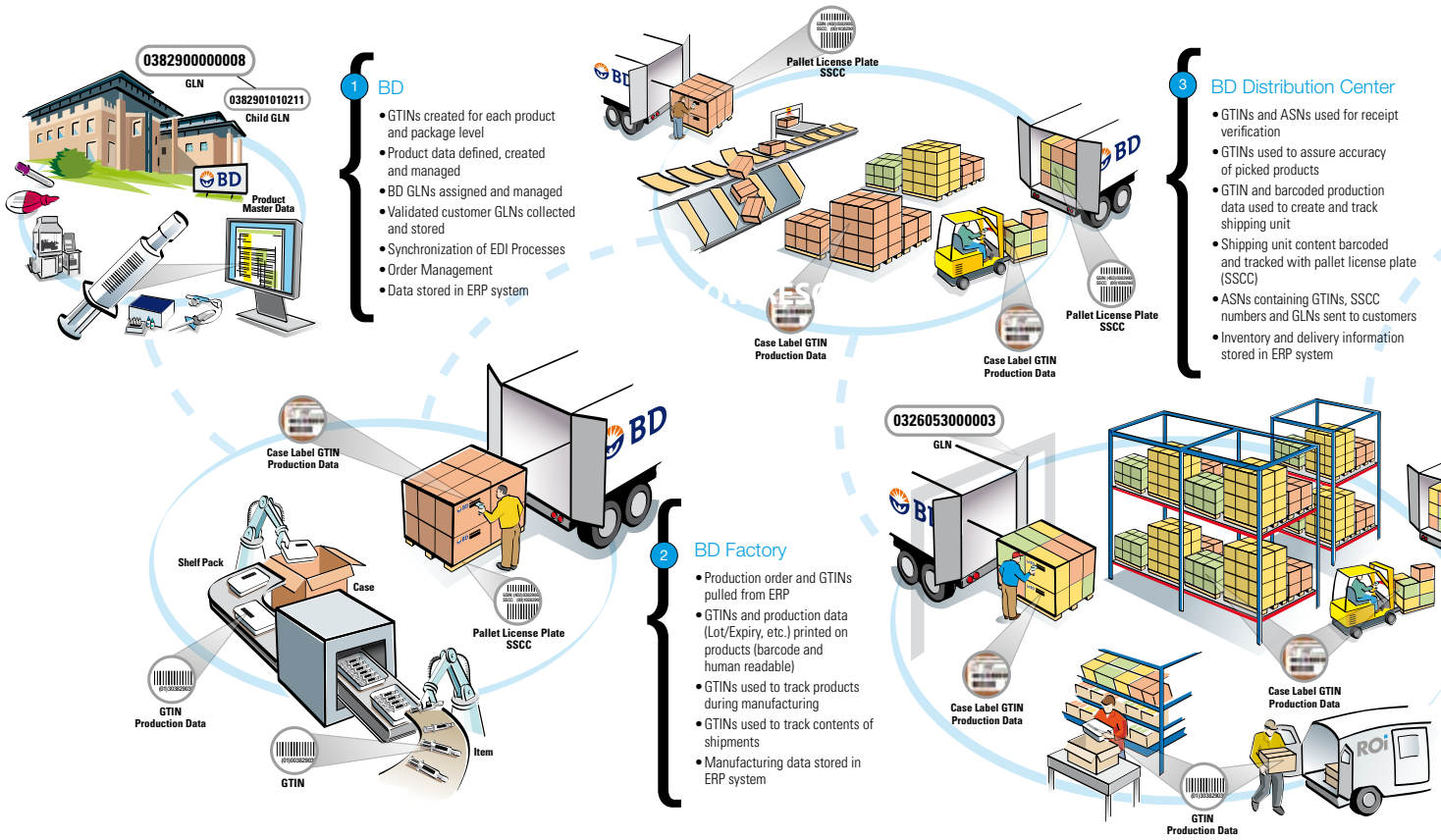
Mercy is the eighth largest Catholic healthcare system in the U.S. and serves more than 3 million people annually. Mercy includes 30 hospitals, more than 200 outpatient facilities, 38,000 co-workers and 1,500 integrated physicians in Arkansas, Kansas, Missouri and Oklahoma. For more about Mercy, visit www.mercy.net

For more information about this case study, refer to "Perfect Order and Beyond: BD and Mercy/ROi Achieve Far-Reaching GS1 Standards Integration" at www.gs1us.org/BDMercyStudy or contact Siobhan O'Bara at sobara@gs1us.org.

Perfect Order and Beyond

BD and Mercy/ROi Achieve Far-Reaching GS1 Standards Integration

End-to-End Integration: GS1 Global Standards Go Where the Product



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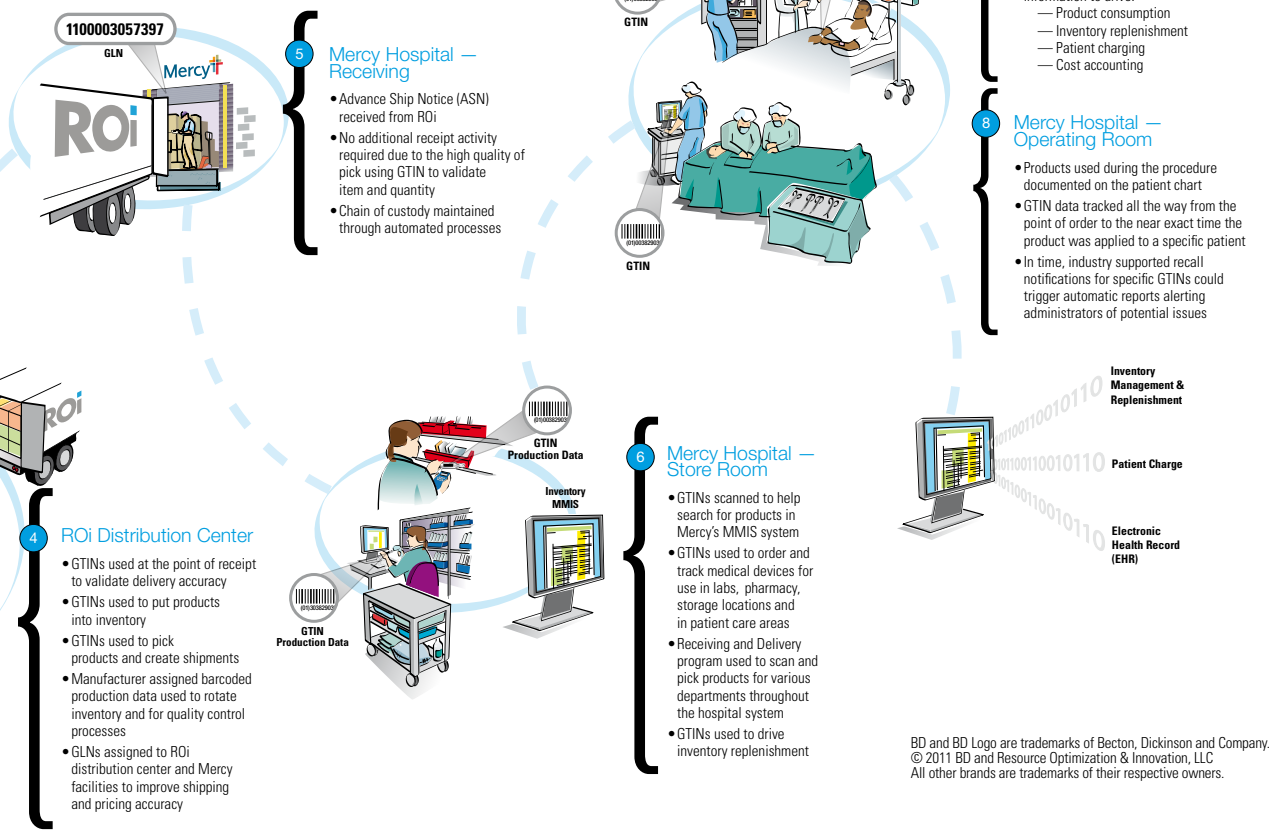

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GS1 Standards in the
Healthcare Industry

Each Level GTIN in a GS1-128 barcode

Shelf Pack Level GTIN and Production Data in GS1-128 barcodes

Case Level GTIN and Production Data in GS1-128 barcodes

Pallet License Plate — Serial Shipping Container Code (SSCC)

The illustrations above are provided as examples and are not exact replicas of actual labels.

ABOUT THE AUTHORS

Dennis Black is Director, e-Business at BD. With more than 20 years of healthcare industry experience, Dennis has responsibilities related to achieving "Perfect Order," leading operational effectiveness initiatives, and other e-Business processes. Dennis is on the GS1 Healthcare US Leadership Team and the GS1 Healthcare Global Leadership Team. He participates in work groups within SMI, AdvaMed and MDSCC and other organisations that are focused on improving the healthcare supply chain. Dennis is involved in a number of pilot and implementation activities to enable BD and healthcare providers to achieve operational efficiencies.

Alex Zimmerman is the Directior of Information Management at ROi, the supply chain division of Mercy. He has more than 11 years experience in the health care supply chain industry, covering a broad range of leadership, planning, systems integration and program management roles. Alex joined ROi in 2002, at the inception of the company. During his career, he has engaged primarily in health care e-commerce initiatives, clinical information technology, information management and standards development. His direction of e-commerce initiatives helped ROi/Mercy win the 2006 GHX Supply Chain Provider of the Year award and the 2007 Innovator of the Year award. Alex is helping lead an organisation-wide effort on GS1 standardisation.

USA

Siemens Healthcare Diagnostics: A holistic approach to global data standards

ABSTRACT

Like all companies with global operations, Siemens Healthcare Diagnostics, one of the world's largest suppliers to the healthcare industry, manages data for thousands of products across multiple countries. To improve patient safety, streamline the healthcare supply chain and support compliance with industry and regulatory requirements, the company needed to standardise its product identification through the use of GS1 Global Trade Item Numbers (GTINs) and share product data with worldwide trading partners using the GS1 Global Data Synchronisation Network® (GDSN®).

Instead of simply implementing standards to meet a specific regulatory or market requirement, Siemens took a holistic approach by examining how global data standards enablement could improve its internal business processes, as well as its interactions with global trading partners and customers.

By **Dr. Dietmar Hein,**
Siemens Healthcare Diagnostics

The need for standardised product identification

As an organisation that was formed through the acquisition and integration of three separate companies, Siemens inherited a disparate product identification system.

It was using proprietary material numbers to identify products internally, but external transactions required multiple numbering systems. Even when products were assigned GTINs, there was no uniformity across product lines since legacy companies had used different versions of the GTIN, with various prefixes and lengths.

"The goal was to leverage global data standards to establish a single point of truth for its products."

In 2009, as dialog around the use of GS1 Standards was heating up within the U.S. healthcare industry, Siemens' e-commerce team began exploring how it could enumerate with GTINs to comply with the December 31, 2012 sunrise date—the date by which a number of U.S. group purchasing organisations (GPOs) and major healthcare providers have designated that trading partners begin using GTINs in supply chain transactions.

Rather than simply assigning GTINs to products that were not previously identified, the team decided to take a holistic approach to global data standards adoption to determine how the use of GTINs could improve business processes for both the company and its customers. It is part of Siemens Healthcare Diagnostics' customer excellence strategy to not only improve patient safety, but also help drive down costs by streamlining supply chain processes and reducing errors.

A single point of truth

"Standardising product identification with GTINs touches every part of our company, so we had to carefully evaluate the impact it would have and the work that needed to be done to make it happen," said David Leedam, senior manager of e-Commerce for Siemens Healthcare Diagnostics. The e-commerce group took an "investigative approach" to initiate its global data standards adoption project. This enabled the team to determine exactly what was needed and

gain buy-in from management. The goal was to leverage global data standards to establish a single point of truth for its products, which would involve not only enumerating its products with GTINs, but also finding ways to share them with trading partners and use them in supply chain transactions.

GTIN allocation

The first step was for the team to determine which version of the GTIN it would use for product enumeration. The healthcare industry was trending toward the use of the 14-digit GTIN.

"Getting started can be difficult because there are so many standards for the same thing. A supplier must decide on which flavor of GTIN to use and then communicate that decision to its customers," said Leedam. "As a global manufacturer with tens of thousands of products, the 14-digit GTIN provided us with the flexibility to keep adding new GTINs to enumerate new products, but still retain the same root prefixes."

The next step for the team was to assess its current state for GTIN enumeration by reviewing the GTINs contained within the company's enterprise resource planning (ERP) system. This assessment would enable it to "clean up" product identification and address duplicates, including:

- Identifying products with the same GTIN
- Locating products with duplicate GTINs assigned to them
- Re-enumerating products to standardise on the 14-digit GTIN
- Assigning GTINs to products that had not yet been enumerated

Another challenge facing the team was amalgamating the processes for the allocation of GTINs inherited from its legacy companies.

"It is critical that a supplier define its GTIN allocation strategy upfront," said Leedam. "If you don't have a clear, global process for allocating GTINs, you can easily fall into the trap of allocating the same GTIN to multiple products or assigning more than one GTIN to the same product."

Eventually, Siemens plans to centralise the allocation of GTINs in its SAP® enterprise resource planning (ERP) system, which will automatically assign GTINs to saleable material when they are first entered into the ERP system—eliminating the risk of human error and preventing duplicate allocations.

To date, Siemens has enumerated a significant proportion of its products worldwide with GTINs and plans to be fully enumerated well ahead of the December 2012 sunrise

date. The company is currently using GTINs in e-commerce transactions with customers in Spain to comply with regional health authority regulations.

GTIN synchronisation

By 2010, Siemens was ready to begin sharing its standardised product data with customers and trading partners. To do so, it joined GS1's Global Data Synchronisation Network (GDSN), which enables trading partners to synchronise standardised organisation and product data so that all parties are transacting with up-to-date and accurate information. By sharing product data through the GDSN, Siemens provides its customers with a single source that they can use from the very beginning of the order-to-cash process.

In a parallel, company-wide master data management initiative, Siemens also cleansed its worldwide product data—including product GTINs—and stored it in a centralised ERP system that feeds peripheral ERP systems for its sales operations in the United States and Europe. This ensured that all systems were functioning with cleansed data and provided a single source from which to draw its product information for the GDSN.

Siemens chose the GHX Health ConneXion℠ data pool as its point of entry into the GDSN and worked closely with the GHX team to meet all attribute requirements for both GDSN and various government authorities. GHX provided the Siemens e-commerce team with a spreadsheet containing fields for the required product information, which enabled the team to draw the data to populate these fields directly from the ERP system. The data-cleansing effort on the front end of the project paid off as the initial upload to the data pool was relatively straightforward.

"The attributes can be a major stumbling block for manufacturers because there is so much data to collect," said Leedam. "Initially, we were going to load GTINs for only a few products, but after consulting with GHX, we extracted information for every product that had a GTIN. Within a very short time, the data was in hand and being prepared by GHX for upload."

As of May 2011, Siemens had published GDSN product data for its entire U.S. product line via the GHX Health ConneXion data pool. Siemens is also working with GHX to publish GTINs for additional product lines in Australia and Europe and is designing a process whereby its updates will be automatically loaded to the GDSN.

GLN Registry

Siemens has also been addressing issues related to organisation and location identification through the use of GS1 Global Location Numbers (GLNs). The company has enumerated itself with GLNs and is in the process of registering them in the GS1 GLN Registry for Healthcare® to prepare for GLN transactions with trading partners in the U.S. In addition, Siemens is using customer GLNs in its group purchasing organisation (GPO) administrative fee reporting to support compliance with the sunrise date.

"Initially, some GPOs had enumerated their customers so that when hospitals belonged to more than one GPO, they may have multiple GLNs for the same location. This, however, is improving thanks to the work that hospitals are doing with their GPOs to address the issue," said Leedam. "Moving forward, the company's goal is to have a seamless process whereby a single GLN can be used by all parties to identify an organisation or location throughout the entire purchase-to-payment and administrative fee processes, which will be a huge benefit in terms of accuracy and efficiency."

In regards to the use of GLNs in electronic transactions with customers, Siemens Healthcare Diagnostics and GHX collaborated on providing a bridging solution that has enabled the company to accept electronic orders from customers using GLNs through the exchange.

Global data standards at Siemens Healthcare Diagnostics today

While adopting global data standards at Siemens started as a low-visibility operation, the project has gained importance and recognition over the last eighteen months thanks to the e-commerce team and the increased media coverage on the topic.

By defining the business purpose of global data standards and using GTINs and GLNs to address specific organisational needs, Siemens is confident that supply chain processes will improve for all parties with which it transacts. In addition, the company's GTIN enumeration and data synchronisation through the GHX Health ConneXion data pool supports participation in the Global Harmonization Task Force (GHTF) and U.S. Food and Drug Administration's emerging Unique Device Identifier initiative, a proposed identification system for medical devices.

Conclusion

Siemens has demonstrated—both in the healthcare sector and other businesses—the benefits that come from managing product data in a professional and standardised manner. It requires more time, resources and planning, but the company is convinced that taking a holistic view of global data standards adoption will pay off in the end.

"Siemens has demonstrated—both in the healthcare sector and other businesses—the benefits that come from managing product data in a professional and standardised manner."

Furthermore, as healthcare trading partners look for ways to increase efficiency and reduce costs, global data standards will play an increasing role in e-commerce moving forward. In five years time, customers who pick up the phone to place an order will be in the minority in healthcare. The move toward e-commerce is accelerating rapidly and the pressure for trading partners to adopt e-commerce practices will force the standardisation issue. Global data standards will become the language of choice for e-commerce – making it easier to work with trading partners in a more efficient and accurate manner, benefitting the whole healthcare industry by driving down costs and improving patient care.

ABOUT THE AUTHOR

Dr. Dietmar Hein is Head e-Commerce, Siemens Healthcare Diagnostics. Dr. Hein leads the process optimisation and technical integration of all global Siemens Healthcare Diagnostics e-commerce operations from three predecessor companies. Under his leadership, Siemens Healthcare Diagnostics has achieved an e-commerce penetration of more than 50 percent of the applicable volume. Driven by his long-term commitment to customer satisfaction, Dr. Hein is automating processes of the cost-per-result business as well as the entire Customer Purchase to Pay process cycle. His responsibilities also include design, development and implementation of innovative approaches to customer supply chain management, an area of growing importance for Siemens. Dr. Hein earned his degree in Biology from the University of Münster, Germany, and holds a Ph.D. in Chemistry from the University of Paderborn, Germany. Dr. Hein serves on the Board of Directors for Global Healthcare Exchange.

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